This month's newsletter has 2 articles. The first is an article written jointly by EMS Physicians Alson and Nelson, in collaboration with the Chief Medical Examiner, Dr. Radisch. It is a review of what qualifies as a medical examiner's case. There has been some confusion about what is a medical examiner case. Some EMS agencies have also had problems finding physicians to sign death certificates. OEMS staff, Medical Examiner staff, and the NC Medical Board have been having multiple discussions regarding this topic. This article, in this edition, is important because Dr. Radish is the Chief Medical Examiner for North Carolina. It addresses many of the issues surrounding what is a medical examiner case and who can sign a death certificate.

In this issue, there is also a review of the pressors dopamine and phenylephrine. We thought this was an important article given the recent addition of phenylephrine to the list of NC Medical Board approved medications. The article is written by Robert Pippin a PharmD at the emergency department at Baptist hospital in Winston-Salem. There are also comments at the end of the article by Dr. John Gilliard, an emergency medicine physician and intensive care physician. Dr. Gilliard is also a former paramedic.

The protocol approval process is also quickly moving ahead. There is a map included which shows which counties have had their protocols approved. Please remember that the deadline to have local protocols approved is July 15th. In addition please remember to visit http://www.ncems.org/nccep2012.html to check if additions or changes have been made to any of the protocols. We have also been getting some questions relating to the legend used in the protocols. I am including a copy of the protocol legend in this newsletter. Some people were concerned that medical responders were not mentioned. Please note on the legend that they are denoted by a clear box.

As always, please remember that this newsletter does not reflect the official position of the Office of EMS. It is also not meant to take the place of or contradict local medical direction. Any questions or concerns regarding local care should be referred to the local medical directors. We are looking for interesting articles pertinent to EMS in North Carolina. Please do not hesitate to contact me for questions, concerns, or possible articles. My email is jwinslow@wakehealth.edu.
Over the past decade a growing number of Emergency Medical Service (EMS) Systems in North Carolina have experienced problems when attempting to obtain a primary care physician to certify the death of a patient. Many legitimate reasons exist including a growing number of people without a primary care physician, loss of insurance and self-terminating their patient-physician relationship as well as patients who rarely visit their physician. However often EMS personnel find themselves with a deceased subject of natural causes where a primary care physician is easily identified and yet declines to certify the death. This leads to numerous problems including extended out-of-service time for the EMS unit, unnecessary use of manpower and in many cases unnecessary delay of funeral arrangements for the family of the deceased, which may prolong the grieving process and interfere with emotional closure.

What determines if a death is a medical examiners case?

This discussion cannot be complete without clarifying what actually places a death within the jurisdiction of the medical examiner in North Carolina. Untimely, violent, unusual, suspicious deaths from external causes and unattended deaths are by definition medical examiner cases and include deaths:
- involving or suspected of involving homicide or suicide,
- involving trauma, accident or violence,
- involving disaster,
- involving unknown, unnatural or suspicious circumstances,
- while in custody of law enforcement including jail and / or prison,
- in a State-operated mental health facilities,
- involving poison or suspicion of poison,
- due to public health hazard (epidemic, communicable disease,)
- during surgical or anesthetic procedures,
- that are sudden, unexpected and NOT reasonably related to previous disease,
- that is without medical attendance.

While the aforementioned define instances where the medical examiner must be notified, it is at the discretion of the medical examiner as to whether a given death is or is not within their jurisdiction. In cases of violent or traumatic injury / accident the medical examiner must investigate, regardless of duration of survival following the injury / accident.
What is an unattended death?

Unattended deaths commonly cause confusion. Generally an unattended death occurs where the decedent has no primary or treating physician and sudden, unexpected death occurs where the decedent does not have a well-documented illness that would explain death (such as deaths in young adults, children, and infants, including possible SIDS cases). Law enforcement and / or EMS personnel often may contact a physician concerning a decedent where death occurred at home or in other cases where the situation clearly or most probably do not fall under medical examiner jurisdiction. In these instances, the medical examiner is prohibited from assuming jurisdiction.

Who is responsible for signing the death certificate of a natural death?

Natural deaths are covered under the authority of North Carolina General Statute (NCGS) 130A-115 and North Carolina Administrative Code. These state that the physician who last treated the deceased is responsible for completing the cause-of-death on the death certificate. If that physician is not available, the physician who pronounces the death may complete the cause-of-death portion of the death certificate. When the last treating physician is not available, an associate or an on-call physician may sign the death certificate. On October 1, 2011 Session Law 2011-197 House Bill 331 now allows physician assistants and nurse practitioners to sign death certificates where death is of a natural cause. Even where the supervising physician declines to sign the death certificate, the mid-level provider may sign assuming it is a natural death.

Why are death certificates necessary?

Accurate data about deaths in North Carolina are important for health and safety research and for public health programs to reduce infant mortality and the spread of communicable diseases. NCGS 130A-115 requires the attending physician or medical examiner to complete cause-of-death information and sign each death certificate within three (3) days following death. This statute also requires the funeral director who first assumes custody of a body to prepare the death certificate, secure the physician's signature and file the certificate-of-death with the appropriate health department within five (5) days following death.
Under what circumstances are forensic autopsies performed in North Carolina?

- homicides and suspected homicides,
- suspected drug related deaths, illicit or prescription,
- hit and run accidents,
- victims alleged to have been lying in the roadway or on railroad tracks before being struck,
- pilots and crew in aircraft crashes, private and commercial,
- sudden, unexpected deaths where the decedent does not have a well-documented illness that would explain death (All such deaths in young adults, children, and infants, including possible SIDS cases, should be autopsied. Deaths in the elderly should be considered on a case-by-case basis.)
- suspicious or contested suicides,
- accidental deaths where the observable injuries do not appear sufficient to explain death or is inconsistent with the alleged “accident,”
- possible public health hazard when the autopsy is the most expeditious means of determining whether in fact a hazard exists,
- law enforcement insistence,
- badly burned (charred) bodies,
- badly disfigured bodies when identification may be an issue, especially if there are multiple fatalities,
- skeletonized remains,
- badly decomposed remains,
- any death where there is a reasonable suspicion that trauma (external force) may have been the cause or a contributing cause and an autopsy will settle the issue.
- apparently natural deaths in known alcoholics and drug abusers,
- deaths of travelers, vacationers, convention attendees, workers, students, and other strangers from afar should be carefully evaluated before a decision NOT to autopsy is made.
Timely and correct completion of death certificates and proper disposition of the deceased are important for a variety of reasons. These include, but are not limited to, returning EMS and Law Enforcement crews back to service, greater satisfaction for EMS crews, and timely funeral services for the decedent, as well as improved grieving process and improved closure for loved-ones.
Phenylephrine was recently approved by the North Carolina Medical Board for use by paramedics. The following highlights some of the differences between phenylephrine and dopamine.

While both phenylephrine and dopamine may have similar results in patients, the way they get these results is very different. Dopamine works on a variety of receptors to raise blood pressure by increasing vascular resistance, heart rate, and heart contractility. Phenylephrine raises blood pressure by increasing vascular resistance without increasing heart rate or contractility. This makes phenylephrine an attractive option in patients that are tachycardic.

Dopamine and phenylephrine both should be infused in a central line if possible since both can cause significant tissue damage from extravasation. Some believe that phenylephrine might cause less local tissue damage than dopamine, but there is considerable debate and little evidence either way. For patients on higher doses of phenylephrine care should be taken to monitor closely for any signs of tissue necrosis secondary to systemic vasoconstriction. Phenylephrine should be avoided in patients with heart block or severe coronary artery disease because it can potentially lower cardiac output. Bradycardia is also a rare side effect of phenylephrine. One side effect of dopamine to highlight is the risk for tachyarrhythmias, particularly at high doses greater than 20 mcg/kg/min. Phenylephrine dosing varies, but generally drips are started at 10-20 mcg/min range and titrated. The following chart lists some general information about each drug.
<table>
<thead>
<tr>
<th></th>
<th>Dopamine</th>
<th>Phenylephrine</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Half Life</strong></td>
<td>2 minutes</td>
<td>About 5 minutes</td>
</tr>
<tr>
<td><strong>Onset</strong></td>
<td>5 minutes</td>
<td>1 minute</td>
</tr>
<tr>
<td><strong>Duration</strong></td>
<td>Less than 10 minutes</td>
<td>About 15 minutes</td>
</tr>
<tr>
<td><strong>Adjustment interval</strong></td>
<td>10 minutes</td>
<td>10-15 minutes</td>
</tr>
<tr>
<td><strong>Dosing</strong></td>
<td>Low 1-5 mcg/kg/min</td>
<td>5-200 mcg/min OR 0.5 mcg/kg/min for weight based dosing</td>
</tr>
<tr>
<td></td>
<td>Medium 5-15 mcg/kg/min</td>
<td></td>
</tr>
<tr>
<td></td>
<td>High &gt;15 mcg/kg/min</td>
<td></td>
</tr>
<tr>
<td><strong>Major Side Effects</strong></td>
<td>Risk of tachyarrhythmias at doses greater than 20 mcg/ kg/min. Tachycardia, angina pain</td>
<td>Reflex bradycardia. Extravasation causing tissue necrosis. May reduce cardiac output in patients with partial heart block, or severe CAD.</td>
</tr>
</tbody>
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Editor's note: I asked John Gilliard, MD for his opinions on dopamine and phenylephrine. He is a former paramedic, and is boarded in both emergency medicine and critical care. He works in the emergency department and intensive care units at Baptist Hospital in Winston-Salem. He had the following comments after reviewing Robert Pippin’s great review.

“I think dopamine will cause tachyarrhythmias at essentially any dose. I haven’t heard much about necrosis with Phenylephrine. I know that anesthesiology will use it without hesitation in the operating rooms through peripheral iv’s. In the grand scheme of things, I think dopamine is much better. I think neo is not a good pressor if someone is sick because it will drop the cardiac output. My 2 cents.”
John Gilliard, MD

Editor's note: Please remember that all indications, contraindications, and doses for these drugs should be verified with local medical direction. The above article is meant only as a review and it not meant to replace or contradict local medical control and local training.
2012 Protocols Approved by County
As of April 29, 2013

Approved WRO
24
2 SCTP
1 NTPS

Approved ERO
26
1 SCTP
0 NTPS

Approved CRO
18
1 SCTP
0 NTPS

SCTP Approved
NTPS