

## Letters to the Editor

### Presence of Inhibitors to the EMIT® Test in Postmortem Urine Samples

Dear Sir:

I read with much interest Isenschmid and Caplan's article "Incidence of Cannabinoids in Medical Examiner Urine Specimens" [1]. This work appears to most certainly debunk the assumption by many in the United States that smoking marijuana is a harmless activity.

I noticed that Dr. Caplan's study simply screened urine for cannabinoids by SYVA EMIT® at a cutoff concentration of 75 ng/mL. It may be that their incidence of positives is biased downward. In our laboratory's experience (both with employee drug screening and with postmortem drug screening), many postmortem urines contain some inhibitor to the SYVA EMIT reactions.

Upon routine screening of such urines by EMIT for benzodiazepines, cocaine metabolite, opiates, barbiturates, phencyclidine, amphetamines, methaqualone, methadone, propoxyphene, and cannabinoids the baseline (the average change in absorbance of completely negative urines) was lower for many postmortem urines than the baseline for employee urines. This lower change in absorbance did not necessarily occur with every assay on a specific postmortem urine. For example, one postmortem urine might give a lower change of absorbance for opiates, cocaine metabolite, or propoxyphene. Whereas, another postmortem urine might give a lower change of absorbance for benzodiazepines and amphetamines. I hypothesized that one or more inhibitors were present in these postmortem urines and proceeded with appropriate standard addition studies.

I found that some urines would still give an absorbance change lower than baseline even when "spiked" at the usual cutoff concentration. Others would give an absorbance change between the value of the negative calibrator and the cutoff calibrator. This study was done using SYVA EMIT reagents diluted 1 to 10 with buffer. I did not test postmortem urines using the manufacturer's recommended dilution. It is possible that this "inhibition" would not occur if the reagents are not diluted.

Our laboratory circumvents this difficulty by extracting drugs from postmortem, calibrator, and control urines using the method of Davidow [2]. We then reconstitute the extracts with drug-free urine and perform the SYVA EMIT testing. Any extracts giving a change in absorbance greater than the cutoff control for a particular drug are presumed positive and then subjected to GC/MS confirmation testing for the drug of interest.

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### References

- [1] Isenschmid, D. S. and Caplan, Y. H., "Incidence of Cannabinoids in Medical Examiner Urine Specimens," *Journal of Forensic Sciences*, Vol. 33, No. 6, Nov. 1988, pp. 1421-1431.
- [2] Davidow, B., Petri, N. L., and Quame, B., "A Thin-Layer Chromatographic Screening Procedure for Detecting Drug Abuse," *American Journal of Clinical Pathology*, Vol. 50, No. 6, Dec. 1968, pp. 714-719.

**Authors' Reply**

Dear Sir:

Mr. Taylor's observation that unusually low delta-absorbances may result when postmortem urine specimens are tested by EMIT® for cannabinoids is noteworthy. In the screening of 500 postmortem urine specimens, we observed that 22 specimens had delta-absorbances more than 20% lower than the delta-absorbance of the negative calibrator. Most of these were 20 to 30% low, and 3 specimens produced virtually no delta-absorbance for the cannabinoid assay (Table 1).

TABLE 1—*Twenty-two postmortem urine specimens with delta-absorbances more than 20% lower than those of the negative calibrator.*

% Delta-Absorbance Below Negative Calibrator	N
20-30	13
30-50	6
50-80	0
>80 (99,99,83)	3

With respect to the possible negative bias of the incidence of cannabinoids in postmortem cases, it would appear that only a small fraction might be missed as a result of any observed decrease in delta-absorbance. Based on the overall 12% incidence of cannabinoids in medical examiner urine specimens in our study, if all 22 of the specimens observed to have low delta-absorbances did in fact contain a possible "inhibitor" to the EMIT assay, only 3 out of 22 might have been reported as false negatives. Statistically, this would not significantly change the overall incidence of cannabinoids reported.

Additionally, the fact that a 75-ng/mL cutoff was used for screening may account for some potentially cannabinoid positive samples to have been screened negative. We decided to use the 75-ng/mL calibrator based on a previous report by Black et al. where the incidence of unconfirmed positives using a 20-ng/mL EMIT cutoff for cannabinoids was significantly higher than when using a 75-ng/mL cutoff [1].

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**Reference**

- [1] Black, D. L., Goldberger, B. A., Isenschmid, D. S., White, S. M., and Caplan, Y. H., "Urine Cannabinoid Analysis: An Integrated Multi-Method Approach," *Journal of Analytical Toxicology*, Vol. 8, No. 5, 1984, pp. 224-227.

**Discussion of "Operational Criteria for the Determination of Suicide"**

Dear Sir:

We found the paper by Rosenberg et al., "Operational Criteria for the Determination of Suicide," to be very thought-provoking [1]. While we agree in principle that operational

criteria for the determination of suicide are desirable, we strongly disagree with the following specific recommendations presented in the paper:

1. That a "yes" or "no" decision with respect to suicide representing the decision maker's best judgement after collecting and reviewing all the evidence is needed.
2. That the basis for the decision regarding suicide should correspond to the legal notion of "preponderance of the evidence," or "reasonable probability."
3. That stressful events, significant losses, serious depression, or mental disorders be considered implicit or indirect evidence of *intent*.

Forcing a "yes" or "no" decision with respect to suicide represents a gross oversimplification of the decision process for classification of manner of death. It is analogous to requiring a pathologist to classify all tissue specimens as simply "cancer" or "non-cancer." Clearly, scientists must realize that there are times when, even after careful painstaking investigation, they may not possess enough information to draw relevant conclusions from their data. One of the most valuable and important things knowledgeable experts can discern is when they do not have enough information to make a determination. When sufficient information is not available, the appropriate classification for this type of death is "undetermined." The application of the "yes" or "no" recommendation could even result in the misclassification of homicide cases as suicides or accidents. Cases should only be classified as suicide or accident when there is sufficient evidence for the determination. Cases should not be called suicide or accident simply because no evidence to the contrary is present. We have seen a number of unwitnessed drowning cases initially classified as accident or suicide turn out to be homicide.

That the basis for the decision regarding suicide should correspond to the legal notion of "preponderance of the evidence" or "reasonable probability" chooses to ignore both English and American common law and the large volume of case law on the determination of suicide. The recommendation purports simply to change the long-established standard of proof for suicide which has been upheld by numerous courts in the United States. In doing so, it does not propose to raise the standard, but rather proposes to adopt the lowest standard of proof possible. The standard of proof required for determination of suicide has been excellently covered by Massello in this journal: "To rebut the presumption in law against suicide, a much stricter standard of proof is generally required than ordinary 'preponderance of the evidence.' . . . 'Clear and convincing' is the standard of the proof therefore applied to a suicide case" [2].

"Clear and convincing" is a standard of proof lying somewhere between "preponderance of the evidence" and "proof beyond a reasonable doubt." A determination of suicide based on "preponderance of the evidence" or "reasonable probability" would mean that it is slightly more likely than not that the deceased committed suicide. This standard seems far too low for such a serious determination and leaves the classifier no margin for error. By forcing a decision on borderline cases, certain cases will actually be misclassified as suicides. The "clear and convincing" standard carries a built-in margin for error, and even with this standard cases are misclassified as suicide.

Overreporting suicide is a much more serious matter than underreporting. Certainly, the many serious consequences resulting from the incorrect classification of a death as suicide, not the least of which may be denial of deserved compensation to widows and orphans, do not outweigh the benefit of improved health statistics. The large number of court decisions in this area cannot be ignored without encountering significant legal challenges, the outcome of which should be predictable. When persons embark on a course of action contrary to established legal precedent they may reasonably expect to be sued and to lose.

Stressful events, significant losses, serious depression, or mental disorders are indicators of motive; they are not indicators of intent, either direct or indirect. In the determination of suicide it is crucial to distinguish intent from motive. *Motive* is the reason a person does

something. It is helpful in understanding and explaining why a suicide occurred, but should not be considered in determining whether or not the death is a suicide. Motive is not necessary for the determination of suicide. If sufficient evidence of intent is present in a suicide, motive need not be established. If evidence of intent is absent, deaths may not be classified as suicide simply because the persons involved had one or more good reason to kill themselves. To do otherwise would be analogous to arresting someone for murder simply because he disliked the deceased and might profit by his death. Inquiries about motivational factors are appropriate because they facilitate acceptance of the suicide determination; they do not, however, assist in making the determination.

The authors are requesting us to lower our standards, ignore previous court decisions on the matter, and consider irrelevant evidence in making the determination of suicide. We believe their proposal will cause serious difficulty for those required to certify manner of death.

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### References

- [1] Rosenberg, M. L., Davidson, L. E., Smith, J. C., Berman, A. L., Buzbec, H., et al., "Operational Criteria for the Determination of Suicide," *Journal of Forensic Sciences*, Vol. 33, No. 6, Nov. 1988, pp. 1445-1456.
- [2] Massello, W., III, "The Proof in Law of Suicide," *Journal of Forensic Sciences*, Vol. 31, No. 3, July 1986, pp. 1000-1008.