THREE AUTHORS REPLY

We thank Dr. Karp (1) for suggesting that the differences we observed (2) in the association between neighborhood poverty and injection cessation comparing estimates derived from standard multivariable regression with those from models fitted with inverse probability weights (IPW) may be due to reasons other than induction of bias by the regression model. This is entirely correct. We respectfully disagree, however, with the assertion that the discrepancy in estimates between multivariable and IPW models “could have easily arisen as a consequence of odds ratio heterogeneity across strata defined by the numerous covariates” (1, p. 863), referred to as the noncollapsibility of the odds ratio (3).

Although the odds ratios from a regression model (i.e., the covariate-conditional odds ratio) may not equal the odds ratio from an IPW model (i.e., the covariate-marginal odds ratio), even in the absence of confounding, noncollapsibility of the odds ratio is not a likely explanation for our findings (2). Our IPW estimates are larger in magnitude than the multivariable regression estimates. As demonstrated by Neuhaus et al. (4), covariate-conditional associations are equal to or larger than their covariate-marginal analogs when the difference is due solely to noncollapsibility. Although our final IPW model was estimated conditional on baseline covariates, making the estimate partially covariate conditional, neighborhood poverty was still associated with cessation in fully covariate-marginal IPW models estimated without conditioning on baseline covariates (data not shown).

Other factors besides those discussed in our paper (2) may explain the discrepant results between the standard regression and IPW models in our analyses. Our standard regression models, for example, did not incorporate censoring...
weights; however, post hoc application of censoring weights produced qualitatively similar results (data not shown). The exact combination of factors that account for the differences we observed between standard regression and IPW models is unclear. It is clear that confounding by neighborhood remains a prominent challenge to causal inference in observational studies of neighborhood effects and that alternative techniques should be explored. Further analyses should consider the application of strategies such as IPW and instrumental variable methods in combination with traditional regression techniques.

ACKNOWLEDGMENTS
Conflict of interest: none declared.

REFERENCES

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DOI: 10.1093/aje/kwq192; Advance Access publication June 17, 2010