Michigan Medical Examiner Database Initiative

Final Report

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Acknowledgements

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Executive Summary

The *Michigan Medical Examiner Database Initiative* (MMEDB) is a collaborative project administered by the Center for Collaborative Research in Health Outcomes & Policy (CRHOP), a program of the Michigan Public Health Institute (MPHI), and funded by the Michigan Department of Community Health and the Centers for Disease Control and Prevention. The project uses Internet-based software to enhance operations for medical examiner (ME) offices and to provide standardized data for public health surveillance. Significant efforts over the past seven years have resulted in 39 of Michigan's 83 counties currently participating.

Recruitment

Over the last seven years, extensive recruiting efforts have been aimed at all 83 counties. Outreach has included:

- Presentations at the annual Michigan Association of Medical Examiners (MAME) Conference to encourage participation of all counties.
- Partnering with the Michigan State Police (MSP) to promote the use of the Death Scene Investigation Form (DSIR). An internal memo was distributed to all state police troopers encouraging cooperation with county medical examiners in the use of the form.
- Presentations at the annual Michigan Association of Local Public Health (MALPH) Information Technology Conference to promote use of the aggregated data and to encourage county participation.
- Written communication, telephone calls, and site visits to all counties.

At present, 31 counties have declined to participate in the MMEDB. Reasons include: not having access to a computer or the Internet, concerns about the security of the data stored on the Internet, the system not meeting the county's needs, being unable to adopt a new data collection system, and lacking personnel to enter data into the online system.

Alcestis

In the summer of 2005, staff of the MMEDB were informed that State funding for the MMEDB would be cut entirely for FY06 beginning October 1, 2005. For the past year, staff have been seeking alternative funding options to maintain the MMEDB and services provided.

MPHI manages a national database, *Alcestis*, which is identical to the MMEDB and is being marketed to ME/Coroner offices nationally. Beginning October 1, 2005, all data in the MMEDB will be transferred to *Alcestis*, and the MMEDB website, <www.mmedb.com>, will cease to exist.

Barriers encountered during the implementation of this project

During the course of the Michigan Medical Examiner Database Initiative, the project met with several barriers that hindered the full realization of the project's goals and objectives. They included:

- Obtaining "buy-in" from local, county, and state law enforcement agencies
- Inconsistent data collection across Michigan
- MMEDB efforts perceived as "State" interference
- Some MEs are not focused on public health surveillance
- Communication issues between ME offices and local health departments
- Lack of adequate funding for ME services across the State
- Lack of adequate staff for ME offices
- Rising costs for ME support services

Benefits derived from this project

The implementation of this project produced several benefits for Michigan that include:

- Improved data collection
- Improved technological capacity for ME offices
- Improved communication between ME offices and local health departments
- ME data shared with research organizations
- ME offices and health departments able to conduct analysis of mortality data

Recommendations

Based on the experiences over the last seven years, MMEDB staff offer recommendations to the State to enhance the services delivered by Michigan ME offices. They include:

- Enhance communication between ME offices and local health departments
- Standardize the data collection processes for Michigan MEs
- Enhance support of ME offices throughout Michigan
- Improve delivery of Michigan ME services

Introduction

The *Michigan Medical Examiner Database Initiative* (MMEDB) is a collaborative project administered by the Center for Collaborative Research in Health Outcomes & Policy (CRHOP), a program of the Michigan Public Health Institute (MPHI), and funded by the Michigan Department of Community Health and the Centers for Disease Control and Prevention. The project uses Internet-based software to enhance operations for medical examiner (ME) offices and to provide standardized data for public health surveillance. Significant efforts over the past seven years have resulted in 39 of Michigan's 83 counties currently participating.

This report provides an overview of the MMEDB, county participation rates, data findings, and future plans for the MMEDB. A summary of barriers encountered during the course of the project and the strategies adopted are discussed. In addition, recommendations for similar future projects are provided.

History

Michigan law requires MEs to investigate the cause and manner of death for sudden, unexpected, accidental, violent, or suspicious deaths. This includes deaths that occur without medical attendance during the 48 hours prior to death in which the attending physician is unable to determine accurately the cause of death. The law also requires investigation into: deaths due to abortion; deaths occurring to a child under the age of two; and deaths of prisoners in city, county, or state prisons.[1]

In 1995, the Michigan Department of Community Health (MDCH), then the Department of Public Health, proposed the idea of a statewide mortality data collection system to organize and make accessible the information collected during required investigations.

In 1997, MDCH commissioned a feasibility study to determine the receptiveness of such a system among Michigan MEs. Prior to the *Michigan Medical Examiner Database Initiative,* only a third of Michigan's ME offices reported having an electronic method for capturing case information. Moreover, 54% of Chief MEs in Michigan reported that a voluntary database would be beneficial.[2]

MDCH contracted with CRHOP at MPHI to facilitate the creation, maintenance, and operation of the MMEDB, as well as recruitment of ME offices. Eighteen pilot counties, along with an advisory council, established standardized data collection practices and tested the database. The database went live in December 1997. Since that time MMEDB staff have implemented several surveys and met in person with many medical examiners to gather feedback and comments that could be used to improve the data collection form and online application.

[1] Medical Examiner Statute, MCL § 52.202, Sec. 2.
[2] Michigan MMEDB and Reporting Feasibility Study, August 1997.

In the beginning of 2004, a new module was introduced to gather pertinent information on incidences of infectious disease or bioterrorism activities. The module included an alert system to remind medical examiner offices to notify their local health department in instances of reportable disease outbreaks.

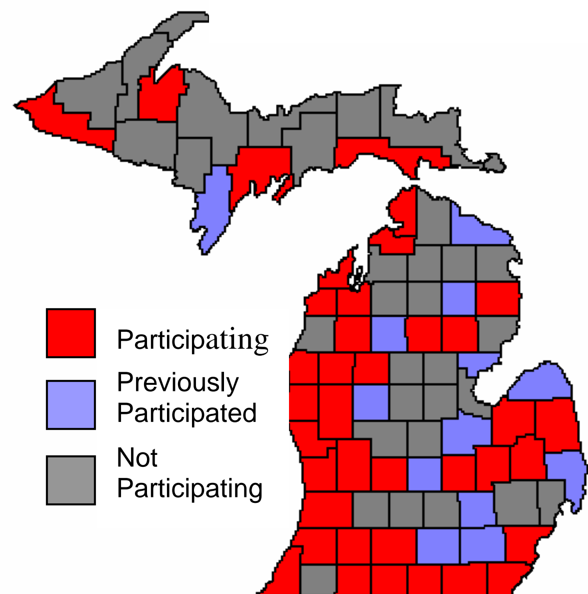
County Participation

Over the last seven years, extensive recruiting efforts have been aimed at all 83 counties. Outreach has included:

- Presentations at the annual Michigan Association of Medical Examiners (MAME) Conference to encourage participation of all counties.
- Partnering with the Michigan State Police (MSP) to promote the use of the Death Scene Investigation Form (DSIR). An internal memo was distributed to all state police troopers encouraging cooperation with county medical examiners in the use of the form.
- Presentations at the annual Michigan Association of Local Public Health (MALPH) Information Technology Conference to promote use of the aggregated data and to encourage county participation.
- Written communication, telephone calls, and site visits to all counties.

County participation is depicted in the map at the right (Figure 1). Participation means that data is entered into the online system or data is provided to MMEDB staff for entry. Not all participating counties elect to use the Death Scene Investigation Report (DSIR) that mirrors the online application. Counties that no longer participate in the MMEDB either had to scale back involvement due to budget cuts and staff shortages or were only involved in the pilot phase of the project.

Figure 1: County participation



At present, 31 counties have declined to participate in the MMEDB. Reasons include: not having access to a computer or the Internet, concerns about the security of the data stored on the Internet, the system not meeting the county's needs, being unable to adopt a new data collection system, and lacking personnel to enter data into the online system.

The table below (Table 1) shows when counties became involved with the MMEDB. The total number of cases entered into the system by each county is also depicted. Please note, some counties use the system to track natural deaths and cremation permits, in addition to ME cases. In other words, the total number of cases entered into the system is not limited to non-natural deaths.

Table 1: County involvement with MMEDB

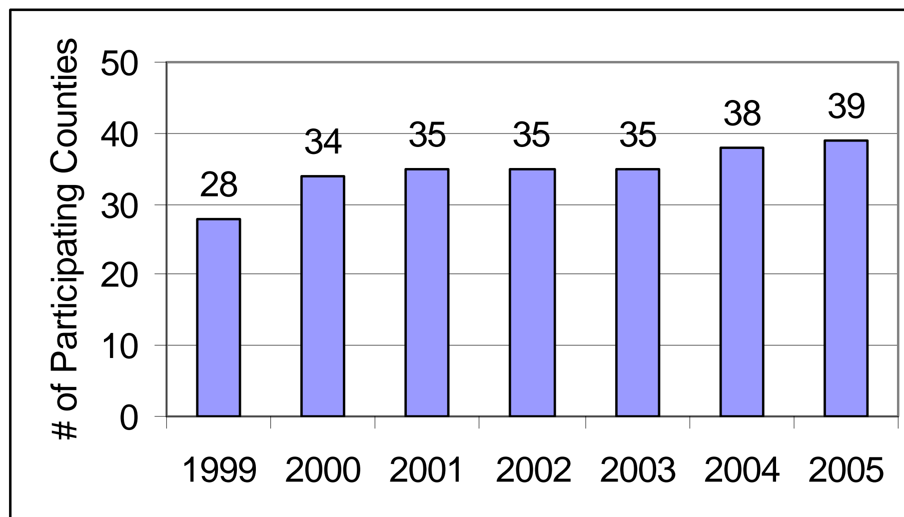
	Year Data Entry Began	Year of Last Data Entry	Number of Cases in System as of 7/15/2005	Chief Medical Examiner
Alcona	2002	2005	152	Gregg Hanert, DO
Alger	NA	NA	0	Christine Krueger, MD
Allegan	1999	2005	1036	Joyce deJong, DO
Alpena	NA	NA	0	Robert Combs. MD
Antrim	NA	NA	0	Dewey Benson, DO
Arenac*	2000	2002	17	Cesar Casten. MD
Baraga*	2004	2005	8	Cary Gottlieb, MD
Barry	NA	NA	0	Jeffrey P. Chapman, MD
Bay	NA	NA	0	Howard F. Hurt, DO
Benzie	2003	2005	47	Matthew Houghton, Jr, DO
Berrien*	2003	2005	373	Robert Clark, MD
Branch	2001	2005	360	Troy Davis, DO
Calhoun*	1999	2005	856	Mehmet B. Ismailoglu, MD
Cass	NA	NA	0	Robert M. Knox, DO
Charlevoix*	1999	2004	131	Reed Fredinger, MD
Cheboygan	NA	NA	0	Donald Ramsey, DO
Chippewa	NA	NA	0	James C. Terrian, MD
Clare	NA	NA	0	Elmer Shurlow, DO
Clinton	2000	2000	18	Donald L. Porter, MD
Crawford	NA	NA	0	William H. McNamara, MD
Delta	1999	2005	190	Steven A. Dosh, MD
Dickinson	NA	NA	0	Robert Anderson, MD
Eaton	NA	NA	0	Robert L. Leeser, MD
Emmett	2001	2005	138	Carl W. Hawkins, MD
Genesee	2004	2005	1144	Gary Johnson, MD, MPH
Gladwin	NA	NA	0	James Sullivan, DO
Gogebic	2004	2005	12	Charles N. Iknayan, MD
Grand Traverse	1999	2005	548	Matthew Houghton, Jr, DO
Gratiot	NA	NA	0	Lewis Sandel, MD
Hillsdale	2000	2005	302	Lawrence E. Dasch, MD

	Year Data Entry Began	Year of Last Data Entry	Number of Cases in System as of 7/15/2005	Chief Medical Examiner
Houghton	NA	NA	0	Dong Gend Liu, MD, PhD
Huron	1999	2000	30	Richard Lockard, MD
Ingham	NA	NA	0	Dean Sienko, MD
Ionia	1999	2005	291	James D. Banner, DO
Iosco	NA	NA	0	Richard Payea, MD
Iron	NA	NA	0	Nasseem F. Rizkalla, MD
Isabella	NA	NA	0	Elmer Shurlow, DO
Jackson	1999	2000	335	John Maino, II, MD, FACEP
Kalamazoo	2002	2005	1184	Richard Tooker, MD
Kalkaska	NA	NA	0	Richard Hodgman, MD
Kent	1999	2005	7227	Stephen Cohle, MD
Keweenaw	NA	NA	0	David Gilbert, MD
Lake	1999	2005	184	Paul Wagner, DO
Lapeer	1999	2005	677	Charles Franckowiak, DO
Leelanau	1999	2005	132	Matthew Houghton, Jr, DO
Lenawee	1999	2005	792	Patricia Lamb, MD
Livingston	2000	2004	227	Bader Cassin, MD
Luce	NA	NA	0	James C. Terrian, MD
Mackinac	1999	2005	43	Carl W. Hawkins, MD
Macomb	NA	NA	0	Daniel Spitz, M.D.
Manistee	NA	NA	0	Michael Barna, MD
Marquette	NA	NA	0	Randolph Smith, MD
Mason	1999	2004	98	Marc E. Keen, MD
Mecosta	2001	2001	17	Paul Wagner, DO
Menominee	2000	2001	68	Paul A. Haupt
Midland	NA	NA	0	J. Daniel Cline, MD
Missaukee	2001	2002	16	Gregory P. Lambourne, MD
Monroe	1999	2005	939	Carl J. Schmidt, MD
Montcalm	NA	NA	0	Ashok Sonnad, MD
Montmorency	NA	NA	0	Michael McNamara, DO
Muskegon*	1999	2004	535	Joyce deJong, DO
Newaygo	1999	2005	486	Richard W. Peters, MD
Oakland	NA	NA	0	L.J. Dragovic, MD
Oceana	2005	2005	26	Rudy Ochs, DO
Ogemaw*	1999	2004	275	James Hall, MD
Ontonagon	NA	NA	0	John Austin, MD
Osceola	1999	2005	181	Paul Wagner, DO

	Year Data Entry Began	Year of Last Data Entry	Number of Cases in System as of 7/15/2005	Chief Medical Examiner
Oscoda	1999	2000	40	Wayne Wahl, MD
Otsego	NA	NA	0	Michael McNamara, DO
Ottawa*	2000	2005	531	David A. Start, MD
Presque Isle	2000	2001	37	Michael Fairbanks, MD
Roscommon*	1999	2004	382	Howard Gregg, Jr., DO
Saginaw	1999	1999	13	Kanu Virani, MD
St. Clair	1999	1999	236	David Hislop, MD
St. Joseph	1999	2005	540	John Robertson, MD
Sanilac	2000	2005	353	Dennis Smallwood, DO
Schoolcraft	NA	NA	0	James C. Terrian, MD
Shiawassee	2001	2005	596	Brian Hunter, MD
Tuscola	1999	2005	335	Larry Cole, DO
Van Buren	2000	2005	763	Jason Tompkins
Washtenaw	1999	1999	344	Bader Cassin, MD
Wayne^	2002	2004	5828	Carl J. Schmidt, MD
Wexford*	1999	2004	453	Howard Gregg, Jr., DO

*MMEDB staff performed data entry for these counties.
^An electronic data sharing agreement enables data from Wayne's system to be imported into the MMEDB.

Figure 2: Number of participating[3] counties by year



[3] Participating is defined as regularly entering data into the online system or providing data to MMEDB staff for entry.

The above figure (Figure 2) takes into consideration the number of counties that joined the MMEDB each year, as well as the number of counties that elected to no longer participate. There were 28 participating counties in 1999 and 39 counties in 2005.

Future of MMEDB

In the summer of 2005, staff of the MMEDB were informed that State funding for the MMEDB would be cut entirely for FY06 beginning October 1, 2005. For the past year, MPHI-CRHOP has been seeking alternative funding options to maintain the MMEDB and services provided.

MPHI manages a national database, *Alcestis*, which is identical to the MMEDB and is being marketed to ME/Coroner offices nationally. Beginning October 1, 2005, all data in the MMEDB will be transferred to *Alcestis* and the MMEDB website <www.mmedb.com> will cease to exist.

ME offices will still have access to their data and reports, via *Alcestis,* through October 2005. All counties with cases in the database will receive a complete copy of their data through August 2005.

If alternative funding is not secured by October 2005, all Michigan counties will have the option to purchase the services of *Alcestis.* Pricing for use of the database is based on the number of ME cases that occur in a county per year.

Summary of Data Findings

The data summary section will look at a general overview of data trends during the past five years. Additionally, more in-depth analysis will be covered for the 2004 calendar year.

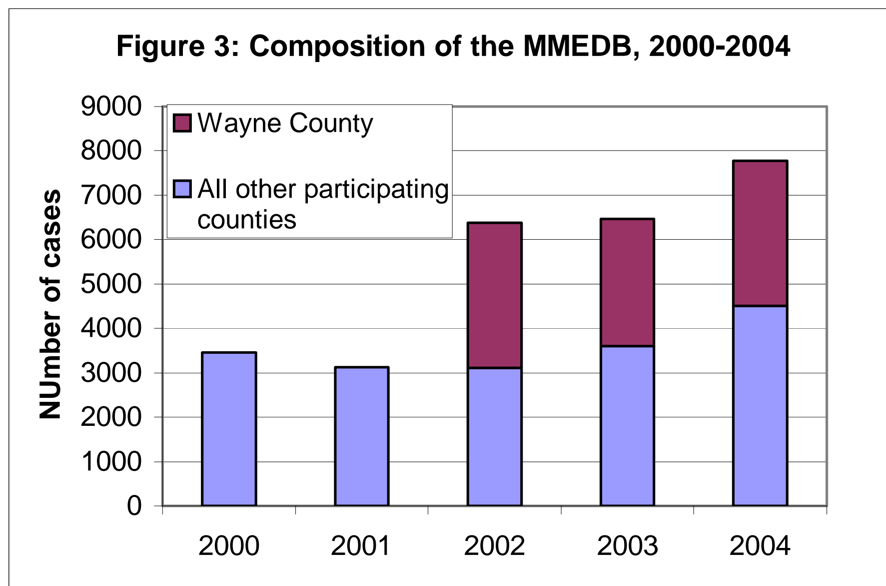
Over the past five years many new counties began participation, and some counties discontinued participation in the MMEDB (See Table 1). Cases in the database do not necessarily reflect full years of data for any county, but only the cases that were entered for each county at any time between January 1, 2000 and December 31, 2004. **Please note that the data presented here are not meant to represent the State of Michigan; they represent only cases from participating counties that were entered into the database.**

The redesigned database was posted at the start of 2004; several new data elements are available for cases entered after the posting of the new database.
In the following presentation, a medical examiner case represents a single death. The denominator changes for each variable examined due to missing information and/or examination of a different subset of data. Note that Wayne County data are present in the database beginning with 2002. Wayne County has an electronic data sharing agreement with the MMEDB and, as a result, there is some variation in the data fields

collected. Wayne County data has been converted to match data fields of the MMEDB to the greatest extent possible.

Composition of the MMEDB

Figure 3 below illustrates the case composition of the database for 2000 through 2004. Wayne County accounts for the largest number of cases from a single county in the database beginning in 2002 with 51.3% of cases, in 2003 with 44.2% of cases and in 2004 with 44.1% of cases. Overall, the number of cases in the MMEDB has increased 125% from 2000 to 2004. The number of cases in the database from all participating counties, excluding Wayne County cases, has increased 30% from 2000 to 2004.



The ratio of male to female cases in the MMEDB did not change significantly from 2000 to 2004, as shown in Table 2. On the other hand, the racial make up of the MMEDB was altered by the inclusion of Wayne County data beginning in 2002. The proportion of African American cases increased from 5% in 2000 to 28% in 2004 while the proportion of White cases decreased from 90% to 65% respectively. Within the same time period, the proportion of American Indian, Asian/Pacific Islander, Hispanic and other races/ethnicities changed very little. The mean age of cases in the MMEDB decreased from 59 years in 2000 to 53 years in 2004.

Table 2: Demographic composition of the MMEDB

Cases in MMEDB	2000	2001	2002	2003	2004
Number	n=3,454	n=3,126	n=6,385	n=6,460	n=7,783
Sex	**2000**	**2001**	**2002**	**2003**	**2004**
Male	63%	63%	67%	66%	66%
Female	35%	35%	32%	34%	34%
Unknown	2%	2%	1%	1%	1%
Race	**2000**	**2001**	**2002**	**2003**	**2004**
African American	5%	6%	34%	29%	28%
American Indian	1%	1%	<1%	1%	1%
Asian/Pacific Islander	<1%	<1%	<1%	<1%	<1%
Hispanic	2%	2%	2%	2%	2%
White	90%	89%	64%	67%	65%
Other	<1%	<1%	<1%	<1%	1%
Unknown	2%	1%	<1%	1%	3%
Age	**2000**	**2001**	**2002**	**2003**	**2004**
Age Range	0-107	0-106	0-104	0-105	0-107
Mean Age	59	57	54	54	53

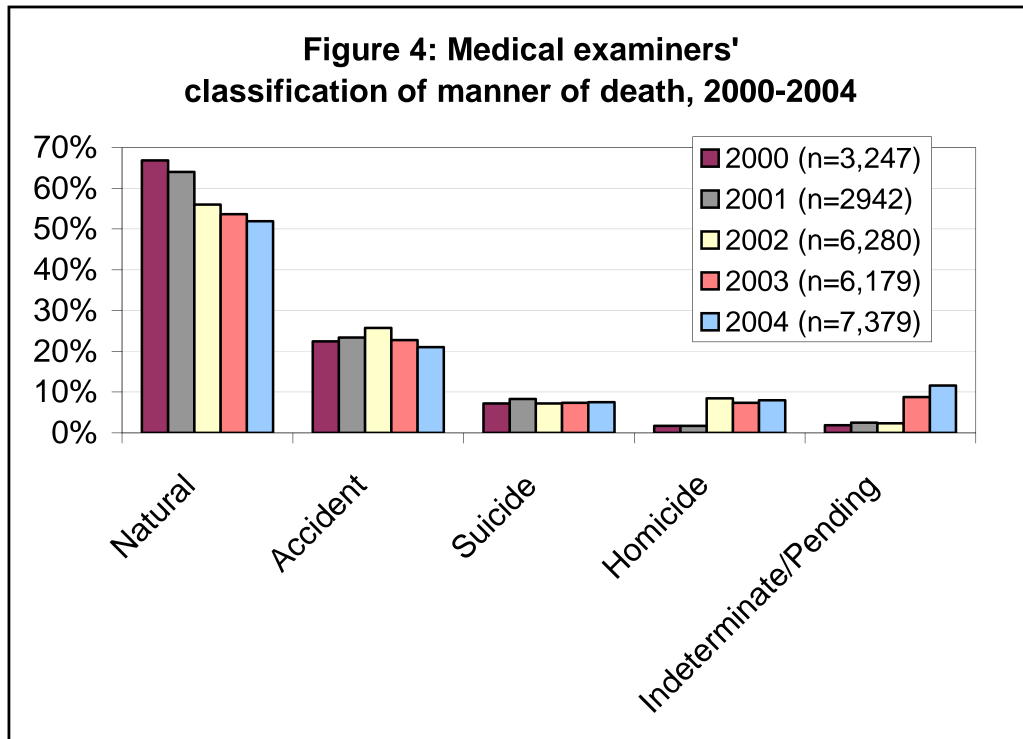
Classification of Death

Cases investigated by Medical Examiners are assigned a manner of death (natural, accidental, suicide, homicide, indeterminate or pending), and a means of death, if the manner was not natural. The MMEDB separates means of death into several categories including: vehicle, firearm, instrument, poisoning, drowning/submersion, fire/burn, fall, asphyxia, SIDS and infectious disease.

There are a few exceptions where a means of death may be assigned to a case with a natural manner of death. For example, some MEs perceive a fall that results in a broken hip and leads to the eventual demise of a person to be a natural death, while other MEs would assign such a case an accidental cause of death. Infectious disease was added to the database as a possible means of death in 2004. It can be assumed that most cases of infectious disease have a natural manner of death, but in the case of a bioterrorism event, for example, the manner of death would be homicide. SIDS as a means of death is typically assigned a natural manner of death. The classification of manner and means of death are determined by the county medical examiners and are included in the data analysis as they were classified.

The cases in the database with a natural manner of death are those that were either investigated by an ME because they were sudden or unexpected, or occurred without medical attendance during the 48 hours prior to death in which the attending physician is unable to determine accurately the cause of death. Other natural deaths may be included in the MMEDB because a cremation permit was requested from the ME, or there was no other physician available to sign the death certificate. The natural cases in the database only represent the natural cases with which an ME was involved and do not represent all natural cases of death within the participating area. For this reason, data analysis will focus mainly on non-natural manners of death.

<u>Manner of Death</u>
Figure 4 below shows the percentage of each manner of death as assigned by medical examiners. There is an obvious increase in homicides beginning in 2002, which corresponds with the inclusion of Wayne County data in the analysis. The increased number of pending/indeterminate cases in 2003 and 2004 may be due to the more recent nature of the cases, as they may not yet be updated in the database with conclusive findings on the manner of death. Additionally, due to the electronic data sharing agreement between Wayne County and the MMEDB, Wayne County cases are not updated once they are entered into the database.



Of the non-natural cases (accident, suicide and homicide) in 2004, 57% (n=1,547) were classified as accidental, 21% (n=558) as suicides and 22% (n=585) as homicides. Comparatively, in 2000, 71% (n=727) of non-natural cases were classified as accidental, 23% (n=233) as suicides and only 6% (n=58) as homicides.

Tables 3 and 4 look at the relationships between non-natural manners of death and age groups. Table 3 breaks down each manner of death by age group for the years 2000-2004 and Table 4 ranks the manners of death within each age group for the year 2004 only.

The year 2002 shows a steady increase in the proportion of natural deaths among the 41-65 year age group (from 32% in 2000 to 49% in 2004) and a decrease among the 66

and older age group (from 60% in 2000 to 42% in 2004). A decrease in the proportion of homicides among the youngest and oldest age groups corresponds with increased proportions among the 16-25 and 26-40 year age groups. Otherwise, the age group distribution among the manners of death remained fairly constant.

Table 3: Manners of death by age group, 2000-2004

Age Group	Year	Natural	Accident	Suicide	Homicide
0-15 years	2000	3%	10%	3%	14%
	2001	4%	9%	1%	14%
	2002	3%	8%	1%	7%
	2003	2%	8%	2%	4%
	2004	2%	6%	1%	5%
16-25 years	2000	1%	17%	15%	19%
	2001	1%	16%	17%	29%
	2002	1%	14%	17%	27%
	2003	1%	13%	12%	28%
	2004	1%	15%	17%	29%
26-40 years	2000	4%	20%	27%	34%
	2001	4%	19%	30%	35%
	2002	8%	20%	29%	42%
	2003	6%	18%	34%	43%
	2004	5%	22%	26%	40%
41-65 years	2000	32%	30%	38%	22%
	2001	35%	31%	37%	18%
	2002	48%	38%	36%	21%
	2003	48%	36%	40%	24%
	2004	49%	34%	44%	22%
66+ years	2000	60%	23%	18%	10%
	2001	56%	25%	15%	4%
	2002	40%	20%	17%	3%
	2003	43%	25%	12%	1%
	2004	42%	23%	12%	3%

The age group of 41-65 year olds had the greatest number of cases (n=2,765) in 2004 while the 0-15 year old age group had the least number of cases (n=198). Even though the greatest number of suicides in 2004 occurred among the 41-65 age group (n=241 or 44% of all suicides, see Table 3), suicide ranks only as the third leading manner of death within that age group (see Table 4).

Accident leads both homicide and suicide as the ranking manner of death for all age groups. Homicide outranks suicide in manner of death for the three youngest age groups, 0-15, 16-25 and 26-40 years. In 2004, the youngest person for whom a medical examiner classified the manner of death as suicide was 12 years old. The oldest person for whom a medical examiner classified the manner of death as homicide was 93 years old.

Table 4: Ranking of manner of death among age groups, 2004 (n=6,455)

Rank	0-15 years	16-25 years	26-40 years	41-65 years	66+ years
1	Accident 47%	Accident 43%	Accident 37%	Natural 68%	Natural 79%
2	Natural 34%	Homicide 31%	Homicide 26%	Accident 19%	Accident 17%
3	Homicide 16%	Suicide 17%	Natural 21%	Suicide 9%	Suicide 3%
4	Suicide 3%	Natural 10%	Suicide 16%	Homicide 5%	Homicide 1%

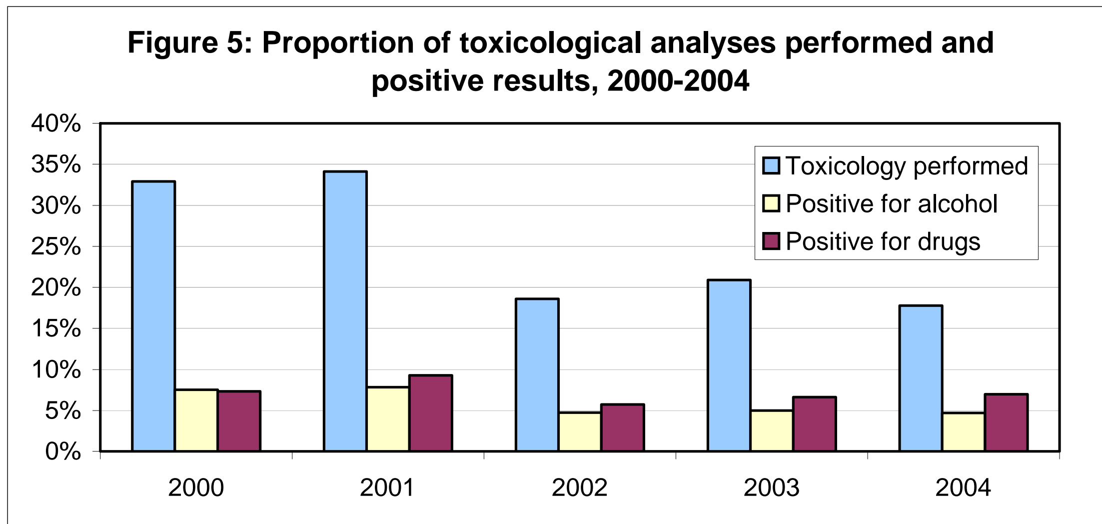
Table 5 represents the Medical Examiners' classification of manner of death by race/ethnicity. Natural was the most common manner of death among African Americans, Hispanics and Whites, followed by accidental deaths among all races for most years. Exceptions include African Americans in 2003 and 2004 where homicides (23% and 26% respectively) outnumbered accidental deaths (20% in both 2003 & 2004) and Hispanics in 2004 where accidental deaths (40%) outnumbered natural deaths (32%). Homicides were more prevalent than suicides among Hispanics and African Americans, while suicides were more prevalent than homicides among Whites for all years. Hispanics consistently had a higher proportion of accidents than African Americans or Whites for all years.

Table 5: Race/ethnicity by manner of death, 2000-2004

Race	Year	Natural	Accident	Suicide	Homicide
African American	2000	59%	27%	4%	10%
	2001	63%	23%	5%	10%
	2002	53%	24%	3%	20%
	2003	53%	20%	4%	23%
	2004	52%	20%	2%	26%
Hispanic	2000	48%	42%	2%	8%
	2001	49%	40%	5%	6%
	2002	45%	31%	8%	16%
	2003	42%	39%	7%	11%
	2004	32%	40%	8%	19%
White	2000	69%	22%	8%	1%
	2001	66%	24%	9%	1%
	2002	60%	28%	10%	2%
	2003	62%	27%	10%	2%
	2004	62%	25%	11%	2%

Toxicology

Figure 5 below depicts the proportion of all ME cases in the database for which toxicological analysis results were recorded and the proportion of cases with positive results.

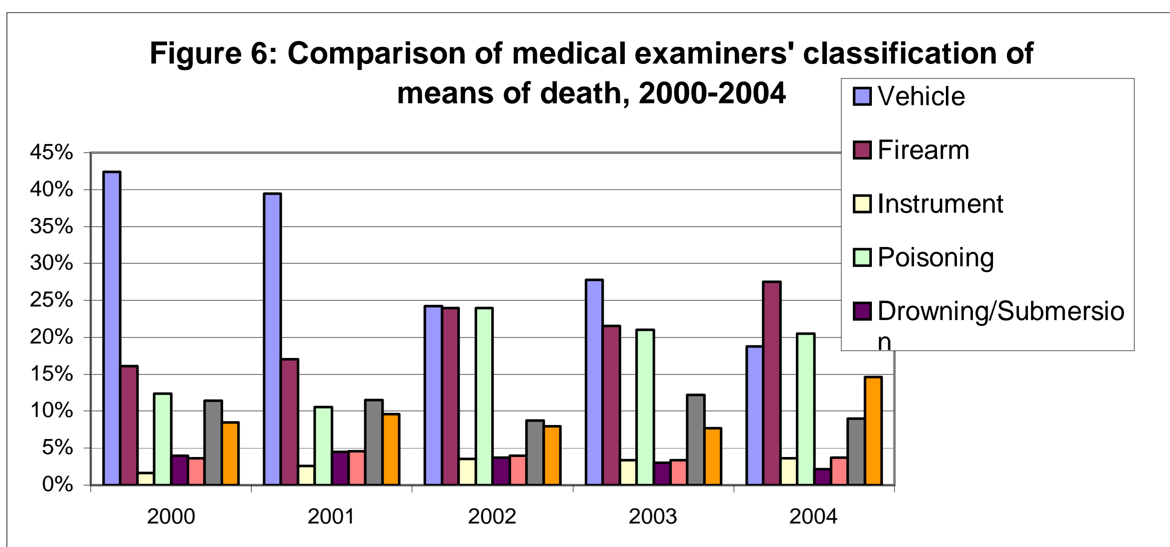


The proportion of cases on which toxicology was performed dropped from over 30% in 2000 and 2001 to around 20% in 2002-2004. This drop corresponds with the inclusion of Wayne County data in the analysis and is likely due to the fact that toxicology results were seldom available from Wayne County. There was little change in the proportion of positive alcohol and drug cases compared to the total number of cases for the years 2000-2004. The proportion of positive results compared to the number of cases on which toxicology was performed increased for alcohol from 23% to 26% and increased for drugs (including prescription, illegal and over the counter drugs) from 22% to 39% between 2000 and 2004.

Toxicology analysis is performed most often for cases of suicide (39% of cases), followed by accidents (35%) and homicides (9%). Of the cases for which toxicology results were available, 35% of accidental deaths, 34% of suicides and 33% of homicides tested positive for alcohol. Positive results for drug use were discovered in 47% of accidents and suicides and 29% of homicides out of the cases for which toxicology results were entered into the database.

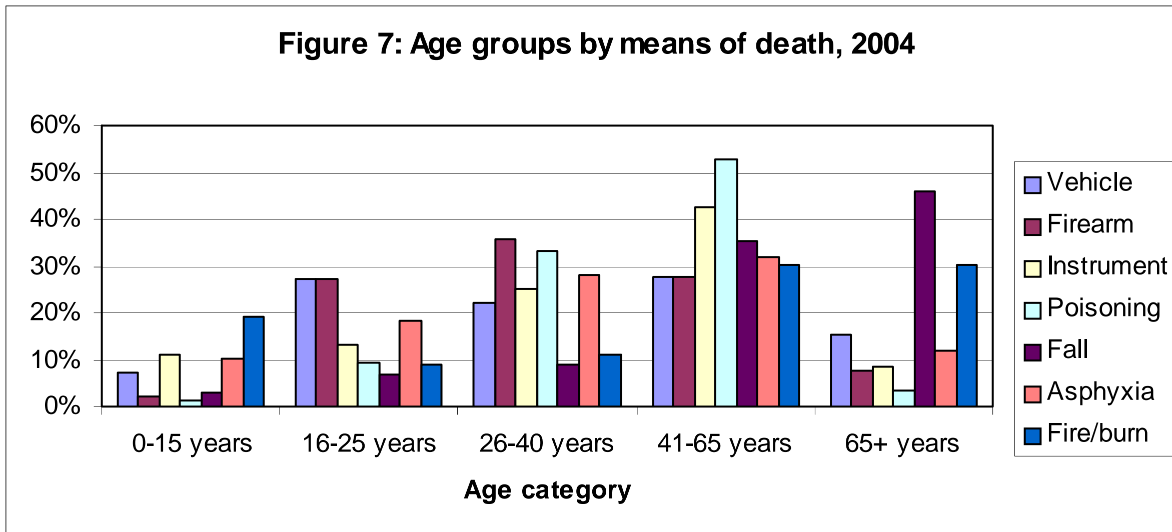
Means of Death

Figure 6 displays the non-natural deaths by their external cause, or the means of death, as classified by the Medical Examiner. Data for Wayne County are included in the analysis for 2002, 2003 and 2004, but have a much lower rate of completion of the means of death data fields than data from other counties in the database. For example, of the cases in the database with a non-natural manner of death (accident, suicide or homicide) from all counties excluding Wayne, 95% had a means of death specified in 2002, but of the cases from Wayne County, only 60% had a means of death attributed to them. The low percentage of specified means of death in Wayne County is largely due to the inconsistencies among data collection forms used in the field, as well as issues pertaining to the conversion of data from the Wayne County system to the MMEDB. It is likely that all means of death are underrepresented, but the most substantial differences between Wayne County and the rest of the database are among deaths due to vehicle crashes and falls.



Vehicle crashes were the leading non-natural means of death recorded in the MMEDB for all years except 2004, when firearm deaths (28%), followed by poisonings (20%), surpassed vehicle deaths (19%). There is an obvious increase in firearm and poisoning deaths with the inclusion of Wayne County data beginning in 2002. The proportion of all other means of death remained fairly constant from 2000 through 2004, with the exception of asphyxia, which nearly doubled between 2003 (8%) and 2004 (15%). SIDS and infectious disease were added as means of death categories in 2004 and are not included in the chart. There were 27 cases with a means of death classified as SIDS and 3 cases classified as infectious disease in 2004. The three cases of infectious disease were bacterial meningitis, tuberculosis and staph disease.

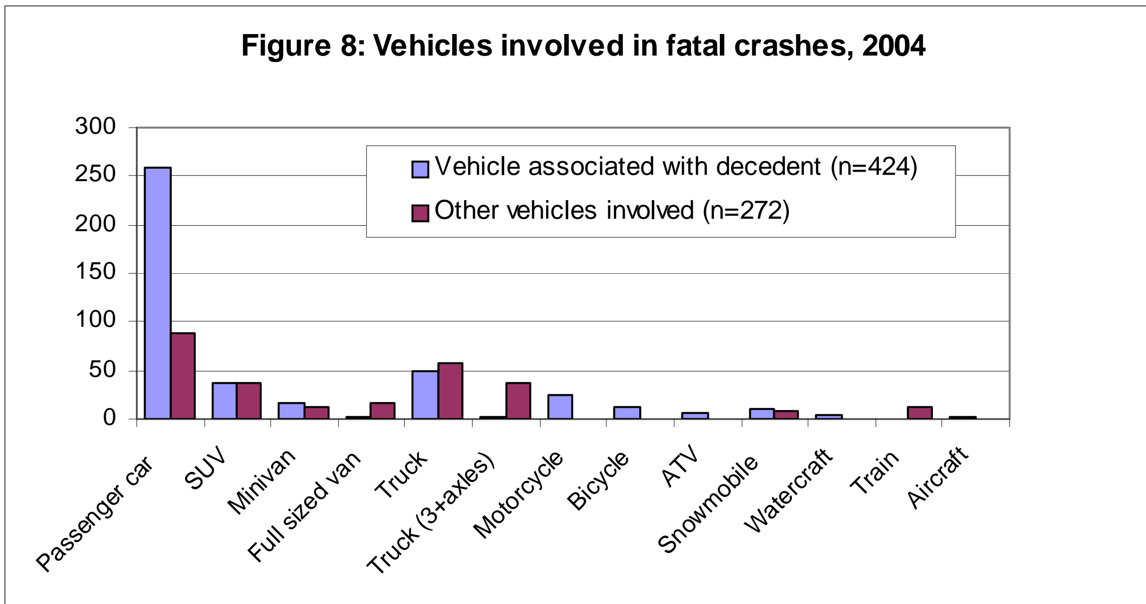
Selected means of death are broken down by age group for 2004 in Figure 7. Firearm deaths were most prevalent among the 26-40 year age group and poisonings were most prevalent among the 41-65 age group. Falls become a leading means of death among the older age groups, especially the 66 and older group. Each means of death will be discussed in more detail.



Vehicle Crashes

Age data were available for 490 cases where death was due to a fatal vehicle crash in 2004. Fatal vehicle crashes were most common among the 41-65 (28%) and 16-25 (27%) year age groups, followed by the 26 to 40 year age group (22%). Males comprised 67% of all deaths due to vehicle crashes; only in the 0-15 year age group did female decedents (64%, n=23) outnumber male decedents (36%, n=13). Note that the decedents were not necessarily the drivers of the vehicles in fatal vehicle crashes.

The types of vehicles involved in fatal crashes are presented in Figure 8. The blue bars show the type of vehicle the decedent was driving, or in which the decedent was a passenger. The maroon bars represent the other types of vehicles that were involved in fatal crashes between two or more vehicles, or between a pedestrian and a vehicle. Passenger cars were the most frequent vehicle type involved in fatal crashes, followed by two-axle trucks for both categories: vehicles associated with the decedent and other vehicles involved. Trucks (both two and three-axles) were more likely to be the “other vehicle involved” rather than the vehicle in which the decedent was driving or riding. Please note, an”other vehicle involved” will also be counted as a “vehicle associated with the decedent” (and vice-versa) in crashes where occupants of more than one involved vehicle die. In such instances, a case will be entered into the database for each decedent.



Among the cases in the database there were 49 pedestrians recorded as killed by vehicles in 2004. Data regarding safety device use were entered into the system in 446 instances of fatal vehicle crashes. Of these cases, 45% of decedents were wearing a seatbelt, were in a car seat or were wearing a helmet. Twenty percent of decedents for which safety information was collected were not utilizing appropriate safety devices.

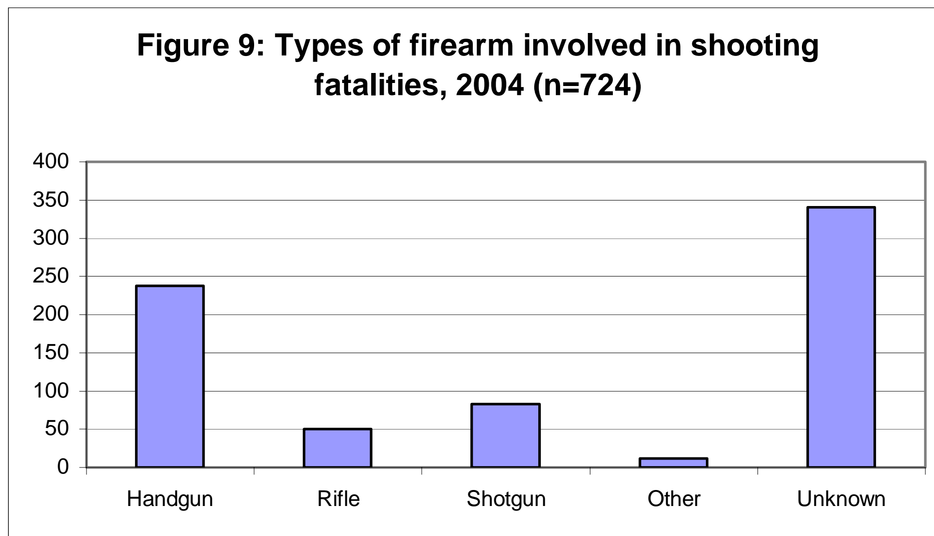
Of the 495 documented vehicle crash deaths, toxicology analysis was recoreded for 308 (62%) cases. Out of these 308 cases, 103 (32%) were found to be positive for alcohol use, and 87 (28%) were positive for drug use other than alcohol. Thirty-seven decedents tested positive for both alcohol and drug use. Of the cases that tested positive for alcohol and/or drug use, 67% were the drivers of the vehicle, 21% were passengers of a vehicle and 12% were pedestrians that were hit by a vehicle.

Firearms

Firearms were the means of death in 724 MMEDB cases in 2004. Deaths due to firearms were most common among the 26-40 year age group; 36% of firearm deaths occurred among persons in this age category. The second most likely age group to die due to a gunshot wound (28%) were 41-65 year olds followed by 16-25 year olds (27%). Firearm deaths recorded in the MMEDB increased by 86% (from 389 to 724) between 2003 and 2004. Additionally, while the proportion of suicides and homicides were equal in 2003 at 50% each, in 2004, 1% (n=4) of firearm deaths were classified as accidental, 37% (n=263) as suicides and 63% as homicides (n=447).

The types of firearms used in fatal shootings are depicted in Figure 9 below. Handguns (n=238) were the most commonly recorded type of firearm used in fatal shootings in 2004, followed by shotguns (n=83). The type of firearm used was not recorded in 47% (n=341) of firearm cases. This could be due to the fact that the gun is typically not left at the scene of a homicide and results of forensic testing are frequently not entered into

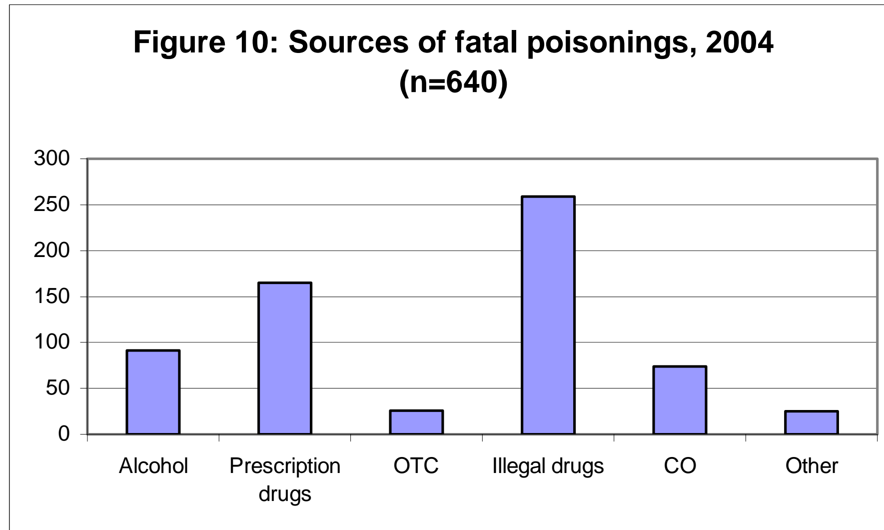
the database. In 2004, information on the type of gun used in a fatal shooting was gathered and recorded for 88% of suicide cases, but only 33% of homicide cases.



Instrument
There were 95 MMEDB deaths recorded as caused by an instrument in 2004. Deaths caused by a blunt or sharp object, such as a baseball bat or a knife, are classified as instrument deaths. Deaths due to an instrument were most common among the 41-65 year age group (45%, n=39) followed by the 26-40 year age group (25%, n=23). Three percent (n=3) of instrument deaths were classified as accidental, 10% (n=10) as suicide and 87% (n=79) as homicide.

Poisoning
In 2004, poisoning was the second most common means of non-natural death in the database with 539, or 20% of cases. Poisoning was the most common means of non-natural death among the 41-65 year age group, accounting for 32% (n=289) of non-natural deaths within this age group. For poisoning deaths with a determined manner of death, 83% (n=406) were classified as accidental and 17% (n=86) as suicide.

The sources of fatal poisonings are illustrated in Figure 10 below. Many cases in the database had more than one source of poisoning listed for a single case. Forty-eight percent of poisoning cases involved illegal drugs, 31% involved prescription drugs, 17% involved alcohol, 14% involved carbon monoxide and 5% involved over the counter medications.



Falls

There were 238 deaths due to falls entered into the MMEDB in 2004. The largest proportion of falls occurred in the over 65 year old age group (46%) followed by the 41-65 year age group (35%). Falls were most often caused by slipping/tripping (59%) followed by medical conditions (14%). Of the cases of falls with an assigned manner of death, 16 were classified as suicides, 12 as homicides and the remaining 187 as accidental or natural.

Asphyxia

There were 386 cases of death due to asphyxia in 2004. Fifty-two percent (n= 184) of all cases of death due to asphyxia were self-induced, 40% (n=143) were accidental and 8% (n=28) were classified as homicide.

Barriers Encountered

During the course of the Michigan Medical Examiner Database Initiative, the project met with several barriers that hindered the full realization of the project's goals and objectives. The barriers described below vary in nature and the project's attempts to overcome these barriers were met with mixed results.

Technological Barriers:

1. Inconsistent levels of computerization in Michigan counties

While recruiting counties to become partners in the MMEDB, it became clear that there were varying levels of technology used in Michigan ME offices. Many counties, especially those in the more rural areas of the state, infrequently used computers to enter and store the medical examiner cases. Such offices relied, and some still depend, on paper copies of cases stored in filing cabinets. Other ME offices used Excel

spreadsheets or an Access database to track their cases; however, there were a few counties that used electronic systems to store pertinent case information (i.e., means of death, cause of death, toxicological findings, etc…). Several counties have an electronic system that captures pertinent data but were not interested in adopting a new system. However, two of these counties chose to allow their data to be imported electronically into the system.

Several counties interested in participating continued to use their old systems to accommodate all of their administrative needs. To reduce the double data entry burdens for these counties, an administrative module was incorporated in 2004.

In counties where computers were not used at all, several strategies were used to facilitate participation. First, computers, loaned by MDCH, were distributed to counties that did not have them for the purpose of data entry. Second, demonstrations of the MMEDB system, as well as teaching the basics of using the Internet to enter the data into the web application, were conducted as needed. Lastly, for counties unable to access the Internet, project staff members entered their data.

2. Inconsistent classification for means of death across in Michigan

As previously mentioned in this report, the classification of the means of death varies across ME offices. There are a few situations where a means of death may be assigned to a case with a natural manner of death. For example, some MEs perceive a fall that results in a broken hip and leads to the eventual demise of a person to be a natural death, while other MEs would assign such a case an accidental cause of death. Infectious disease was added to the database as a possible means of death in 2004. It can be assumed that most cases of infectious disease have a natural manner of death, but in the case of a bioterrorism event the manner of death would be homicide.

Because of the variance in the means of death classification, the data that were entered into the MMEDB and the data that are submitted to the MDCH's Division for Vital Records and Health Statistics on death certificates may not portray a consistent picture of deaths in Michigan. It was the hope of this project that MMEDB staff could educate the MEs on the standards set forth for the classification of the means of death. However, because MEs have their own interpretations and without State mandated guidelines pertaining to this subject, a standardized reporting process across Michigan counties has yet to be achieved.

Recruitment Barriers:

The MMEDB set out to elicit the partnership of all 83 Michigan counties. Several barriers presented themselves to obtaining the full partnership and participation of all counties. Listed below are the primary barriers encountered during recruitment efforts.

1. Obtaining buy-in from local, county and state law enforcement agencies

One key barrier to recruitment involved the differing infrastructures of ME offices in Michigan. ME offices are administered by local health departments, law enforcement agencies, hospitals, private medical practices, and even out of the homes of the Chief ME. In addition, the level of cooperation among the ME office, the law enforcement agencies, and the local health department varies greatly across the state.

In the majority of counties, the Chief ME relies on local law enforcement to conduct the death scene investigations and to submit the information collected to the ME office. In many instances, even if the Chief ME wished to participate in the MMEDB, it was necessary to gain the buy-in and support of local law enforcement before proceeding. As a result, MMEDB staff spent time not only recruiting medical examiners, but local and state police departments as well. In an attempt to aid in the recruitment of the police departments, an endorsement from the Michigan State Police Department (MSP) was sought and received. The endorsement gave permission for all MSP posts to implement use of the Death Scene Investigation Report (DSIR) should the Chief ME of the county wish to do so. This endorsement proved to be valuable when communicating with the various MSP departments, as well as local and county police departments. Upon obtaining buy-in from the various police departments, trainings were conducted to show the scene investigators and ME offices how to use the DSIR and web-based system.

Several counties that employed separate death scene investigators, such as Muskegon, Calhoun, and Ottawa, agreed to participate early on in the project. These scene investigators found the ability to enter, store, and access data during the course of a case investigation valuable. In most cases, the implementation of this application was the first instance where this ability was possible.

2. Inconsistent death scene data collection in Michigan

One of the objectives of this project from the onset was to define a minimum standard dataset that should be collected during the course of a death scene investigation. This minimum standard was defined with the input from over twenty Michigan MEs, as well as representatives from the Centers for Disease Control and Prevention (CDC) and MDCH. The minimum standard for data collection was incorporated into the web application, as well as on the DSIR, and became known as the Core Data Set. This Core Data Set represented the data elements that MEs and health officials viewed as being the primary data elements that should be collected for every non-natural death.

Early in the implementation of this project, it became clear that many counties did not consistently collect the Core Data Set. As such, it was suggested by MMEDB staff that the DSIR be implemented and used as a check-list for scene investigators. Attempts to have counties fully implement the DSIR were met with mixed results. Most MEs, and especially those where the Chief ME served in more than one county, acknowledged that there were great inconsistencies in the information that was collected across counties. Some counties also suffered from inconsistencies in data collection within the

county due to established practices of different law enforcement agencies and ME office death scene investigators.

MMEDB staff, in conjunction with the ME office, held trainings on the use and implementation of the DSIR. While most agencies saw the value of consistency in data collection across counties and the need for a minimum standard for data collection across the state, several law enforcement agencies continued to collect death scene information in the manner that they had prior to the MMEDB Initiative. This occurred most frequently in counties where the ME office did not share a close working relationship with the law enforcement agencies involved in the death scene investigations.

3. MMEDB perceived as State interference

Another barrier to obtaining the participation of some counties was the perception that the MMEDB was an attempt by the State to mandate medical examiner office operations. This perception appeared to be most prevalent in rural counties. While this project has always maintained that participation is voluntary, some medical examiners resented being asked to collect the data elements in the Core Data Set and to share this data with the State and research organizations who might find it of value. The project attempted to alter the perceptions of these MEs by attending and presenting at the Michigan Association of Medical Examiners' (MAME) annual conference, distributing newsletters to keep all MEs informed of project status and developments, and offering technical assistance and training services to all counties as needed.

Several medical examiners expressed concerns regarding the security of the system and ownership of county data once entered into the system. MMEDB staff educated all prospective participating counties on the security measures and protocols put into place to protect data confidentiality and informed counties that they would always maintain ownership of their data. Even with such assurances, some medical examiners felt that the data should remain solely in the county's possession, even though anyone wishing to see the cases could make use of the Freedom of Information Act (FOIA). In short, some MEs saw themselves as the gatekeepers of their county data and believed it their duty to maintain sole possession of it. As one Chief ME stated, "if the state wants this data, the state should mandate it [participation in the MMEBD] by law".

4. Many MEs are not focused on public health surveillance

Another primary goal of this project was to build and maintain a unique data set of non-natural deaths that could be used by local and state health officials and researchers for health surveillance measures and injury prevention efforts. While many counties found the case management tool of the MMEDB enough of an incentive to participate, those that did not see the need to automate their office were asked to contribute their ME data for research and surveillance purposes.

Some MEs felt that their data would not make an impact toward these efforts due to the relatively low number of ME cases that rural counties encounter. It should be mentioned that this perception occurred more often in counties where the office of the medical examiner did not reside in the county health department. In these counties few MEs were willing to allocate resources to entering their data into the MMEDB. However, some MEs faxed or mailed their cases to MMEDB staff for data entry.

5. Reporting issues between ME offices and County Health Departments

Deaths that are attributed to infectious disease are mandated by law to be reported to the local health departments. Because many ME offices, especially those not residing in a local health department, seemed unaware of these requirements, an automated alert system was integrated into the web application. Based on the data entered, this system alerted the ME office that a case may be required to be reported to the local health department. Additionally, the form that was generated from the application contained all the pertinent information for the case, including the contact information for the local health department.

Furthermore, as project information and data collection spread across the state, health departments and epidemiologists became advocates for the project. To assist county health departments, MMEDB incorporated a separate level of access to the data contained in MMEDB that allowed health departments to view aggregate reports of county and state-wide data. In so doing, local county health departments had the ability to conduct health surveillance in a timely manner.

Lack of adequate funding for ME services across the State:

One primary obstacle encountered during the course of the project was the lack of resources for ME office operations. Funding obstacles produced two barriers.

1. Lack of adequate staff for ME offices

Due to budgetary constraints, especially in smaller rural counties, many ME offices were unable to provide support staff for the Chief ME. In these counties, MEs were paid a small stipend, or in a few cases, not at all. In many instances, where the Chief ME also maintained a private medical practice, his office staff would serve as ME office staff. Because the staff's primary purpose is to support and maintain the private practice, very little extra time could be devoted to ME functions such as data entry. In these situations, MMEDB staff assisted by performing data entry either on an on-going basis, or at times when the ME office fell behind in the data entry of cases.

2. Costs for ME support services rising

While ME offices across the state have had to endure budget reductions, the costs associated with ME support services such as autopsies and toxicology reports have increased. Increasing costs have caused many counties to bid out contracts for these

services to other hospitals. In some instances, these hospitals are located over a hundred miles away. Many MEs, especially those in rural areas, are forced to be less involved with the entire death investigation, as the scene is investigated by law enforcement personnel and the autopsy and toxicological information are performed off site. Because of the different agencies and counties involved with these cases, obtaining the scene investigation and forensic data posed a challenge for this project. In many instances, MMEDB staff were responsible for obtaining this data by traveling to the county, copying the files, and entering the data.

Benefits

1. Improved data collection

With the implementation of the DSIR across the state, the quality and consistency of the data collected during a death investigation improved. The DSIR served as a check-list for scene investigators and provided a standardized set of data. MMEDB staff found instances where counties had refused to participate in the project, yet still implemented the DSIR for its scene investigators to use during the course of an investigation. MEs who serve as the Chief ME for multiple counties valued the ability to collect standardized data across counties and make comparisons between counties under their jurisdiction.

2. Improved technological capacity for ME offices

Due in large part to the technical training and assistance that MMEDB staff gave to counties, many ME offices now use computers to enter and track case information. This benefit is mostly seen in the smaller, rural counties where previously no electronic case management was being conducted.

3. Improved information sharing between ME offices and local health departments

In counties where the office of the ME resided outside of the local health department, the Chief MEs were often not aware of the diseases that were required to be reported to the local health departments and the time frame in which to report the case. To assist ME offices, MMEDB added the infectious disease alert in 2004 that prompted ME offices to report appropriate cases to the local health department. It also provided the contact information for the local health department and the time frame in which the case needed to be reported.

Reports designed specifically for health departments were integrated into the web application and allowed health officers to view aggregated mortality statistics for county residents without violating the confidentiality of specific case information. This tool allowed health departments to monitor the deaths that occurred within a county in a timelier manner.

4. ME data shared with research organizations

Because the ME data is stored centrally, it can and has been shared (with permission of the MEs) with organizations such as the Consumer Protection Safety Commission (CPSC), Michigan Fatality and Control Evaluation (MIFace), and the Michigan Intimate Partner Violence Surveillance System (IPVSS) to further their research and injury control efforts.

5. ME offices and health departments able to conduct analysis of mortality data

The data in the MMEDB can be viewed and used by ME offices and health departments for further analysis. One such instance was Kent County's analysis and identification of a statistical anomaly relating to heroin deaths. The county, using MMEDB data, implemented a county-wide educational program to reduce the number of deaths related to heroin use. It is believed that lives were saved due, in part, to this intervention.

Recommendations

To address the barriers that have been identified and to enhance the delivery of services from ME offices throughout Michigan, MMEDB makes the following recommendations.

1. Enhance information sharing between ME offices and local health departments

Prior to the MMEDB, there was little collaboration between ME offices and local health departments in counties where the ME had no affiliation with the Health Department. This lack of collaboration may have affected the reporting of communicable diseases to the Health Department as mandated by Michigan law.

It is recommended that ME offices be encouraged by the State to maintain and enhance the reporting of deaths due to specific communicable diseases. However, information shared with the local health department should not be limited to deaths caused by communicable conditions. Many local health departments are interested in all deaths, natural and non-natural, for health surveillance purposes. As mentioned previously, in 2000 the Kent County Health Department was informed that tainted heroin was associated with a number of deaths. The Health Department initiated a media campaign to alert the public of this danger. The number of deaths attributed to heroin use dropped by 39% the following year. While no direct correlation can be derived from the media campaign, the timely information the Kent County Health Department was able to receive from the ME office was vital to the media campaign.

2. Standardize the data collection processes in Michigan

If the data collected by ME offices in Michigan are to have value to State agencies and researchers, the same data needs to be collected from all ME offices. Furthermore, the minimum standards for data collection, (as defined by MEs, representatives from the CDC, and representatives from MDCH), should be incorporated in all counties.

The use of the DSIR by counties streamlined the manner in which information was collected at a death scene. It provided the scene investigator a check-list of the information that was to be collected and aided in removing the guesswork from investigators who were unsure what information was needed for a complete death scene investigation. The DSIR includes data elements that are essential for a medical investigation, in addition to a law enforcement investigation.

It is hoped that those counties that have implemented the DSIR for data collection will continue to use the form after the MMEDB's end and that the use of the DSIR will continue to proliferate to other counties. Minimum standards for death scene data collection would allow comparisons of mortality statistics among counties and state regions, as well as give value to the data collected for State injury prevention measures, health surveillance efforts, and mortality research initiatives.

3. Enhance delivery of services for ME Offices in Michigan

Some ME offices were met with resistance when trying to modify the manner in which death scene investigations were being conducted, as well as the information that was gathered at these scenes. In most cases it was the law enforcement agency collecting death scene information that was opposed to change.

As the ME is best qualified to know what medical information is needed during a death scene investigation, it is recommended that State, county and local law enforcement agencies be encouraged to collaborate with and accept guidance from the Chief ME on the procedures and policies for a death scene investigation. In doing so, the inconsistencies that occur in death scene investigations across the state may be lessened.

In many counties, ME offices lacked staff support, computers, and even office space to conduct their operations. Because medical examiners have the last word in non-natural, unexpected, or suspicious deaths, it seems fitting that they be given the appropriate resources to operate their offices.

In other states, information collected by MEs is distributed to other state agencies that can make use of it, such as highway safety agencies and community health agencies. For example, in Wisconsin the information collected by MEs is used to supplement information in the Health Alert Network (HAN) system, allowing for much more timely alerts in instances of infectious disease outbreaks.

To enhance the delivery of ME services, Michigan could; 1) provide additional resources to ME offices, 2) provide clear mandates as to the responsibilities of the ME offices, and 3) distribute ME information to other state agencies to further their efforts.

Conclusion

For the last seven years, this project has attempted to elicit the participation of ME offices across the state. In doing so, a data set has been built that allowed researchers to begin to answer the questions of "how," "where," and "why" non-natural deaths are occurring in Michigan. The data presented in this report are meant to assist public health surveillance efforts. Although the project was not able to achieve its goal of 100% participation of Michigan counties, it is believed that the data presented in this report begins to portray the non-natural deaths that occur in Michigan.

The three primary goals for this project included:

- To offer MEs in Michigan an electronic case management tool to assist in the operations of their offices.
- To build a data set that could be used by the state, local health departments, and research organizations to further the efforts of health surveillance and injury prevention.
- To standardize data collection across the State by developing a Core Data Set, derived from the input of MEs, the CDC, and State health officers, to be collected during the course of a death scene investigation.

While the project's goals were not fully achieved, great strides were made over the course of the project. The MMEDB web application was developed and modified several times to meet the changing needs of ME offices. A data set was created that was used by the State, local health departments, and research organizations. The implementation of the DSIR improved data collection that was conducted during the course of a scene investigation. Since similar data was being collected in many counties, comparisons could be made at the county or regional level.

While there have been many successes derived from the implementation of this project, further efforts need to be made to bring the services rendered by Michigan ME offices into the twenty-first century.

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