W21 The National Transportation Safety Board (NTSB): Understanding and Preventing Impairment in Transportation

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Learning Overview: After attending this presentation, attendees will be able to (1) describe how the NTSB conducts its investigations of aviation, marine, rail, and highway events; (2) know the role of toxicology in the investigations; and (3) understand how this knowledge leads to recommendations to improve transportation safety and prevent impairment.

Impact on the Forensic Science Community: This presentation will impact the forensic science community by demonstrating the role of impairment in NTSB investigations and the importance of toxicology in understanding the contribution of drugs to impairment.

In this workshop, the NTSB's role in improving transportation safety, a historical overview, and current issues in transportation safety, as well as the goals for the agency and its future, will be discussed. The steps the NTSB investigators take both while on scene at an event and afterward to document the information necessary to understand potential impairment issues will be defined. With examples from recent and historical NTSB investigations, the methods to collect and document evidence, including operator and witness interviews, medical and pharmacy records, toxicological evidence, in-vehicle data, cell phone data, and physical evidence from the crash scene, will be provided. The criteria applied in the NTSB investigations to determine if operator impairment contributed to the cause of a crash will be explained. Three case studies will provide examples of drug impairment: a truck driver impaired by a prescription benzodiazepine and cannabis; a commercial balloon pilot impaired by a psychiatric condition and multiple prescription medications; and a pilot of a light civil aircraft impaired by the effects of prescription and over-the-counter sedating antihistamines and heart disease. The impact of safety recommendations on transportation will be explained. Three brief investigations produced safety recommendations regarding drug impairment and drug testing. The status of these recommendations, as well as the advocacy actions addressing driver and operator impairment are illustrated. The NTSB Most Wanted List items, such as impairment, which are eligible for additional advocacy support from the NTSB Board Members and staff, will be explained, and the resources to further promote these items and drive implementation of the NTSB safety recommendations provided. The toxicological road map for analyzing biological specimens collected in NTSB investigations will be outlined. The wide variety of biological specimens and analytes required, their advantages and disadvantages, especially in trauma cases, required instrumentation, and recent trends and potential future impairing drugs will be included.

Toxicological data from several challenging NTSB cases will be described to illustrate specimen testing procedures. Technical aspects of how forensic toxicology is used in the analysis of NTSB investigations to develop probable cause will be illustrated. Toxicological findings in specific cases and their contribution to probable cause will be portrayed. In an Amtrak® train rail crash involving a backhoe in Chester, PA, multiple drugs and medications were identified in several individuals. The role the drugs played in the event and the determination of probable cause are discussed. In the conclusion, the drugs did not contribute to the crash.

In the second case, the role of medications and the determination of probable cause of a light airplane crash in Abilene, TX, are described. This case involved coordinated testing between two laboratories and the conclusion was that the identified drugs directly contributed to pilot impairment and were part of the probable cause. Onsite biological specimen collection and testing now and in the future and how this might be helpful for NTSB investigations will be presented. The advantages and disadvantages of alternative matrices and their role in transportation safety and the difficulties in interpretation in these cases will be discussed.

NTSB, Drug Impairment, Human Performance