

Documentation of Mortality Statistics and Cause of Death Information for MIDUS Refresher Samples (National and Milwaukee)

This memo accompanies an updated mortality dataset containing 315 decedents from the MIDUS Refresher National and Milwaukee samples that were ascertained via NDI searches up to the end of 2022.

In 2022, all MIDUS Refresher sample, regardless of prior decedent status, were submitted to the National Death Index (NDI) to find new decedents, confirm known decedents, and obtain cause of death information. Two NDI Plus¹ searches were performed: a Final Data Search for years 2011 through 2020; and an Early Release Data Search for 2021. Information from 4,084 Refresher participants with sufficient minimum matching criteria² were submitted to the NDI. Based on the results for the NDI Plus search, 281 decedents were ascertained.

In 2023, all Refresher sample were resubmitted to the NDI to obtain updated mortality information. Similar as the NDI Plus Search in 2022, two NDI searches were conducted: NDI Final Data Search for 2021; as well as NDI Early Release Search for 2022. Information from 4,084 Refresher participants with sufficient minimum matching criteria were submitted to the NDI.

The updated dataset:

MIDUS_Refresher_MortalityCauseData_N315_20240125.sav

The updated dataset adds 34 newly-identified decedents to the 281 decedents in the previous mortality dataset for a total of 315 decedent cases. Most of the new decedents are those who died in 2021 and 2022. ***Note that the mortality information of deaths through 2021 is considered “complete” due to the NDI Final Data Search, and the mortality information of deaths in 2022 is considered as “close to complete” due to the NDI Early Release Search***

Note the changes in cause of death information in the current update. In the current update, multiple cause of death information in ICD-10 and categories of cause of death are newly included. The simplified cause of death contains six categories, based on the leading cause of death in the U.S. among adults in recent years, are provided in the mortality data. Furthermore, 27 simplified categories are also included in addition to six categories of cause of death.

Each death certificate contains a single underlying cause of death and up to 20 additional multiple causes of death. The NDI provides two sets of multiple cause of death fields: entity-axis codes and record-axis codes. The entity-axis codes represent what is actually written in the death certificate by the certifier, but their main limitation is that they do not necessarily reflect the best code for a condition when considered within the context of the medical certification as a whole. Therefore, the Division of Vital Statistics created a new code set called record-axis multiple cause data from the original set of entity codes. The record-axis codes are assigned based on the codes that best describe the overall medical certification portion of the death certificate. They represent a further processing of the entity-axis codes to ensure consistency with the underlying cause data and to make them more amenable to statistical tabulation and analysis. The record-

¹ Different from NDI Routine searches that only provide potential decedent matches, the NDI Plus search also provides the cause of death (ICD Codes).

² To be eligible for an NDI search, each record must contain at least one of the following combinations of data items: (a) First and last name and SSN, (b) First and last name and month and year of birth, or (c) SSN and full date of birth and sex.

axis codes are what the MIDUS Refresher Mortality Data provides as multiple cause of death information. For more information about entity-axis and record-axis codes, please refer to the NDI User Guide on pages 58-61 (https://www.cdc.gov/nchs/data/ndi/ndi_users_guide.pdf).

This mortality dataset is a flat file containing 315 confirmed decedents and 46 variables that can be combined with or linked to other MIDUS Refresher datasets via the MRID variable.

The focal variables are:

- DECEASED indicates decedent status.
- DOD_M and DOD_Y indicate the month and year of death.
- UNDERCOD contain underlying cause of death based on ICD codes. For convenience to researchers the MIDUS Admin Core appended descriptive labels to each ICD code using source material provided by NDI. In this variable, the ICD codes represent the underlying cause of death, which is defined 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” (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; 1977). For more information about how NDI Plus provides cause of death information, see NDI user guide.
- Because the MIDUS Refresher study began in 2011 and includes deaths from that year onward, the Refresher mortality dataset contains ICD-10 codes:
 - CAUSE_ICD10 contains the 10th revision of the ICD codes (ICD-10) and are used by NDI Plus to classify deaths occurring in 1999 and afterwards.
 - The ICD-10 code sets include approximately 72,000 procedures and 70,000 diagnoses. The complete ICD-10 coding manual as of FY 2019 is available from: <https://www.cdc.gov/nchs/icd/data/10cmguidelines-FY2019-final.pdf>
- NUM_MULTICOD denotes the total number of multiple cause of death available for the decedent.
- MULTICOD_1 thru MULTICOD_12 contain multiple cause of death information for decedents who died in 1999 or afterwards.
- UNDERCOD_C27, and MULTICOD_1_C27 thru MULTICOD_12_C27 contain 27 categories of underlying and multiple cause of death information. The original ICD codes were recoded into 27 categories based on the leading cause of death in the U.S. among adults in recent years: 1) Cancer, 2) Heart disease, 3) CLRD, 4) Cerebrovascular disease, 5) Alzheimer's disease, 6) Diabetes, 7) Other accidents (e.g., car accidents, falls, etc.), 8) Influenza and Pneumonia, 9) Kidney disease, 10) Septicemia, 11) Parkinson's disease, 12) Drug induced causes, 13) Hypertension, 14) Chronic liver disease, 15) Covid-19, 16) Intentional self-harm, 17) Alcohol induced causes, 18) Aortic aneurysm and dissection, 19) Assault, 20) Cholelithiasis, 21) HIV disease, 22) Complications of medical and surgical care, 23) Congenital malformations, 24) Legal intervention, 25) Tuberculosis, 26) Pregnancy, childbirth and the puerperium, and 27) Other disease.

- UNDERCOD_C6, and MULTICOD_1_C6 thru MULTICOD_12_C6 contain categorized version of underlying and multiple cause of death information. The original ICD codes were recoded into six categories based on the leading cause of death in the U.S. among adults in recent years: 1) Heart disease, 2) Cancer, 3) CLRD, 4) Diabetes, 5) COVID-19, and 6) Other disease. The specific ICD-10 codes that were used to create the categorized version of cause of death variables are shown in **Table 1** and **Table 2** below.

Table 1. ICD-10 Codes Used to Create Six Categories of Cause of Death Variables

Cause of Death Group	ICD-10 Code
Heart Disease	I00-I09, I11, I13, I20-I41, I42.0-I42.5, I42.7-I42.9, I44-I51
Cancer	C00-C97
CLRD	J40-J47
Diabetes	E10-E14
Covid-19	U07.1

Table 2. ICD-10 Codes Used to Create 27 Categories of Cause of Death Variables

Cause of Death Group	ICD-10 Code
Cancer	C00-C97
Heart Disease	I00-I09, I11, I13, I20-I41, I42.0-I42.5, I42.7-I42.9, I44-I51
CLRD	J40-J47
Cerebrovascular Diseases (stroke-caused deaths)	I60-I69
Alzheimer's Disease	G30
Diabetes	E10-E14
Other accidents (e.g., car accidents, falls, etc.)	V01-V99, W00-W99, X00-X39, X46-X59, Y85-Y86
Influenza and Pneumonia	J09-J18
Kidney disease (Nephritis, nephrotic syndrome and nephrosis)	N00-N07, N17-N19, N25-N28
Septicemia	A40-A41
Parkinson's disease	G20-G21

Drug induced causes	F11.0-F11.5, F11.7-F11.9, F12.0-F12.5, F12.7-F12.9, F13.0-F13.5, F13.7-F13.9, F14.0-F14.5, F14.7-F14.9, F15.0-F15.5, F15.7-F15.9, F16.0-F16.5, F16.7-F16.9, F17.0, F17.3-F17.5, F17.7-F17.9, F18.0-F18.5, F18.7-F18.9, F19.0-F19.5, F19.7-F19.9, X40-X44, X60-X64, X85, Y10-Y14, Y45, Y47, Y49
Essential hypertension and hypertensive renal disease (hypertension)	I10, I12, I15, I16
Chronic liver disease and cirrhosis	K73-K74
COVID-19	U07.1
Intentional self-harm (suicide)	U03, X60-X84, Y87.0
Alcohol induced causes	E24.4, F10, G31.2, G62.1, G72.1, I42.6, K29.2, K70, K85.2, K86.0, R78.0, X45, X65, Y15
Aortic aneurysm and dissection	I71
Assault (homicide)	U01-U02, X85-X99, Y00-Y09, Y87.1
Cholelithiasis and other disorders of gallbladder	K80-K82
Human immunodeficiency virus (HIV) disease	B20-B24
Complications of medical and surgical care	Y40-Y84, Y88
Congenital malformations, deformations and chromosomal abnormalities	Q00-Q99
Legal intervention	Y35, Y89.0
Tuberculosis	A16-A19
Pregnancy, childbirth and the puerperium	O00-O99