OSAC RESEARCH NEEDS ASSESSMENT FORM

Title of research need: Research in radiologic imaging technology for the practice of forensic pathology

Keyword(s): Postmortem examination; medicolegal death investigation; autopsy

Submitting subcommittee(s): MDI **Date Approved:** 2/28/2021

(If SAC review identifies additional subcommittees, add them to the box above.)

Background Information:

1. Does this research need address a gap(s) in a current or planned standard? (ex.: Field identification system for on scene opioid detection and confirmation)

No.

2. Are you aware of any ongoing research that may address this research need that has not yet been published (e.g., research presented in conference proceedings, studies that you or a colleague have participated in but have yet to be published)?

No.

3. Key bibliographic references relating to this research need: (ex.: Toll, L., Standifer, K. M., Massotte, D., eds. (2019). Current Topics in Opioid Research. Lausanne: Frontiers Media SA. doi: 10.3389/978-2-88963-180-3)

https://www-sciencedirect-com.liboff.ohsu.edu/science/article/pii/S1076633218301041?via%3Dihub
https://europepmc.org/article/med/28819715

4. Review the annual operational/research needs published by the National Institute of Justice (NIJ) at https://nij.ojp.gov/topics/articles/forensic-science-research-and-development-technology-working-group-operational#latest? Is your research need identified by NIJ?

No.

5. In what ways would the research results improve current laboratory capabilities?

Using advanced imaging modalities, medical examiner/coroner offices would be able to provide more accurate and detailed information on injuries and other health conditions without the need for a full autopsy. This transition would help offices reduce workload as well as honor culturally based requests for non-invasive examinations. Furthermore, radiologic imaging technology has been shown to provide supplemental information to that gleaned from medicolegal autopsies, and in some cases, imaging can supplant the medicolegal autopsy. Implementing an efficient means to utilize deep learning algorithms would help offices with CT capabilities achieve better accuracy and potentially improve triaging processes.

6. In what ways would the research results improve understanding of the scientific basis for the subcommittee(s)?

Ongoing investigation has already demonstrated that utilization of advanced imaging modalities in the postmortem setting can reduce workload by helping pathologists transition cases to external examinations.

Since pathologists are typically reviewing these images, assistive technologies such as deep/machine learning algorithms could help in accuracy and speed of triage in high volume offices. Examples include automated deep learning methods to identify projectiles, subtle lethal injuries (such as AO dislocation), or identification of natural disease that could be easily missed (such as lung consolidations). Other research could target efficient imaging protocols to help throughput of decedents, reducing wear and tear of machines, and additional ways to help offices with implementation.

7. In what ways would the research results improve services to the criminal justice system?

Research into computed tomography can further the criminal justice system by helping to ensure accurate interpretation, a permanent record for expert review, and a providing an effective means of communication to jurors. Computed tomography can render volumetric images to demonstrate injuries without the need for inflammatory photographs that may be marred by blood or other material. Further research could help with more sophisticated 3D renderings for jurors, deep learning algorithms to help elucidate injuries (such as wound paths), assurance of accuracy by assistive technologies, and possibly teleradiology protocols.

8. Status assessment (I, II, III, or IV): II

	Major gap in current knowledge	Minor gap in current knowledge
No or limited current research is being conducted	I	III
Existing current research is being conducted	II	IV

This research need has been identified by one or more subcommittees of OSAC and is being provided as an informational resource to the community.