

# WORKING P A P E R

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## Are There Unusually Effective Occupational Safety and Health Inspectors and Inspection Practices?

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## SUMMARY

Several studies of federal OSHA inspections have shown that, under some conditions, they reduce injuries at manufacturing establishments by approximately 20% over the two years following the inspection. Research about the factors that determine whether inspections are effective or ineffective in preventing injuries is still in its early stages. One issue that has not been well explored is whether the characteristics of the inspector matter. In addition, we are interested in the possible impact of different inspection practices. Are there unusually effective (or ineffective) inspectors? If so, why are they more effective? What can we learn from studying these variations that might help in the design of recruitment, training and the policies that inspectors should follow in the field?

There are four main research questions that this study addresses:

- 1) How much do inspectors vary in the way that they carry out inspections in terms of practices that might have an impact on inspection effectiveness?
- 2) How much of the variation in inspection outcomes can be explained by which inspector carried out the inspection?
- 3) How much of the variation in inspection outcomes can be explained by which Cal-OSHA district the inspector was associated with?
- 4) Are certain inspection practices associated with better inspection outcomes?

The inspection data we use to explore these questions is from the California OSHA program (Cal-OSHA). We identified the inspections which each Cal-OSHA inspector carried out from 1991 through mid-2007. We interviewed inspection supervisors to get suggestions about what elements in the data might have a relationship to inspector effectiveness. We examined the variations among inspectors (and among Cal-OSHA District offices) on a number of different inspection practices. We also constructed regression models to estimate whether some inspectors were unusually effective or ineffective.

The chief conclusions of this exploratory study are the following:

There is a substantial amount of variation among inspectors in many inspection practices, even when the type of inspection is the same. Some of this variation probably represents other differences in the inspection environment rather than variation in how different inspectors would behave in the same situation. However, the finding that the extent of the variation is almost as large even when we look only at inspectors with at

least 60 inspections of a given type suggests that differences among inspectors play a role. Whether the degree of variability that we found provides a valid reason for concern is an issue that agency managers and other policymakers need to determine, but this information should be useful to them in identifying the patterns.

We also found substantial variation in inspection practices among the 23 Cal-OSHA districts that we examined despite the fact that most districts had well over 1,000 inspections in that sample.

When we used regression models with fixed effects for inspectors, we found that the identity of the inspector explained about 3% of the variation in injury rate changes subsequent to the inspections. There were 7 to 14 more inspectors with significantly strong or weak impacts than the number we would have expected (7) due to chance. That result hints that some real inspector outliers do exist, but also that they don't have much impact on the effectiveness of the total inspection program. We also saw that inspector experience was related to larger preventive effects.

The finding that inspections by inspectors with more experience tended to reduce injury rates more than inspections by others echoes the finding in the earlier study conducted with a national sample of federal OSHA inspectors. With this agreement between studies, we have greater confidence in this relationship. Experience is not, of course, a variable that is easily subject to policy manipulation. The finding may, however, suggest the importance of retaining experienced personnel or perhaps hiring people who already have some experience elsewhere. However, the value of this finding depends heavily on developing an understanding of what it is that makes more experienced inspectors, on average, more effective. Further work on this topic is justified even though it appears that the identity of the inspector explains only a small part of the variation in effectiveness.

When we used a regression model with fixed effects for Cal-OSHA districts, we did find 1 or 2 districts that appeared to have less effective inspections. This number, however, is similar to what we would have expected to find by chance. Therefore, we cannot have much confidence in the accuracy of those identifications.

Nevertheless, we did investigate whether inspections practices in those two Districts differed from those in the other Districts. Most of the differences were not very large. Lastly, we ran a linear regression (with no fixed effects) to see whether the practices we have been examining had any effect on whether injuries declined following inspections. None of them did. The practices included having an employee accompany the inspector, citing a wide range of different standards, and finding at least some violations in most

inspections. The closest to an exception was that the practice of widening the scope of complaint and accident investigations was significant at a 'p' value of 0.11; however, its coefficient was positive (i.e., higher injury rates), not negative as expected.

Despite the small effects related to inspectors and the lack of clear ties to the practices we have examined, we believe that further investigation is warranted. Hiring new inspectors is costly; if we can gain new knowledge about how effective different practices are, we might be able to prevent more injuries without adding as many new resources.