



### K44 Metaxalone Related Deaths in North Carolina (2002-2010)

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After attending this presentation, attendees will be able to describe the types of postmortem casework associated with metaxalone at various concentrations.

This presentation will impact the forensic science community by providing information regarding metaxalone as it relates to cause and manner of death determinations.

Metaxalone (Skelaxin<sup>®</sup>) is a central nervous system (CNS) depressant indicated for the treatment of acute, chronic, traumatic, and inflammatory musculoskeletal disorders. It is typically prescribed in doses ranging from 800 to 3,200 mg daily. Approved by the Food and Drug Administration in 1962, metaxalone given orally at a therapeutic doses typically produces peak plasma concentrations  $\leq 4.0$  mg/L. Adverse reactions associated with metaxalone are generally related to CNS depression including drowsiness, dizziness, headaches, as well as nausea and vomiting. Limited information has been published on metaxalone toxicity. A review of the literature indicates that there are presently five reported deaths in which the causative agents included metaxalone.

At the North Carolina Office of the Chief Medical Examiner, cases suspicious for toxicological cause or with essentially negative autopsy findings are routinely screened for common over-the-counter, prescription and illegal drugs via various laboratory techniques. This presentation will detail 44 cases where metaxalone was detected during routine postmortem drug screening in support of cause and manner of death determination. The laboratory methods used to detect and quantify metaxalone in this laboratory have been previously described.<sup>1</sup>

Decedents were divided into three groups according to manner of death for the purposes of studying metaxalone concentrations in overdose and non-overdose situations (Table). The accidental and suicidal overdoses were subsequently divided into subgroups for further study: those where metaxalone was determined to contribute to the cause of death (attributed) and those where it was not (unattributed). The deaths in which metaxalone was determined to contribute to the cause of death were further divided into those where metaxalone additively combined with other drugs to cause the death and those where the drug was present in sufficient amounts to have caused the death regardless of other drugs and their concentrations.

Manner	N	Mean (median)	Range
Natural (n=4)		5.4	1.2-8.6
Accidental (n=24)			
Unattributed	13	N/A	<2.0-6.9
Attributed	11	15.4 (10)	4.4-50
Suicidal (n=16)			
Unattributed	4	N/A	<2.0-5.0
Attributed	12	25(24)	8.4-63

N/A - not calculated due to the number of concentrations reported as less than the lower limit of quantification.

Total, there were nine cases (seven suicides, two accidents) where the pathologist ruled that metaxalone was present at sufficient concentrations to cause death had it been the only drug detected. The mean (median) concentration of metaxalone in these cases was 34 (32) mg/L and concentrations ranged from 23 to 63 mg/L. Of these nine cases there was only one in which metaxalone was the only drug detected (suicide, 63 mg/L) and the remaining eight were ruled multiple drug intoxications. Co-intoxicants included antidepressants (five of eight), antihistamines (three of eight), and miscellaneous CNS depressants (four of eight). Notable was the absence of opiates/opioids in this sub-group. This was not the case in deaths where metaxalone was ruled as an additive agent in the death (nine accidents, five suicides). In these cases, metaxalone mean, median and range were 10.8, 9.5 and 4.4-18, respectively. Opiates/opioids were ruled as contributing to death in 86% (12 of 14) of these cases.

In conclusion, of the 44 cases studied, 21 (47.7%) metaxalone was ruled noncontributory to death, 22 (50%) were ruled multiple drug intoxication and 1 (2%) single agent intoxication. Concentrations of metaxalone in these groups were <2.0-8.6, 4.4-50 and 63 mg/L, respectively.

#### Reference:

<sup>1</sup> J Anal Toxicol. 2004 Sep;28(6):537-41 PMID:15516312[PubMed - indexed for MEDLINE]

#### Metaxalone, Death Investigation, Toxicology