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Notes & Key definitions

The HIV Mortality Report includes deaths among persons with HIV (PWH) in Michigan. Mortality rates are age-adjusted using the [U.S. 2000 standard population](#) to control for the influence that age alone has on mortality. This report is meant to guide care and prevention strategies by identifying the populations of PWH who are at the highest risk of death, especially those who have a higher risk of dying due to an HIV-related cause.

The following measures are displayed on pages 1-4 of this report:

Region or Demographic	All-cause deaths					HIV-related deaths			Non-HIV-related deaths			Persons with HIV
	Count	Rate	MI %	Time to death (years)	Age at death (years)	Count	Rate	MI %	Count	Rate	MI %	
Group X	A	B	C	D	E	F	G	H	I	J	K	L

All-cause deaths includes all deaths, regardless of cause, among PWH in Michigan during the given calendar year.

Count (A): The total number of deaths among PWH in Group X during the year.

Rate (B): The age-adjusted mortality rate per 1,000 PWH in Group X.

MI % (C): Of all deaths in Michigan during the year, the percent who are in Group X (i.e. column percent).

Time to death (years) (D): The median time from date of diagnosis to date of death for Group X in years expressed as Median (IQR) where IQR is the interquartile range. The IQR provides a measure of spread or variability in the data.

Age at death (years) (E): The median age at death for Group X in years expressed as Median (IQR) where IQR is the interquartile range.

HIV-related deaths includes deaths with an underlying cause due to HIV among PWH in Michigan during the given calendar year. (NOTE: a detailed description of underlying causes of death can be found on the following page.)

Count (F): The number of HIV-related deaths among PWH in in Group X during the year.

Rate (G): The age-adjusted HIV-related mortality rate per 1,000 PWH in Group X.

MI % (H): Of all HIV-related deaths in Michigan during the year, the percent who are in Group X (i.e. column percent).

Non-HIV-related deaths includes all deaths with an underlying¹ cause other than HIV among PWH in Michigan during the given calendar year (excludes deaths with an unknown cause of death).

Count (I): The total number of non-HIV-related deaths among PWH in Group X during the year.

Rate (J): The age-adjusted non-HIV-related mortality rate per 1,000 PWH in Group X

MI % (K): Of all non-HIV-related deaths in Michigan during the year, the percent who are in Group X (i.e. column percent).

Persons with HIV (PWH) (L): All people living with HIV in Michigan as of December 31 of the previous calendar year along with persons newly diagnosed with HIV during the given calendar year. PWH is used as the denominator in the calculation of mortality rates.

How are age-adjusted rates calculated?

The crude rate in the area of study (e.g., race, county, etc.) is calculated for each age group by dividing the number of deaths (count) in that age group by the number of PWH in the same age group in that area of study and then multiplying by a constant of 1,000. This results in an age-specific death rate (ASDR) per 1,000 PWH for each age group. That is, for each age group, $ASDR = \text{deaths in age group} \div \text{PWH} \times 1,000$.

Each ASDR is then multiplied by the proportion of the [U.S. 2000 Standard Population](#) in that same age group. The results are then summed to get the age-adjusted mortality rate for the area of study.

Age-adjusted mortality rates should only be compared to other age-adjusted mortality rates calculated using the same standard population.

Cause of Death Codes and Classifications:

For 1999 to present, all causes of death are classified according to the ICD-10 classification system. The ICD-9 coding system was used for deaths occurring between 1978 and 1998, so cause of death classifications before 1999 are not directly comparable to classifications for 1999 or later.

Cause-of-death coding: Mortality statistics for these tables were compiled in accordance with the World Health Organization (WHO) regulations, which specify that member nations classify causes of death by the current Manual of the International Statistical Classification of Diseases, Injuries, and Causes of Death. The current version is the Tenth Revision of the International Classification of Diseases [ICD-10]. Mortality statistics for 1999 and earlier were classified using the Ninth Revision [ICD-9]. ([NCHS Data Definitions: Classification of Diseases](#))

Underlying causes of death: Tabulations of HIV-related and Non-HIV-related cause of death statistics are based solely on the underlying cause of death. Every death is attributed to one underlying condition, based on information reported on the death certificate and using the international rules for selecting the "underlying cause of death" from the conditions stated on the death certificate. The underlying cause is defined as the disease or injury that initiated the train of events leading directly to death, or the circumstances of the accident or violence, which produced the fatal injury. If more than one cause or condition of death is entered, the underlying cause is then determined by the sequence of conditions on the death certificate and selection rules of the ICD (Murphy 2000). ([NCHS Data Definitions: Cause of Death](#))

Aggregated causes of death: Examination of the combination of all listed causes can shed additional light on factors related to mortality among PWH. Therefore, in Michigan, we also present "aggregated" causes of death for disease groups and conditions. "Aggregated" refers to the presence of a cause of death code in either the underlying or non-underlying ("contributing") causes. For example, "HIV-related" is the count of death cases where HIV appears as the underlying cause of death while "HIV-contributing" is the count of death cases where HIV appears in any of the causes of death listed on the death certificate (both underlying and contributing).

The following measures are displayed on page 5 of this report:

	Year of death	Count (K): The number of deaths reported with an underlying or contributing cause of death associated with Group Y.
Disease Group	Count MI %	MI % (L): Of all deaths reported among PWH in Michigan in the specified year of death, the percent who were reported with an underlying or contributing cause of death associated with Group Y.
Group Y	K L	

Year of Death	All-cause deaths				HIV-related deaths ¹		Non-HIV-related deaths ¹		Persons with HIV
	Count	Rate ²	Time to death (years)	Age at death (years)	Count	Rate ²	Count	Rate ²	
1990	476	112.0	1 (0-2)	38 (32-43)	337	79.3	120	28.2	4,249
1991	564	108.1	1 (0-2)	38 (32-44)	418	80.1	120	23.0	5,218
1992	708	114.7	2 (1-3)	38 (32-44)	516	83.6	161	26.1	6,175
1993	879	130.0	2 (1-4)	38 (32-44)	667	98.6	175	25.9	6,762
1994	980	137.8	3 (1-5)	38 (33-45)	769	108.1	195	27.4	7,114
1995	1,021	139.6	3 (1-5)	39 (33-45)	813	111.2	185	25.3	7,314
1996	712	95.9	4 (2-6)	39 (34-45)	518	69.8	175	23.6	7,423
1997	499	64.4	4 (1-6)	41 (34-47)	315	40.7	172	22.2	7,747
1998	425	52.1	4 (1-7)	42 (36-48)	268	32.9	146	17.9	8,152
1999	408	48.3	5 (2-8)	43 (37-48)	242	28.6	148	17.5	8,449
2000	416	46.5	5 (2-9)	43 (37-49)	254	28.4	159	17.8	8,947
2001	437	46.5	5 (2-9)	44 (39-51)	268	28.5	149	15.9	9,400
2002	422	43.5	7 (3-10)	45 (38-51)	240	24.7	159	16.4	9,706
2003	414	40.9	7 (3-11)	46 (40-52)	233	23.0	163	16.1	10,121
2004	387	36.6	8 (3-12)	46 (40-53)	224	21.2	153	14.5	10,570
2005	389	35.2	9 (4-13)	47 (41-54)	231	20.9	149	13.5	11,065
2006	373	32.6	9 (4-13)	48 (40-54)	196	17.1	165	14.4	11,450
2007	361	30.4	10 (4-15)	47 (41-55)	195	16.4	158	13.3	11,860
2008	375	30.5	11 (4-15)	49 (42-56)	199	16.2	161	13.1	12,276
2009	307	24.2	10 (5-15)	51 (44-58)	151	11.9	143	11.3	12,706
2010	311	23.6	11 (4-16)	49 (42-57)	153	11.6	148	11.2	13,159
2011	315	23.1	13 (6-17)	52 (45-60)	132	9.7	170	12.5	13,620
2012	344	24.4	13 (6-18)	51 (44-59)	148	10.5	183	13.0	14,096
2013	298	20.5	13 (8-18)	53 (46-60)	127	8.8	166	11.4	14,504
2014	295	13.8	13 (6-19)	54 (45-61)	109	5.1	182	8.6	15,141
2015	316	17.9	14 (7-20)	55 (47-63)	118	6.8	190	10.7	15,569
2016	295	15.9	15 (8-20)	55 (47-62)	99	5.0	189	10.5	15,117
2017	303	14.5	16 (9-22)	55 (46-61)	93	4.4	207	10.0	16,316
2018	339	16.1	17 (9-24)	57 (49-65)	81	3.9	252	11.9	16,564
2019	313	14.6	17 (10-24)	57 (48-63)	81	3.9	230	10.7	16,881
2020	407	17.5	16 (11-24)	57 (47-65)	94	4.1	307	13.2	17,452
2021	387	15.6	18 (9-25)	57 (48-65)	93	3.8	289	11.6	17,924
2022	417	16.8	18 (10-26)	57 (46-66)	106	4.0	305	12.5	18,312

¹A proportion of deaths are reported with an unknown cause of death in any given year and are not reflected in the HIV-related deaths and Non-HIV-related deaths counts.

²Crude rates are presented prior to 2014 due to the fact prevalence counts broken down by age prior to 2014 were unreliable due to incomplete reporting of current address. As of 2014, rates are age-adjusted using the U.S. 2000 Standard Population.

Region	All-cause deaths					HIV-related deaths ¹			Non-HIV-related deaths ¹			Persons with HIV, 2022
	Count	Rate ²	MI %	Time to death (years)	Age at death (years)	Count	Rate ²	MI %	Count	Rate ²	MI %	
Michigan	417	16.8	100%	18 (10-26)	57 (46-66)	106	4.0	100%	305	12.5	100%	18,312
DMA ³	269	16.6	65%	17 (9-25)	56 (45-65)	66	4.0	62%	198	12.2	65%	11,610
Outstate ⁴	144	16.6	35%	19 (10-27)	59 (51-66)	39	4.0	37%	104	12.5	34%	6,420
Prison ⁵	4	26.2	1%	34 (27-35)	62 (58-65)	1	1.4	1%	3	24.8	1%	281
Select Local Health Department (LHD) Jurisdictions: at least 10 deaths												
Central Michigan District+North Districts ⁶	19	14.3	5%	15 (10-24)	64 (52-68)	3	1.9	3%	16	12.4	5%	845
Detroit LHD ⁷	151	19.4	36%	17 (9-25)	56 (43-65)	38	4.9	36%	110	14.2	36%	5,705
Genesee County	19	21.3	5%	18 (6-24)	53 (47-60)	3	2.8	3%	16	18.5	5%	625
Ingham County	11	17.8	3%	23 (18-27)	65 (58-72)	2	3.3	2%	9	14.5	3%	486
Kent County	22	14.7	5%	19 (13-29)	60 (54-63)	5	3.8	5%	17	10.9	6%	1,167
Macomb County	20	10.0	5%	13 (8-24)	54 (39-60)	2	0.9	2%	18	9.1	6%	1,406
Oakland County	56	17.0	13%	19 (13-26)	57 (46-67)	12	3.5	11%	43	13.1	14%	2,303
Wayne Co. LHD	35	12.6	8%	14 (7-26)	59 (51-67)	13	4.6	12%	21	7.6	7%	1,882
Select Metropolitan Statistical Areas (MSA's): at least 10 deaths⁸												
Detroit-Warren-Dearborn	268	17.0	64%	17 (9-25)	56 (45-66)	66	4.2	62%	197	12.4	65%	11,184
Flint	19	21.8	5%	18 (6-24)	53 (47-60)	3	2.9	3%	16	18.9	5%	604
Grand Rapids-Wyoming	29	16.1	7%	22 (13-29)	61 (54-66)	9	5.1	8%	20	10.9	7%	1,356
Lansing-E Lansing	16	17.7	4%	22 (18-26)	61 (55-69)	3	3.6	3%	13	14.0	4%	643
v.Micropolitan Area	24	27.2	6%	16 (8-25)	55 (42-66)	7	7.1	7%	16	19.3	5%	750
w.Rural	12	14.4	3%	20 (12-26)	64 (57-68)	2	2.1	2%	10	12.3	3%	423
Select Cities: at least 10 deaths												
Detroit	138	19.4	33%	17 (9-25)	56 (43-65)	35	4.9	33%	100	14.0	33%	5,282
Flint	17	27.9	4%	12 (6-23)	52 (47-56)	3	4.5	3%	14	23.4	5%	422
Grand Rapids	13	11.1	3%	17 (13-29)	58 (54-62)	2	2.2	2%	11	8.9	4%	869
Pontiac	11	27.6	3%	18 (11-25)	49 (36-66)	2	6.4	2%	9	21.3	3%	341
Southfield	11	20.9	3%	25 (18-30)	63 (47-68)	4	7.7	4%	6	11.2	2%	399

¹1% of deaths were reported with an unknown cause of death and are not reflected in the HIV-related deaths and Non-HIV-related deaths counts.

²Rates are age-adjusted using the U.S. 2000 Standard Population. Rates calculated on the basis of <20 deaths are considered unstable and should be interpreted with caution.

³Detroit Metro Area (DMA) includes Lapeer, Macomb, Monroe, Oakland, St. Clair, and Wayne Counties. Prisons are excluded.

⁴Outstate includes Michigan residents outside the DMA. Prisons are excluded.

⁵Persons in prisons (state or federal) located in Michigan are reported separately for geographic stratification.

⁶Central Michigan LHD includes all otherwise unlisted counties in the lower peninsula.

⁷Detroit LHD includes the cities of Detroit, Hamtramck, Harper Woods, Highland Park, & the Grosse Pointes. Detroit, under "select cities", includes only residents of the city of Detroit.

⁸MSA designations: https://www2.census.gov/geo/maps/metroarea/stcbsa_pg/Feb2013/cbsa2013_MI.pdf

	All-cause deaths					HIV-related deaths ¹			Non-HIV-related deaths ¹			Persons with HIV, 2022
	Count	Rate ²	MI %	Time to death (years)	Age at death (years)	Count	Rate ²	MI %	Count	Rate ²	MI %	
Sex assigned at birth												
Male	340	17.6	82%	18 (9-26)	57 (46-66)	89	4.3	84%	245	12.9	80%	14,639
Female	77	14.1	18%	18 (12-26)	57 (49-64)	17	3.0	16%	60	11.1	20%	3,673
Transgender³	5	27.6	1%	14 (9-26)	49 (46-66)	2	4.7	2%	3	23.0	1%	316
Race & Latinx ethnicity by sex assigned at birth⁴												
Black/AA overall	230	18.7	55%	18 (10-25)	56 (46-65)	58	4.4	55%	168	14.0	55%	9,945
Black/AA males	169	19.4	41%	18 (10-25)	55 (43-64)	47	4.9	44%	118	14.0	39%	7,466
Black/AA females	61	16.1	15%	19 (13-25)	59 (50-66)	11	2.8	10%	50	13.3	16%	2,479
Latinx overall	20	12.6	5%	13 (5-28)	52 (39-62)	7	3.9	7%	13	8.6	4%	1,329
Latinx males	16	12.7	4%	9 (4-27)	52 (38-62)	6	3.5	6%	10	9.1	3%	1,105
Latinx females	4	14.7	1%	20 (13-28)	49 (39-61)	1	4.6	1%	3	10.1	1%	224
White overall	147	14.3	35%	19 (10-27)	60 (52-68)	34	3.1	32%	111	11.0	36%	6,177
White males	139	15.3	33%	19 (11-27)	60 (52-68)	31	3.2	29%	106	11.9	35%	5,380
White females	8	6.8	2%	17 (7-27)	54 (43-62)	3	2.0	3%	5	4.8	2%	797
Multi/other overall	20	18.9	5%	12 (6-24)	54 (40-63)	7	7.3	7%	13	11.6	4%	858
Multi/other males	16	19.4	4%	11 (4-26)	47 (39-65)	5	6.2	5%	11	13.2	4%	686
Multi/other females	4	16.3	1%	12 (9-19)	56 (50-60)	2	11.1	2%	2	5.2	1%	172
Age at death												
00-14	0	0.0	0%	N/A	N/A	0	0.0	0%	0	0.0	0%	65
15-19	1	9.4	0%	7 (7-7)	18 (18-18)	0	0.0	0%	1	9.4	0%	106
20-29	15	6.9	4%	3 (1-7)	27 (23-28)	5	2.3	5%	9	4.1	3%	2,183
30-39	50	12.0	12%	9 (6-12)	36 (33-37)	22	5.3	21%	28	6.7	9%	4,150
40-49	57	16.8	14%	13 (6-18)	45 (41-47)	17	5.0	16%	39	11.5	13%	3,388
50-59	111	23.6	27%	19 (12-26)	55 (52-57)	29	6.2	27%	81	17.2	27%	4,705
60+	183	49.3	44%	24 (18-29)	67 (63-72)	33	8.9	31%	147	39.6	48%	3,715
HIV transmission risk by gender⁵												
Sex w men	275	14.7	66%	19 (11-25)	56 (46-66)	67	3.4	63%	202	10.9	66%	13,848
Cis men	215	15.3	52%	19 (10-26)	58 (47-67)	54	3.7	51%	155	11.2	51%	10,522
Cis women	55	11.7	13%	18 (11-22)	54 (46-62)	11	2.1	10%	44	9.7	14%	3,038
Transgender	5	28.7	1%	14 (12-20)	49 (39-55)	2	5.1	2%	3	23.6	1%	288

HIV transmission risk continued on next page

¹1% of deaths were reported with an unknown cause of death and are not reflected in the HIV-related deaths and Non-HIV-related deaths counts.

²Rates are age-adjusted using the U.S. 2000 Standard Population with the exception of rates presented by age at death. Rates calculated on the basis of <20 deaths are considered unstable and should be interpreted with caution.

³Transgender persons are also included in the sex at birth categories.

⁴Black/AA, White, & Multi/Other are non-Latinx, Latinx persons may be of any race but are only included in the Latinx group.

⁵For additional risk details see [HIV Transmission Risk Category Definitions](#).

	All-cause deaths					HIV-related deaths ¹			Non-HIV-related deaths ¹			Persons with HIV, 2022
	Count	Rate ²	MI %	Time to death (years)	Age at death (years)	Count	Rate ²	MI %	Count	Rate ²	MI %	
HIV transmission risk by gender³, continued from previous page												
PWID	50	25.4	12%	26 (16-30)	64 (57-67)	12	7.9	11%	38	17.5	12%	976
Cis men	30	28.2	7%	25 (17-30)	64 (56-69)	6	8.4	6%	24	19.8	8%	530
Cis women	20	24.9	5%	27 (15-30)	64 (59-66)	6	8.3	6%	14	16.6	5%	446
Transgender	0	--	0%	N/A	N/A	0	--	0%	0	--	0%	0
Sex w men & PWID	25	21.9	6%	21 (10-27)	57 (41-62)	8	6.8	8%	17	15.1	6%	783
Cis men	25	22.6	6%	21 (10-27)	57 (41-62)	8	7.1	8%	17	15.5	6%	758
Transgender	0	0.0	0%	N/A	N/A	0	0.0	0%	0	0.0	0%	25
Sex w women	14	16.8	3%	23 (4-28)	58 (40-65)	4	7.0	4%	10	9.8	3%	679
Cis men	14	16.8	3%	23 (4-28)	58 (40-65)	4	7.0	4%	10	9.8	3%	679
Transgender	0	--	0%	N/A	N/A	0	--	0%	0	--	0%	0
Perinatal or Pediatric	2	3.7	0%	13 (7-18)	21 (18-23)	0	0.0	0%	2	3.7	1%	228
Other risk	0	0.0	0%	N/A	N/A	0	0.0	0%	0	0.0	0%	47
Unknown risk	51	18.5	12%	9 (2-14)	53 (45-61)	15	5.4	14%	36	13.1	12%	1,751
Any Ryan White (RW) service during 2022												
No RW service	274	23.2	66%	17 (8-25)	56 (45-65)	78	6.0	74%	193	17.0	63%	9,183
RW client	143	10.4	34%	20 (13-26)	60 (50-67)	28	2.2	26%	112	8.0	37%	9,129

¹1% of deaths were reported with an unknown cause of death and are not reflected in the HIV-related deaths and Non-HIV-related deaths counts.

²Rates are age-adjusted using the U.S. 2000 Standard Population with the exception of rates presented by age at death. Rates calculated on the basis of <20 deaths are considered unstable and should be interpreted with caution.

³For additional risk details see [HIV Transmission Risk Category Definitions](#).

	2018		2019		2020		2021		2022	
	Count	MI %	Count	MI %	Count	MI %	Count	MI %	Count	MI %
Communicable & infectious diseases										
HIV	112	33%	110	35%	150	37%	135	35%	153	37%
COVID-19	0	0%	0	0%	43	11%	37	10%	26	6%
Other infectious diseases	53	16%	51	16%	69	17%	77	20%	71	17%
Respiratory infections	26	8%	32	10%	61	15%	51	13%	48	12%
STI	1	0%	0	0%	2	0%	1	0%	1	0%
Noncommunicable diseases										
Cardiovascular diseases	126	37%	123	39%	166	41%	153	40%	180	43%
Congenital anomalies	2	1%	0	0%	0	0%	1	0%	1	0%
Diabetes	12	4%	10	3%	27	7%	24	6%	24	6%
Digestive diseases	26	8%	21	7%	35	9%	29	7%	23	6%
Endocrine, blood, and immune disorders	20	6%	20	6%	30	7%	24	6%	36	9%
Genitourinary diseases	50	15%	35	11%	54	13%	52	13%	49	12%
Malignant cancers	73	22%	68	22%	77	19%	95	25%	96	23%
Other cancers	0	0%	0	0%	1	0%	2	1%	2	0%
Mental and behavioral disorders	68	20%	65	21%	94	23%	93	24%	118	28%
Musculoskeletal diseases	2	1%	4	1%	1	0%	4	1%	5	1%
Neurological conditions	10	3%	17	5%	20	5%	13	3%	24	6%
Nutritional deficiencies	7	2%	6	2%	21	5%	11	3%	14	3%
Respiratory diseases	66	19%	64	20%	94	23%	78	20%	85	20%
Sense organ diseases	0	0%	0	0%	0	0%	0	0%	1	0%
Skin diseases	3	1%	1	0%	0	0%	1	0%	6	1%
Injuries										
Intentional injuries	9	3%	9	3%	16	4%	9	2%	20	5%
Unintentional/unspecified injuries	55	16%	51	16%	53	13%	66	17%	48	12%
Total Deaths	339	100%	313	100%	407	100%	387	100%	417	100%

Cause of Death categories are classified using the ICD-10 reference tables in the [Deaths: Leading Causes National Vital Statistics Report](#) and the [World Health Organization 2020 Technical Report](#)