A REPORT FROM THE
VIRGINIA MATERNAL MORTALITY REVIEW TEAM

PREGNANCY-ASSOCIATED MATERNAL DEATH IN VIRGINIA 1999-2001

EXECUTIVE SUMMARY AND RECOMMENDATIONS

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VIRGINIA DEPARTMENT OF HEALTH
OFFICE OF THE CHIEF MEDICAL EXAMINER

Virginia Maternal Mortality Review Team

2007 REPORT

EXECUTIVE SUMMARY

Mission Statement

Virginia's Maternal Mortality Review Team is dedicated to the identification of all maternal deaths in the Commonwealth and the development of interventions that reduce preventable deaths.

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EXECUTIVE SUMMARY

This report presents findings and recommendations from the Virginia Maternal Mortality Review Team (MMRT). This Team reviews all cases of death occurring in the Commonwealth of Virginia to a Virginia resident who was either pregnant at the time of death or had a pregnancy in the year prior to death. The purpose of this review is to identify factors that contributed to death and develop public health strategies to prevent similar deaths in the future.

Through its review, the Team discovered that women who died within one year of pregnancy received services in settings where assessments, prevention efforts, treatments, referrals, and/or interventions might have changed the outcome. By describing these deaths and locating the systems in which women were already involved, public health initiatives can be identified to reduce morbidity and mortality.

With few exceptions, each of the women whose cases were reviewed by the MMRT had been seen in doctor's offices, hospitals, community service agencies, or by law enforcement agents during or soon after their pregnancies.

Maternal death review has a long history in Virginia. In 1928, the Medical Society of Virginia (MSV) began conducting systematic review of deaths that occurred during pregnancy and childbirth. MSV's efforts continued well into the 1990's. By that time, morbidity and mortality during pregnancy and childbirth had become issues of public health importance. During the 1990's the Virginia Department of Health (VDH) joined forces with the Medical Society of Virginia in their efforts to continue reviews of deaths to pregnant and postpartum women.

In 2001, with support from the Centers for Disease Control and Prevention (CDC), the VDH restructured maternal death review. The VDH Office of Family Health Services and the VDH Office of the Chief Medical Examiner partnered to establish the Virginia Maternal Mortality Review Team. This multidisciplinary Team chose to adopt the broad definition of maternal death, pregnancy-associated death, for its review. Pregnancy-associated death refers not only to those deaths that occurred as a direct result of a pregnancy but also to deaths that occurred within one year of a pregnancy irrespective of the cause of death. There are several important reasons for using the expanded definition. Review of these cases results in better identification of populations at risk for both natural and violent causes of morbidity and mortality. The relationship between violence and pregnancy is a newly recognized phenomenon requiring further study. Also, using the broad definition of pregnancy-associated death allows for examination of the systems, agencies, and organizations that serve women during pregnancy and the postpartum period. Strengths, gaps, and the need for additional resources can be identified. The Team can then make suggestions for intervention and prevention strategies to reduce deaths that apply to a wide array of service providers -- prenatal health care providers, social workers, psychiatrists, emergency care providers, dieticians, healthcare facility administrators, advocates, and law enforcement agents.

With few exceptions, each of the women whose cases were reviewed by the MMRT had been seen in doctor's offices, hospitals, community service agencies, or by law enforcement agents during or soon after their pregnancies. The Team asked several questions: Which

agencies met this woman in the five years before her pregnancy? Who might have gathered more information, provided additional resources, and/or sought alternatives to address an identified need? Had someone known that violence or a serious mental illness or substance abuse was an ongoing problem, or known that once Medicaid insurance coverage for the pregnancy ended that no follow-up for chronic illness would be obtained, might they have attempted to steer her toward a resolution of these problems?

The Team chose to focus on five areas for this report: racial disparity, motor vehicle collisions, substance abuse, mental illness, and domestic violence.

The women whose cases were reviewed were young women whose deaths were premature. They were 14 to 46 years old with a median age of 29 years. Approximately one in five (22.3%) of the deaths were to women over the age of 35. Half (50.4%) of the women were White, 43.0% were Black, and 6.6% were of another race. The highest percentage (47.9%) had a high school education. Married women comprised 48.8% of all cases while 42.9% were never married. The majority (52.8%) of deaths were due to natural causes. Violent deaths accounted for 45.5% of all cases and included unintentional injury (25.7%), homicide (14.0%), and suicide (5.8%).

Fewer than half (42.1%) of the women began prenatal care in the first trimester of their pregnancies. Close to half (44.6%) had private insurance to cover the cost of care while one-third (33.1%) were covered by Medicaid. Roughly half of the women had vaginal deliveries (49.6%) followed by primary Cesarean sections (24.0%) and repeat Cesarean sections (9.1%). Three-fourths of the women (74.4%) delivered a live infant while fifteen women (12.4%) were pregnant when they died.

The Team found that nearly half (47.1%) of the women had died by 42 days (six weeks) after the end of the pregnancy. They noted the significance of this interval in so many cases because the postpartum visit typically takes place at six weeks. This visit reflects an important opportunity for assessment and referral. The Team's findings support the need for earlier follow-up by healthcare providers after delivery.

This report identifies contributors to pregnancy-associated mortality in Virginia as determined through review of 121 cases of pregnancy-associated deaths from the years 1999-2001. The Team chose to focus on five factors for this report: racial disparity, motor vehicle collisions, substance abuse, mental illness, and domestic violence. Major findings for each factor are discussed below. The Maternal Mortality Review Team offers recommendations to address these factors to reduce deaths in the Commonwealth.

Racial Disparity

Virginia's Maternal Mortality Review Team confirmed that racial disparity in maternal death is a significant problem.[1] The overall maternal mortality ratio[2] in Virginia for the three year

[1] The population of Virginia was 7,078,515 in 2000. Roughly 72% of the population was White and 20% was Black. There were a total of 96,759 live births in Virginia during 2000. Births to White women totaled 67,232 and births to Black women totaled 22,302.

[2] The pregnancy-associated maternal mortality ratio is the number of pregnancy-associated maternal deaths divided by the number of live births then multiplied by 100,000.

period of the review was 42.2. The ratio of deaths among Black women is more than double the ratio of deaths among White women -- 78.4 and 30.5 respectively.

Black women tended to enter prenatal care during the second trimester of pregnancy (14.1 weeks estimated gestational age) while White women entered care earlier (11.7 weeks estimated gestational age). Black women had fewer prenatal care visits (10 for Black women and 12 for White women) and delivered their babies earlier (37.6 weeks) than White women (38.1 weeks).

The leading types of death among White women were all violent: motor vehicle incidents, homicide, suicide, and accidental overdoses. For Black women, the leading death types were a combination of natural and violent types: homicide, cardiac disease, motor vehicle incidents, cardiomyopathy, and pulmonary embolism.

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Motor Vehicle Collisions

The Team reviewed 22 cases of motor vehicle collision deaths over the three year period. This death type represents the largest number of pregnancy-associated deaths. The women who died in a motor vehicle collision were primarily young (median age was 25 years old), single (72.7%), and had obtained at least a high school education. Just over one-quarter of these women (27.2%) were pregnant at the time of death. Over half (54.5%) were not using safety equipment at the time of the fatal incident. The driver of the vehicle had a blood alcohol content above the legal limit (at or over 0.08%) in 18.2% of cases of motor vehicle related deaths.

Substance Abuse, Mental Illness, and Domestic Violence

Team members were surprised to discover the severity of problems associated with substance abuse, mental illness, and domestic violence and how often these factors contributed to maternal death. Often, there was no indication of the risks in the medical records reviewed by the Team even though almost all of the women had recent involvement with healthcare providers, usually obstetricians or a hospital, prior to their death. More commonly, these problems were revealed in records generated after they died. The median length of time between the end of pregnancy and death for women with mental health problems was 98 days, 105 days for women with domestic violence risk, and 116 days for those with substance abuse issues.

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Team review of all records revealed that 38 women (31.4% of all cases) were at risk for problems related to substance use/abuse, and in 35 cases, the Team determined that substance use contributed to death.

More than one-third (36.8%) of women with a substance abuse risk were known to have used alcohol during pregnancy and over a quarter (28.9%) were known to have used other drugs during their pregnancy. The majority of the women identified with a substance abuse risk died a violent death. Twenty-one percent were victims of homicide, 18.4% died from accidental overdoses, 13.2% committed suicide, and 10.5% died in motor vehicle incidents.

Of the 27 women identified with a risk for mental illness, slightly more than half died a violent death. Twenty-two percent of these women committed suicide, 11.1% died in motor vehicle collisions, 11.1% died from accidental overdoses, and 7.4% were homicide victims. Forty-three percent of the suicides occurred between two and four months after the end of the pregnancy while the remaining 57.0% occurred five to eight months after the pregnancy. In three of the seven cases of suicide, the Team determined that the suicide was directly related to the pregnancy.

The Team determined that 46.3% of pregnancy-associated deaths were preventable.

Twenty women were identified with a risk for domestic violence and in 17 cases, the Team determined that domestic violence was a direct contributing factor in the death. Forty-five percent of women with a risk for domestic violence died from homicide, 15.0% in motor vehicle collisions, and 15.0% from accidental overdoses. Five percent died from suicide and an additional 5.0% were undetermined in cause and manner. In 13 cases, the homicide perpetrator was an ex-boyfriend, boyfriend, husband, acquaintance, or family member. In over three-fourths of those cases, there was known conflict between the decedent and perpetrator at the time of death.

As each case was reviewed, the MMRT determined whether a reasonable change in one or more factors may have altered the outcome. Overall, the Team determined that 46.3% of pregnancy-associated maternal deaths were preventable. Nearly one-third (32.8%) of natural deaths and well over one-half (63.7%) of violent deaths were determined to be preventable.

Based on these findings, the Maternal Mortality Review Team offers the following recommendations for reducing pregnancy-associated maternal deaths in the Commonwealth of Virginia. These recommendations are offered in the spirit of public health to the Governor, Members of the General Assembly, healthcare professionals, community services providers, law enforcement officers, and citizens of the Commonwealth.

Team Recommendations

Funding

1. The General Assembly should provide additional funds to support domestic violence prevention and intervention efforts in the Commonwealth.
2. The General Assembly should provide funding to treat substance abuse among pregnant and postpartum women. This should include expansion of intensive outpatient and home visitation services.
3. The General Assembly should provide funds to the Virginia Department of Health for prenatal services, including case management and home visitation services.
4. The General Assembly should provide funding to expand the Department of Medical Assistance Services' Family Planning Waiver to include assessment and treatment for mental health and substance abuse as needed.

Legislation

The Maternal Mortality Review Team supports strengthening laws related to medical history screening and the care and well-being of pregnant and postpartum women. Where there are recommended additions to the *Code of Virginia,* they are indicated by italicized text. Recommended subtractions are noted with strike-through text.

1. The General Assembly should enact legislation requiring the Department of Medical Assistance Services and all other third-party payers to provide payment for screening and management of substance abuse, domestic violence, and mental health problems including perinatal depression.
2. The General Assembly should amend and reenact *§37.2-407* of the *Code of Virginia* referring to treatment of pregnant women with substance abuse with the following amendment:

   The Board shall adopt regulations that ensure that providers licensed to offer *mental health and/or* substance abuse services develop policies and procedures for the timely and appropriate treatment of pregnant *and/or postpartum* women with *mental health conditions and/or* substance abuse. *These policies shall reflect a provision that services shall be initiated within 48 hours of a request for service for a pregnant and/or postpartum woman.*
3. The Commonwealth of Virginia should enact a primary seat belt law.
4. The General Assembly is encouraged to amend and re-enact *§46.2-1094* of the *Code of Virginia* referring to occupants of front seats of motor vehicles to use safety lap belts and shoulder harnesses. The Team recommends specific statute changes as follows:

   A. Each person at least sixteen years of age and occupying ~~the front seat~~ *any seat* of a motor vehicle equipped or required by the provisions of this title to be equipped with a safety belt system, consisting of lap belts, shoulder harnesses, combinations thereof or similar devices, shall wear the appropriate safety belt system at all times while the motor vehicle is in motion on any public highway. A child under the age of sixteen years, however, shall be protected as required by the provisions of this chapter.

   B. This section shall not apply to:

      1. Any person for whom a licensed physician determines that the use of such safety belt system would be impractical by reason of such person's physical condition or other medical reason, provided the person so exempted carries on his person or in the vehicle a signed written statement of the physician identifying the exempted person and stating the grounds for the exemption; or
      2. Any law-enforcement officer transporting persons in custody or traveling in circumstances which render the wearing of such safety belt system impractical; or
      3. Any person while driving a motor vehicle and performing the duties of a rural mail carrier for the United States Postal Service; or

4. Any person driving a motor vehicle and performing the duties of a rural newspaper route carrier, newspaper bundle hauler or newspaper rack carrier; or
5. Drivers of taxicabs; or
6. Personnel of commercial or municipal vehicles while actually engaged in the collection or delivery of goods or services, including but not limited to solid waste, where such collection or delivery requires the personnel to exit and enter the cab of the vehicle with such frequency and regularity so as to render the use of safety belt systems impractical and the safety benefits derived there from insignificant. Such personnel shall resume the use of safety belt systems when actual collection or delivery has ceased or when the vehicle is in transit to or from a point of final disposition or disposal, including but not limited to solid waste facilities, terminals, or other location where the vehicle may be principally garaged; or
7. Any person driving a motor vehicle and performing the duties of a utility meter reader; or
8. Law-enforcement agency personnel driving motor vehicles to enforce laws governing motor vehicle parking.

C. Any person who violates this section shall be subject to a civil penalty of ~~twenty-five~~ *fifty* dollars to be paid into the state treasury. *Twenty-five dollars shall* be credited to the Literary Fund *and twenty-five dollars credited to the Virginia Department of Health, Office of Family Health Services to be used for public health education on seat belt usage.* No assignment of demerit points shall be made under Article 19 of chapter 3 of this title and no court costs shall be assessed for violations of this section.

D. A violation of this section shall not constitute negligence, be considered in mitigation of damages of whatever nature, be admissible in evidence or be the subject of comment by counsel in any action for the recovery of damages arising out of the operation, ownership, or maintenance of a motor vehicle, nor shall anything in this section change any existing law, rule, or procedure pertaining to any such civil action.

E. A violation of this section may be charged on the uniform traffic summons form.

~~F. No citation for a violation of this section shall be issued unless the officer issuing such citation has cause to stop or arrest the driver of such motor vehicle for the violation of some other provision of this code or local ordinance relating to the operation, ownership, or maintenance of a motor vehicle or any criminal statute.~~

G. The governing body of any city having a population of at least 66,000 but no more than 67,000 may adopt an ordinance not consistent with the provisions of this section, requiring the use of safety belt systems. The penalty for violating any such ordinance shall not exceed a fine or civil penalty of ~~twenty-five~~ *fifty* dollars.

Enforcement

1. Law enforcement agencies should enforce domestic violence laws and hold abusers accountable.

Virginia Department of Health

1. The Office of Family Health Services should provide a culturally competent public health education campaign on the use of seat belts by pregnant women.

Virginia Department of Mental Health, Mental Retardation and Substance Abuse Services

1. The Department of Mental Health, Mental Retardation and Substance Abuse Services should take the lead in working with appropriate agencies to propose a statewide substance abuse and mental health screening program protocol for all pregnant women as provided in *§54.1-2403*.1 of the *Code of Virginia*.

Healthcare Providers and their Professional Organizations

1. The Virginia Section of the American College of Obstetricians and Gynecologists and the Virginia Chapter of the American College of Nurse-Midwives should encourage its members to provide a two week postpartum follow-up visit.
2. The Virginia Board of Pharmacy should alert and train all licensed prescribers in the utilization of the Virginia Prescription Monitoring Program.

Education for Healthcare Providers

1. The Virginia Department of Health, Office of Minority Health should create cultural competency training programs for all personnel involved in the care of pregnant and postpartum women.
2. The Department of Health Professions should require four hours of continuing learning activities on domestic violence and substance abuse for all license renewal.

Third Party Payers

1. All public and private third party payers should expand Maternity Management Programs to include mental health, substance abuse, and domestic violence.

Community Initiatives

1. Community health centers should apply for changes in scope of services and seek funding to include perinatal care and care of women with mental illnesses and substance abuse.
2. The Virginia Department of Health and the Virginia Sexual and Domestic Violence Action Alliance should provide written resources on domestic violence for dissemination to patients in every healthcare provider's office.
3. Working with the Virginia Sexual and Domestic Violence Action Alliance, all local school divisions should strengthen domestic violence primary prevention (including dating violence prevention) in their Family Life curriculum.

Virginia Department of Health, Division of Vital Records

The Division of Vital Records should adopt the Centers for Disease Control and Prevention's proposed revision of Section 28b of the Certificate of Death as follows:

IF FEMALE:

- Not pregnant within past year
- Not pregnant, but pregnant within 42 days of death
- Not pregnant, but pregnant 43 days to 1 year before death
- Pregnant at the time of death
- Unknown if pregnant within the past year

This report is available at the following website:

http://www.vdh.virginia.gov/medexam/maternalmortality.htm

Or by calling:

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