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Letter to the Editor

Critique of Bahorik *et al.* (2013) – 'Under-reporting of drug use among individuals with schizophrenia: prevalence and predictors'

Scientific consensus indicates that adults with serious mental illnesses, including schizophrenia, can validly and reliably self-report (Swanson *et al.* 2006; Lincoln *et al.* 2010; Baumstarck *et al.* 2013) intra-psychic, cognitive, and behavioural functioning, including drug use (Wolford *et al.* 1999). Bahorik and colleagues (2013) depart from this viewpoint, concluding that adults with schizophrenia significantly under-reported drug use in the Clinical Antipsychotic Trials of Intervention Effectiveness (CATIE) study. However, there are reasons to question their findings.

Representativeness of analytical sample

Bahorik and colleagues' analytical sample consisted of 1042 patients with schizophrenia; the full CATIE trial included 1460 patients (Reimherr *et al.* 2010). Based on their stated sample selection criteria, they should have analysed a larger sample: at baseline there were 1445 urine drug screens (UDS) and 1130 radioimmunoassays (RIAs) of hair. The only way to arrive close to $N=1042$ would be by first selecting those with a valid hair RIA. Moreover, comparisons between patients selected in and out of their analytical sample were not reported; characteristics may have differed systematically between those who did and did not have RIA results.

Selective inclusion and exclusion of UDS data

Bahorik and colleagues used RIAs of hair as a gold standard and first-order inclusion criterion, a measure that was missing for over one-fifth of all CATIE participants, but then discarded one-quarter of valid UDS data for the remaining participants. Specifically, they excluded participants who did not have a valid RIA of hair (even if they did have a valid UDS), but included UDS for participants who had a valid RIA of hair. If it is appropriate to include UDS for some participants, then it is appropriate to include UDS for all participants. If Bahorik and colleagues were interested in matching the 90-day RIA of hair detection period with the 90-day retrospective self-report, they should have excluded all UDS results, which generally detect use over a shorter period of time (DuPont & Baumgartner, 1995; Verstraete, 2004). Still, it has been argued that RIA of hair should *not* be used as a gold standard (Ledgerwood *et al.* 2008).

Conflicting results

Bahorik and colleagues' finding that, '*rates of under-reported drug use are considerable*' is not replicable when using all available CATIE data, as shown in our prior paper (Van Dorn *et al.* 2012), as well as in analyses undertaken for this letter. First, of 1448 patients for whom self-report and biological test data were available, 155 (10.7%) patients denied drug use, but had a positive biological test, while 114 (7.9%) patients self-reported drug use, but had negative biological tests, suggesting that patients were almost as likely to *over*-report as they were to *under*-report. Second, Bahorik and colleagues show a negative predictive value and a positive predictive value of 0.72 and 0.76, respectively, for any drug use; we found values of 0.89 and 0.61. They report sensitivity and specificity of 0.42 and 0.91; we found values of 0.68 and 0.86. Their kappa of 0.37 improved to 0.52 in our reanalysis. Third, we computed areas under the curve (AUC) of receiver-operating characteristic of self-report compared to biological tests and found acceptable, not poor, accuracy (AUC=0.73, S.E.=0.02, 95% CI=0.70–77). While it is beyond the scope of this letter, there is also reason to question the validity of Bahorik and colleagues' multivariable results in light of these divergent findings. Fourth, Bahorik and colleagues do not report how they handled positive biological tests attributable to prescribed medication. Prior CATIE publications (Swartz *et al.* 2006; Van Dorn *et al.* 2012; Desmarais *et al.* 2013) describe a protocol for handling such situations: participants who test positive for a prescribed medication in biological tests are *not* considered to be using. Given their claim of increased under-reporting compared to those reported herein and in prior CATIE publications, the possibility that Bahorik and colleagues (mis)attributed under-reporting to appropriate use of prescribed medications should not be overlooked.

Representation of extant research

Bahorik and colleagues' representation of the extant research also deserves comment. They assert that adults

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with schizophrenia are at increased risk of under-reporting drug use during an '*acute crisis, but not when their symptoms were stabilized*', citing Stone and colleagues (1993); yet, there is nothing to support this statement in the Stone *et al*. paper. The authors also cite Møller & Linaker's (2010) study of 48 patients, stating that approximately 14% under-reported '*their use of drugs*'. However, Møller & Linaker found that one in seven patients under-reported their drug use *problems* compared to clinician ratings on the Drug Use Scale (DUS), which is not the same as under-reporting their drug *use*. Moreover, research shows that DUS ratings frequently over-identify disordered use (Desmarais *et al.* 2013). Bahorik and colleagues also misreport the findings of Galletly and colleagues (1993): one-quarter of patients – not all patients, as Bahorik and colleagues state – who had a positive UDS failed to disclose their drug use. Finally, Bahorik and colleagues' argument that self-report measures '*could considerably underestimate actual rates of use*' in outpatient samples is not supported by contemporary research. Research on inpatient samples from the late 1980s and early 1990s showed under-reporting of drug use; however, more recent research concludes that self-report is an accurate approach to assessing drug use (Wolford *et al.* 1999; Van Dorn *et al.* 2012; Desmarais *et al.* 2013).

Summary

Bahorik and colleagues' efforts to examine the potential for under-reporting drug use in the CATIE data are laudable. In contrast with their conclusions, findings presented herein and in our previous publications are consistent with previous research showing that individuals with schizophrenia can adequately and accurately self-report their substance use. In fact, biological tests add little incrementally to the accuracy of multi-modal assessment protocols (Wolford *et al.* 1999; Van Dorn *et al.* 2012; Desmarais *et al.* 2013). As Bahorik and colleagues note, '*much remains to be learned*' about the reporting of drug use in this population; however, their framing of the research, sample selection, findings, and conclusions misconstrue the relationship between self-report and biological tests in the CATIE data.

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Declaration of Interest

None.

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Letter to the Editor

Critique of Bahorik *et al.* (2013) – 'Underreporting of drug use among individuals with schizophrenia: prevalence and predictors' – a reply

We thank the authors of 'Critique of Bahorik *et al.* (2013) – "Underreporting of drug use among individuals with schizophrenia: prevalence and predictors" ' (Van Dorn *et al.* 2013), for taking the time to comment on our paper, as we have uncovered an error in the data coding that may have otherwise gone undetected. Although unrelated to the material in the critique, we are grateful for the opportunity to have re-examined our paper and to have caught an error. Our updated findings are qualitatively consistent with our original results, and the implications still suggest that the under-reporting of drug use is a concern in individuals with schizophrenia (Bahorik *et al.* 2013). *Psychological Medicine* is correcting the tables that were reported in error, and we hope that interested readers will consider our updated work.

Despite that the field has not achieved consensus on an ideal strategy for combining self-report and biological data, recent reports from the U.S. National Institute on Drug Abuse have indicated that such measures demonstrate optimal agreement when the time-frame covered by the self-report matches the biological window for detection (Donovan *et al.* 2012). Given that one of our aims was to examine the extent of agreement between self-reports and biological tests (Bahorik *et al.* 2013), employing measures that largely covered the same retrospective index was an important consideration to our study, and this methodological decision is supported by the current state of the evidence (Donovan *et al.* 2012).

The research that we conducted examined the extent of agreement between self-reports and biological tests for detecting drug use in individuals with schizophrenia, and then determined the predictors of drug use under-reporting (Bahorik *et al.* 2013). Given that there are strengths and weaknesses on every method that is used to assess for drug use in individuals with schizophrenia as well as limitations in the reliability and validity of measures of drug use collected from any source (e.g. Carey, 2002; Ziedonis *et al.* 2005; McHugo *et al.* 2006; Donovan *et al.* 2012), we are glad that this topic is receiving relevant attention. These weaknesses and limitations are reasons why we refrained from stating in our paper that there was a gold standard for collecting drug screen information. Nonetheless, our paper as well as others examining this topic, shed light on an important issue that affects a vulnerable population who essentially are the beneficiaries of this important area of research. We are glad that this topic is receiving the relevant attention it deserves.

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Declaration of Interest

None.

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