"The need for informatics to support forensic pathology and death investigation." **Levy 2015**

Medicolegal Death Investigation creates a wealth of data that is invaluable for many purposes and have been used effectively to protect the health and safely of the general public in a variety of ways – despite current and historical limitations, which include:

- lack of data standards in US death investigation systems
- rudimentary electronic information systems for US death investigation systems
- lack of effective communications and interfaces between these systems

There are opportunities for integration between forensics and informatics. Collaboration between forensic pathologist/medicolegal death investigation and the clinical informatician "to transform data into information" can "lead to the development of processes and systems that will better protect the health and safety of the public in an era of expanding threats from infectious disease, violent crime and terrorism."

Clinical Informatics (CI)

- "the subspecialty of all medical specialties that transforms health care by analyzing, implementing, and evaluating information and communication systems to improve patient care, enhance access to care, advance individual and population health outcomes, and strengthen the clinical-patient relationship."
- not to be confused with Information Technology (IT)
    - IT emphasizes the tools that are used, over the content

Two CI subdomains:

Pathology Informatics

- "the study and management of information, information systems, and processes in pathology."
- involves management of the huge volumes of data generated by anatomical pathology and the clinical library via preanalytic, analytic, and postanalytic phases of laboratory testing

Public Health Informatics

- "the systematic application of information, computer science, and technology to public health practices, research, and learning"
- focused on populations, rather than individuals, prevention instead of treatment, and government agencies rather than health care systems
- "Public Health systems work at local, state, national, and global levels to both prevent morbidity and mortality using multiple modalities and to address emergent situations such as infectious disease outbreaks when they occur."

Data Collection in Forensic Pathology

- Forensic health care professionals "gather a large quantity of textual and image data about their patients"

- In addition to histories, physical examination, and laboratory results which parallel data collected in other fields of medicine data gathered at the scene of death and from law enforcement agencies
- "Frequently it is the investigative data from the scene instead of the physical exam findings of the autopsy that allows the forensic pathologist to distinguish an accident from a homicide or suicide."

Solving this issues is complicated by a variety of political, logistical, and financial challenges:

- ME/C jurisdiction variability
- resources heavily concentrated in a few large systems
- lack of funding and personnel in smaller jurisdictions
- smaller offices typically rely on law enforcement, whose investigative focus is on the investigation of crime rather than death
- currently no standards regarding structuring of data or interfaces for electronic (M)DI databases
- lack of standards impeded efficient operation day-to-day and is "crippling during multijurisdictional emergencies, such as mass fatality incidents or infectious disease epidemics, where the free flow of information is critical"
- 2009 NAS recommended case management databases to allow trend analysis of deaths for public health and safety purposes and continuous quality improvement
- despite well-documented issues there is little political will to invest the resources to address

<u>Information generated as a result of medicolegal death investigation has been "utilized in meaningful ways":</u>

Death Certification

-this information is not only used by local, state and national public health departments to help set public health initiatives, but is also used by other agencies reviewing deaths from specific causes:

US Department of Transportation Fatality Analysis Reporting System
US Department of Labor's Census of Fatal Occupational Injuries
National Institute for Occupational Safety and Health's Traumatic Occupational Injuries Research and Prevention Program

Medical Examiners and Coroners Alert Project -MECAP

-created by the US. Consumer Product Safety program as a quick alert system to report deaths where consumer products played a role

Medical Examiner and Coroner Information Sharing Program – MECISP

-created by the CDC, defunded by the mid-20000's

National Violent Death Reporting System – NVDRS

-created by the CDC to. Collect and study causes of homicides and suicides (considered preventable)

National Missing and Unidentified Persons System – NamUs

-created by the US Department of Justice

Shortcomings of Existing Data Collection Systems

Voluntary

Manual or semi-automated data entry, requiring significant human effort

Manual data entry represents both duplication of effort and a source for transcription errors.

There is currently no communication standard that would allow information to flow freely to, from, and between (M)DI electronic systems, even when they are provided by the same vendor

A Path Forward

1) The MDI community must recognize the value of their data beyond the individual case
2) NAME and IACME need to take leadership of this issue
    a. Note: both have existing standards for accreditation of offices and are experts in the are of MDI, but lack necessary informatics expertise to ensure success
3) The Association for Pathology Informatics (API) is "the obvious partner" for this endeavor
    a. API is pa professional organization of pathologists with expertise in informatics
    b. API's focus on data standards and education complement the standards and education focus of IACME and NAME
    c. Collaboration between these groups could address the challenges of sharing, merging, and analyzing data from the large number of MDI systems using unique methods to organize their data
4) It may be advantageous to choose a handful of smaller projects to demonstrate value and to work through issues
    a. Data fields most likely to be consistent (e.g. basic demographics) are an obvious first step
        i. Toxicology and other lab results may also be potential "low hanging fruit"
    b. With some early successes, it will be easier to develop more comprehensive solutions, including standard for the next generation of systems
5) They key is to develop a process by which data can be automatically transferred from (M)Di office systems into a single database and back out to other systems for analysis
    a. Challenges to be addressed:
        i. security of the data containing personal health information
        ii. ensuring the receiving system understands the message and can place into proper fields (example: Health Level7)
        iii. different names, data types, and conventions for expressing the data and data fields in different systems
            1. Note: this may seem insurmountable, but has been accomplished in other areas of health care
        iv. Policies regarding storage and access to the data will need to be created
            1. Law enforcement may need to restrict access to data for actively investigated criminal cases

2. NamUS and NVDRS are examples that have a mixture of data that is either freely accessible or restricted

v. In addition to expertise and collaboration, this effort will require significant financial support
    1. Including: design and define standards, database creation and support, data storage costs, design of mechanisms to access or transfer data for study, and general ongoing support
    2. “Given the value of this data to many different government agencies and departments, it is reasonable to pursue funding through these agencies”
        a. Control over the collected data should reside with the professional organizations and not with the government itself as subject matter experts are the best custodians of the data