Contingency management is an addiction treatment that has been shown to reduce cigarette smoking by delivering monetary incentives contingent upon objective verification of abstinence. Most contingency-management studies have evaluated cigarette smoking during treatment by measuring breath carbon monoxide levels. One limitation of this measure is that the relatively short half-life of carbon monoxide requires breath samples be collected at least twice daily in order to detect all instances of smoking. Another biomarker of smoking which may have utility for contingency-management treatment for smoking cessation is cotinine, a nicotine metabolite. Cotinine has a longer half-life than carbon monoxide and thus can detect smoking up to six days prior. Although cotinine levels are usually assessed with urine tests, recently, saliva cotinine tests have been developed, which may be easier and more convenient to administer. There is little research on the effectiveness of using saliva cotinine tests in contingency-management treatments.

One goal of the present study was to investigate the effectiveness of monitoring saliva cotinine twice weekly in a contingency-management treatment for cigarette smoking using a cash prize-based payment system. Participants were randomly assigned
to one of two groups: a contingent reinforcement group or a non-contingent reinforcement group. The study began with a Baseline phase lasting five consecutive days during which participants smoked as usual, and was followed by a four day Shaping phase, during which participants were asked to gradually decrease smoking. Breath carbon monoxide measures were used to assess smoking during Shaping, as cotinine tests cannot detect short-term changes in smoking levels. During the subsequent three-week treatment phase, participants submitted saliva cotinine and breath carbon monoxide samples twice per week. For the contingent group, meeting abstinence criteria earned draws from a cash prize-bowl on an escalating scale that reset when either breath or saliva samples were above criteria. Participants in the non-contingent reinforcement group earned a set number of draws during this phase simply for submitting saliva cotinine samples, regardless of smoking status. Participants also completed a brief computerized delay-discounting test each visit to measure the effects of nicotine abstinence on impulsivity.

Sixteen participants completed the study. Saliva cotinine measures significantly correlated with breath CO measures and aligned with self-reports of smoking. Smoking levels decreased in both groups, and there was not a group difference. Attendance rates significantly decreased when the frequency of monitoring decreased to twice per week. These results suggest that twice weekly monitoring of saliva cotinine is an easy and effective way to monitor smoking in a contingency-management smoking cessation program. However, infrequent monitoring may limit treatment efficacy and require additional program modifications, such as higher payment. The decrease in smoking in the non-contingent group indicates that additional research on the role of feedback on smoking during CM programs is warranted. Impulsivity did not change throughout the study, and baseline impulsivity measures were not predictive of abstinence. Baseline carbon monoxide level was the only predictor of days abstinent. Scores on the Fagerstrom Test for Nicotine Dependence were predictive of baseline CO and cotinine levels, but not changes in smoking. Additional delay-discounting research using various reward types, in which delay-discounting is measured across short- and long-term nicotine abstinence is necessary to better investigate the relationship between nicotine and impulsivity.