Reducing Recidivism: Evaluation of Goals, Measures, and Compliance Tools, and Options for Improvement

DEPARTMENT OF LABOR
EVALUATION OF ESA WAGE & HOUR DIVISION: INCREASING COMPLIANCE AMONG PREVIOUSLY INVESTIGATED EMPLOYERS

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Table of Contents

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1.0 Executive Summary

This evaluation, conducted for the Wage and Hour Division (WHD) in the Employment Standards Administration (ESA) in the U.S. Department of Labor (DOL) has examined the effectiveness of a variety of methods intended to reduce recidivism among employers who have previously been detected violating provisions of Acts enforced by the WHD. The goals and measures relating to recidivism that have been established by WHD under the Government Performance and Results Act (GPRA) have first been reviewed. Then, the effectiveness of the enforcement tools and compliance actions that WHD uses to discourage recidivism among previously investigated employers has been evaluated. The results of the evaluation and recommendations for improvement are summarized below.

GPRA goals and measures

A major goal that WHD has established under GPRA is to *ensure workers receive the wages due* them. The indicator of recidivism that is currently used by the Department of Labor to evaluate the performance of WHD in achieving that goal is: *reducing employer recidivism by increasing the percent of prior violators who achieved and maintained FLSA compliance following a full FLSA investigation*. This indicator considers the extent to which previously noncompliant employers have subsequently achieved full compliance with the minimum wage and overtime requirements of the Fair Labor Standards Act (FLSA).

Although achieving full compliance with those provisions is doubtless a valid measure of WHD's goal, it is incomplete. Employers can improve their performance in relation to that goal without becoming fully compliant. Adopting measures that focus more directly on the workers and their wages would more clearly connect the measure to the WHD's stated goal, as well as placing the emphasis more precisely on the statute's intent of economic protection for workers.

In addition, DOL's FY 2007 *Annual Performance and Accountability Report* has stated that 66 percent of employers who previously violated provisions of the FLSA were found to be in compliance in reinvestigations: a decline of 10 percentage points from FY 2006. These measurements are based, however, on small, randomly selected samples of, on average, 68 employers per year. A random selection process generates results that are accurate on average. Small sample sizes, however, provide limited confidence that a particular yearly sample is an accurate representation of the population of previously investigated employers at that time. Such samples therefore do not assure estimation of average annual compliance rates that are sufficiently accurate for reliable evaluation of the levels that have been targeted for the GPRA recidivism indicator. Small shifts in the composition of a sample of 68 employers among industries with notably different compliance rates can produce appreciable changes in the value estimated for the GPRA recidivism indicator, as observed between FY 2006 and FY 2007.

Our analysis of data that are routinely retrievable from the WHD's Wage and Hour Investigative Support and Reporting Database (WHISARD) has found that, overall, the agency's enforcement

actions and compliance tools have had substantial success in improving the compliance of prior violators. The analysis has examined not only compliance by previously noncompliant employers, but also reductions in the numbers of workers who are owed back wages and in the amounts of back wages that they are owed, in total and on average.

It is therefore recommended that the agency should consider adopting recidivism indicators that address the number of workers affected by the FLSA non-compliance of prior violators, and the severity of the impact of their violations on individual workers. In particular, it is recommended that WHD should consider adopting GPRA measures such as:

> Reducing by *a specified number of percentage points* the average percent of prior violators' workers who are owed back wages.
>
> Reducing by *a specified percentage* the average back wages owed by prior violators to their workers.
>
> Reducing by *a specified amount* the percentage of prior violators' workers who are owed *a specified minimum average amount* in back wages per worker.

where the *italicized* percentages and amounts can be set as practical GPRA objectives by WHD.

In setting such objectives, values should be chosen that can be reliably measured on the basis of data that are available or can realistically be collected with available resources and funding. Accordingly, if the WHD chooses to continue to use data from its National Recidivism Initiative (NRI) surveys to compute the values of its recidivism indicators, it should review with the University of Tennessee the sample size required to reach a confidence level of 90 percent for its GPRA measures, and should set its targets to attain a statistically significant level of performance improvement at a minimum by the end of the five-year strategic planning cycle.

Caution should then be exercised and appropriate context should be provided in interpreting estimated differences in outcomes over time, especially those that are not statistically significant at the 90 percent confidence level. Differences might occur by chance with probability greater than 0.10 may not be sufficiently reliable evidence of performance changes to be used for purposes such as determining program budgetary requirements.

Effectiveness of WHD enforcement actions and compliance tools

The enforcement actions and compliance tools that are currently applied in conjunction with WHD investigations have been associated statistically with substantial improvements in compliance by previously investigated employers in their next WHD investigations. Both for investigations in general and in relation to specific Acts, a substantial proportion of employers with violations in their historical investigations did not have violations detected in their current investigations. Further, previously investigated employers who have not become fully compliant have substantially reduced the extent and the severity of their noncompliance.

In addition, results of multivariate statistical analyses indicate that the enforcement actions and compliance tools for which data are presently available in WHISARD are effective in improving compliance by investigated employers in specific ways. Those actions and tools include: complaint-based investigations, directed investigations, assessment of back wages, and imposition of civil monetary penalties.

Collectively, the enforcement actions and compliance tools are clearly effective in encouraging general reduction in recidivism, but the patterns of offsetting increases and decreases in compliance that, in combination, provide the general reduction is not reliably predictable. The actions and tools are not sufficiently focused to provide demonstrably strong stimulus for compliance with most specific Acts or provisions. Their effects on employers who reduce but do not eliminate their noncompliance are much more uncertain than their effects on employers who become fully compliant.

Effect of investigations

In general, conducting complaint-based investigations is associated with elevated probability of detecting violations in those investigations, and with reduced probability of detecting violations in the next investigations of the same employers. These statistically significant results indicate first that complaints received by the WHD reliably identify employers with elevated probabilities that they are currently noncompliant. Second, they indicate that, after investigations of those employers have been conducted in response to the complaints, those employers are more likely to be found compliant in their next investigations than are employers who previously had directed investigations.

Effect of back wages

In the aggregate, among employers who have undergone two successive WHD investigations, the back wages paid by employers with liability for back wages in their current investigations is substantially less than the back wages paid by employers with liability in their historical investigations. Also, the average back wages paid to affected employees by employers with liability for back wages in their current investigations is substantially less than the average back wages paid to affected employees by employers with liability in their historical investigations.

Further, results of multivariate statistical analyses reveal that both the probability that violations have been detected in subsequent investigations and the total amounts of back wages that those investigations determine are owed to employees are directly related to the total amounts of back wages that the previous investigations discovered were owed to employees. The amounts owed, however, are much smaller in the current investigations than in the previous investigations. The numbers of employees affected also appear to be reduced.

In particular, when all violations detected in the investigations are taken into consideration, the analyses estimate that $267,000 in back wages are owed at the current investigation for every $1,000,000 in back wages that were owed at the prior investigation. Similarly, at the current

investigation, there are 64 affected employees for every $1,000,000 owed in back wages at the prior investigation. This corresponds to one additional affected worker currently for every $15,625 in back wages owed previously. This inordinately high value per worker suggests that the number of affected workers previously was probably appreciably higher per $1,000,000 owed in back wages than it is currently.

Effect of civil monetary penalties

Overall, the imposition of civil monetary penalties in prior investigations is associated with reduced probability of noncompliance in the next investigations of the same employers. Higher civil monetary penalties are associated with lower probabilities of subsequent violations of Acts enforced by WHD in general. Their effects on the probability of compliance with specific Acts or with specific provisions in specific Acts are more equivocal, however. These results suggest that employers, in general, respond to civil monetary penalties by improving their overall compliance, and not by improving their compliance in relation to the specific Acts and provisions for which the penalties have been applied.

Effect of alternative investigation tools

In comparison with full investigations, reliance on conciliation or limited investigation as investigation tools is associated with increased probability of detecting violations in subsequent investigations of the same employers. Reliance on self audits, in contrast, is associated with decreased numbers of workers who are owed back wages and with decreased amounts of back wages owed to those workers in subsequent investigations.

Recommendations on evaluation of specific compliance tools

Focus groups or surveys of employers who have used different types of compliance materials and activities should be considered as practical options for evaluating the effectiveness of specific compliance stimulation options. Because such options are often exercised in combination, the ability of statistical analysis to determine reliably the separate effectiveness of individual options is severely limited. Further, because many options, such as web-based materials, are freely accessible to and usable by employers without any ability of WHD to detect their use, even identifying which options have been exercised by individual employers is not possible. Consequently, the data available for use in statistical analysis are incomplete, adding additional uncertainty to any estimates of effectiveness that are developed on the basis of such analysis.

2.0 GPRA Indicators and Measures for Recidivism

Since Fiscal Year (FY) 1999, the Wage and Hour Division (WHD) in the Employment Standards Administration (ESA) in the U.S. Department of Labor (DOL) has developed and presented indicators and measures of compliance by employers who have previously violated Acts enforced by the Division (i.e., improvements in recidivism) in the strategic plans, annual performance plans, budgets and annual reports required under the Government Performance and Results Act (GPRA) of 1993. The WHD has requested that the Systems Research and Applications Corporation, a wholly owned subsidiary of SRA International, Inc. (SRA) provide recommendations concerning the GPRA indicators and measures as part of its overall evaluation of employer recidivism. This chapter provides an analysis of indicators and measures of recidivism and recommends options for new measures for the consideration of the WHD.

Like many programs administered by the DOL, the WHD has changed performance goals, indicators, and measures frequently during the first several years of GPRA implementation, as the program has experimented with various approaches to presenting its objectives and results that would be meaningful to its own employees, the employer community, Departmental executives, OMB, the Congress, other stakeholders, and the general public. The initial GPRA goals and measures for recidivism focused on the low-wage industries with chronic violations that the WHD had been targeting with a variety of initiatives for several years prior to the enactment of GPRA, and relied on compliance surveys to measure changes. With the array of measures used for specific industries, locations, and agricultural commodities, as well as the number and variations in compliance issues tested by the compliance surveys from year to year, it was difficult for the WHD's stakeholders and overseers to draw conclusions from its GPRA reporting about whether the program was or was not achieving the outcome goal, *increasing compliance with worker protection laws*, that it pursued from FY 1999 through FY 2006.

While the WHD's GPRA recidivism indicators for FY 2002 and FY 2003 continued to measure compliance with all worker protection laws enforced by the agency, the presentation of those performance data was simplified. Specifically, the WHD adopted a new, streamlined indicator, *reducing employer recidivism*, that cuts across all reinvestigated employers, regardless of industry or location.

In the *Strategic Plan* for FY 2003 through FY 2008, the WHD further refined its recidivism indicator, reducing the number of measures to one and targeting only compliance with the Fair Labor Standards Act (FLSA). In the *FY 2003 Annual Report on Performance and Accountability,* the WHD explained this modification by noting that the FLSA is "the law with the most general application." The recidivism indicator measuring improved FLSA compliance among prior violators has endured through FY 2006 and has been continued, with a more ambitious target of 80 percent compliance by FY 2011, in the DOL *Strategic Plan for FYs 2006 – 2011.*

Table 2.1 summarizes the targets and results for the WHD's recidivism indicator, *reducing employer recidivism by increasing the percent of prior violators who achieved and maintained FLSA compliance following a full FLSA investigation*, for FYs 2003 through 2011.

Table 2.1: Recidivism Measures, FYs 2003 - 2011

Fiscal Year	Percentage of Prior Violators Who Achieve Compliance in Reinvestigation		
	Baseline	Targeted Performance[1]	Actual Performance
2003	73%		
2004		74%	71%
2005		72%	72%
2006		73%	76%
2007		77%	66%
2008		67%	
2011		80%	

2.1 Analysis of the Current Indicator and Measure

The rate of non-recidivism is an important component among the data elements monitored by the WHD since it measures the impact and effectiveness of the program's enforcement and compliance assistance efforts in persuading employers who have previously violated the FLSA to pay their workers the wages due them. While many enforcement agencies have established GPRA goals and measures targeting the overall levels of intended results within their areas of responsibility, such as the incidence of workplace injuries and fatalities, measures addressing the impact of interventions by enforcement agencies are not generally included in agencies' annual performance and accountability reports. In particular, we reviewed the performance measures of two DOL programs, the Occupational Safety and Health Administration and the Office of Federal Contract Compliance Programs, as well as measures of the Environmental Protection Agency (EPA) and the U.S. Department of Agriculture's Food Safety Inspection Service to determine whether these enforcement organizations had developed approaches to assessing the impact of their initiatives on the behavior of their respective regulated industries. Of the four regulatory agencies whose goals and measures we reviewed, we identified only one measure used by EPA that targets changes resulting from the agency's interventions. The EPA's measure targets an increase in the number of facilities taking complying actions during EPA inspections and evaluations after deficiencies have been identified. While the WHD's measure of recidivism represents a more complete and direct picture of the agency's impact on the behavior of employers who have violated the FLSA than the pictures provided by the measures used by other

[1] Annual performance targets have not been established, to date, for FYs 2009 and 2010. FY 2011 target of 80 percent of prior violators who achieve and maintain FLSA compliance is included in DOL's *Strategic Plan for FYs 2006 – 2011*.

agencies, our analysis has identified three limitations that the WHD should consider in its decisions about future recidivism measures.

First, the measurements computed for the current indicator are based on small, randomly selected samples of, on average, 68 employers per year. A random selection process generates results that are accurate on average. Small sample sizes, however, provide limited confidence that a particular yearly sample is an accurate representation of the population of previously investigated employers at that time. Such samples therefore do not assure estimation of average annual compliance rates that are sufficiently accurate for reliable evaluation of the levels that have been targeted for the GPRA recidivism indicator. Small shifts in the composition of a sample of 68 employers among industries with notably different compliance rates can produce appreciable changes in the value estimated for the WHD's recidivism indicator, as observed between FY 2006 and FY 2007.

Our second observation concerns the statistical significance of the variations in actual performance reported in Table 2.1 above and the consequent reliability of the performance targets shown in the table, which may lead to misinterpretations of the program's results in bringing about changes in the behavior of employers who have previously violated the FLSA. In a typical year, 68 employers who have previously violated the FLSA are selected for reinvestigation in the National Recidivism Initiative (NRI) survey. To date, approximately 73 percent of the sampled employers, on average, have been found to be in compliance. For a sample of this size and with this frequency of compliance, the estimated standard deviation is 3.66 employers, which represents 5.38 percent of the sample size. With a sample size of 68 employers, however, statistical significance at the 90 percent confidence level requires a difference of 1.282 standard deviations. Thus, a difference of 6.90 percentage points between the percentages of prior violators who achieve compliance in reinvestigations must be observed in two different years to conclude that the difference in compliance between the two years is statistically significant. On this basis, the 10 percentage point decline that has been observed between 2006 and 2007 is large enough to be statistically significant at the 90 percent confidence level. Furthermore, the seven percentage point increase targeted by the DOL's current Strategic Plan from a baseline of 73 percent to a goal of 80 percent compliance among prior violators by 2011 would be just large enough to be statistically significant at the 90 percent confidence level.

Only differences that are at least that large are large enough to conclude that they are statistically significantly different from zero at the 90 percent confidence level, and hence are unlikely to have occurred by chance. All differences that are smaller than that are too small to conclude reliably that they might not have occurred by chance. Such differences include all year-to-year changes in targeted performance between 2004 and 2007, which range only from one to four percent. If, as observed to date, 73 percent of employers generally are in compliance, to detect reliably (i.e., at the 90 percent confidence level) a difference in compliance of four percent would require reinvestigation of a random sample of 203 previously investigated employers. Similarly, to detect reliably differences in compliance of three, two, or one percent would require random samples of 360, 810, and 3,239 employers, respectively. The samples of employers that have typically been reinvestigated in the NRI surveys are thus much too small to detect changes in compliance as small as the percentages that have been selected as targets for 2005 through 2007. Substantial variations in compliance over time that are not statistically significant at the 90

percent confidence level do, nonetheless, merit further assessment by WHD management to identify possible emerging issues or strategies that should either be emphasized or revamped. On the other hand, some caution should be exercised in interpreting estimated differences with low confidence levels as reliable evidence of changes in the performance of the universe of prior FLSA violators or for purposes such as determining program budgetary requirements.

The third observation about the existing recidivism measure pertains to the object of the measure, i.e., the extent of compliance among employers who previously violated the FLSA. Achieving full compliance with the minimum wage and overtime requirements of the FLSA is undoubtedly a valid measure of the WHD's goal to *ensure workers receive the wages due them.* However, adopting measures that focus more directly on the workers and their wages would more clearly connect the measure to the WHD's goal statement as well as placing the emphasis more precisely on the statute's intent of economic protection for workers. Compliance with the FLSA is a means to an end, but the best GPRA goals and indicators measure the achievement of the end or purpose of the program. Establishing one or more new indicators for recidivism that reliably measure changes in the numbers or percentages of workers affected by prior violators' non-compliance with the FLSA and changes in the severity of the impact on the affected workers also permits the WHD to show degrees of progress by employers who have not achieved full FLSA compliance at the times when they are reinvestigated.

2.2 Analysis of Some Alternative Recidivism Indicators

To establish an improved quantitative basis for evaluating changes in compliance by previously investigated employers with the provisions of Acts that are enforced by the WHD, an array of alternative recidivism measures have been developed that describe differences in the outcomes observed by WHD investigators in successive investigations of individual employers. The recidivism measures have been expressly designed for routine use in periodic evaluations of such changes in compliance. Accordingly, the values of the alternative measures can all be calculated on the basis of data elements that are routinely compiled by WHD in the Wage and Hour Investigative Support and Reporting Database (WHISARD).

2.2.1 Data Usable for Computing Recidivism Measures

WHISARD contains three sets of data items that, first, are uniformly recorded whenever they are pertinent and, second, describe the existence and the severity of noncompliance with specific provisions enforced by WHD that have been detected in individual investigations. Those sets of data items include:

- Data elements indicating that violations of specific provisions of specific Acts have been detected in an investigation. Those data elements are labeled with codes that either uniquely identify the specific Act and type of provisions in the Act that have been violated, or indicate that no violation has been detected in relation to a specific Act, or state that the employer is not covered under that Act.

- Data elements reporting the number of employees who have been affected by a specific violation, typically because they are owed back wages as a result of the violation. Separate

data elements contain counts of unduplicated numbers of affected employees at different levels of investigative detail (e.g., for a specific provision in a specific Act, or for all provisions in a specific Act, or for all provisions in all Acts examined in the investigation). The unduplicated numbers count any employee only once at any designated level of detail, regardless of how many provisions have been violated in relation to that employee at that level of detail.

- Data elements reporting the amounts of back wages that are due to the employees affected by a specific violation. Separate data elements contain values at levels of detail that correspond to the levels used in reporting unduplicated numbers of affected employees. Thus, a specific amount of back wages (specifically, the back wages owed by their employers) can be associated with each unduplicated number of affected employees compiled in WHISARD.

Other data elements in WHISARD that appear potentially useful for measuring recidivism have been rejected for two reasons. First, some data elements, such as those relating to injuries, are reported too seldom to be usable in practice. Second, some data elements, such as those reporting civil monetary penalties and the status or type of an employer's compliance, describe or are strongly influenced by actions taken by the WHD. Those data elements are not pure measures of the behavior of employers, and hence are equivocal indicators of recidivism.

2.2.2 Method Used to Develop Practical Alternative Measures

The alternative measures of recidivism that have been developed are all based on comparisons of analogous outcomes observed and recorded in WHISARD for specific employers in historical and current investigations. Data in WHISARD can be used to perform such comparisons, and hence to implement the measures, at different levels of investigative detail. In particular, comparisons of outcomes can be produced for a specific provision in a specific Act, or for all provisions in a specific Act, or for all provisions in all Acts examined in the investigation. Typically, in a WHD investigation in which violations are detected, violations will be found for some provisions and Acts, while compliance will be observed for others. Further, employers for whom violations are detected in one investigation will commonly exhibit different patterns of violations in their reinvestigation. Unless full compliance is achieved, the employers will generally still be violating some provisions, will have ceased violating others, and may have begun violating some with which they previously complied. Accordingly, for any sample of employers with paired investigations recorded in WHISARD, different groupings of the employers will, in general, be pertinent for comparing outcomes of successive investigations at different levels of detail, and the values computed for specific recidivism measures will differ among provisions, Acts, and total investigations. Neither the FLSA nor any other single Act or provision will be a reliable indicator of recidivism in general.

At any level of investigative detail, four groups of employers can, in general, be formed on the basis of comparisons of their compliance in successive investigations. The groups are: (1) employers who, in their current investigations, have not been detected committing the same pertinent type of violations that they were detected committing in their historical investigations; (2) employers who, in their current investigations, have been detected committing the same pertinent type of violations that they were detected committing previously; (3) employers who

have not been detected committing the pertinent type of violations in either their historical or current investigations; and (4) employers who, in their current investigations, have been detected committing the pertinent type of violations, whereas they were not detected committing such violations in their historical investigations.

Comparisons of outcomes observed for employers in groups (1) and (2) represent the basic alternative measures of recidivism that have been developed. Comparison of the results computed for those measures to the analogous outcomes observed for employers in groups (3) and (4) provides additional perspective to the basic measures.

More specifically, recidivism can be measured by calculating for each of the four groups, on the basis of data compiled in WHISARD for pairs of historical and current investigations for individual employers in each group, cumulative values for four measures of noncompliance in relation to either a specific provision of a specific Act, or a specific Act, or all Acts examined in the investigations. Those measures are:

- the number of employers who are in each of the four groups in relation to the provision, Act, or entire investigation,

- the corresponding unduplicated number of employees who have been affected by violation of the provision, Act, or entire investigation by the employers in each of the four groups,

- the cumulative amount of back wages due to those affected employees for the violations of the provision, Act, or entire investigation that have been detected for the employers in each of the four groups, and

- the average amount of back wages due per affected employee for the violations of the provision, Act, or entire investigation detected for the employers in each of the four groups.

Comparison of the values calculated for the four measures among the four groups in relation to a specific provision, a specific Act, or the entire investigation, including the calculation of pertinent ratios and proportions, yields an array of quantitative descriptions of the ways in which, and the extent to which, compliance with the Acts enforced by WHD has changed among previously investigated employers between their historical and current investigations. The ratios and proportions, in particular, provide clear indications of reductions or increases in the extent and severity of recidivism, and hence represent alternative recidivism measures that warrant serious consideration.

2.2.3 Results from Computing Alternative Measures Using Identified Data

A demonstration of the potential usefulness of the set of recidivism measures described above has been performed by calculating and suitably tabulating values for the measures on the basis of data extracted from WHISARD for a large sample of pairs of historical and current investigations of individual employers for whom violations of provisions of Acts enforced by the WHD were detected in the historical investigations. The sample consists of three groups of employers. First, the sample includes 254 employers who have participated in the NRI surveys

conducted by the WHD and analyzed by the University of Tennessee between 2003 and 2006, and for whom current investigations have been concluded by the WHD. Second, it includes 31 employers who have participated in Regional Recidivism Initiatives and for whom current investigations have been concluded. Finally, the vast majority of the sample consists of 3,158 employers for whom WHISARD contains records of, first, a recent concluded investigation that has been designated a reinvestigation and, second, one or more previous investigations of employers with the same names (as indicated by their Soundex codes) and the same locations (as indicated by their zip codes). For each employer identified on this basis, the recent concluded investigation has been used as the current investigation and the most recent previous investigation has been used as the historical investigation in the sample. The current investigations of these employers have been concluded between May 22, 2003 and September 30, 2006. The earliest date when any of their historical investigations has been concluded is October 17, 1990. All 3,443 employers who have been identified in this way have been included in the sample.[2]

Using this sample, a separate set of values has been computed for the alternative recidivism measures for three different levels of investigative detail. They include: all provisions for which violations have been detected in the historical investigation of employers in the sample, all provisions in a specific Act; and individual provisions in specific Acts for which codes are included in WHISARD. The results of those computations are summarized in Tables 2.2, 2.3, and 2.4.

All of the tables have the same general format, although Table 2.4 contains only a subset of the results reported in Tables 2.2 and 2.3, for a reason that will be explained when the quantitative results summarized in Table 2.4 are discussed. Therefore, the format of the tables is first described briefly below. Then, the notable results from each table are highlighted and explained.

In each table, the first block of results (i.e., the top block of results in Part 1a and Part 2a of Tables 2.2 and 2.3, and the only block of results in Table 2.4) presents the numbers of employers for whom violations have been detected in neither their current nor their historical investigation, in their current investigation only, in their historical investigation only, and in both their current and historical investigations. Based on those numbers, the numbers of employers for whom violations have been detected in their current investigations (with or without violations in their historical investigations) and in their historical investigations (with or without violations in their current investigations) have been calculated. Finally, two ratios have been computed. The first ratio measures the proportion of initially noncompliant employers who have been found to be compliant in relation to the specified Act, provision, or set of provisions in their current investigations. The second ratio measures the comparative flows of sampled employers into and out of compliance with the specified Act, provision, or set of provisions.

[2] There doubtless are other employers for whom two or more successive WHD investigations have been concluded during this period, but who have not been identified on the basis of the criteria described above. For example, some might have changed their names or their locations, or their current investigations might not have been designated as reinvestigations. The number of pertinent employers who have been omitted from the sample is unknown. All identified employers, however, have been included.

The other four blocks of results in Tables 2.2 and 2.3 (i.e., the lower two blocks of results in Part 1a and Part 2a of each table and two blocks of results in Part 1b and Part 2b of each table) apply essentially the same logic contained in the first block to four additional types of recidivism measures relating to: numbers of employers who are liable for back wages, numbers of employees who are affected by the violations (often consisting of employees who are owed back wages), amounts of back wages owed, and average back wages owed per affected employee. Calculation of values for these measures is quite similar to the calculation of values described for the measures presented in the first block. There is only one difference. For the four additional types of measures in Tables 2.2 and 2.3, for employers with violations detected in both investigations, it is necessary to accumulate values separately for the two investigations. Improvements in compliance in relation to those measures can be achieved even when some violations are detected in the current investigations. The number of employers who are liable for back wages can decrease, number of affected employees can decline, the amount of back wages due to such employees can diminish, and the average back wages owed per affected employee can fall. Deteriorations in compliance can also occur if the values of any of those measures are larger in the current investigations than in the historical investigations for those employers. After separate values have been accumulated for those employers for each investigation, the calculation of all remaining values for each type of measure involves the same process described for the measures in the first block of results.

The results summarized in Table 2.2 relate to two of the three levels of investigative detail that are available in WHISARD. Specifically, Table 2.2 contains results relating to all provisions in all Acts examined in an investigation and to all provisions in specific Acts examined in the investigation. Focusing on the five proportions or ratios for which values are reported in the table, the values presented in the table indicate that:

- Both for the overall investigations and for specific Acts examined in the investigations, a substantial proportion of employers with violations in their historical investigations did not have violations detected in their current investigations. With two exceptions, FMLA and the Migrant and Seasonal Agricultural Worker Protection Act (MSPA), the proportions are lower for the overall investigations than they are for specific Acts, in accord with our expectations.

- Overall, the number of new violators (employers with violations in their current investigations only) is smaller than the number of remediated violators (employers with violations in their historical investigations only). However, for four Acts − FMLA, MSPA, the Davis-Bacon and related acts (DBRA), and the McNamara-O'Hara Service Contract Act (SCA) − the number of new violators exceeds the number of remediated violators, although the proportional difference is small for two of the Acts, DBRA and SCA.

- A substantial proportion of employers with liability for back wages in their historical investigations have no liability for back wages in their current investigations, although the proportion is considerably lower for MSPA than it is for other Acts or for overall investigations.

- A substantial proportion of the employees who were affected by violations in the historical investigations were not affected by violations in their current investigations. With two exceptions, MSPA and SCA, the proportions are lower for the overall investigations than they are for specific Acts.

- In most cases, the back wages paid by employers with liability for back wages in their current investigations is substantially less than the back wages paid by employers with liability in their historical investigations. For employers with violations of FMLA and DBRA, the two amounts are virtually equal.

- With one exception, FMLA, the average back wages paid to affected employees by employers with liability for back wages in their current investigations is substantially less than the average back wages paid to affected employees by employers with liability in their historical investigations.

Table 2.3 contains a similar display of results relating to specific provisions in specific Acts. Qualitatively, these results are highly analogous to the results presented in Table 2.2 relating to overall investigations and to specific Acts.

Finally, Table 2.4 presents results relating to violations of specific provisions in MSPA. Results are displayed only for the alternative recidivism measure that relates to the numbers of employers with violations in their historical investigations because, in the corresponding sample of employers, each detected violation affected only one employee. The results in this table are very similar to the results presented in Table 2.2 relating to all provisions in MSPA.

2.3 Recommendations for New GPRA Indicators

Although we recognize the value of stability in measuring the results of programs over time, we believe that the limitations to the WHD's current indicator and measurement of recidivism identified in Section 2.1 above are of sufficient concern to recommend that the program consider adopting new GPRA indicators in this area. In addition, the availability of data in WHISARD for most of the alternative measures examined in Section 2.2 above and the additional measures suggested below would permit WHD to develop baselines and provide historical results to meet some of the requirements of the Office of Management and Budget's Program Assessment Rating Tool. We also understand the pressures on all Federal programs to reduce the numbers of measures. However, the impact of FLSA violations on workers cannot be adequately assessed without measuring both the number of workers affected by the violations and the extent to which the workers were underpaid. Reporting on only one metric may lead to a shift in the patterns of violations to demonstrate progress against either the number of affected workers or the amounts of the underpayments, while simultaneously raising the amount of violations in relation to the unreported metric, resulting in equivalent net economic advantage to the employer. The indicators recommended below are intended to be prefaced by a phrase such as, "*Reinvestigations of prior FLSA violators find improvements in the compensation of workers as indicated by…*"

To address the number of workers affected by the FLSA non-compliance of prior violators, we recommend the following GPRA measure:

> *Reducing by _____ percentage points the average percent of prior violators' workers who are owed back wages.*

To address the degree of the violations' impact on individual workers, we recommend that the WHD consider adopting one of the following measures for GPRA purposes:

> Option 1: *Reducing by _____ percent the average back wages owed by prior violators to their workers.*
>
> Option 2: *Reducing by _____ percentage points the percent of prior violators that owe an average of $500 or more in back wages per worker.*
>
> Option 3: *Reducing by _____ percentage points the percent of prior violators' workers who are owed $500 or more in back wages.*

The third option above cannot be measured using the data currently available in WHISARD alone and would require collecting additional information if the WHD determines that the measure would be worth the resources and demands on employers necessary to obtain the information. In our opinion, the second option is preferable to the other two since it sets a level of severity which the WHD may choose to raise or lower from the $500 average back wage amount included for illustration, but can be calculated using data currently available in WHISARD.

For purposes of the reports required by GPRA, we have recommended the recidivism indicators that, in our opinion, would best demonstrate to the program's stakeholders and the public whether the WHD's enforcement and compliance assistance activities influence employers who have violated the FLSA to pay their workers the wages due under the law. However, as described in Section 2.2, WHISARD also permits the WHD to measure an array of additional metrics that should be used by the program's managers to evaluate and improve the compliance of prior violators.

We also recommend that, if the NRI survey is to serve as the basis for measuring the new indicators, the WHD should review with the University of Tennessee the sample size required to reach a confidence level of 90 percent, and set its targets to attain a statistically significant level of performance improvement at a minimum by the end of the five-year strategic planning cycle. The WHD should consider whether WHISARD data can be used to supplement or supplant the information from the NRI survey to raise the confidence levels of reported data at low cost. Appropriate context should be included when reporting GPRA results that are not statistically significant at the 90 percent confidence level to ensure that report users understand how to interpret the results and the possible limitations on the use of the data.

3.0 Use and Effectiveness of Current and Alternative Compliance Tools

The WHD is responsible for monitoring and enforcing the compliance of employers with the provisions of numerous Acts and the regulations established to implement the Acts. The Acts enforced by the WHD include, most notably, FLSA, FMLA, MSPA, DBRA, SCA, and the Contract Work Hours and Safety Standards Act (CWHSSA).

To determine whether specific employers are complying with the provisions of the Acts, the WHD conducts investigations. If the investigators detect violations of any provisions, the WHD takes actions to enforce the Acts and to encourage employers to improve their compliance in the future. The enforcement actions and compliance tools that the WHD can use for these purposes include: requiring payment of back wages owed to employees; providing compliance assistance, such as documents, seminars, and web-based interactive systems; initiating litigation for recovery of back wages and liquidated damages; imposing civil monetary penalties for repeated or egregious violations; and, in extreme cases, imposing criminal penalties for willful violations.

The effectiveness of the enforcement actions and compliance tools in improving recidivism is determined by the degree to which investigated employers cease or reduce the extent or severity of their violations of provisions of Acts enforced by the WHD. Further, improvements in recidivism can be evaluated in relation to subsequent violation of the specific provisions for which noncompliance was detected in the prior investigation, all provisions in the Acts containing the previously violated provisions, or all provisions examined in the succeeding investigation.

Accordingly, to evaluate changes in compliance by previously investigated employers with provisions of Acts enforced by the WHD and to identify factors that might account for the changes, multivariate statistical analyses have been performed that relate variables that describe the current compliance with such provisions by individual employers to an array of possible explanatory variables. The explanatory variables examined in the analyses include variables that describe the employers' historical compliance with the provisions for which violations were detected and other provisions, actions taken by WHD to encourage future compliance, and attributes of the employers and the circumstances in which they operate. The statistical analyses are based predominantly on data documenting outcomes, actions, and attributes that have been routinely recorded by WHD investigators in WHISARD during and after successive investigations of individual employers. A few analyses have also examined additional explanatory variables that have been developed from data collected in the NRI surveys.

3.1 Data Used in the Analyses

All of the multivariate statistical analyses that have been conducted have used data extracted from WHISARD as either the only data or the primary data. In a few of the analyses, the data from WHISARD have been augmented with data from the NRI surveys. The data obtained from the two sources are described successively below.

3.1.1 Data Used from WHISARD

WHISARD contains four sets of data items that describe the existence and the severity of noncompliance with specific provisions enforced by WHD that have been detected in individual investigations. Three of those sets of data items have been used in the analysis of alternative recidivism measures described in Section 2.2 above. As explained fully in Section 2.2.1, those sets of data items include:

- Data elements indicating that violations of specific provisions of specific Acts have been detected in an investigation.
- Data elements reporting the unduplicated number of employees who have been affected by a specific violation, typically because they are owed back wages as a result of the violation.
- Data elements reporting the amounts of back wages that are due to the employees affected by a specific violation.

The values recorded in WHISARD for these data items in relation to the current investigation of an employer have been used either as dependent variables or to develop dependent variables for use in the statistical analyses. Similarly, the values recorded for these data items in relation to the historical investigation for an employer have been used as or in the development of explanatory variables describing the employer's prior compliance or noncompliance for use in the analyses.

The fourth set of data items from WHISARD that have been used in analyzing the effectiveness of WHD compliance tools consists of data elements reporting the amounts of civil monetary penalties that have been imposed on the employer as a result of a specific violation. Separate data elements contain values at levels of detail that correspond to the levels used in reporting unduplicated numbers of affected employees and amounts of back wages due to those employees. Thus, a specific amount of civil monetary penalties can be associated with each unduplicated number of affected employees compiled in WHISARD. The amounts of civil monetary penalties imposed on an employer as a result of violations detected in the historical investigation for the employer have been used as or in the development of explanatory variables describing the employer's prior compliance or noncompliance for use in the analyses.

Other data items from WHISARD have been used as or in the development of additional explanatory variables. Values from the current investigation have been used for explanatory variables describing attributes of the employer, including the size of the establishment in terms of total employment and annual revenues, the industry sector in which it operates, and the WHD regional office area where it is located. An explanatory variable indicating whether the employer has agreed to comply in the future has been developed from a data item for the historical investigation. Values from both investigations have been used to develop explanatory variables describing WHD actions, including whether the current investigation and the historical investigation have been complaint-based or directed, and the time elapsed between the dates when the two investigations have been concluded.

3.1.2 Data Used from NRI Surveys

In addition to the data items that have been developed from values recorded in data elements in WHISARD for use as dependent or explanatory variables in the multivariate statistical analyses, numerous data items have been developed from values recorded in the database compiled from data collected in the NRI surveys. Those data items indicate specific types of compliance material that have been provided to, and specific sources of compliance assistance that have been utilized by individual previously investigated employers after their prior (historical) WHD investigations and before their subsequent (current) investigations. Dichotomous (1,0) variables indicating whether specific forms of material or assistance have been used by an employer have been included as explanatory variables for each employer who has been included in the NRI surveys and whose current investigation has been concluded by the DOL.

3.1.3 Data Omitted from the Statistical Analyses

Numerous other data elements in WHISARD and in the NRI surveys that appear potentially useful as bases for dependent variables or explanatory variables have not been used in developing such variables for three reasons. First, some data elements, such as the data elements in WHISARD that relate to injuries and to compliance actions taken by WHD, are reported too seldom to be usable in practice.

Second, other data elements in WHISARD have only been used to record information during a portion of the time period that is being examined in the evaluation. Those data elements include, most notably, elements indicating whether an investigation is a reinvestigation, and whether it involves a repeat violation or a recurring violation. Reporting on some data elements has been discontinued, and information for them is only available for the early portion of the period. Reporting on others has only been initiated in the recent past, and information for them is only available for the last portion of the period. Data items that are available for only a fraction of the employers included in the analysis cannot be used as explanatory variables in the analysis.

Third, the values recorded for some data elements are highly correlated with the values recorded for other data elements. Different explanatory variables developed on the basis of highly correlated data elements often are highly correlated also. Sets of variables that are correlated strongly with each other cannot be included simultaneously as explanatory variables in a multivariate statistical analysis, because the analysis cannot reliably sort out the separate consequences of the individual explanatory variables in relation to the dependent variable. Whenever hypothesized explanatory variables are found to covary strongly with each other, only one of the correlated variables should be included as an explanatory variable in the statistical analysis, and the effect estimated for that variable should be interpreted as the net effect of all of the highly correlated variables. Examination of correlations between pairs of potential explanatory variables has occasionally found very high correlations between specific pairs of variables or among specific groups of variables within the data sets that have been developed to examine improvement in recidivism. When such correlations have been encountered, only one of the correlated variables has been retained for use as an explanatory variable in that data set.

3.2 Structure of the Statistical Analysis

A complete list of the dependent variables and the explanatory variables that have been developed from data elements in WHISARD and used in the multivariate statistical analyses is contained in Table 3.1. A definition is provided for each variable, and the variables that are dichotomous and hence have values of either one or zero for any employer are indicated. The additional explanatory variables that have been developed from data elements in the database from the NRI surveys will be listed and defined when the analyses that include those explanatory variables are discussed in Section 3.3.4 below.

As reported in Table 3.1, one of the dependent variables used in the statistical analyses is dichotomous, and the other five dependent variables are interval measures that span an ample range of values. As a result, it has been necessary to use two different types of regression analysis to estimate the relationship between the dependent variables and the explanatory variables. For the dichotomous dependent variable, which indicates whether at least one violation has been detected in a particular current investigation, logistic regression analysis must be applied, whereas for the other five dependent variables, multiple linear regression analysis has been used. It should also be noted that those five dependent variables actually relate to only three measures of recidivism. Three of the dependent variables describe the number of employees affected by the violations detected in the current investigation. One of them relates to violation of a specific provision in a specific Act; one relates to violation of any of the provisions in a specific Act, and one relates to violation of any of the provisions examined in the entire investigation.[3] The other two dependent variables describe the back wages due to affected employees, and to the back wages owed per affected employee in the current investigation.

In the logistic regressions, the statistical analysis in effect predicts the probability (or, more precisely, the logarithm of the odds ratio, $p / (1 - p)$, where p is the predicted probability) that a violation has been detected in a particular current investigation. The values estimated for the coefficients associated with the explanatory variables indicate the influence that the corresponding variables have on that predicted probability.

In the multiple linear regressions, the statistical analysis predicts the value of the dependent variable (i.e., the number of employees affected, the amount of back wages owed, or the back wages owed per affected employee) in a particular current investigation. The values estimated for the coefficients associated with the explanatory variables indicate the influence that the corresponding variables have on that predicted value.

This set of statistical analyses has been conducted for the same large sample of pairs of historical and current investigations of individual employers that has been described in Section 2.2.3 above. Thus, the sample consists of 254 employers who have participated in the NRI surveys between 2003 and 2006, 31 employers who have participated in Regional Recidivism Initiatives, and 3,158 employers who have been identified by applying the criteria specified in Section 2.2.3

[3] In these three variables, individual employees are unduplicated. Thus, in the last two variables, employees who are affected by two or more violations are counted only once, thereby avoiding double counting.

to data recorded for investigated employers in WHISARD.[4] In total, 3,443 employers are included in the sample.

Using this sample, a separate set of statistical analyses has been performed for three different breadths of investigation. They include: all provisions for which violations have been detected in the historical investigation of employers in the sample, all provisions in a specific Act; and individual provisions in specific Acts for which codes are included in WHISARD.

In those analyses, the logistic regression has been applied to all employers in the sample for whom violations have been detected in relation to pertinent provisions in their *historical* investigations. The multiple linear regressions, in contrast, have been applied to the portion of those employers for whom violations have been detected in relation to pertinent provisions in their *current* investigations. The remaining employers have not violated any pertinent provisions and, hence, have no affected employees and owe no back wages.

This analytic structure is based on the assumption that explanatory variables affect employers' compliance in two ways. First, the explanatory variables influence all previously investigated employers to comply fully with all pertinent provisions. Second, for those employers who do not achieve full compliance, the explanatory variables encourage them to reduce the extent and severity of their noncompliance. The logistic regression evaluates the first set of hypothesized effects, and the multiple linear regressions evaluate the second set of hypothesized effects.

3.3 Results from the Multivariate Statistical Analysis

The results derived by applying the analytic structure described in Section 3.2 to the three breadths of investigation specified in that section above are presented in the remainder of this section. Summaries of the results from all statistical analyses conducted for a particular breadth of investigation with a particular array of explanatory variables are presented in separate tables. In each table, for each explanatory variable included in a specific statistical analysis, two estimated values are reported. They are: the estimated value of the coefficient associated with the explanatory variable in that analysis, and the estimated probability that the estimated coefficient value might have occurred randomly in the sample of employers when the actual coefficient value among all employers is zero. Low estimated probabilities indicate that the corresponding estimated coefficient values are reliable, and can be interpreted as being greater than or less than zero with substantial confidence. Conversely, high estimated probabilities indicate that the corresponding estimated coefficient values are unreliable, and cannot be confidently interpreted to differ from zero.

[4] As explained in Section 2.2.3, there doubtless are other employers for whom two or more successive WHD investigations have been concluded during the period studied, but who have not been identified on the basis of the criteria described above. The number of pertinent employers who have been omitted from the sample is unknown. All identified employers, however, have been included.

Next, in all but three tables, for each of the four dependent variables, results are reported either for one statistical analysis or for two analyses that contain different sets of explanatory variables. For each dependent variable, one analysis includes all explanatory variables that pertain to one or more of the employers in the sample. Whenever a second analysis has been conducted, all explanatory variables with unduly high estimated probabilities of random occurrence greater than or equal to 0.10 in the first analysis have been omitted from the analysis. Thus, the included explanatory variables consist of all explanatory variables with acceptably low estimated probabilities of random occurrence in the first analysis. A second analysis has not been conducted whenever the estimated probability of random occurrence for all explanatory variables has been unacceptably high in the first analysis.

Finally, for each analysis, three statistics are reported that indicate how well the predicted values from the analysis correspond to the values of the dependent variable for all employers included in the analysis. These statistics appear at the bottom of the column in which the results of the analysis are documented, on the last (typically, the second) page of the corresponding table. Two of the statistics are R-squared statistics that indicate the proportion of the variance of the dependent variable that is accounted for by the explanatory variables included in the analysis. For the logistic regressions, the two statistics correspond to different estimators of that proportion that have been developed by different statisticians, and provide a range of estimated values for the proportion. For the multiple linear regressions, the second statistic is an adjusted value of the first statistic that accounts for the number of explanatory variables that have been included in the analysis. The third statistic is a Chi-squared statistic for the logistic regressions and an F-statistic for the multiple linear regressions. Those statistics provide estimates of the probability that the values estimated for all coefficients in the analysis might have occurred randomly for the sample of employers if their actual values among all of the employers were zero.

The remaining three tables (Tables 3.4.E, 3.4.F, and 3.5.D) contain results for only one of the four dependent variables in analyses of specific provisions of specific Acts. Two of the tables summarize results for more than one provision and Act. Most of the results relate to logistic regressions in which the dependent variable is a dichotomous variable indicating that a violation of the provision has been detected. Three sets of results relate to linear regressions in which the number of employees affected by the violation is the dependent variable.

The tables are classified into five groups. Except for Table 3.1, the second number in the classification code for a table indicates the group to which it belongs. Then, with a few exceptions, the remaining entries in the classification code denote the Act and, as appropriate, provision to which the results relate. The exceptions will be explained within the discussion of the groups in which they are included.

3.3.1 Results for All Violations Detected in Individual Investigations

Table 3.2 contains a summary of the results from the logistic regression analyses and the linear regression analyses that have been conducted to examine factors affecting recidivism in relation to all violations detected in individual investigations of employers in the sample of employers with paired investigations that has been assembled from data in WHISARD.

The most notable results from these analyses in relation to enforcement actions and compliance tools used by the WHD include:

- In comparison to directed WHD investigations, complaint-based investigations are associated with a statistically significantly higher probability that violations are detected in those investigations and a statistically significantly lower probability that violations are detected in subsequent investigations of the same employers.

- The probability that violations are detected in subsequent investigations is statistically significantly negatively related to the amounts of civil monetary penalties imposed on the employers in previous investigations. Higher civil monetary penalties are associated with lower probabilities of subsequent violations of Acts enforced by WHD in general.

- The higher are the back wages owed by employers that have been detected in their previous investigations, the statistically significantly higher are the numbers of affected employees, amounts of back wages owed, and back wages per affected employee for those employers in their subsequent investigations. The amounts of back wages owed, however, are greatly reduced. Taking into account all other explanatory factors included in the analyses, $267,000 in back wages are owed at the subsequent investigation for every $1,000,000 in back wages owed at the prior investigation. Similarly, at the subsequent investigation, there are 64 affected employees for every $1,000,000 owed in back wages at the prior investigation. This corresponds to one additional affected worker currently for every $15,625 in back wages owed previously. This ratio suggests that the number of affected workers previously was probably appreciably higher per $1,000,000 owed in back wages than it is currently.

- There are statistically significant differences among industries in the probability and the severity of recidivism. Most notably, in comparison to industry in general:
  - In the information industry (NAICS industry 51), the probability that violations are detected in subsequent investigations, the number of employees affected by the violations, and the amounts of back wages owed are statistically significantly higher;
  - In the manufacturing industry (NAICS industries 31 through 33), the retail trade industry (NAICS industries 44 and 45), and the agricultural industry (NAICS industry 11), the probability of violations in subsequent investigations is statistically significantly higher, but the number of employees affected and the total amounts of back wages owed are lower, and the average back wages owed per affected employee are statistically significantly lower; but
  - In the agriculture industry (NAICS industry 11), the probability that violations of provisions in FLSA are detected in subsequent investigations is statistically significantly lower, as reported in Table 3.3.A.

- Neither the probability that violations are detected in a subsequent WHD investigation, the number of employees who are affected by violations, nor the total or the average back wages owed to affected employees is related coherently to either the total number of workers employed nor the annual revenues received by the employer.

- There is no coherent evidence that the probability that violations are detected in current investigations is affected by the time elapsed since the previous investigations of the same employers. The results do indicate, however, that the average back wages owed to affected employees tends to increase as the time elapsed between investigations increases.

3.3.2 Results for Violations of All Provisions in Specific Acts

Tables 3.3.A through 3.3.E contain summaries of results that are analogous to those presented in Section 3.3.1. The results in these tables relate to all violations of specific Acts that have been detected in individual investigations of pertinent employers from the same sample of employers. Results are presented for five Acts: FLSA, FMLA, CWHSSA, SCA, and DBRA. In these analyses, the explanatory variables used to measure numbers of affected employees, amounts of back wages owed, back wages owed per affected employee, and amounts of civil penalties relate specifically to violations of provisions of the specific Act, and not to all violations detected in the corresponding investigations.

The results presented in Table 3.3.A relating to violations of all provisions of the FLSA are quite similar to the results contained in Table 3.2 relating to overall violations detected in WHD investigations, with only a few exceptions such as the agriculture industry (NAICS industry 11). The results summarized in Tables 3.3.B through 3.3.E relating to the other four Acts are more equivocal. The results do generally support the finding from Table 3.2 that, in comparison to directed investigations, complaint-based investigations are associated with a higher probability that violations are detected in those investigations and a lower probability that violations are detected in subsequent investigations of the same employers. In most cases, however, those results are not statistically significant.

3.3.3 Results for Violations of Specific Provisions in Specific Acts

Tables 3.4.A.through 3.4.F present summaries of results that relate to specific violations of specific Acts (i.e., violations of specific provisions of specific Acts) for pertinent employers from the same sample of employers. Results are presented for 12 specific provisions of Acts other than MSPA and, in Table 3.4.E, for 29 provisions of the MSPA. In these analyses, the explanatory variables used to measure numbers of affected employees, amounts of back wages owed, back wages owed per affected employee, and amounts of civil penalties relate specifically to violations of the specified provision of the specific Act, and not to all violations detected for the corresponding specific Acts or in the corresponding investigations.

The results presented in these tables are much more equivocal and less coherent than the results discussed in Sections 3.3.1 and 3.3.2. The only result from those sections that is typically supported in the results relating to specific provisions of specific Acts is that previous complaint-based investigations tend to be associated with comparatively low probabilities that violations of those provisions will be detected in subsequent investigations. These results indicate that even those actions that are conditioned expressly on violation of a specific provision are not demonstrably effective at stimulating employers to comply with that provision. Rather, the collective results in Sections 3.3.1, 3.3.2, and this section indicate that the WHD enforcement

actions and compliance tools for which descriptive data are reported in WHISARD represent general interventions that are effective in encouraging employers to improve their compliance in general, but are not very effective in inducing employers to improve compliance in relation to specific Acts or, especially, specific provisions in specific Acts.

3.3.4 Results from Analyses with NRI-based Variables on Compliance Assistance Materials and Sources

Table 3.5.A lists the expanded set of variables that have been developed using data collected in the NRI surveys between 2003 and 2006, in addition to data from WHISARD. The list contains the independent and explanatory variables developed from data in WHISARD that have been used in the analyses discussed in Sections 3.3.1 through 3.3.3. In addition, the list includes the explanatory variables on types of compliance materials and sources of compliance assistance used by employers that have been developed from data collected in the NRI surveys. Because data on the additional explanatory variables is available only for employers who have participated in the NRI surveys and for whom current investigations have been concluded by the WHD, these analyses are based on data for only 254 employers.

The results obtained when those additional explanatory variables are added to the set of explanatory variables that have been developed from data in WHISARD are presented in Tables 3.5.B, 3.5.C, and 3.5.D. The three tables relate to all violations detected in individual investigations, to all violations of provisions in the FLSA, and to violation code 3, failure to pay proper overtime, for the FLSA. These are the only analyses that can be performed with the small sample of employers for which data on the additional explanatory variables are available.

In this limited data set, the effects estimated for civil monetary penalties with the large sample of employers are once again observed, but the effects estimated for current and historical complaint-based investigations are not. Rather, in comparison to directed investigations, complaint-based investigations are estimated, on the basis of this small sample of employers, to be statistically significantly associated with relatively high probability that violations are detected in subsequent investigations.

The results in Tables 3.5.B, 3.5.C, and 3.5.D contain some interesting evidence about the effectiveness of specific compliance materials and sources of compliance assistance in inducing subsequent compliance, however. In particular, the results suggest that provision of compliance material I-9 or Reg/Pub 778, or information from such sources as an association with whom the employer is affiliated, a corporate office, a compensation specialist, a state wage and hour agency representative, a DOL/WHD investigation, a DOL/WHD representative, or a DOL/WHD poster might be effective in stimulating compliance in subsequent investigations. The results also suggest that some materials or sources might be counterproductive, such as information from a payroll corporation or compliance material M1261, M1312, or FMLA posters. Results for many other compliance materials or assistance sources are equivocal.

3.3.5 Results from Exploratory Analysis of Effects of Civil Monetary Penalties on Compliance by Others

An exploratory effort has been made to investigate the effects that civil monetary penalties (CMPs) imposed on some employers might have on subsequent recidivism or compliance by other employers. Pertinent data have been compiled from WHISARD for the individual employers included in the sample of employers described in Sections 2.2.3 and 3.2 above. For each of the employers, the total number of CMPs, the total value of CMPs, and the average value of CMPs imposed during the period between the employer's historical and current investigations has been computed for CMPs imposed on other establishments of the same employer, on other employers in the same 2-digit NAICS industry, and on other employers in the same WHD regional office territory. Too few CMPs imposed on other establishments of the same employer have been found in WHISARD to allow statistical analysis of effects at that level of detail. For the other two levels of detail, sufficient numbers of CMPs have been matched with individual employers to permit statistical analysis.

The results of the statistical analyses that have been conducted by adding the six explanatory variables that have been developed as outlined above to the data set used to analyze all violations detected in individual investigations and all violations detected in relation to the FLSA are presented in Table 3.6.A and 3.6.B. Those results indicate that the average value of CMPs imposed on other employers in the same region during the period between an employer's historical and current investigations has a statistically significant association with relatively low probabilities that violations will be detected in subsequent investigations. No association with the number or value of CMPs imposed on other employers in the same industry has been observed in the exploratory analysis, however.

3.3.6 Results from Analyses with Variables on Investigation Tools Used by WHD

A set of dichotomous variables was created that indicate the investigation tools (i.e., full investigations, limited investigations, office audits, self audits, conciliations, or pre-occupancy housing inspections) used in the historical investigation and in the current investigation for each of the 3,443 employers in the sample that was developed for use in the multivariate statistical analyses for which results are presented in Sections 3.3.1 through 3.3.3 and 3.3.5. The names and definitions of those variables are included in the list of explanatory variables contained in Table 3.1.

The results of the statistical analyses that have been conducted by adding those explanatory variables for investigation tools to the data set used to analyze all violations detected in individual investigations and all violations detected in relation to the FLSA are presented in Table 3.7.A and 3.7.B. Those results indicate that, in comparison to conducting full WHD investigations:

- Reliance on conciliation is associated with increased probability of detecting violations in those investigations and in the subsequent investigations of the same employers, and the increase in probability typically is statistically significant.

- Conducting limited investigations is associated, first, with reduced, although not always statistically significantly reduced, probability of detecting violations in those investigations,

and second, with statistically significantly increased probability of detecting violations in the subsequent investigations of the same employers.

- Reliance on self audits is associated, first, with statistically significantly increased amounts of back wages owed to affected employees, both in total and on average, in those investigations, and second, with decreased numbers of workers who are owed back wages and decreased amounts of back wages owed to those workers, in total and on average, in the subsequent investigations of the same employers, with the decreases typically being statistically significant.

3.3.7 Results from Detailed Analyses of Effects of Complaint-based Investigations

In all of the multivariate statistical analyses for which results have been presented and discussed in Sections 3.3.1 through 3.3.6, the comparative effects of complaint-based WHD investigations and directed WHD investigations on compliance by employers has been examined by including in each analysis two dichotomous variables. The variables indicate, for each employer included in the analysis, whether a specific investigation of the employer, either the historical investigation or the current investigation, was complaint-based or directed. When the effects of the two investigations are analyzed on the basis of only these two variables, it is not possible to evaluate whether the effects of complaint-based current investigations might depend upon whether the corresponding historical investigations have also been complaint-based or, alternatively, have been directed.

To evaluate this proposition, three new dichotomous variables have been developed to describe the specific combination of investigations conducted for each employer. The variables indicate whether both the current investigation and the historical investigation were complaint-based, whether only the current investigation was complaint-based, and whether only the historical investigation was complaint-based. The results obtained when these three variables have been included as explanatory variables instead of the two variables that were included in the other analyses are presented in Tables 3.8.A and 3.8.B. The results in the two tables relate to all violations detected in individual investigations and to all violations of provisions in the FLSA, respectively.

In the two tables, the results derived for the three new variables are similar. They indicate that, in comparison to situations where both the historical and the current investigation are directed investigations:

- The probability that violations are detected in current investigations is statistically significantly higher by similar amounts in situations where only the current investigations are complaint-based and in situations where both the historical and the current investigations are complaint-based.

- The probability that violations are detected in current investigations is statistically significantly smaller, and the number of affected employees and the total amount of back wages owed to affected employees are statistically significantly larger in situations where only the historical investigations were complaint-based.

These results indicate that effects of complaint-based current investigations are almost identical, regardless of whether the historical investigation has been complaint-based or directed; whereas the effects of complaint-based historical investigations differ statistically significantly, as described above, when the current investigations are complaint-based rather than directed. Specifically, when both the current investigation and the historical investigation are complaint-based, the effects of the two investigations on current compliance counter each other, and the effect of the current investigation is stronger. The probability that violations are detected in current investigations is raised by the current investigations being complaint-based more than it is lowered by the historical investigations being complaint-based. The net effect is an increase in the probability of detecting a violation in the current investigation.

3.3.8 Results from Analyses of Directed Investigations with Violations Involving Back Wages

Directed investigations conducted by WHD have historically been targeted at employers in industries such as agriculture, garment manufacturing, restaurants, and nursing and rehabilitation facilities where violations of the minimum wage and overtime requirements in FLSA have frequently been detected in the past. To examine whether the data compiled for this evaluation contain statistically reliable evidence of the effectiveness of that targeting in reducing recidivism, a dichotomous variable has been created that indicates whether the historical investigation of a specific employer has been a directed investigation in which violations have been detected that involve back wages owed to affected employees. Such investigations are referred to hereafter as historical purposive investigations.

Based on this dichotomous variable, four new explanatory variables have been added to the set of explanatory variables used in the multivariate statistical analyses described in Section 3.3.1 through 3.3.3. They include the dichotomous variable itself and three composite variables. The composite variables are: the product of the dichotomous variable and the variable indicating whether an agreement for future compliance has been obtained from the employer, the product of the dichotomous variable and the amount of civil monetary penalties that were imposed in the employer's historical investigation, and the product of the dichotomous variable and the current annual revenue of the employer. The three composite variables will determine whether compliance agreements, civil monetary penalties, and the annual revenues of the employer have systematically larger or smaller effects when combined with purposive investigations than they have otherwise.

The results obtained when these four variables have been included as additional explanatory variables are presented in Table 3.9. The table contains estimates only for two logistic regression analyses that relate to all violations detected in individual investigations and to all violations of provisions in the FLSA, respectively. The results indicate that employers who have previously undergone purposive investigations (i.e., historical investigations in which violations have been detected that involve back wages owed to affected employees) are statistically significantly less likely to have violations of any Act that is enforced by the WHD detected in their next investigations than are other employers who have previously undergone directed investigations. No incremental effects of historical purposive investigations on either the extent or the severity

of violations detected in subsequent investigations have been discovered in linear regression analyses of employers who have undergone such investigations, however.

3.4 Conclusions

The results of the analysis summarized in this chapter suggest the following conclusions:

- In general, conducting complaint-based investigations is associated with elevated probability of detecting violations in those investigations and reduced probability of detecting violations in the subsequent investigations. These effects are also observed for compliance with the FLSA and with the FMLA. For other Acts and for specific provisions in any Act, the effects are more equivocal (sometimes positive, sometimes negative, and seldom statistically significant).

- Overall, the imposition of civil monetary penalties in prior investigations is associated with reduced probability of noncompliance in the subsequent investigations. The effects on the probability of compliance with specific Acts or with specific provisions in specific Acts are more equivocal.

- For all regulations enforced by WHD in total and for the FLSA, the total amounts of back wages owed that are determined in those investigations are directly related to the total amounts of back wages owed that were discovered in the previous investigations (i.e., the regression coefficients are positive). The amounts owed, however, are much smaller in the subsequent investigations than in the previous investigations. The numbers of employees affected also appears to be reduced. There is scant evidence that detection that back wages are owed affects the probability that employers will comply in subsequent investigations. Such evidence has been found only for employers who have been involved in directed investigations in which violations have been detected where back wages are owed.

Collectively, these results indicate that the enforcement tools for which data are recorded in WHISARD have broad impacts that, on balance, comprise net improvements in compliance with the array of Acts enforced by WHD. They are not sufficiently focused, however, to provide demonstrably strong stimulus for compliance with most specific Acts or provisions. Their effects on compliance with the FMLA and the FLSA are reasonably clear, but their effects on compliance with other Acts or with specific provisions of the FLSA and the FMLA are less evident.

The enforcement actions are clearly effective in encouraging general reduction in recidivism, but the patterns of offsetting increases and decreases in compliance that, in combination, provide the general reduction is not reliably predictable. The effects of the enforcement actions on employers who reduce but do not eliminate their noncompliance (the employers whose behavior is described by the linear regression models) are much more uncertain than the effects on employers who become fully compliant (the employers whose behavior is represented within the logistic regression models).

4.0 Refined or Modified WHD Procedures and Practices for Improving Compliance

The WHD is responsible for monitoring and enforcing the compliance of employers with the provisions of numerous Acts and the regulations established to implement the Acts. The Acts enforced by the WHD include, most notably, FLSA, FMLA, CWHSSA, MSPA, DBRA, and SCA. Among those Acts, FLSA is the one on which the WHD has focused attention in evaluating improvements in recidivism in the strategic plans, annual performance plans, budgets and annual reports that the DOL is required to prepare under GPRA.

To determine whether specific employers are complying with the provisions of the Acts that it enforces, the WHD conducts investigations. If the investigators detect violations of any provisions, the WHD takes actions to enforce the Acts and to encourage employers to improve their compliance in the future. The enforcement actions and compliance tools that the WHD can use for these purposes include: requiring payment of back wages owed to employees; providing compliance assistance, such as documents, seminars, and web-based interactive systems; initiating litigation for recovery of back wages and liquidated damages; imposing civil monetary penalties for repeated or egregious violations; and, in extreme cases, imposing criminal penalties for willful violations.

The effectiveness of the enforcement actions and compliance tools in improving recidivism is determined by the degree to which investigated employers cease or reduce the extent or severity of their violations of provisions of Acts enforced by the WHD. The results of statistical analyses of available empirical evidence of that effectiveness are summarized in Section 2.2 and Chapter 3.0 above. This chapter consolidates the available evidence on the effectiveness of WHD enforcement actions and compliance tools and presents conclusions and recommendations relating to possible refinements and modifications of WHD procedures and practices intended to improve employers' compliance.

4.1 General Effectiveness of WHD Enforcement Actions and Compliance Tools

Results presented in the Section 2.2 clearly indicate that, collectively, the enforcement actions and compliance tools that have been applied by the WHD to encourage employers to improve their compliance with the provisions of Acts and regulations that it enforces have been very effective in improving compliance by the employers who have been investigated. Although DOL's FY 2007 *Annual Performance and Accountability Report* has stated that 66 percent of employers who previously violated provisions of the FLSA were found to be in compliance in reinvestigations, a decline of 10 percentage points from FY 2006, the measurements are based on small, randomly selected samples of, on average, 68 employers per year. Such small samples cannot be truly representative of the entire, diverse population of previously investigated employers. Small shifts in the composition of a sample of that size among industries with notably different compliance rates can produce appreciable changes in the value estimated for the GPRA recidivism indicator.

Table 4.1 presents a brief summary of the evidence of general improvement in compliance that is contained in that section.[5] In the table, improvement is documented in relation to, first, all provisions of Acts and regulations that have been considered in the WHD investigations that have been analyzed and, second, all provisions of the FLSA and its associated regulations that have been examined in the investigations.

Table 4.1: Improvement in compliance detected in successive WHD investigations

Compliance indicator	Provisions considered	
	All provisions in all Acts investigated	All provisions in FLSA
Proportion of employers with violations in their historical investigations who have no violations in their current investigations	0.227	0.429
Proportion of employers with liability for back wages in their historical investigations who have no liability in their current investigations	0.315	0.434
Proportion of employees affected by violations in their historical investigations who are not affected by violations in their current investigations	0.300	0.475
Ratio of the back wages paid by employers with liability for back wages in their current investigations and the back wages paid by employers with liability in their historical investigations	0.687	0.649
Ratio of the average back wages paid by employers with liability for back wages in their current investigations and the average back wages paid by employers with liability in their historical investigations	0.464	0.387

Source: Table 2.2: Total Violations and Violations of Specific Acts Detected in Two Successive Investigations of Individual Employers.

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[5] It is important to note that the compliance indicators in Table 4.1 differ from the recidivism indicator that has been used by the WHD since its introduction in the *Strategic Plan* for FY 2003 through FY 2008 to measure WHD's achievement of its adopted GPRA outcome goal, *reducing employer recidivism by increasing the percent of prior violators who achieved and maintained FLSA compliance following a full FLSA investigation*. As discussed fully in Section 2.1, the sample of establishments that has been used to estimate the value of the recidivism indicator for any year is too small to measure reliably differences in the specified percentage as small as the increases established as annual GPRA performance targets by the WHD. The values reported for the compliance indicators in Table 4.1 are based on much larger samples of establishments and, hence, reliably measure improvements in compliance by previously investigated employers.

The values computed for the five compliance indicators presented in Table 4.1 reveal that, in their current investigations, previously investigated employers have substantially reduced the occurrence, the extent, and the severity of the noncompliance detected in their previous investigations in relation to Acts enforced by the WHD in general and the FLSA in particular. Similar evidence of improvement in compliance is tabulated in Section 2.2 for other Acts and for specific provisions of specific Acts. For all Acts and provisions for which values for the compliance indicators in Table 4.1 have been compiled and presented in that section, improvements in compliance have uniformly been found in relation to the first three indicators, and have almost always been found in relation to the last two indicators. Collectively, this evidence strongly demonstrates that the enforcement actions and compliance tools applied by the WHD in conjunction with historical investigations have been associated with substantial improvements in compliance by previously investigated employers in their next WHD investigations.

4.2 Effectiveness of Specific Enforcement Actions and Compliance Tools

Results presented in Chapter 3.0 then provide empirical evidence of the contributions of specific enforcement actions and compliance tools to the general improvement in compliance demonstrated for previously investigated employers in Section 2.2. Specifically, Chapter 3.0 summarizes the results of multivariate statistical analyses that have been performed for the same samples of previously investigated employers that have been examined in Section 2.2.

The statistical analyses relate variables that describe the current compliance with specific Acts and provisions by individual employers in those samples to an array of possible explanatory variables. The explanatory variables examined in the analyses include variables that describe the employers' historical compliance with the provisions for which violations were detected and other provisions, actions taken by WHD to encourage future compliance, and attributes of the employers and the circumstances in which they operate. The statistical analyses are based predominantly on data documenting outcomes, actions, and attributes that have been routinely recorded by WHD investigators in WHISARD during and after successive investigations of individual employers. A few analyses have also examined additional explanatory variables that have been developed from data collected in the NRI surveys.

4.2.1 Estimates Based on Analysis of WHISARD Data

In the statistical analyses that have been based solely on data obtained from the WHISARD database, pertinent data have been compiled for a total of 3,443 employers for whom results from two or more successive investigations have been identified in WHISARD. Using those data, multivariate statistical analyses have been performed examining changes in compliance in relation to all Acts enforced by the WHD, five individual Acts, and 40 specific provisions in individual Acts. The results of those analyses are documented in Chapter 3.0. In those analyses, estimates have been derived for the effects on the compliance of employers in their current investigations that are associated with five explanatory variables relating to WHD enforcement actions or compliance tools. Those explanatory variables describe:

- The type of investigation (either directed or complaint-based) conducted by the WHD in the historical investigation,

- Whether, after the historical investigation, the employer has agreed to comply in the future,

- The amount of civil monetary penalties that has been assessed after the historical investigation,

- The amount of back wages that has been assessed after the historical investigation, and

- The time elapsed between the historical and current investigations.

The results of the multivariate statistical analyses of data from WHISARD that are summarized in Chapter 3.0 provide clear and coherent evidence of the effectiveness of complaint-based investigations in improving compliance by investigated employers. Specifically, the results consistently indicate that, in comparison to directed investigations, complaint-based investigations are associated with, first, a statistically significantly higher probability that violations have been detected in those investigations and, second, a statistically significantly lower probability that violations are detected in their subsequent investigations. These results indicate, first, that the complaints received by the WHD reliably identify establishments with elevated probabilities that violations of Acts and provisions enforced by the WHD are currently being committed. Second, they indicate that, after investigations have been conducted in such establishments, the probability that violations will again be detected in their next WHD investigations is lower than the corresponding probability for establishments that have undergone directed investigations. The statistical results do not indicate, however, why establishments for which complaints have been submitted to the WHD respond more strongly and appropriately to the investigations triggered by those complaints than do establishments that have undergone directed investigations.

Next, the results of the statistical analyses indicate that, when all Acts and provisions considered in the investigations are taken into account, the probability that violations are detected in subsequent investigations is statistically significantly negatively related to the amounts of civil monetary penalties imposed on the employers after their previous investigations. Thus, at the aggregate level, higher civil monetary penalties are associated with lower probabilities of subsequent violations of Acts enforced by WHD. Similar results are not observed at more detailed levels, however. Although the amounts of civil monetary penalties that have been imposed for violations of specific Acts and provisions are specified by the WHD, there is no coherent, reliable statistical evidence that such detailed specification elicits improved compliance with those specific Acts and provisions by the employers on whom the civil monetary penalties have been imposed. Rather, the results indicate that employers, in general, respond to civil monetary penalties by improving their overall compliance, and not by improving their compliance in relation to the specific Acts and provisions for which the penalties have been applied. In addition, results from some exploratory statistical analyses presented in Section 3.3.5 suggest that civil monetary penalties increase the probability that other employers in the same region will comply with Acts and provisions enforced by the WHD. Specifically, those results indicate that the average value of civil monetary penalties imposed on other employers in the

same region during the period between an employer's historical and current investigations has a statistically significant association with relatively low probabilities that violations will be detected in subsequent investigations. No association with the number or value of civil monetary penalties imposed on other employers in the same industry has been observed in the exploratory analysis, however.

Similarly, the statistical analyses produce scant results indicating that detection that back wages are owed affects the probability that employers will comply in subsequent investigations. Such results have been observed only for employers who have been involved in directed investigations in which violations have been detected where back wages are owed. Results of the analyses frequently indicate, however, that the higher are the employer's back wages liabilities in their previous investigations, the statistically significantly higher are the numbers of affected employees, amounts of back wages owed, and back wages owed per affected employee for those employers in their subsequent investigations. Yet, the amounts of back wages owed in the subsequent investigations are greatly reduced from the amounts owed previously. Taking into account all other explanatory factors included in the analyses, $267,000 in back wages are owed at the subsequent investigation for every $1,000,000 in back wages owed at the prior investigation. Similarly, at the subsequent investigation, there are 64 affected employees for every $1,000,000 owed in back wages at the prior investigation. This corresponds to one additional affected worker currently for every $15,625 in back wages owed previously. This ratio suggests that the number of affected workers previously was probably appreciably higher per $1,000,000 owed in back wages than it is currently, and hence that the number of worker to whom back wages are owed has decreased since the prior investigation.

Finally, the results of the statistical analyses do not provide any coherent evidence that the time elapsed between successive WHD investigations has any effect on the probability that violations will be detected in the current investigations of the employers. The results do indicate, however, that the severity of noncompliance (particularly the average back wages owed to affected employees) tends to increase as the time elapsed between investigations increases.

Similar results to those described above for employers in general have been derived in analogous statistical analyses that have performed in relation to employers in specific two-digit NAICS industries. Because the analyses provide no added insights, the detailed results are not presented here. Also, exploratory analyses that include additional explanatory variables focusing on employers for whom violations involving back wages owed to employees have been detected in directed investigations indicate that such employers have statistically significantly lower probabilities than other employers that violations have been detected in their next investigations. Further, such employers who have also agreed to comply with Acts and provisions enforced by the WHD in the future have statistically significantly lower probabilities that violations of provisions of the FLSA have been detected in their subsequent investigations.

Although, as indicated at the beginning of this chapter, there are a large number of other enforcement actions and compliance tools that are available for use by the WHD in addition to the five discussed above, data documenting their use in conjunction with historical investigations are not available for the vast majority of the historical investigations in the set of successive investigations that has been identified in the WHISARD database. A few enforcement actions,

such as imposition of criminal penalties, are used too seldom to allow statistical analysis of their effects. For other enforcement actions and especially compliance tools, the WHD has begun to compile data about their use in the WHISARD database too recently for the information to be available for a large majority of the historical investigations in the identified set of successive investigations. Pertinent data elements here include, most notably, elements indicating whether an investigation is a reinvestigation and whether it involves a repeat violation or a recurring violation. Finally, for many compliance actions, no data about their use are currently being collected in WHISARD. For example, the collection of detailed information about the use of various compliance assistance resources in the NRI surveys indicates that such information is not yet being routinely collected in WHISARD. Although, as explained below, those data are too detailed to allow reliable estimation of the separate effects of the individual resources, data on broad classes of compliance assistance methods applied and other compliance actions taken might be usable in multivariate statistical analysis and informative in practice.

4.2.2 Estimates Based on Analysis of NRI Survey Data

In the statistical analyses that have been based on data obtained from the NRI surveys between 2003 and 2006, pertinent data have been collected to date for only 254 employers. Those data include lists of compliance materials that have been provided to the employers at the time of their historical investigations. In total, data have been collected on 56 types of compliance materials, including publications, posters, seminars, verbal instructions, websites, specific types of professionals, specialists, and organizations, and others. Using those data, multivariate statistical analyses have been performed examining changes in compliance in relation to all Acts enforced by the WHD, the FLSA, and one specific provision in the FLSA (violation 3, failure to pay proper overtime). If the explanatory variables indicating that specific types of compliance materials have been provided to or used by individual employers were statistically independent of each other, it would be possible, in principle, to compute separate estimates of the effectiveness of each type of compliance material in improving compliance by employers. The explanatory variables are not, however, statistically independent of each other. Rather, there are numerous, complex correlations among the 56 possible explanatory variables.

Because it is not possible to derive separate, reliable estimates of the effects of individual explanatory variables that are highly correlated with each other, it has been necessary to omit from the set of potential explanatory variables a sufficiently large number of them that no inordinately high correlations remain among the explanatory variables that are retained for inclusion in the multivariate statistical analyses. Thus, for the linear regression analyses examining changes in employers' compliance with all provisions of the FLSA, a total of 36 potential explanatory variables, including 22 variables describing employers' use of specific types of compliance materials, have been omitted because of their high correlations with one or, typically, several of the explanatory variables that have been retained. As a result, among the 59 potential explanatory variables involved in high correlations with others, only 23 variables, including 16 describing employers' use of specific types of compliance materials, have remained available for inclusion in the statistical analyses. An additional 34 potential explanatory variables, including 18 that describe employers' use of compliance materials, are not highly correlated with any other variables and have also been included in the analyses. Similar, albeit fewer, omissions of potential explanatory variables have been performed in relation to the linear

regression analyses examining changes in employers' compliance with provisions of all Acts enforced by the WHD.

The results of the analyses that have been performed after those omissions have been accomplished are documented in Section 3.3.4. In those analyses, estimates that have been derived for the effects on compliance that are associated statistically with the highly correlated explanatory variables that have been retained do not describe just the effects caused by use of the corresponding type of compliance material (or other factor). Rather, they also account for portions of the effects that have been caused by omitted variables with which they are correlated. Thus, the analyses do not provide estimates of the separate effects of individual types of compliance materials. The effects that have been estimated for the correlated explanatory variables that have been included in the analyses actually represent amalgams of the effects of those variables and the effects of the omitted explanatory variables with which they are complexly correlated.

It is therefore not surprising that the values estimated for effects of individual explanatory variables in the statistical analyses of data collected in the NRI surveys do not exhibit much coherence among the different analyses conducted using those data. The values estimated for the same explanatory variable in different analyses doubtless consist of different combinations of the actual effects of the corresponding set of omitted variables with which the included variable is directly or indirectly correlated. Accordingly, the results of those statistical analyses are not reliable estimates of the actual effects on employers' compliance that are caused by the included explanatory variables with which they are nominally associated. Indeed, it is not possible to sort out reliably the portions of any estimated effects that are actually attributable to individual members of the sets of omitted variables that are correlated with one or more of the included explanatory variables.

Consequently, the results of those analyses provide little or no reliable information about the comparative effectiveness of individual types of compliance materials in eliciting compliance from investigated employers. This confounded outcome doubtless has occurred because employers are not provided with or do not choose to rely on only one type of compliance material after violations have been detected in WHD investigations of their establishments. Rather, they doubtless are typically given packets of compliance materials and are encouraged to avail themselves of other compliance activities such as seminars, websites, or professional services of lawyers, accountants, or other specialists. Because different employers use available compliance materials in similar combinations, the potential explanatory variables describing their use become highly correlated, and it is impossible to sort out their separate effects in statistical analyses. Moreover, if some of the compliance materials that are included in such combinations are effective in improving compliance, whereas others are ineffective or confusing for employers who use them, the combined effect that is estimated for the type of compliance material that is in a statistical analysis may well be small and statistically insignificant, despite that type of compliance material actually being quite effective in encouraging compliance. Thus, a statistically significant estimate of the effect of a specific included explanatory variable does not necessarily indicate that the corresponding type of compliance material is actually effective, and a statistically insignificant estimate of the effect of a specific included explanatory variable does not necessarily indicate that the corresponding type of compliance material is actually

ineffective. Focus groups or surveys of employers who have used different types of compliance materials and activities would likely be much more effective techniques for evaluating the effectiveness of individual compliance stimulation options.

4.3 Conclusions and Recommendations

Because of (1) the small numbers of explanatory variables relating to WHD enforcement actions and compliance tools that currently are available in the WHISARD database, (2) the small number of employers for whom data have been collected in the NRI surveys, and (3) the severe and confounding correlation among the explanatory variables relating to compliance tools that have been compiled through the NRI surveys, it is difficult to reach confident conclusions about possible refinements or modifications of WHD procedures and practices that might improve compliance and reduce recidivism among employers who are investigated by the WHD. The statistical evidence that has been developed on the basis of data obtained from the WHISARD database clearly demonstrates that collectively the enforcement actions and compliance tools that are currently applied in conjunction with WHD investigations have been associated with substantial improvements in compliance by previously investigated employers in their next WHD investigations. In addition, results of statistical analyses performed using those data indicate that the few enforcement actions and compliance tools for which data are presently available in the WHISARD database (i.e., complaint-based investigations, directed investigations, imposition of civil monetary penalties, and detection of back wages) are effective in improving compliance by investigated employers in specific ways.

Based on even that limited evidence, it can confidently be concluded that the WHD should continue to rely heavily on complaints as the main basis for selecting employers for investigation, and to continue to conduct directed investigations as available resources permit. Consistent detection of back wages owed by employers and judicious imposition of civil monetary penalties also appear to be useful enforcement tools that elicit somewhat different responses from investigated employers, and hence are complementary of each other, rather than competitive or conflicting. The usefulness of agreements to comply in the future appears equivocal. At a minimum, their continued use should be supplemented with use of a more forceful enforcement tool, particularly for employers who reveal themselves to be recalcitrant.

In addition, WHD investigators should be strongly encouraged to collect uniformly the data on reinvestigations, repeat violations, and recurring violations that have recently been added to the WHISARD database. Additional data items should be identified that, if collected, might appreciably enhance the ability of the WHD to evaluate the effectiveness of its enforcement and compliance assistance efforts. The usefulness of collecting those data items should then be evaluated, taking into account the experiences gained from the collection and attempted analysis of similar data items in the NRI surveys. Based on the results of that analysis, specific expansions of the data routinely collected in WHISARD should be undertaken. Finally, focus groups or surveys of employers should be considered as practical options for evaluating the effectiveness of specific, more detailed types of compliance materials, activities, and other compliance stimulation options.

Appendix: Interpreting the Regression Results

Regression models have been developed to analyze the extent to which certain variables that are accessible in the data are useful as predictors of recidivism.

Two main types of regression models have been developed: linear regression models and logistic regression models.

Linear Regression Models

Linear regression models have the general form:

$$Y = b_0 + b_1X_1 + b_2X_2 + \ldots + e$$

where Y is the dependent variable whose value we are trying to predict, the X_i are explanatory variables, the b_i are the regression coefficients for which values are estimated, and e is the error term.

In this project, the dependent variables that we seek to predict with linear regression models are:

- Numbers of affected employees in current investigations
- Amounts of back wages assessed (overall and per affected employee)

Most of the explanatory (predictive) variables are characteristics associated with the employer being re-investigated (e.g., total employees, total revenues, industry classification) and characteristics associated with the prior investigation of the employer (e.g., type of investigation, back wages owed to affected employees, amount of civil monetary penalties imposed). Many of the variables are dichotomous, taking on the value of 1 if a condition is present and 0 if it is not present.

The effect of an explanatory variable X_i on the dependent variable Y is estimated by the value of its regression coefficient b_i multiplied by the value of X_i. If X_i is a dichotomous variable whose value is 1, the effect is the estimated value of the regression coefficient b_i.

Logistic Regression Models

Logistic regression models have the general form:

$$\ln[P/(1-P)] = b_0 + b_1X_1 + b_2X_2 + \ldots + e$$

where P is the probability that a violation is detected in a re-investigation, the X_i are explanatory variables, the b_i are regression coefficients for which values are estimated, and e is the error term.

The form of these regression models is more technically complex than is the form of the linear regression models, and the rationale behind trying to predict ln[P/(1-P)] instead of just trying to predict P is beyond the scope of this appendix.

The same set of explanatory variables that are available as candidates for inclusion in the linear regression models described above are also available for inclusion in the logistic regression models.

The effect of an explanatory variable X_i on ln[P/(1-P)] is estimated by the value of its regression coefficient b_i multiplied by the value of X_i. If X_i is a dichotomous variable whose value is 1, the effect is the estimated value of the regression coefficient b_i.

It is important to note that the value of ln[P/(1-P)] increases as the value of P increases between zero and one. Therefore, if the regression coefficient b_i associated with an explanatory variable X_i has a positive (or negative) value, the probability that a violation will be detected in the re-investigation of an employer will increase (or decrease) as the value of X_i increases.

Sample Calculation

The average values of each of the dependent and explanatory variables that have been included in logistic regression models and linear regression models that have been analyzed in Chapter 3.0 are presented in Table A.1. The average values relate to all investigations, and not just to investigations that have looked for violations of specific Acts or specific provisions in specific Acts. The first column of values pertains to all employers who have been investigated, and the second column of values pertains to the employers who have had violations detected in their re-investigations.

In any linear regression model or logistic regression model, the average effect of any explanatory variable can be computed by multiplying the value of its regression coefficient by the average value of the variable. Thus if, as reported in Table 3.2 for the linear regression model that predicts the number of affected employees in current investigations, the estimated value of the coefficient for the explanatory variable "Current annual revenues ($ billions)" is 97.3 and , as reported in Table A.1, the average "Current annual revenues" for employers with violations detected in current investigations is $91,011,722, then the average effect of the current annual revenues of such employers on the average number of affected employees in current investigations is computed as the product of 97.3 and 0.091 (the average current annual revenues in billions of dollars). That product is equal to 8.9 employees.

By performing similar computations for all of the explanatory variables that are included in a specific linear or logistic regression model, and then summing those computed values, the predicted value of the corresponding dependent variable can be calculated. Similarly, by using the values of the explanatory variables for a specific employer instead of using the average values in Table A.1, the predicted value of the dependent variable for that employer can be computed.