

National Longitudinal Study of Adolescent Health

Wave IV Cause of Death Codebook



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Wave IV: Cause of Death Codebook			
Number of observations: 227			
Respondent identifier			AID
			char 8
227		range 10000000 to 99999999	
Underlying cause of death from 2007 NDI			NDICOD07
			num 1
66	1	accidents	
22	2	intentional self-harm	
19	3	assault	
72	4	all other causes	
17	8	cause not available, confirmed deceased	
31	9	not matched	
Total days between Wave I interview and 2007 NDI reported date of death			NDIDAY07
			num 4
196		range 7 to 4,499	
31	9999	not matched	

Wave IV Cause of Death Documentation

INTRODUCTION

To determine the cause of death for Add Health respondents reported as deceased at Wave III (n=96) and Wave IV (n=126), the National Death Index (NDI), 2007, produced by the National Center for Health Statistics (NCHS), was referenced. The NDI uses the World Health Organization's (WHO) International Classification of Disease (ICD) codes to identify initiating or underlying causes of death. Prior to 1999, the Ninth Revision of ICD (ICD-9) was employed; in 1999, revised ICD-10 codes were adopted. The WHO defines underlying causes of death as:

- (a) the disease or injury which initiated the train of events leading directly to death, or
- (b) the circumstances of the accident or violence which produced the fatal injury.¹

Although the NDI provides multiple causes of death, referred to as "entity axis codes," Add Health's Cause of Death data only report the underlying cause. For example, a respondent with heart disease who dies from injuries sustained in an automobile accident will have "External causes of morbidity and mortality" as the underlying cause of death and "Diseases of the circulatory system" as an entity axis code.

CAUSE OF DEATH MEASUREMENT

To mitigate disclosure risks, only the most common causes of death, as reported in both the Add Health sample and the National Vital Statistics Report (NVSr), 2008, appear in this data file. Table 1 lists the most common causes of death for adults age 25 to 34 in 2008, according to the NVSR.

Table 1: NVSR ten leading causes of death among 25 to 34 year olds, regardless of race and sex in the United States, 2008. (reporting ICD-10)²

NSVR Cause of Death Categories	ICD-10	Rank
Accidents	V01-X59,Y85-Y86	1
Intentional self-harm	U03,X60-X84,Y87.0	2
Assault	U01-U02,X85-Y09,Y87.1	3
Malignant neoplasms	C00-C97	4
Diseases of heart	I00-I09,I11,I13,I20-I51	5
Human immunodeficiency virus disease	B20-B24	6
Diabetes mellitus	E10-E14	7
Cerebrovascular diseases	I60-I69	8
Chronic liver disease and cirrhosis	K70,K73-K74	9
Congenital malformations, deformations and chromosomal abnormalities	Q00-Q99	10

Using the NVSR specified ICD-10 codes³ and an NVSR ICD crosswalk⁴ to identify comparable ICD-9 codes, which denote the cause of death for respondents deceased prior to 1999, the cause of death frequency rankings among deceased Add Health respondents correspond to those expected based on the NVSR table for comparable age groups. To reflect the NVSR categories listed above, the specific ICD codes appearing in the NDI data were collapsed into more general categories. Additional collapsing occurred when cause of death frequencies in the Add Health sample failed to exceed a threshold to adequately ensure respondent anonymity. As a consequence, for Add Health respondents the following four categories represent the original ICD codes denoting cause of death.

Underlying Cause of Death for Add Health respondents. (ICD-9 / ICD-10) ⁵
1. Accidents (E800-E949/V01-X59, Y85-Y86)
2. Intentional self-harm (E950-E959/U03, X60-X84, Y87.0)
3. Assault (E960-E969/U01-U02, X85-Y09, Y87.1)
4. All other causes ⁶

The Add Health Cause of Death data report neither ICD-9 nor ICD-10 codes; rather, ICD values are substituted with codes ranging from 1 to 4 as shown in the above table. Two additional special codes, 8 and a sequence of 9s, designate sources of missing causes.

SPECIAL CODES

Due to irregularities in death certificate policy at the state-level and NDI assembly cutoff dates, some records in the NDI lack underlying cause of death codes. In such cases, the ICD code provided equals "N/A" for "not available".⁷ In the Add Health Cause of Death data, a cause of death value of 8 denotes the NDI confirmed that a respondent was deceased, but a code was not available due to administrative procedures.

Other Add Health respondents lack cause of death specification because they failed to satisfactorily match any NDI records. For details on matching procedures consult the following sections of this users guide: NDI Record Matches and Rejected Records and Match Verification. Respondents reported deceased in Add Health Waves III or IV who did not have discernible corresponding records in the NDI are identified with the special cause of death code of 9 or 9999, for “not matched.”

NDI RECORD MATCHES AND REJECTED RECORDS

The Add Health project submitted identifying information on respondents suspected of being deceased at Wave III or Wave IV to the NCHS in order to locate matching records in its NDI database.

Wave III

Out of the 96 Add Health respondents reported as deceased at Wave III, 95 underwent NDI matching. One respondent was not eligible for matching due to required data being missing. Table 2 provides NDI match counts.

Table 2: Summary of NDI Respondent Match Processing, Wave III

Match Processing	Count
User request records submitted	95
User records involved in matches	82
Non-matching user records	13
Rejected user records	0

Among the records that involved matches (82), 34 matched to multiple NDI records.

Wave IV

Although only 126 respondents were reported as deceased at Wave IV, a total of 1,601 records were considered for NDI matching based on disposition codes indicating that the respondent was not interviewed by the conclusion of Wave IV. The final dispositions selected for NDI matching at Wave IV included:

Access denied
Deceased
Final refusal by other
Language barrier
Unlocatable
Other non-interview

Of the 1,601 respondents with these dispositions, 11 were ineligible due to required data being missing. Six of the remaining 1,590 were rejected by NDI for failing to satisfy the criteria required by the NDI matching program. The match processing results for the Wave IV respondents appear in Table 3.

Table 3: Summary of NDI Respondent Match Processing, Wave IV

Match Processing	Count
User request records submitted	1,590
User records involved in matches	797
Non-matching user records	787
Rejected user records	6

As with Wave III, out of the 797 records that involved matches, 468 matched to multiple NDI records.

Match Verification

Match success was evaluated using a combination of measures provided by NDI and developed by Add Health. NDI's matching process depended on the extent of agreement between the following measures in Add Health respondent and NDI records: Social Security Number, first name, middle initial, last name, sex, race, marital status, state of birth, and birth day, birth month, and birth year. Add Health utilized NDI-supplied variables that estimated agreement between these measures to verify match outcomes. Additionally, Eric A. Whitsel of the Add Health team, provided a scoring algorithm used by the

Atherosclerosis Risk in Communities (ARIC)⁸ study since November 3, 2005 that assigned an overall match value based on points accumulated from agreement on: first name or first initial (0 or 1 point), middle initial (0 or 1), last name (0 or 2), sex (0 or 1), state of residence (0 or 1), Social security number (0 through 9), and birth day (0 or 2), birth month (0 or 2), and birth year (0 or 2). This score permitted construction of a match confidence code consisting of three possible outcomes.

Value	Point Total	Match Evaluation
0	0 to 11	non-match
1	20 to 21	confirmed
2	12 to 19	further review

Note that Add Health employed RTI International to apply this algorithm, because security protocols prohibit access to respondent identifiers by the Add Health team.

The Add Health respondent's disposition also informed match confidence. Match confirmation required that the Add Health respondent be recorded as deceased or not confirmed alive at Wave III or Wave IV.

Of the 95 Wave III respondent records sent to NDI, Add Health verified that 81 respondents reported deceased at Wave III matched returned NDI records with adequate confidence. Although 1,590 Wave IV Add Health respondent cases were sent to NDI and 797 of these matched recorded decedents according to the NDI, only 126 records received a disposition of 'deceased' at the end of Wave IV. Of the 797 matches returned, Add Health verified that 115 Add Health respondents matched NDI records with sufficient confidence. Five of the 115 verified decedents had not been reported as deceased at Wave IV; their Wave IV dispositions have been corrected, increasing the total deceased at Wave IV from 126 to 131.

With Wave III and Wave IV combined, the Add Health Cause of Death file contains 227 respondents, Wave III deceased (96) and Wave IV deceased (131). Of these, 196 were confirmed deceased by the NDI, and 179 have a valid non-missing cause of death code. Respondent status in the Add Health Cause of Death file may change as additional information becomes available.

CAUSE OF DEATH DATA FILE STRUCTURE

Add Health Cause of Death data consist of 3 variables: a respondent identifier, the previously described cause of death code, and the span of days that passed between the respondent's Wave I interview and their NDI reported date of death. To further protect respondent anonymity, a standard value of 15 replaced the actual day of death in the calculation of the days alive after the Wave I interview.

AID	Respondent identifier
NDICOD07	Underlying cause of death from 2007 NDI
NDIDAY07	Total days between Wave I interview and 2007 NDI reported date of death

REFERENCES

1. World Health Organization. Manual of the International Statistical Classification of Diseases, Injuries, and Causes of Death, based on the recommendations of the Ninth Revision Conference, 1975. Geneva: World Health Organization, 1977.
2. Heron M. Deaths: Leading causes for 2008. National vital statistics reports; vol 60 no 6. Hyattsville, MD: National Center for Health Statistics. 2012.
3. Heron M. Deaths: Leading causes for 2008. National vital statistics reports; vol 60 no 6. Hyattsville, MD: National Center for Health Statistics. 2012.
4. Anderson RN, Miniño AM, Hoyert DL, Rosenberg HM. Comparability of cause of death between ICD-9 and ICD-10: Preliminary estimates. National vital statistics reports; vol 49 no. 2. Hyattsville, Maryland: National Center for Health Statistics. 2001.
5. See the APPENDIX for ICD-9 and ICD-10 code detail.
6. The most common causes of death within the other category are: Malignant neoplasms and Diseases of heart.
7. Among others, Human immunodeficiency virus (HIV) disease, Diabetes mellitus, and Chronic liver disease and cirrhosis are present in the data but occur infrequently.
8. National Center for Health Statistics. National Death Index user's guide. Hyattsville, MD. 2013.
9. Atherosclerosis Risk in Communities (ARIC) <http://www2.csc.unc.edu/aric/>.

APPENDIX

Code Category (ICD-9 /ICD-10)

1. Accidents (E800-E949/V01-X59, Y85-Y86)
 - Railway accidents (E800 E807)
 - Motor vehicle traffic accidents (E810 E819)
 - Motor vehicle non-traffic accidents (E820 E825)
 - Other road vehicle accidents (E826 E829)
 - Water transport accidents (E830 E838)
 - Air and space transport accidents (E840 E845)
 - Vehicle accidents not elsewhere classifiable (E846 E848)
 - Accidental poisoning by drugs, medicaments and biologicals (E850 E858)
 - Accidental poisoning by other solid and liquid substances, gases, and vapors (E860 E869)
 - Misadventures to patients during surgical and medical care (E870 E876)

Surgical and medical procedures as the cause of abnormal reaction of patient or later complication, without mention of misadventure at the time of procedure (E878 E879)

Accidental falls (E880 E888)

Accidents caused by fire and flames (E890 E899)

Accidents due to natural and environmental factors (E900 E909)

Accidents caused by submersion, suffocation, and foreign bodies (E910 E915)

Other accidents (E916 E929)

Late effects of accidental injury (E929)

Drugs, medicaments, and biological substances causing adverse effects in therapeutic use (E930 E949)

Pedestrian injured in transport accident (V01-V09)

Pedal cyclist injured in transport accident (V10-V19)

Motorcycle rider injured in transport accident (V20-V29)

Occupant of three-wheeled motor vehicle injured in transport accident (V30-V39)

Car occupant injured in transport accident (V40-V49)

Occupant of pickup truck or van injured in transport accident (V50-V59)

Sequelae of transport accidents (Y85)

Sequelae of other accidents (Y86)

2. Intentional self-harm (E950-E959/U03, X60-X84, Y87.0)

Suicide (E950 E959)

Terrorism (suicide) (U03)

Intentional self-harm (suicide) (X60-X84)

Sequelae of intentional self-harm (Y87.0)

3. Assault (E960-E969/U01-U02, X85-Y09, Y87.1)

Homicide (E960-E969)

Terrorism (homicide) (U01)

Sequelae of terrorism (homicide) (U02)

Assault (homicide) (X85-Y09)

Sequelae of assault (Y87.1)