INTERNATIONAL
FORENSICS SYMPOSIUM
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Forensic Pathology as a Forensic Science: History, Current Challenges, Improving Quality, and Understanding Cognitive Bias

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Chief Medical Examiner

Hennepin County, Minnesota

Disclosures

- I have no financial conflicts to disclose
- The views of the speaker are mine alone and do not necessarily represent the views of NAME, AAFS, CAP, NIST, or Hennepin County
- This presentation will contain graphic images of human remains

Overview

- History of death investigation
- Medical examiner autopsies
- What medical examiners do
- Death certification
- Certification and accreditation in forensic pathology
- Current challenges in forensic pathology
- Why history and cognitive bias are not the same thing

Ancient history

- Coroner emerged in England in the 9th or 10th century
- 1194 - role of coroner was formalized in the Articles of Eyre
- Coroners
  - Also known as "crowners"
  - "Guardians of the crown's pleas"

Early coroners

- Local official
- Duty to protect the financial interest of the crown
- Responsible for inquests to
  - Confirm the identity of the deceased
  - Determine the cause and manner of death
  - Confiscate property
  - Collect death duties
  - Investigate treasure troves

North America

- Coroner often established under common law
- Mentioned in some early state constitutions
- Turn of the century (~1900)
  - Elected coroners often used to balance a ticket
  - Rife with corruption

Coroners → Medical Examiners

- 1860 – Maryland allowed coroners to require physician attendance at inquests
- 1877 – Massachusetts replaced coroner with "medical examiner"
- 1890 – physician medical examiner began performing coroner autopsies in Maryland
- 1918 – New York City
  - Chief Medical Examiner appointed
  - Ordered and performed autopsies

1928: NRC Report
"*The Coroner and the Medical Examiner*"

- The office of coroner is an anachronistic institution which has conclusively demonstrated its incapacity to perform the functions customarily required of it
- The medical duties of the coroner's office should be vested in the office of medical examiner
- The office of medical examiner should be headed by a scientifically trained and competent pathologist

1954: NCCUSL

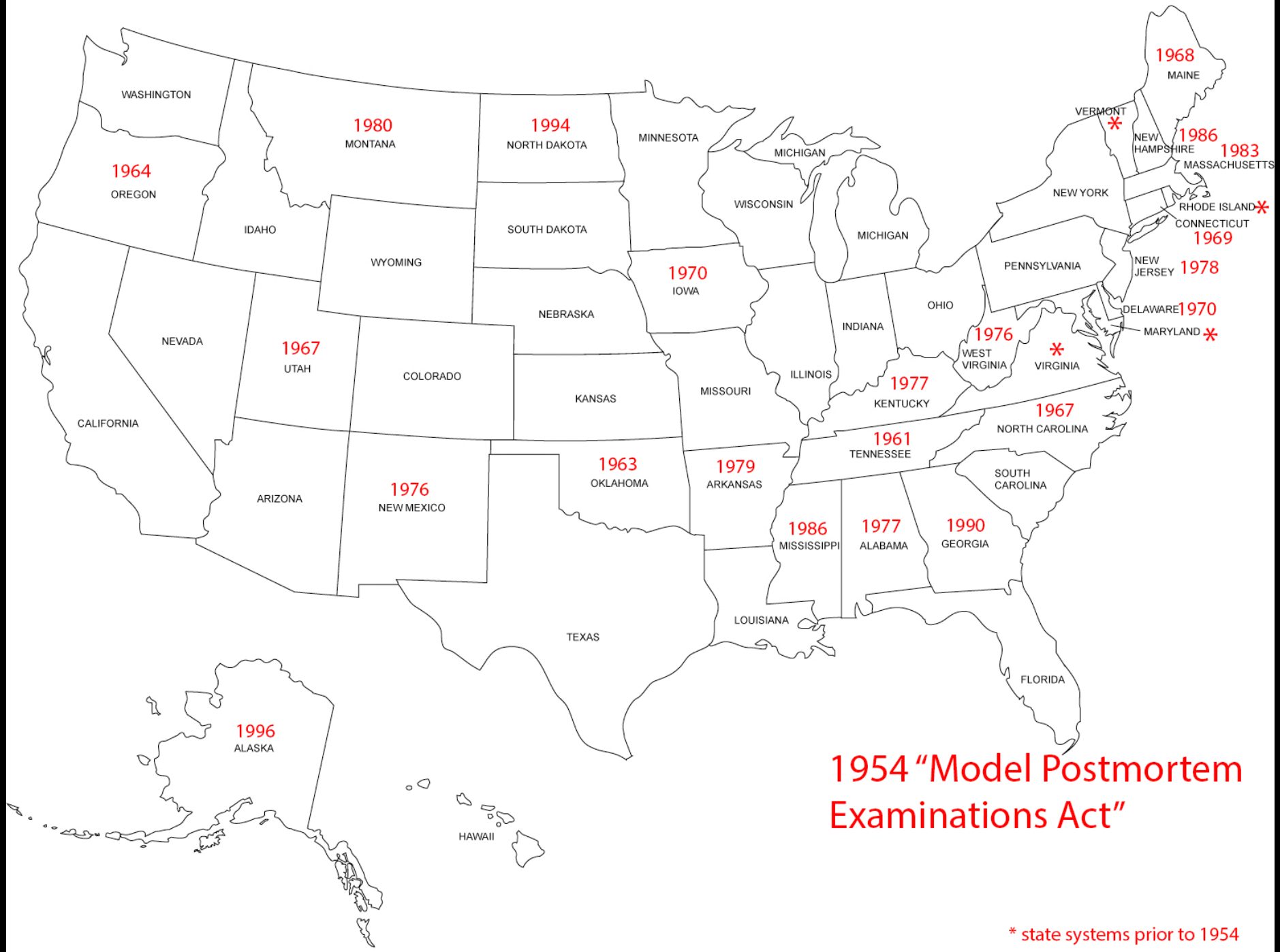
Model Post-Mortem Examinations Act

Experience has shown that many elected coroners are not well trained in the field of pathology, and the Act should set up in each state an Office headed by a trained pathologist, this Office to have jurisdiction over post-mortem examinations for criminal purposes. The Office would supersede the authority of Coroner's Offices in this field.

1954: NCCUSL

Model Post-Mortem Examinations Act

- "*provide a means whereby greater competence can be assured in determining cases of death where criminal liability may be involved*"
- A "Model" act (not a "Uniform" act)
- State level commission
- State medical examiner office
- Chief medical examiner would be of the "*highest mental and moral caliber*"
- Many states and counties converted



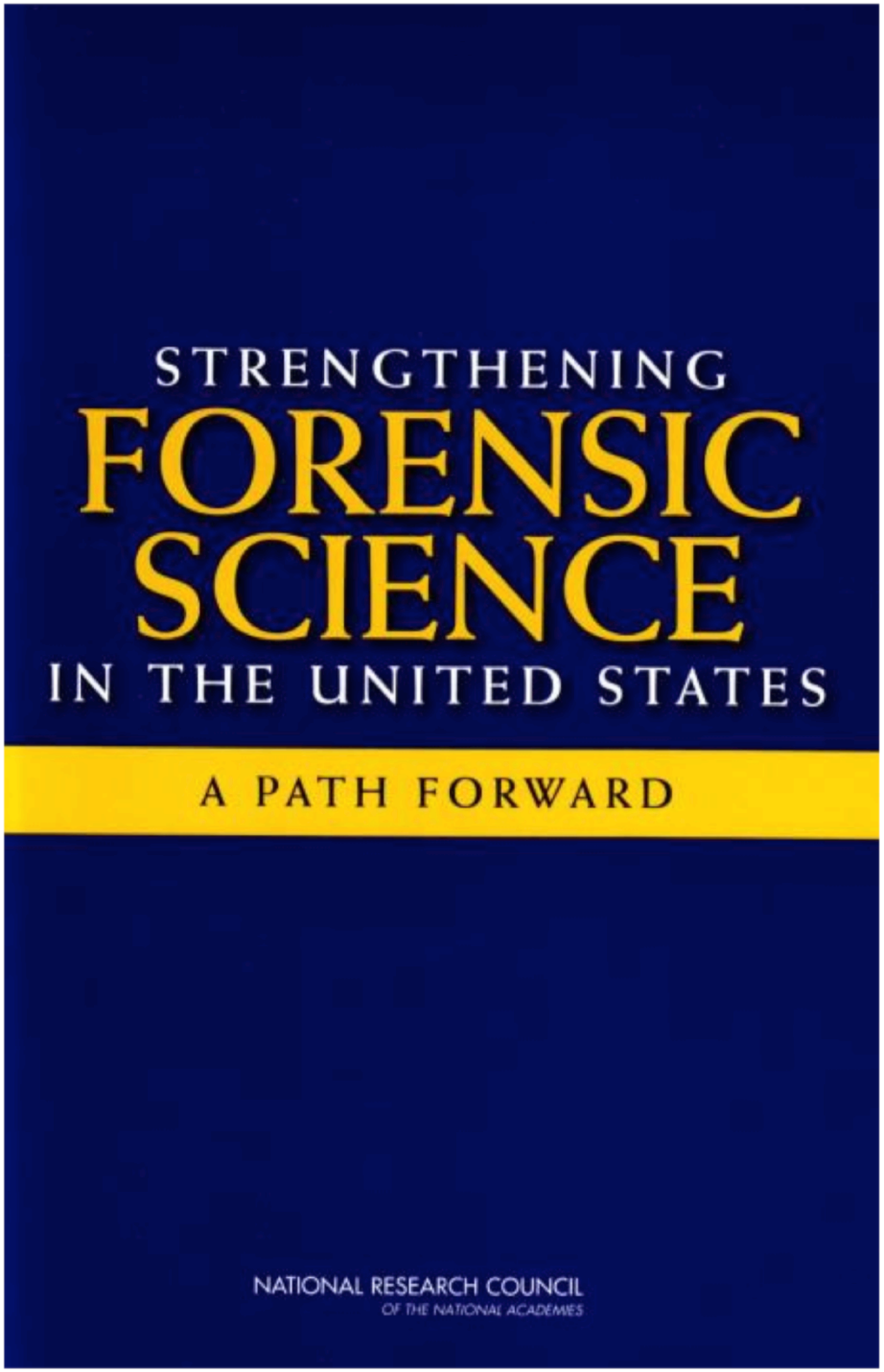
1954 "Model Postmortem Examinations Act"

* state systems prior to 1954

1968: NAS/NRC

Progress Report on Forensic Pathology

- Forensic pathology education in medical schools is lacking
- Exposure of pathology residents to forensic pathology is deficient
- Affiliations between ME offices and medical schools lacking
- Research and publishing needs to be bolstered
- Nationwide shortage of forensic pathologists
- Salaries not competitive
- Difficult to recruit and retain



Deficiencies

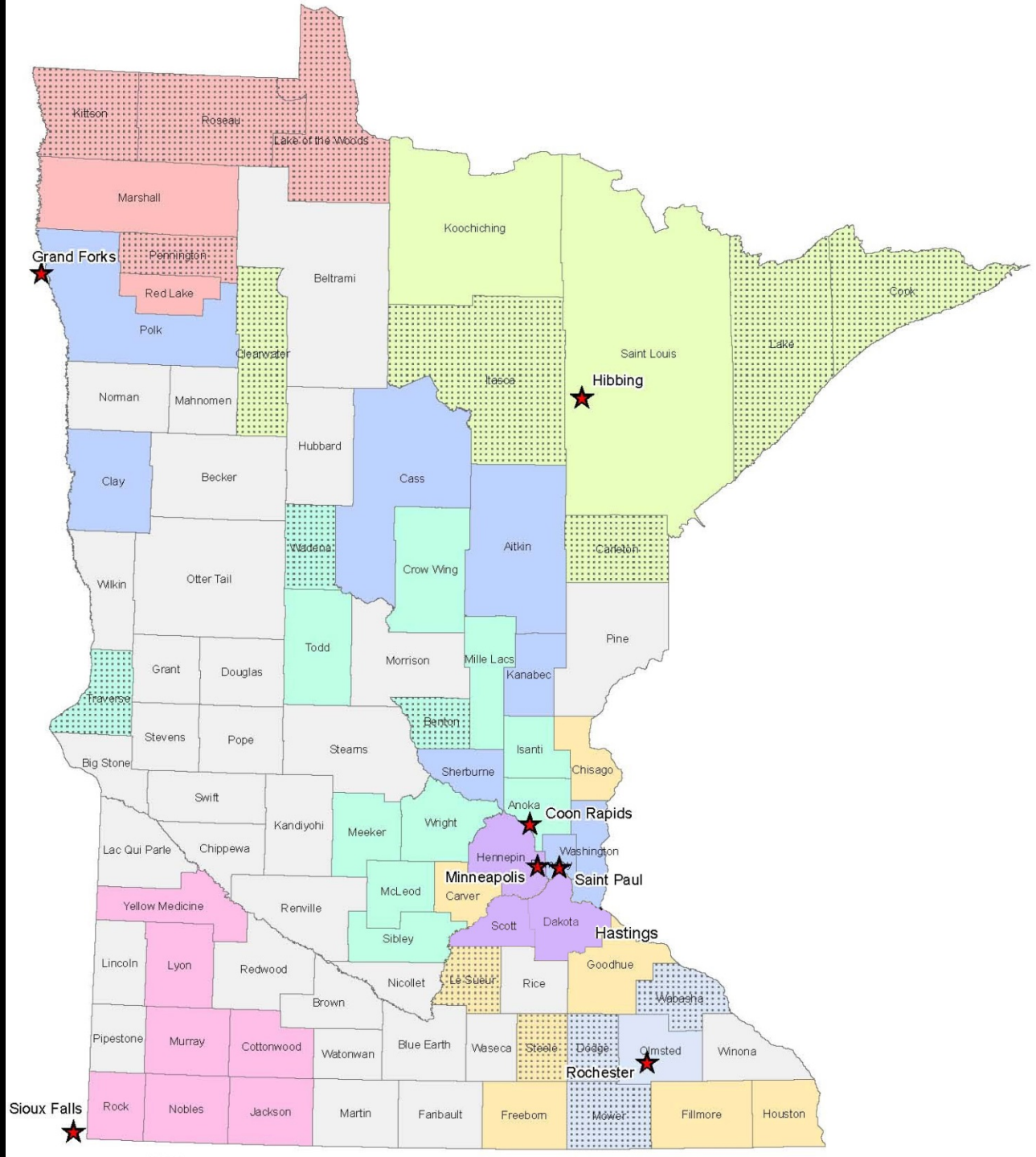
- Patchwork system with wide variability in laws, polices, procedures
- Expertise
- Facilities, equipment, and laboratory support
- Training
- Quality measures and controls
- Information systems
- Research and university affiliations

America today

- >2300 medical examiner and coroner (ME/C) offices
  - 80% are county coroners
  - 660 serve populations of 25000-250000
  - 848 serve populations < 25000
- About 1% of the US population dies each year
- 30-40% of deaths are reportable to the ME/C
- About 1/2 of these are accepted
- In total, about 1/6 deaths are ME/C cases

Death Investigation Systems: 2014

- Some counties have a medical examiner and many or most have a coroner
- State medical examiner with coroners in each county
- State medical examiner with various types of non-coroner regional or local assitance
- State medical examiner assisting coroners in most counties, at least one autonomous county medical examiner
- District medical examiners (FL)
- Mostly state-funded district offices assisting coroners in most counties (AL)
- Medical examiner (physician) in each county
- Coroner in each county
- Regional offices administratively (but not operationally) overseen by person with title of State Medical Examiner (NJ, TN)


Kittson
Roseau
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Hubbard
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Wadena
Aitkin
Carlton
Crow Wing
Wilkin
Otter Tail
Todd
Morrison
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Douglas
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Chisago
Big Stone
Sherburne
Swift
Anoka
Coon Rapids
Kandiyohi
Meeker
Wright
Lac Qui Parle
Chippewa
Hennepin
Washington
Minneapolis
Saint Paul
McLeod
Carver
Yellow Medicine
Renville
Scott
Dakota
Hastings
Sibley
Lincoln
Lyon
Redwood
Nicollet
Le Sueur
Rice
Goodhue
Brown
Wabasha
Pipestone
Murray
Cottonwood
Watonwan
Blue Earth
Waseca
Steele
Dodge
Olmsted
Winona
Rochester
Sioux Falls
Rock
Nobles
Jackson
Martin
Faribault
Freeborn
Mower
Fillmore
Houston

Medical Examiners and Coroners

Medical Examiners

- Undergraduate (4)
- Medical school (4)
- Residency (4)
- Fellowship (1)
- Board examination
- Appointed

Coroners

- Minimum age
- Registered voter
- Free of felonies
- +/- training
- +/- medical knowledge
- Elected

Staffing issues

- Certified forensic pathologists: **1491** (1959-2012)
- Training: average of **33**/year since 2000
- Practicing: ~500 in U.S. (87% full time)
- Needed: ~1000 in U.S.

Accreditation

- 68 ME/C offices fully accredited by NAME
  - 28 states represented
  - 12 statewide
  - 56 county or regional
- 28 coroner offices accredited by the IAC&ME

Medicolegal death investigators

- American Board of Medicolegal Death Investigators (ABMDI)
- Created in 1998
- Currently 1426 Diplomates and 162 Fellows
- Estimated less than 20% of all medicolegal death investigators

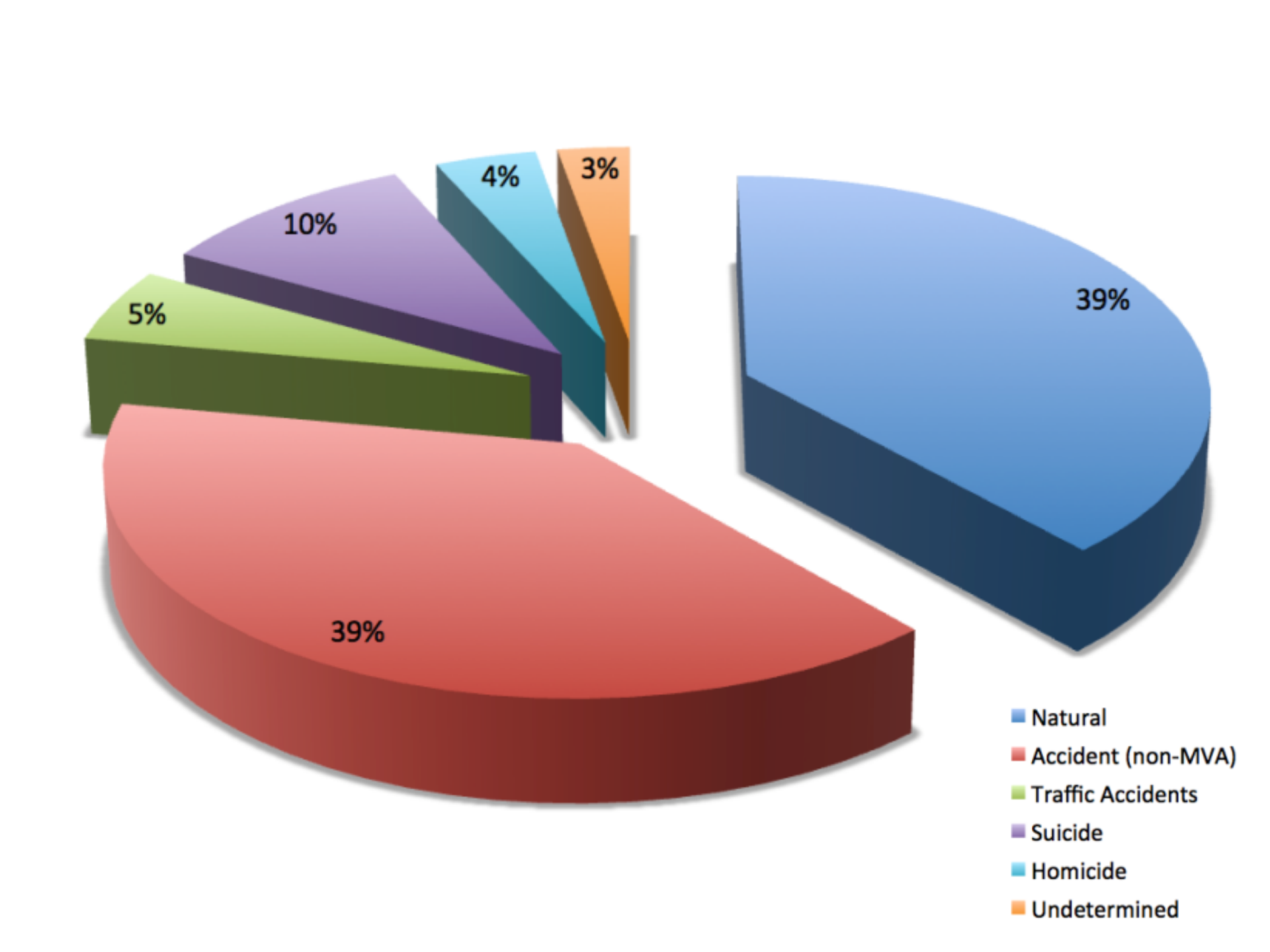
What do medical examiner offices do?

What we do

- Autopsies
- Identification
- Death certification
- Death investigations
- Laboratory services
- Records management
- Communications
- Transport decedents
- Manage/release property
- Court testimony
- Cremation approval
- Hospice pre-registration
- Facilitate tissue donation
- Disaster drills
- Reports to boards & administrators
- Domestic and child fatality review teams
- Community outreach
- Teaching

Case Types

- Natural Deaths
- Sharp force injuries
- Blunt force injuries
- Firearm deaths
- Asphyxia
- Fires
- Electrical
- Drowning
- Child abuse
- Transportation/Aviation
- Mass disaster
- Bombings/explosions
- Toxicology and poisonings
- Environmental


3%
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Natural
Accident (non-MVA)
Traffic Accidents
Suicide
Homicide
Undetermined

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HEALTH

ng prompts kids' jewelry

swallowing bracelet

ed: 12:07 p.m. EST (17:07 GMT)

More than dren's alled by use of the ing that overnment

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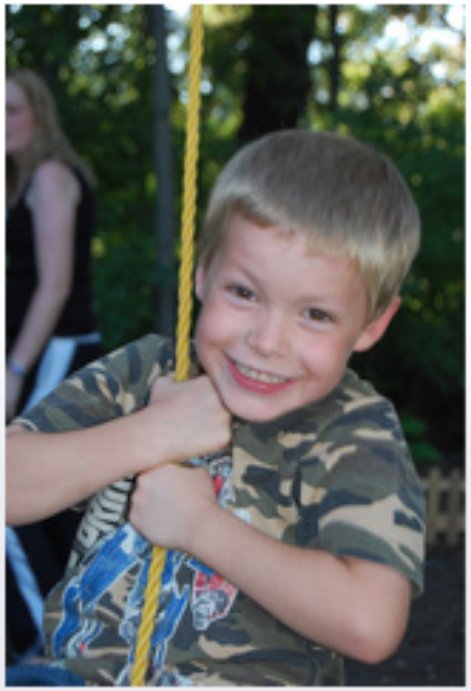
The Reebok bracelet was a free gift with the purchase of children's shoes.

"I want to assure all of our consumers and our retailers that I will do everything in my power to ensure that no other family, no other child, suffers a similar tragedy," Reebok President Paul Harrington said in a statement.

ME06-0489



Nathan Schilling

Large Photo

Corcoran, Minn. 1st Grader Dies of H1N1

Nathan Schilling, 6, died of myocarditis

Published : Monday, 05 Oct 2009, 11:31 AM CDT

ST. PAUL, Minn. - A healthy 6-year-old boy from Corcoran, Minnesota has died from complications from the H1N1 flu, bringing the total number of H1N1-related deaths in Minnesota to seven.

Nathan Schilling died September 24 from myocarditis -- a swelling of the heart muscle, according to the Hennepin County medical examiner. He was a first grader at St. John's Lutheran School in Corcoran.

The Schilling family said Nathan was taken to the hospital at 10 a.m. on Sept. 24 and died at their home at 5 p.m. that evening. Schilling had no underlying health conditions.

The health department has recorded 327 hospitalized cases of H1N1 to date in Minnesota. 138 of the cases were children under the age of nine, with three of the state's seven H1N1-related deaths also children under nine.

The Autopsy

The Hospital

- Requires consent
- Death in hospital
- Identification known
- History from patient
- Academic orientation
- Internal examination key
- Often limited dissection
- Don't want to go to court

The Medical Examiner

- Legal authority
- Death often out of hospital
- Identification an issue
- History from family, police, witnesses
- Evidentiary orientation
- External examination often more important
- Complete dissection
- Court part of the job

Bedside vigil for wrong woman

CALEDONIA, MICH. – A couple sat by their daughter's hospital bedside for weeks after an auto accident.

It wasn't until she came out of a coma that they realized she was not their daughter after all, but another woman injured in the wreck. Their own daughter was dead and buried.

One family had been incorrectly told that their daughter had died in the April 26 crash in Indiana, and another was erroneously informed that their daughter was in a coma. Both were students at Indiana's Taylor University.

The family of Laura VanRyn, 22, disclosed the mix-up Wednesday on a Web log.

"Our hearts are aching as we have learned that the young woman we have been taking care of over the past five weeks has not been our dear Laura, but instead a fellow Taylor student of hers, Whitney Cerak," they said.

Coroner Ron Mowery apologized for the mistake. He said acquaintances of the students had identified the survivor as VanRyn, but no scientific tests were conducted to verify the IDs. The survivor had facial swelling, bruises and was in a neck brace. VanRyn, one of five people killed in the crash, had a closed casket funeral.

ASSOCIATED PRESS

Identification

PRESUMPTIVE

- Visual
- Documents
- Personal effects
- Distinguishing marks

DEFINITIVE

- Dental
- Fingerprints
- DNA
- Unique identifiers

Dental Identification

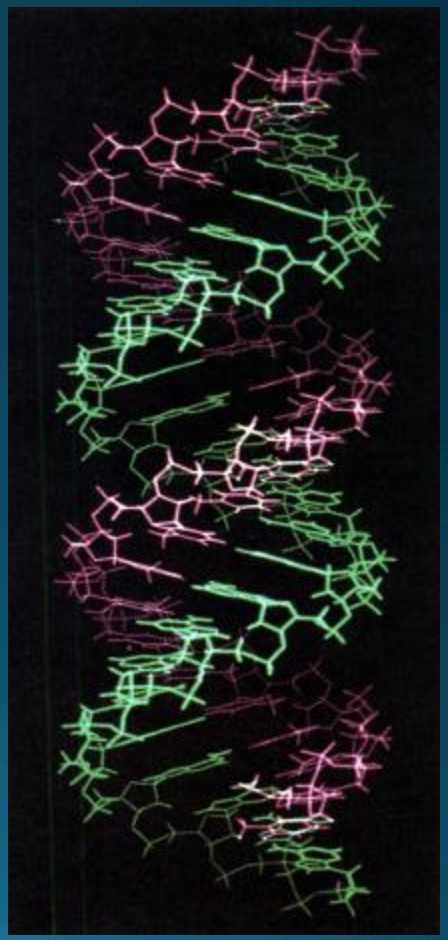
- Advantages
  - Hardiness of teeth
  - Almost everyone has dental records somewhere
- Disadvantages
  - Requires professional training
  - Requires x-ray equipment
  - Requires antemortem records

Fingerprint Identification

- Advantages
  - Relatively rapid
  - Occasionally get a 'cold hit'
- Disadvantages
  - Requires professional training
  - Requires antemortem fingerprint(s)

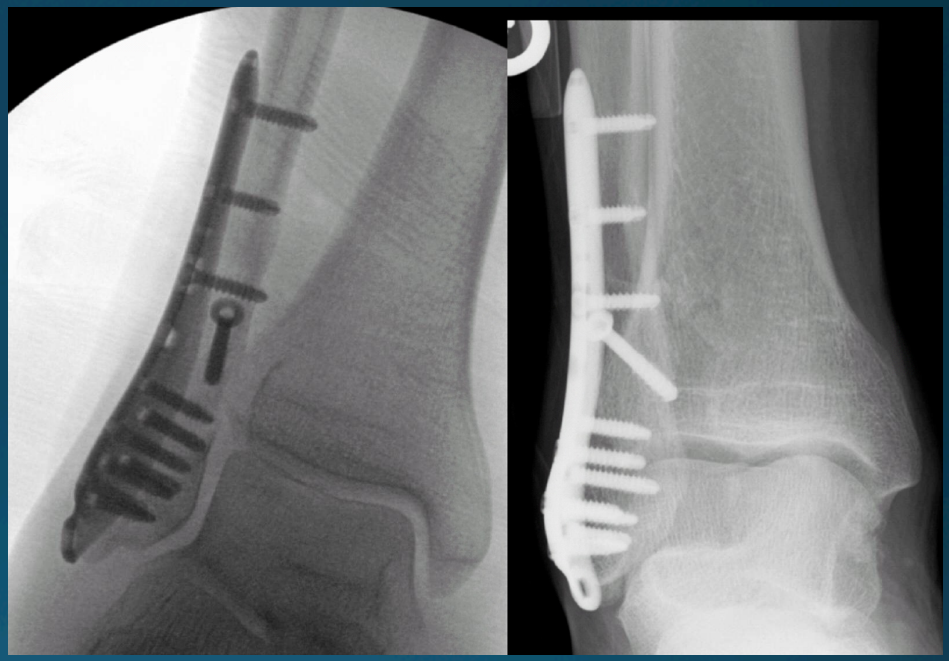
DNA Identification

- Advantages
  - Positive identification
  - Can use antemortem or family specimen
- Disadvantages
  - Requires professional training and laboratory
  - Time and $



Medical/Radiological ID

- Advantages
  - Positive identification
- Disadvantages
  - Requires professional training and antemortem documentation
  - May require x-ray equipment
  - Pretty uncommon



Death certification

- Cause of death
- Manner of death

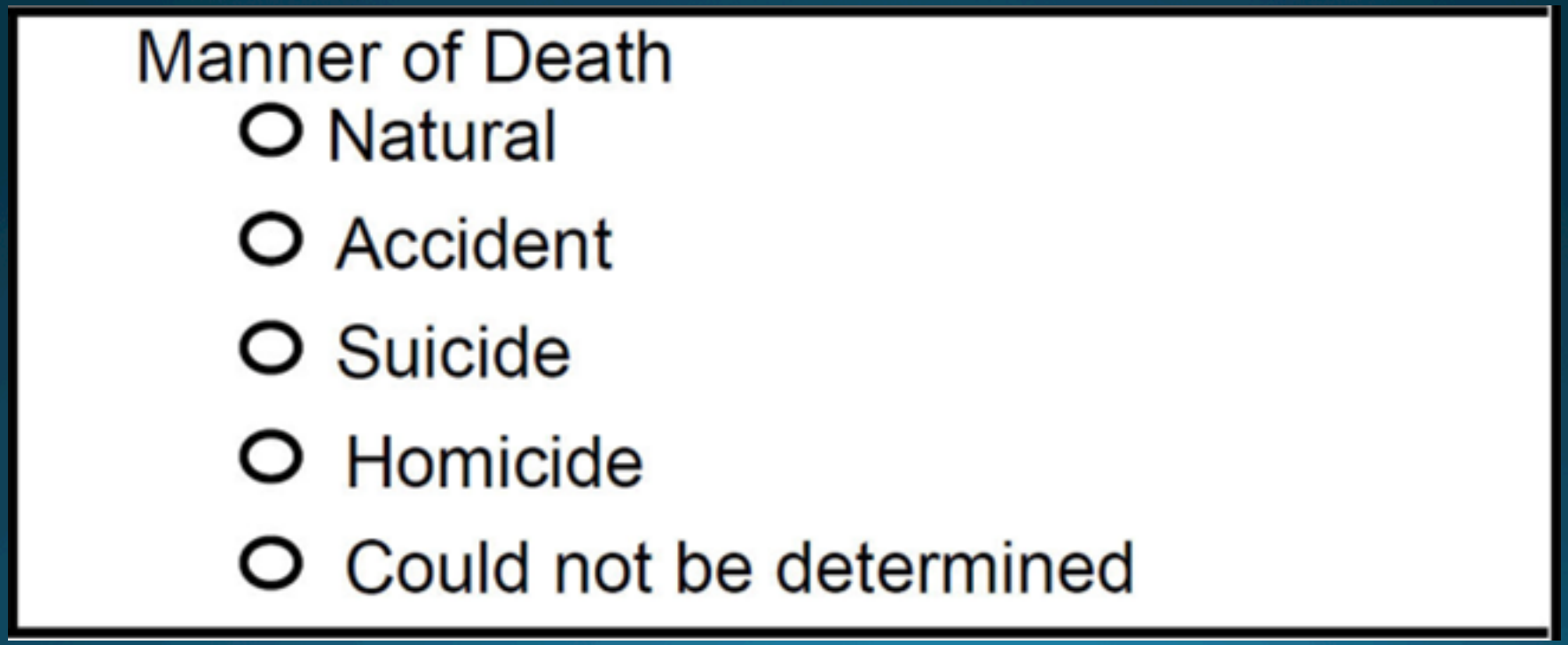
Cause of Death

Whatever disease(s) or injury(ies) caused the person to die

Cause of Death		Approximate interval: Onset to death
Part I Enter the chain of events-diseases, injuries, or complications that directly caused death. Do not enter terminal events such as cardiac arrest or ventricular fibrillation without showing the etiology. DO NOT ABBREVIATE. Enter only one cause per line. Add additional lines if necessary.		
IMMEDIATE CAUSE (final disease or condition resulting in death)	a.	
Sequentially list conditions, if any, leading to the immediate cause. Enter the **UNDERLYING CAUSE** (disease or injury that initiated events resulting in death) **LAST**	Due to (or as a consequence of) b.	
	Due to (or as a consequence of) c.	
	Due to (or as a consequence of) d.	
Part II Other significant conditions contributing to death but not resulting in the underlying cause given in Part I		

Manner of Death

The circumstances under which the person died



Manner of Death

- An American innovation, circa 1900-1910
- Its use will "conquer difficulties and raise the vital statistics of America to a worthy place among civilized nations" (BMJ, 1907)
- WHO recommended death certificates do not include manner (may change in 2016)
- Fundamental roles
  - Public health surveillance
  - Vital statistics
- Correct classification touches many areas

Manner of Death

"Off-label uses" (Oliver, 2014)

- Cultural context
- Financial purposes
  - Life insurance
  - Funeral benefits
  - Veteran's benefits
- Law enforcement
- Admitted in court

Challenges

- Certification
- Recruiting and retention
- Standards
- Accreditation
- Cognitive bias
- Independence

The making of a forensic pathologist

Undergraduate	4 years
Medical school	4 years
Residency	4 years
Fellowship	1 year
Total	13 years

The American Board of Pathology

A Member Board of the American Board of Medical Specialties

Year	First Time Takers	Passed
2007	34	30
2008	36	36
2009	28	27
2010	41	38
2011	37	31
2012	44	40
2013	38	37
2014	43	39
TOTAL	**301**	**278**

Medical students - 18,148

Pathology residency - 300 (1.7%)

Forensic pathology fellowship -41

Board Certified - 27

Full-time Forensic Pathology Practice - 21

Non Forensic pathology practice

Part-time or consulting practice

Shortage of forensic pathologists costs county

By JOHN KLINE john.kline@goshennews.com | Posted: Thursday, May 7, 2015 6:54 pm

ELKHART — A national shortage of forensic pathologists has apparently hit close to home, forcing the Elkhart County Coroner's office to seek forensic pathology services outside of the county for at least the foreseeable future.

According to Elkhart County Coroner John White, who spoke on the topic before a gathering of county leaders at the 2015 County Leadership Summit Thursday, the Elkhart County Coroner's office has traditionally used the services of the forensic pathologist on staff at Elkhart General Hospital when such need arises. A forensic pathologist is a medical professional who specializes in determining cause of death through the use of an autopsy, examination of injuries related to crime and examination of tissue samples relevant to crimes or suspected crimes.

However, White noted Thursday that the hospital's forensic pathologist resigned in January, leaving the county without a local alternative for such services. The doctor's last day was May 1.

St. Louis County medical examiner to resign

By John Myers on Mar 10, 2015 at 1:49 p.m.

Longtime St. Louis County Chief Medical Examiner Thomas Uncini has quietly announced that he will step down in the coming weeks, county officials confirmed Monday.

Uncini, who was mired in controversy last month when he planned to conduct autopsies on two Native Americans despite religious objections by their families and tribal leaders, has served in the role since 1998.

Uncini, 58, of Hibbing, notified county officials verbally in recent days "that he is no longer interested in serving in that capacity," a St. Louis County Board memo notes.

The board today will vote to temporarily extend the county's contract with Uncini through June 30 to allow time for a replacement to be found. Uncini has been working under the terms of a previous three-year contract, that expired at the end of 2014.

SWGMDI

SCIENTIFIC WORKING GROUP FOR
MEDICOLEGAL DEATH INVESTIGATION

Increasing the Supply of Forensic Pathologists in the United States

Scientific Working Group on Medicolegal Death Investigation (SWGMDI)

Executive Summary

The National Research Council's (NRC) *Strengthening Forensic Science in the United States: A Path Forward* identified a shortage of forensic pathologists in the United States and made recommendations to encourage physicians to enter the subspecialty of forensic pathology (1). This report reviews the reasons for the shortage of forensic pathologists and makes recommendations to increase their supply in the United States.

NATIONAL COMMISSION ON FORENSIC SCIENCE

NIST National Institute of Standards and Technology

Increasing the Number, Retention and Quality of Board Certified Forensic Pathologists

Type of Work Product

Policy Recommendation prepared by the Medicolegal Death Investigation Subcommittee.

Pathologist Workforce in the United States

I. Development of a Predictive Model to Examine Factors Influencing Supply

Stanley J. Robboy, MD; Sally Weintraub, MBA; Andrew E. Horvath, MD; Braddon W. Jensen, MD; C. Bruce Alexander, MD; Edward P. Fody, MD; James M. Crawford, MD, PhD; Jimmy R. Clark, MD; Julie Cantor-Weinberg, MPP; Megha C. Joshi, MD; Michael B. Cohen, MD; Michael B. Prystowsky, MD, PhD; Sarah M. Bean, MD; Saurabh Gupta, BPharm;

***Conclusions.*—This comprehensive analysis predicts that pathologist numbers will decline steadily beginning in 2015. Anticipated population growth in general and increases in disease incidence owing to the aging population, to be presented in a companion article on demand, will lead to a net deficit in excess of more than 5700 FTE pathologists.**

Table 3. ACGME-Approved and Filled Pathologist Fellowship Positions (2012–2013)[a]

Programs 2012–2013	No. of Programs	Filled Positions	Approved Positions	Vacancy, %
Hematopathology	85	135	154	12
Molecular genetic pathology	34	45	53	15
Cytopathology	92	138	167	17
Selective pathology	69	153	187	18
Dermatopathology	54	84	105	20
Blood bank/transfusion medicine	48	51	79	35
Neuropathology	33	42	72	42
Microbiology	13	10	19	47
Forensic pathology	34	39	76	49
Pediatric pathology	27	19	39	51
Chemical pathology	2	1	3	67
Pathology informatics	New			
Total	**143**	**717**	**954**	**25**

Abbreviation: ACGME, Accreditation Council for Graduate Medical Education.

Arch Pathol Lab Med—Vol 137, December 2013

October 2014

AAMC

Medical Student Education: Debt, Costs, and Loan Repayment Fact Card

Indebted Graduates Class of 2014*	Public	Private	All
Pct. with Ed. Debt	86%	82%	84%
Mean	$167,763 (↑3%)	$190,053 (↑5%)	$176,348 (↑4%)
Median	$170,000 (↑1%)	$200,000 (↑5%)	$180,000 (↑3%)

Sample Repayment – $180,000 in Federal Direct Loans

Description	Repayment Years	Monthly Payment	Interest Cost	Total Repayment
Forbearance during residency, then Standard	Residency: 3 Post-Res.: 10	$0 $2,700	$148,000	$328,000

Recommendations

NAME, SWG, NCFS

- Exposure to undergraduate medical students
- All pathology residents spend time in a medical examiner office
- Federal funding of training programs
- Loan forgiveness
- Competitive salaries
- Neutral and autonomous practices

SWGMDI

SCIENTIFIC WORKING GROUP FOR
MEDICOLEGAL DEATH INVESTIGATION

Regional Medicolegal Autopsy and Death Investigation Centers
-Construction, Staffing, and Costs-

A Report and Recommendations
Prepared by the System Infrastructure Committee of the
Scientific Working Group on Medicolegal Death Investigation (SWGMDI)

Executive Summary

Given the shortage of forensic pathologists and adequately equipped and staffed forensic autopsy facilities in the United States, a regional system of medicolegal autopsy and death investigation facilities might be an effective and efficient way of serving the needs for quality services in underserved areas of the United States. To this end, the National Research Council's (NRC) Report, *"Strengthening Forensic Science in the United States: A Path Forward"* recommended that funds be provided to build regional offices in areas of need.

StarTribune

Death investigations shift from county coroners to regional medical examiners

Hennepin County medical examiner's office considers expanding as it takes on more duties from other Minnesota counties.

By Jessie Van Berkel Star Tribune | JUNE 8, 2015 — 8:08AM

DAVID JOLES, STAR TRIBUNE

An autopsy bay at the Hennepin County medical examiner's office, which sits in the shadow of the new Vikings stadium.

Public I&A Documents

The National Association of Medical Examiners (NAME) Accreditation Standards have been prepared and revised by NAME for the purpose of improving the quality of the medicolegal investigation of death in this country. Accreditation applies to offices and systems, not individual practitioners. The standards emphasize policies and procedures, not professional work product. The standards represent minimum standards for an adequate medicolegal system, not guidelines. NAME accreditation is an endorsement by NAME that the office or system provides an adequate environment for a medical examiner in which to practice his or her profession and provides reasonable assurances that the office or system well serves its jurisdiction. It is the objective of NAME that the application of these standards will aid materially in developing and maintaining a high caliber of medicolegal investigation of death for the communities and jurisdictions in which they operate.

The NAME Accreditation Program is a peer review system. Its goal is to improve office or system performance through objective evaluation and constructive criticism. The Inspector is the medical examiner's peer and serves as a guest consultant to the office or system.

The accreditation program is intended to evolve over time. Procedures ensure the review of standards and procedures and a mechanism is established for setting standards.

Accreditation is conferred for a period of five (5) years.

Offices wishing to apply for Inspection should contact Occupational Research Associates at https://ina.orainc.com/

Documents pertaining to the I&A process are available here:

NAME Accreditation Checklist 2009-2014 01-20-11

NAME Autopsy Performance Standards 2011

NAME Inspection and Accreditation Checklist

Adopted February 2014

A	8		Quality Assurance	P	Result		
		a	Does the office have a written and implemented policy or standard operating procedure, signed within the last two years, covering quality assurance?	II	Y	N/A	N
		b	Does the quality assurance procedure include a "feedback" mechanism, so that all identified errors are brought to the attention of those persons responsible for them?	I	Y	N/A	N
		c	Is the quality assurance program a planned and regularly scheduled activity?	II	Y	N/A	N
		d	Is the quality assurance program sufficient and adequate to assure the quality of the office or system work product?	II	Y	N/A	N
		e	Is there documentation of corrective action taken for identified deficiencies?	II	Y	N/A	N
		f	Does the office actively participate on the local Child Death Review Committee (if one exists)?	I	Y	N/A	N
		g	Does the office have a procedural method of keeping track of unfinished or overdue case reports?	II	Y	N/A	N

Why aren't offices accredited?

68 ME/C offices fully accredited by NAME

- Small coroner offices: size, staff, training, facility
- ME offices: budget, staff, equipment, facilities
- Accreditation is a lot of work (policies and procedures)
- The process requires renewal
- The process costs money
- Some offices do not see the benefit

Forensic Autopsy Performance Standards

Prepared by:
Garry F. Peterson, M.D. (Committee Chair, 2005)
Steven C. Clark, Ph.D. (NAME Consultant)

Approved by General Membership
October 17, 2005 NAME Annual Meeting, Los Angeles, California
October 4, 2010 NAME Annual Meeting, Cleveland, Ohio

Amendments Approved by General Membership
October 16, 2006 NAME Annual Meeting, San Antonio, Texas
August 11, 2011 NAME Annual Meeting, Ketchikan, Alaska
October 8, 2012 NAME Annual Meeting, Baltimore, MD
September 22, 2014 NAME Annual Meeting, Portland, OR

The forensic pathologist shall perform a forensic autopsy when:

B3.1 the death is known or suspected to have been caused by apparent criminal violence.
B3.2 the death is unexpected and unexplained in an infant or child.
B3.3 the death is associated with police action.
B3.4 the death is apparently non-natural and in custody of a local, state, or federal institution.
B3.5 the death is due to acute workplace injury.
B3.6 the death is caused by apparent electrocution.
B3.7 the death is by apparent intoxication by alcohol, drugs, or poison.
B3.8 the death is caused by unwitnessed or suspected drowning.
B3.9 the body is unidentified and the autopsy may aid in identification.
B3.10 the body is skeletonized.
B3.11 the body is charred.
B3.12 the forensic pathologist deems a forensic autopsy is necessary to determine cause or manner of death, or document injuries/disease, or collect evidence.
B3.13 the deceased is involved in a motor vehicle incident and an autopsy is necessary to document injuries and/or determine the cause of death.

National Association of Medical Examiners Position Paper: Recommendations for the Investigation, Diagnosis, and Certification of Deaths Related to Opioid Drugs

Gregory G. Davis MD MSPH and the National Association of Medical Examiners and American College of Medical Toxicology Expert Panel on Evaluating and Reporting Opioid Deaths

Acad Forensic Pathol
2013 3 (1): 77-83

NAME Positions

- Laboratory accreditation should be **mandatory**
- Individual certification of forensic science professionals should be **mandatory**
- All death investigators should at least be **certified** by the American Board of Medicolegal Death Investigators at the registry (basic) level.
- **All medicolegal autopsies** should be performed or directly supervised by a board certified forensic pathologist

My soapbox

- You wouldn't knowingly take your loved one to a doctor you knew was not certified or a hospital you knew was not accredited
- As a patient, you wouldn't trust your biopsies and laboratory work to a laboratory that was not accredited
- Why would you trust your loved one's death investigation and autopsy to anything less?
- Why should public health and the civil and criminal justice systems deserve anything less?

Forensic pathology is different from other forensic sciences

- Forensic pathology is the practice of medicine
- Forensic pathology is descriptive, rather than comparative or quantitative
- The forensic pathologist is charged with explaining what happened to the decedent, not implicating who made it happen
- Physical findings often make sense only in the context of the history
- History and cognitive bias are not the same thing

Cognitive bias

- **Motivational bias**
- **Role effect bias**
- **Confirmation bias**
- **Contextual bias**

History ≠ cognitive bias

- All medical diagnoses integrate history and circumstances with physical examination and laboratory findings
- This is just as true for forensic pathologists as any other medical specialty

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Target article

The forensic confirmation bias: Problems, perspectives, and proposed solutions

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ABSTRACT

As illustrated by the mistaken, high-profile fingerprint identification of Brandon Mayfield in the Madrid Bomber case, and consistent with a recent critique by the National Academy of Sciences (2009), it is clear that the forensic sciences are subject to contextual bias and fraught with error. In this article, we describe classic psychological research on primacy, expectancy effects, and observer effects, all of which indicate that context can taint people's perceptions, judgments, and behaviors. Then we describe recent studies indicating that confessions and other types of information can set into motion *forensic confirmation biases* that corrupt lay witness perceptions and memories as well as the judgments of experts in various domains of forensic science. Finally, we propose best practices that would reduce bias in the forensic laboratory as well as its influence in the courts.

The New York Times

Questions Left for Mississippi Over Doctor's Autopsies

By **CAMPBELL ROBERTSON** JAN. 7, 2013

JACKSON, Miss. — For a long time, if a body turned up in Mississippi it had a four-in-five chance of ending up in front of Dr. Steven T. Hayne.

Between the late 1980s and the late 2000s, Dr. Hayne had the field of forensic pathology in Mississippi almost to himself, performing thousands of autopsies and delivering his findings around the state as an expert witness in civil and criminal cases. For most of that time, Dr. Hayne performed about 1,700 autopsies annually, more than four for every day of the year and nearly seven times the maximum caseload recommended by the National Association of Medical Examiners.

"I'm sure there's a lot of people that don't like Hayne, but from a prosecutor's standpoint I don't know anybody who didn't like him," said John T. Kitchens, a former district attorney and circuit court judge. "He was always so helpful and useful to law enforcement. And he worked all the time."

Dr. David Fowler, the chief medical examiner in Maryland and a former chairman of the standards committee for the National Association of Medical Examiners, called the number "beyond defensible."

"There are hundreds of cases that have to be reconsidered," said Dr. James Lauridson.

"I saw a very similar case like that on 'Law & Order: SVU,' " said Dr. Andrew M. Baker, the president of the medical examiners' association and chief medical examiner for Hennepin County, Minn. "I've never heard of it in real life." Dr. Baker said not only was the technique unheard of but so was the ability to speculate from those sorts of wounds . . . . .

No. 13-735

In The
Supreme Court of the United States

EFREN MEDINA,

Petitioner,

v.

ARIZONA,

Respondent.

On Petition For Writ Of Certiorari To The Supreme Court Of Arizona

BRIEF OF THE INNOCENCE NETWORK AS *AMICUS CURIAE* IN SUPPORT OF PETITIONER

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Like other forensic sciences, forensic pathology is susceptible to cognitive bias, human error, and incompetence. Moreover, ***forensic pathology is particularly susceptible to cognitive bias due to the subjectivity of autopsies*** *and the way they are generally conducted.*

… the pressure put on the report's author by a detective standing over his or her shoulder in the autopsy room to corroborate a detective or a prosecutor's case theory.

Miller SA, Kint B, Scheck BC, Fabricant MC, Moreno P.
Amicus brief file with the US Supreme Court, 2014

Cognitive bias: conclusions

- NAME urges caution in the arena of contextual information and forensic pathology. Medical examiners are physicians who operate in the medical paradigm of using a clinical history and information about the circumstances surrounding a death to generate hypotheses about potential causative diseases and injuries. The autopsy and laboratory examination allows a forensic pathologist to confirm or refute these hypotheses and reach medical conclusions. Autopsy is the practice of medicine.

Cognitive bias: conclusions

- "History" is not cognitive bias
- Cognitive bias is real, and worthy of study …
  - … but it should not be equated with unqualified individuals in corrupt systems offering fraudulent, unscientific conclusions
- Contextual bias ("history") not the real problem, but role effect/motivational bias may very well be

National Association of Medical Examiners Position Paper: Medical Examiner, Coroner, and Forensic Pathologist Independence

Acad Forensic Pathol
2013 3 (1): 93-98

Judy Melinek MD, Lindsey C. Thomas MD, William R. Oliver MD MS MPA, Gregory A. Schmunk MD, Victor W. Weedn MD JD, and the National Association of Medical Examiners Ad Hoc Committee on Medical Examiner Independence

- 97% believe independence is an important issue
- 23% reported pressure from elected/appointed official to change a cause or manner of death
- 24% "are considered prosecution witnesses" in their jurisdictions
- 42% expected to divulge details of their conversations with the defense

MN v Beecroft

If Minnesota's law enforcement and prosecutorial communities believe that medical examiners are not independent, autonomous, and neutral actors, we now state clearly that such a belief has no place within Minnesota's criminal justice system.

Minnesota Supreme Court

2010

Quality assurance monitors in forensic pathology

Preanalytic Monitors	Analytic Monitors	Postanalytic Monitors
Body correctly identified	Error rate in targeted review of cases	Report completeness (NAME Autopsy Performance Standards)
Investigator report (aka adequate clinical history), scene photographs and medical records available prior to autopsy	Error rate in releasing (or near misses) the incorrect body or valuables	Time for critical diagnosis to reach law enforcement, families, health department or clinician
Time from report of death to body arrival at medical examiner office	Individual productivity (number of autopsies and external examinations performed/supervised)	Time for completed report delivery to family, law enforcement, or hospital medical records
Time required for pre-autopsy radiological studies	Amended report and undetermined cause and manner of death rate	Completeness of ancillary testing results incorporated within autopsy report (e.g. toxicology, images, radiological studies)
Appropriate supplies available for autopsy (e.g. correct containers for toxicology samples, evidence collection and storage supplies)	Number of autopsy reports reviewed prior to completion	Time until evidence is available for analysis
	External quality assessment (check samples)	Turn-around-time
	Review of cases with undetermined cause and manner of death	Customer Satisfaction Survey
	Rate of mislabeled cassettes, slides and specimens	

Reichard, Acad For Path, 2011

Sources of error

Pre-analytical

- Bad and antequated statutes
- Inadequate funding
- Lack of qualified medical investigators
- Error(s): right cases not coming in for autopsies, misidentified bodies

Analytical

- Unqualified pathologists
- Inadequate equipment/laboratory support
- Error(s): misdiagnoses and missed diagnoses

Post-analytical

- Lack of contextual information
- Lack of independence from other agencies
- Error(s): undercalls and overcalls

Summary: Confronting our challenges

- Distinguish cognitive bias and legitimate medical history
- Work to transition to independent, appointed medical examiner systems
- Increase the number of qualified forensic pathologists
- Trained medicolegal death investigators
- Lobby for model medical examiner legislation and incentive-based funding
- Ensure that all medicolegal autopsies are done by trained and certified forensic pathologists, and that all ME/C offices are accredited to recognized national standards.
- Produce legislative or judicial guarantees that medical examiners are independent of law enforcement and prosecutors

Recap

- History of death investigation
- Medical examiner autopsies
- What medical examiners do
- Death certification
- Certification and accreditation in forensic pathology
- Current challenges in forensic pathology

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Forensic Pathology as a Forensic Science: History, Current Challenges, Improving Quality, and Understanding Cognitive Bias

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