

Interview with Dr. George Hime from Miami-Dade County Medical Examiner's office



Dr. George Hime, I wanted to thank you for your willingness and time to participate in this interview. First, could you please outline the challenges that the forensic toxicologist faces in today's society?

I believe the biggest challenges facing all forensic toxicologists today is meeting the needs of a changing science with regard to improvements being made on the national level in quality, training, and preparation. With the issuance of the NAS (National Academy of Sciences) report 10 years ago standards of quality are changing rapidly throughout forensic science, but even more so in forensic toxicology. It is these new requirements that are putting more demands on government agencies, funding sources, and the lab personal. It is changing the thinking on how labs are funded and whether to rely on outside reference lab services or the local lab connected to a medical examiner facility for instance. In postmortem forensic toxicology it is my feeling this is a big mistake. Forensic toxicology is done best when there is access to information from investigators and pathologists.

I think another important issue facing forensic toxicologists is maintaining the technological edge and capability to deal with the emerging illicit synthesized drugs. These substances are coming at us so fast. Toxicology labs must remain alert and use all the tools at their disposal to identify these new substances. Being able to detect and measure these unknowns, to understand their chemistry, to be able to interpret their toxicological significance, presents a real challenge. I think what we are seeing today is only the tip of the iceberg. There will be many more to come in the days ahead.

What is your laboratory focusing on to combat these challenges?

Maintaining accreditation and standards for one, and implementing stringent QC procedures is another. Also things such as providing good training programs and maintaining a solid ongoing program of in-house education using workshops, webinars, professional meetings, etc to keep our staff informed on technical trends, instrumentation, and general science concepts in our field. We encourage and support participation, presentations, and publications from everyone in the lab.

Regarding keeping up with the challenges of new emerging drugs; we engage all our staff in the evaluation of case data using a very thorough electronic record keeping system (LIMS/Laboratory Information Management System) that provides them details on investigative information on each case as well as pathology findings. We discuss new tox findings and data such as MS results. Since everyone participates we all learn. No one gets left behind. When we see something new we all learn about it.

Where do you see the role of a post mortem toxicology lab moving to in the future? What is the future of forensic toxicology?

Hopefully the future is bright. As I mentioned before the trend is away from ME (Medical Examiner) labs towards centralized reference labs. This may have some economic advantages but, in my opinion, it is bad for the profession, the medical examiners, and the communities. Considering the history of postmortem forensic toxicology where the toxicologist worked closely with the ME and the investigator to help in determining the cause and manner of death using analytical science, the current trend is away from this collaboration. A big mistake. Unlike the clinical sciences forensic science cannot be conducted effectively in

this manner. The clinical laboratory scientist can work blindly in their testing, the forensic scientist cannot. This field is getting very complicated. Drugs, both pharmaceutical and illegal drugs, poisons, toxins, natural products and industrial toxins are all around us. More than they have ever been. The effects of exposure whether intentional or not cannot be evaluated in a vacuum. If death results an understanding of the total picture must be the goal. Flailing around performing test after test with no understanding of what you are looking for is both a waste of time and money. No matter what kind of capability the lab has this is not productive. I submit the only way postmortem forensic toxicology can be effective is if it is a collaboration of parties.

My hope is that this will be realized and we return to our historical roots, using modern scientific techniques and instrumentation. Only the future knows.

Could you tell us why you chose Shimadzu as your partner when expanding your instrument needs?

The laboratory instrument market is very competitive. But unlike other products we are exposed to as consumers choosing an instrument must be based on a solid understanding of your needs and how you plan to use the instrument you are shopping for. One cannot be blinded by flashy marketing, slick advertisement, and promises of performance that is dubious. When we start the process of purchasing an expensive instrument we define how we will use the instrument to address our needs, what capabilities we are interested in, and then we investigate each manufacturer's offerings. Some manufactures put a new face on old technology. Some re-invent the technology to address deficiencies. But it's always about the details. We found Shimadzu's attention to the details (LC design, source design and function, electronics design, analyzer design, etc) were very good. Efficiency of design in electronics for instance to squeeze the most out of the system was impressive. Also it was clear to us there was widespread confidence and acceptance among other manufacturers in Shimadzu's basic designs such as their LC systems. This told us a lot about reliability and stability of all Shimadzu's instruments. Buying a Shimadzu would not be a waste of money. The customer support and service was the second most important aspect of buying an instrument. If it is good then the instrument is good. That has been my experience after 40 years of buying instrumentation. When the service and support goes down then beware of the instrumentation quality. Shimadzu has delivered on this promise. Our lab has received excellent support for both instrument maintenance and application development. If a company can provide this type of service in this field it should be very successful.

How are these instruments assisting you with the current opioid crisis?

We currently use the 8060 LC/MS/MS system for quantitative measurements of many very potent opioids including fentanyl and its analogues. We needed sensitivity to measure them at relevant concentrations (<0.05 ng/mL) in very messy postmortem samples. The instrument has functioned well at this task. Developing multi-analyte methods was essential because it is more efficient and cost effective.

What are Shimadzu's strengths compared to other vendors (not limited to the instruments)?

Support and training are two big strengths. Some manufacturers seem to be falling behind in this area. A good collaboration between the manufacturer and customer assures the instrument is being properly used and enables the manufacturer to better understand the needs of the customer. I think Shimadzu has excelled at this. Manufacturers must be able to react quickly and use their resources to solve problems. Instrument design seems very well thought out down to the smallest details. Performance specs seem to be more real rather than those proposed by some manufacturers who use software tricks to achieve what they feel is comparable performance.

Finally, could you share any requests that you have with respect to analytical and measuring instruments?

Analytical instruments have gotten more complex over the years. The newer instruments are more software driven than ever before. I think I would like to see more software driven diagnostics capability to aid in troubleshooting. It's an exciting time in analytical instrumentation development. I hope with this advancement comes more user friendliness and continued collaboration between manufacturer and customer. TOF and QTOF instrumentation development will be interesting to watch in the coming years.

