



D50 The Role of a Coroner's System in an Infectious Pandemic: The Toronto SARS Experience

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After attending this presentation, attendees will understand the evolving role of a medicolegal death investigation system during a pandemic caused by an initially unknown pathogen.

This presentation will impact the forensic community and/or humanity by increasing understanding of how a medicolegal death investigation system can advance public safety during an infectious pandemic by improving medical knowledge and assisting public health decision making.

Sudden Acute Respiratory Syndrome (SARS) was first publicly identified by the World Health Organization (WHO) on March 12, 2003, but in retrospect this new infectious disease appears to have started in Asia in late 2002. At the time of submitting this abstract SARS has been identified in 31 countries worldwide. Significant outbreaks of SARS have occurred in China, Hong Kong, Singapore and Toronto. The political, economic and public health effects of this pandemic has been enormous.

The first death of a SARS victim in Toronto occurred on March 5, 2003, although its public health significance was not appreciated until just over one week later. At the time of abstract submission there have been 40 deaths (20 male/20 female; age range 39-99 years; median age 75 years) attributable to SARS in Toronto (with 13 active probable cases still in hospital).

The Toronto experience can be separated into two distinct epidemiological outbreaks (SARS I – March 5 to May 10, 2003, and SARS II – May 22 to June 12, 2003). At the time of the first deaths (SARS I) the pathogenesis and specific causative agent responsible were not known. 14 autopsies (out of 25 deaths) were performed during SARS I with the focus on medical cause of death, including testing to identify the etiological agent. All but one of the autopsies were conducted on cases with a probable (WHO criteria) diagnosis of SARS; all cases with probable diagnosis were positive for SARS based on microscopic and, when available later, PCR testing. As a result of these initial autopsies the *Coronavirus* genome was sequenced and PCR-based diagnostic testing developed. Autopsies were centralized at one site with the best ventilation and physical plant. All but 4 of the autopsies were performed by one pathologist. A protocol for a limited autopsy (including in situ organ sampling from liver, spleen, kidney, urinary bladder, heart, lung, pharynx, trachea, bone marrow and skeletal muscle) was developed during SARS I. The cranium was not opened in order to reduce aerosol formation.

The second outbreak (SARS II) resulted from transmission from an unrecognized acute care hospital inpatient; by the time of recognition 3 other health care facilities had SARS patients secondary to patient movement between facilities. By the time of SARS II *Coronavirus* had been identified as the causative agent and the focus at autopsy shifted, in large part, to using post mortem examination and test results to rule out potential (yet clinically low suspicion) cases. Autopsies were predominately performed on elderly inpatients with non-specific clinical pictures and evidence of infection, and provided important information for public health decision making (specifically identifying who required isolation). Based on experience from SARS I a new protocol was developed requiring that only the chest be opened; samples from lung, heart and skeletal muscle were examined by light and electron microscopy and PCR (reverse transcriptase PCR for SARS *Coronavirus* RNA) testing was performed within 24 hours of autopsy. Twenty autopsies were performed during SARS II (18 negative, 2 positive). Based on this new protocol it was possible to efficiently diagnose or rule out SARS cases within 24 hours of death, information that proved invaluable for public health decision making. There was one homicide case (stab wound to head) during SARS II where the decedent was febrile at the time of death and had been exposed to a SARS patient prior to death. This was the only case where a complete autopsy was performed. Test results available 20 hours after autopsy were negative for SARS.

Medicolegal death investigation systems do play an important role in an infectious pandemic, a role that may evolve during the course of the outbreak. Information gained as a result of autopsies can both advance medical knowledge and assist with public health decision making. In this instance of major public health concern the Coroners Office played a major role in diagnosis and disease containment.

Pandemic, Epidemic, Virus