K19 The Validity of Surrogate Reporting of Substance Use

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After attending this presentation, attendees will have an understanding of evaluating the validity of surrogate reporting of substance use for the deceased.This study contribute to the understanding of factors involved in achieving high sensitivity and specificity of certain substances when contesting the validity of next-of-kin reporting versus toxicology reports.

Introduction: Collection of substance use information for those who died unexpectedly often rely on proxy respondents or toxicology reports. Past research have examined surrogate reporting about the deceased characteristics. However, the direct assessment of proxy reporting of substance use versus toxicology report were rarely investigated. The purpose of this study were: 1) to use toxicology report as a gold standard to evaluate the validity of proxy reporting of substance use, and 2) to identify which drug groups that are more likely to be accurately reported by the surrogate.

Methods: The data for this study were obtained from the 1993 National Mortality Followback Survey (NMFS) conducted by the National Center for Health Statistics, Centers for Disease Control and Prevention. With the permission from next-of-kin of the deceased, questionnaire data were linked to 3483 toxicology report collected from 1265 medical examiner/coroner offices. Ten items that asking the deceased substance use behavior were selected from questionnaire and compared with toxicology report. In the interview questionnaire, substances were grouped into nine drug categories : alcohol, pain killer, sedative, tranquilizer, antidepressant, stimulant, cocaine, marijuana, and methadone. Sensitivity and specificity test were used to evaluate the validity of nextof-kin reporting. We defined sensitivity is the toxicology report GC/MS confirm positive of a substance used and next-of-kin also reported yes to that substance for the deceased. Specificity is the toxicology report GC/MS confirm negative of a substance used and next-of-kin also reported no to that substance for the deceased.

Results and Discussion: The study results in the table below demonstrated that methadone and painkillers such as morphine, codeine and propoxyphene had 100% sensitivity. High sensitivity reflects that immunoassay procedures and confirmation techniques for these two categories of substance that were well developed and routinely executed for their identification in the laboratory. However, the sensitivity for other categories of substance use was low. The possible explanation for low sensitivity could be: 1) inability of the laboratory to detect substances that were not routinely screened and confirmed; 2) each substance has an unique halflife.

Consumption of substances such as methamphetamine, cocaine, or alcohol few days prior to death often provides a negative lab result; 3) small quantity of substance use frequently causes a lab result below the detection limit; 4) detection time also varies depending upon analytical method used, drug metabolism, individual's physical condition, fluid intake, and method and frequency of substance ingestion prior to death. Furthermore, cutoff values for positive substance vary from one laboratory to another. Regarding specificity, the survey revealed an average 76% specificity indicating that proxy reporting of substance use has some degree of scientific certainty in general. However none of the individual categories of substance reached 100% specificity, meaning proxy respondents did not know whether the decedents had used substance prior to their death. Alcohol, on the other hand, has the lowest specificity. It is probably associated with proxy's social, financial, psychological and legal implications. In conclusion, our study showed that both the toxicology report and proxy reporting provided important information in identifying forensic relevance for those who died unexpectedly. Nevertheless, shortfalls of each reporting system should be cautiously taken into consideration in result interpretation.

	Sensitivity	Specificity
Alcohol	0.93	0.26
Pain Killer	1.00	0.73
Sedative	0.36	0.88
Tranquilizer	0.47	0.85
Antidepressant	0.60	0.75
Stimulant	0.41	0.93
Cocaine	0.59	0.85
Marijuana	0.58	0.80
Methadone	1.00	0.90

Validity, Toxicology Report, Surrogate Reporting

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