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REDUCING FOOD STAMP OVERPAYMENTS: MORE FREQUENT RECERTIFICATION AND MONTHLY REPORTING

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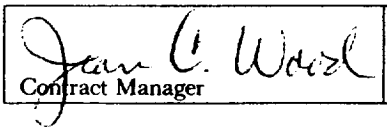		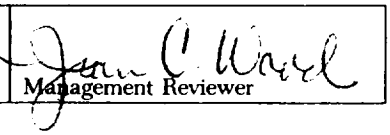

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EXECUTIVE SUMMARY

The objective of this research is to estimate the effects on food stamp overpayment (i.e., ineligibility and overissuance) of two kinds of corrective actions: more frequent recertification and more extensive use of monthly reporting. This report focuses on the overpayment case error rate--the percentage of active cases with overpayment error--and examines this error rate nationally as an outcome of three separate administrative activities: initial certification, recertification, and interim maintenance. Monthly reporting is treated as one form of interim maintenance.

The approach taken here is to consider the case error rate as the outcome of systematic monthly caseload activity, with households moving onto and off of the active caseload and with ongoing active cases experiencing month-to-month changes that affect the correctness of their coupon allotment. This monthly pattern of activity--and the resulting error rate--is importantly affected by administrative decisions regarding the length of designated certification periods and the assignment of cases to monthly reporting. Such decisions can be translated in terms of the percentage of all active cases in any month that are subject to a recertification or to the monthly reporting requirement.

Specifically, for any given month the active food stamp caseload can be divided among four subgroups, by whether or not cases are subject to a recertification in the given month and whether or not they are subject to monthly reporting. For each subgroup, one can define an error introduction rate (the percentage of correct cases that become error cases the following month) and an error correction rate (the percentage of error cases that become either correct cases or closed cases the following month).* For the entire active caseload, the rates of error introduction and error correction are the weighted averages of the corresponding rates by subgroup. In addition, with respect to initial certification, one can define the intake portion of the caseload (the percentage of active cases that have just been initially

*Throughout this report, the term "correct cases" refers to active cases with no overpayment error. Such cases may be either correctly paid or underissued.

certified) and the intake error rate (the percentage of such cases that are in error).

By thus characterizing the effect on error of regular monthly administrative activity, one can derive an expected case error rate that will result if monthly administrative activity continues uninterrupted. Most importantly, the lower the rate of error introduction or the higher the rate of error correction, the lower will be the expected error rate. One can estimate the effect of more frequent recertification or more extensive use of monthly reporting by comparing the expected error rate under current administrative procedures with the expected error rate that would result if revised administrative procedures were to alter the caseload-wide rates of error introduction and error correction. These caseload-wide rates could be changed by assigning more (or fewer) cases to monthly reporting or by assigning shorter (or longer) certification periods to cases.

Sources of Overpayment Error

Using national data for fiscal year 1986, we have learned the following information about the sources of overpayment error and the potential for reducing the error rate through administrative changes:

> In 1986, the 15.9 percent national case error rate for overpayment was comprised of an error rate of 11.9 percent for cases immediately following initial certification and 16.2 percent for all other active cases. The spread between these two latter rates is narrow enough to argue against the notion that cases enter the program relatively free of error and then quickly lapse into error as their monthly issuances are not adjusted to reflect changes in household circumstances. Instead, households appear to enter the active caseload with a substantial degree of error, with correct cases lapsing subsequently into error at a relatively slow rate.
>
> This pattern of error appears to suggest that improvements in the intake error rate would have substantial impact on the caseload-wide error rate. However, the active caseload reflects a relatively low rate of monthly turnover; only 5.9 percent of active cases at any time are ones that have just been initially certified in the previous month. This means that a lowering of the intake error rate has only a modest direct effect on the caseload-wide error rate. In addition, because the error rate for ongoing cases--the above-cited 16.2 percent for those already on the caseload--is not very sensitive to the entering error rate

for such cases, the intake process also has only a modest indirect effect on caseload-wide error. (To illustrate, the probability of error expected after 18 months is 12 percent for a case not in error at intake; for a case that is in error at intake, the probability is only slightly higher, 14 percent.)

The caseload-wide error rate is thus more responsive to improvements in the error patterns for currently-active cases than for newly-certified cases. In particular, the error rate is relatively sensitive to the rate of error correction (i.e., the probability that a case in error one month either becomes a correct case or is closed by the start of the following month).

An increase in either the frequency of recertification or the use of monthly reporting will lower the expected case error rate by raising the caseload-wide error correction rate. The rates of error correction currently exhibit a predictable pattern among the four caseload subgroups. Error correction--through either benefit adjustment or case closure--is highest among nonmonthly reporters subject to recertification (59 percent), followed by monthly reporters subject to recertification (24 percent), monthly reporters not subject to recertification (20 percent), and nonmonthly reporters not subject to recertification (6 percent).

This approach to error rate analysis could be further developed to yield useful information for planning corrective actions. For instance, one could diagnose State error rates in terms of the effectiveness of initial certification, recertification, and interim maintenance at preventing and correcting error.

Limitations of the Analysis

The predictive power of such analysis is at this point limited by underlying assumptions. Some of these simplifying assumptions are necessitated by the available data. For instance, the analysis assumes that during the period of observation (fiscal year 1986) the Food Stamp Program exhibited a stable monthly caseload and a stable monthly case error rate. The analysis also considers recertification, monthly reporting, and other reporting each as generically-defined administrative procedures that do not differ between States or within States. Other assumptions are largely dictated by the particular analytic approach. For instance, it is assumed that the rates of error introduction and error correction are independent of the length of time that a case has been previously correct or in error. These various assumptions are ones that cannot be easily altered.

Other assumptions reflect only to some degree the inherent limitations of available data or the requirements of the analytic approach; additionally, they reflect a desire to restrict the complexity of this initial analysis. For example, the analysis currently provides only a partial estimate of administrative effects on error, in that it does not capture the influence of administrative measures on the rate of case closure. More importantly, the current analysis reflects the simplifying assumption that cases are alike in their demographic characteristics and their response to administrative procedures. These latter assumptions can be tested and altered. For instance, the analysis could be conducted on separate segments of the caseload, to determine whether there are significant differences in the rates of error introduction and error correction for differing subgroups. If such differences exist, the current predictions can be improved by considering the expected error rate as an outcome of subgroup-specific error rates, each responding in different degrees to possible increases in the frequency of recertification or the use of monthly reporting.

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CHAPTER ONE

INTRODUCTION

1.1 Statement of the Research Question

Federal policies to reduce overpayment error in the Food Stamp Program have taken several forms during the 1980s. First, and most visibly, the federal funding of each State's costs in the program has effectively become contingent upon the State's error performance, as measured annually through quality control sampling. By statutory provision, "fiscal liabilities" are assessed for high-error States and "enhanced funding" is provided to low-error States. From fiscal year 1981 to 1986, 49 States faced threatened liabilities in at least one reporting period, with the total exceeding $500 million. During the same period, 19 States qualified for incentive payments in at least one period, totalling about $16 million.

Second, and less visibly, federal statutes and regulations prescribe in some detail the administrative procedures for determining household eligibility and benefits. For instance, such rules specify the procedures by which income is to be verified and household changes are to be reported.

Policies of either type must rely--at least implicitly--on judgments about the administrative controllability of overpayment error. However, no systematic capability exists for estimating the effect on overpayment of different administrative practices. This reflects both the complexity of the underlying relationships between administrative procedure and overpayment and the limitations of the available data by which to examine these relationships. This report presents preliminary answers to the following question:

> To what extent can food stamp overpayments be further reduced through more frequent case recertification or more extensive use of monthly reporting?

In seeking to estimate the effects on overpayment error of administrative actions, one confronts several limitations in the available data. The principal data source for such research is the national quality control sample, an annual sample of about 67,000 active food stamp cases, with

recorded information on household characteristics, administrative circumstances, and findings of the quality control review. This data set has the following limitations:

> Because the sample includes only active cases, one does not observe case closures. It is thus not possible to measure directly, for instance, the extent to which ineligible cases are closed at recertification. [While terminations are observed in the negative case action sample, the partial nature of the sampling universe and review process for negative actions prohibits any linkage with the active case data.]
>
> For cases that are correctly paid in the review month, one does not know whether the case was previously in error. We thus do not observe directly those instances in which an overpayment error has been corrected as a result of a monthly report or recertification.
>
> One does not know with any certainty the degree of overpayment error among cases immediately prior to a recertification, since the data do not indicate whether a case is about to undergo a recertification. [This hampers any attempt to assess recertifications through pre-post comparisons of case status.]
>
> One does not know whether an active case is subject to monthly reporting.

At the same time, the following information is available for each case in the quality control sample:

> the date and nature of the most recent case action;
>
> the length of the current certification period; and
>
> for cases found to be in error, the date of error occurrence.

In addition, information became available at the time of this study allowing one to impute whether the sample case is subject to monthly reporting.

Given these considerations, the current research has been undertaken as an exploratory effort, to test whether the observed national rate of food stamp overpayment error can be explained as an outcome of administrative choices regarding recertification and monthly reporting. The particular approach adopted here is to express the measured rate of overpayment error in mathematical terms that allow one then to simulate an increase in the frequency of recertification or the use of monthly reporting. In brief, the

approach taken here is to represent the error rate as the outcome of a repeated monthly process whereby households move between three possible categories: active correct cases, active error cases, and nonrecipient households.

1.2 Organization of the Report

The remainder of this report is organized into a nontechnical description of the analysis and two technical appendices. Chapter Two presents the research approach and discusses the findings of the analysis, with respect to both the determinants of the current error rate and the effects of increasing the frequency of recertification or the use of monthly reporting. Appendix A presents the modelling approach used to examine overpayment error. Appendix B explains the procedure by which the model is estimated, describing the data sources that are used and the assumptions that underlie the estimated parameters.

CHAPTER TWO

ANALYSIS AND FINDINGS

In seeking to reduce overpayment error in the Food Stamp Program, State and local administrators must decide how best to allocate scarce administrative resources. For instance, which combination of procedures will most effectively promote accurate payment, within the constraints of one's administrative budget? Most importantly, how should available staff time be allocated among alternative casework activities? Managers typically rely on experience and intuition to make such choices. Rarely is there any reliable information to guide one's decisions. The design of corrective actions becomes "more art, than science."

This analysis aims to provide a more systematic approach to evaluating alternative corrective actions, by addressing one side of the program manager's cost-benefit calculation--the expected reduction in overpayment associated with differing administrative choices. Two particular forms of corrective action are examined here: more frequent recertification and more extensive use of monthly reporting. The technical approach developed in this study is one that could be applied as a generalized framework for evaluating administrative options to reduce error.

2.1 Method of Analysis

The error measure that has become the principal focus of administrative attention is the "official" overpayment error rate--the sum of issuances to ineligible cases and overissuances to eligible cases, as a percentage of total issuances to active cases (and reflecting adjustments for federal review findings and sample noncompletion). This dollar-based measure can be viewed as the product of two contributing factors:

> cases with overpayment error as a percentage of total active cases; and
>
> the average error amount per case with overpayment error, as a percentage of the average issuance to active cases.

The first factor--the case error rate for overpayment--is by far the more important empirical determinant of State-to-State variation in the official overpayment error rate, accounting for nearly two-thirds of the interstate variation observed in fiscal year 1986. Because this is likely also to be true for intrastate error variation--the relevant concern for any given State--the focus of this analysis is the case error rate for overpayment.

It is important at the outset to acknowledge that once a change in administrative procedure is implemented, its effect on the measured case error rate is fully realized only over a period of time. One analogy to this is the effect on a car's speed of fully depressing the accelerator. While the car begins to accelerate immediately, the full effect on the car's speed comes only after some number of seconds. If the accelerator remains fully depressed, the car will eventually reach and maintain its top speed.

Similarly, if one improves some aspect of caseload management, the measured error rate does not immediately adjust to a lower level. The error rate may begin to respond immediately, but will not fully reflect the administrative change until some number of months has elapsed. As with the car's speed, the error rate makes a transition to its new level. For example, a change in recertification procedure will have its full effect only after each continuing case has become subject to the altered practice at its next recertification. In the short run, there is a period during which cases not yet subject to recertification remain unaffected.

This suggests that one should appropriately assess alternative administrative procedures by comparing the error rate that one could eventually expect to attain, abstracting from any anticipated short-term transition. To carry the automobile analogy further, this is equivalent to ranking the engine performance of two cars in terms of their corresponding top speeds. One could of course also look at how quickly the error rate adjusts to its new level (as in the number of seconds required for a car to accelerate from 30 to 50 miles per hour). An advantage of the technical approach developed here is that one can examine not only the long-term expected error rate, but also the length of time required for the error rate to adjust. Preliminary analysis indicates that the length of this transition period does not vary substantially among different assumed scenarios of administrative change. For this reason, the eventual level of the error rate is viewed as the relevant criterion for evaluating different administrative actions.

This focus on the likely error rate to be reached in the long term is especially appropriate because of the "investment" nature of many corrective actions. That is, a substantial initial administrative cost may be necessary to implement a new procedure, in terms of training staff, revising forms, redesigning data systems, etc. Whether one can justify such "front-end" expenditures, in addition to possible increases in monthly operational costs, will depend on the long-term improvement in the error rate.

Clearly, no program manager has the luxury to pilot test each promising administrative change in order to assess its potential effect on the error rate. For this very reason, managers would find it valuable to have some method for simulating--or pilot testing in a hypothetical way--possible administrative changes, if only to provide some approximation that could confirm or refute their best intuition. The analysis here seeks to provide an empirically-based tool for such predictions.

As detailed in Appendix A, the technical approach taken here centers on the concept of an expected case error rate--the error rate that would result in the long run from any particular set of administrative procedures. As discussed earlier, this measure is the appropriate criterion by which to compare alternative sets of administrative procedures. In principle, one can thereby examine the effects on overpayment error of numerous alternative administrative scenarios. To do so, it is necessary first to characterize each set of administrative procedures in terms of the following four factors:

> the intake portion of the caseload--the percentage of active cases that have just been initially certified. This reflects the degree of monthly caseload turnover, as affected by the rates of client applications, applicant approvals, and case closures.
>
> the intake error rate--the percentage of the above newly-certified cases that are overpaid at the time of initial certification. This reflects the accuracy of agency decisions on initial applications.
>
> the error introduction rate--among those active cases with no overpayment error at the start of any month, the percentage that becomes overpaid by the following month. This reflects the extent of changes in household circumstances and the effectiveness of client reporting (and agency response) in making timely benefit adjustments and thus preventing the occurrence of errors.

the error correction rate--among those active cases overpaid at the start of any month, the percentage that by the following month are no longer overpaid active cases, including those that have in the interim left the active caseload. This reflects the effectiveness of interim maintenance and recertification procedures in detecting and correcting errors that are already present among active cases. To a lesser extent, it also reflects the extent of "self-correcting" changes in household circumstances among error cases, as through the loss of unreported part-time earnings.

Appendix A indicates that the expected case error rate can be expressed mathematically in terms of these four factors. Thus, after translating any set of alternative procedures into these terms, the corresponding expected error rate can be determined by straightforward arithmetic computation. The latter three factors--the intake error rate, the error introduction rate, and the error correction rate--are the ones most subject to change through administrative action. Not surprisingly, the expected error rate is reduced if the intake error rate or error introduction rate can be lowered; the expected error rate is also reduced if the error correction rate can be raised. In proportional terms, the expected error rate is shown in Appendix A to be most responsive to changes in the error correction rate.

This approach offers a generalized framework for examining the effects on the error rate of possible changes in program administration. Of particular interest here are the effects of two specific kinds of administrative changes--more frequent recertification and more extensive use of monthly reporting. Because recertification and monthly reporting are administrative procedures pertaining to the currently active caseload, their effects on error come through changes in the rates of error introduction and error correction. (In contrast, a change in initial certification practices would have its effect on error only through the intake error rate.) In any month, the active caseload can be considered as divided between those that are assigned to monthly reporting and those that are not. Furthermore, the cases within each group can be considered as positioned in a queue according to the number of months remaining in their current certification period.

For the entire active caseload, the rates of error introduction and error correction can each be viewed as a weighted average of the corresponding rates among four separate subgroups of the active caseload:

(1) monthly reporting cases subject to recertification;

(2) monthly reporting cases not subject to recertification;

(3) nonmonthly reporting cases subject to recertification; and

(4) nonmonthly reporting cases not subject to recertification.

The set of weights for the error introduction rate will reflect the distribution of correct cases among these four subgroups; for the error correction rate, the weights reflect the distribution of error cases.

With this framework in mind, the most direct approach to simulating more frequent recertification or more extensive use of monthly reporting is to alter the weights corresponding to each of the four subgroups above. For instance, more frequent recertification implies an increase in the weights for the first and third subgroups. More extensive use of monthly reporting implies an increase in the weights for the first and second subgroups. Because the weights for the four subgroups must sum to one, any increase for one subgroup must be offset by a decrease for at least one other subgroup.

Such an approach may misestimate the effect of such administrative actions on the error rate, to the extent that caseload demographic characteristics differ between the four subgroups. To illustrate, consider a scenario in which all nonmonthly reporting cases with a six-month certification period are to have their certification periods reduced to four months. This can be represented by an increase in the weight for the third subgroup, with an offsetting reduction in the weight for the fourth subgroup. The caseload-wide rates of error introduction and error correction could then be recomputed on the basis of the new weights, resulting in a new expected error rate.

However, this method assumes that the nonmonthly reporters now recertified semiannually do not differ from other cases in their pattern of error introduction and error correction. This assumption enables one to simulate the administrative change through only a shift in the weights, without any change in the subgroup-specific rates themselves. Specifically, a higher proportion of the nonmonthly reporters in any month will be considered as subject to a recertification and will thus be assigned the error introduc-

tion and error correction rates now currently estimated for nonmonthly reporters who are undergoing recertification. (Correspondingly, a lower proportion of nonmonthly reporters in any month will be considered as not subject to a recertification, with no presumed effect on the error introduction and error correction rates applicable to subgroup four.)

Such an assumption of case homogeneity runs counter to conventional understanding about the demographic diversity within the caseload. To continue the above example, nonmonthly reporters with six-month certification periods may be expected to have a higher error introduction rate between case actions than other nonmonthly reporters. Most notably, the food stamp agency may have assigned these cases the (shorter-than-average) six-month certification length because of case circumstances suggesting a likely change in the household's situation (which, if unreported or undetected, would lead to an error). This implies that the revised, caseload-wide error introduction rate should reflect not only a lowering of the weight attached to the fourth subgroup--nonmonthly reporters not subject to recertification--but also a lowering of their subgroup-specific error introduction rate.

To continue this example, the above-described upward bias to the expected error rate may be offset by assuming no increase in the subgroup-specific error introduction rate for the third subgroup--nonmonthly reporters subject to recertification. Such an increase might be warranted--in addition to the increased weight--if the cases now observed in the third subgroup are arguably more stable in their household circumstances than those with six-month certification periods who are to be newly-shifted into the subgroup.

The assumption of case homogeneity warrants further attention in subsequent analysis. For the purposes of this report, however, the biases introduced by this assumption are treated as negligible.

2.2 Sources and Uses of Data

As indicated in Appendix B, the above-described framework has been used to examine the determinants of the national error rate for fiscal year 1986. A sample of 63,623 active cases entered the analysis, after deleting observations from the total national QC sample due to missing or miscoded information. Based on this sample, with appropriate weighting of each observation, the national case error rate for overpayment is estimated at 15.9 percent.

Identifying cases that are subject to recertification. The analysis requires that cases be identified according to whether are not they are subject to recertification in the sample month. As mentioned earlier, this information is not recorded on the quality control review schedule. However, the review schedule does indicate the length of the certification period, the date of the last case action, and the nature of the last case action.

The following logic is used to identify cases that are about to undergo recertification. We observe in the sample data that 10.2 percent of active cases at the start of each month have just undergone recertification in the previous month. By itself, this figure understates the percentage of active cases that are subject to recertification in any month, to the extent that it excludes cases that have been closed at recertification and thus do not enter the active case sample. However, we also know from the data that 5.9 percent of active cases at the start of each month have been initially certified or reopened in the previous month. If we assume the caseload to be at a constant month-to-month level, this implies that 5.9 percent of active cases at the start of each month will close in the ensuing month. These figures bound the monthly percentage of cases subject to recertification between 10.2 percent (if one assumes that no closures occur at recertification) and 16.1 percent (if one assumes that all closures occur at recertification).

Following this logic, we can infer the monthly percentage of cases subject to recertification if we also know the percentage of case closures that occur among cases that are subject to recertification. As there are no available national estimates of this latter percentage, we make the mid-range assumption here that one-half of all closures occur in the course of a recertification. (This includes cases subject to recertification who never appear for their scheduled interview and are thus closed due to expiration of the certification period.) This implies that the monthly percentage of active cases subject to recertification is 13.2 percent--the sum of 10.2 percent (the portion of the caseload that has just been recertified) and 3.0 percent (one-half of the 5.9 percent closure rate). A case "subject to recertification" is thus any case whose next-month payment will not be made unless the case is recertified. Some of these cases never appear at all for a recertification interview; others apply for recertification, but are found

ineligible and are thus denied recertification. The remaining cases--under current assumptions, about three-quarters of those subject to recertification--are recertified and continue into the next month as active cases.

The assumption that one-half of closures occur at recertification is consistent with data available from Alabama. Among all closures during the period March 1987-February 1988, 47 percent were reported as due to expiration of the certification period or a formal denial of recertification. See Exhibit 2.1.

As to which particular cases comprise the 13.2 percent of the national monthly caseload subject to recertification in the review month, we simply draw them from a recertification queue, with each active case positioned in the queue on the basis of the remaining time left in its current certification period (on the basis of the reported date of the most recent certification action and the length of the certification period). Given the distribution of cases in this queue, the 13.2 percent figure was comprised of the following cases:

> those for whom a recertification already occurred during the review month;
>
> those for whom the review month is the last month of the current certification period; and
>
> those for whom the review month is the second-to-the-last month in the current certification period, where the action occurred on or before the 11th day of the action month.

The last group was simply defined so as to yield the appropriate number of cases in order to reach the 13.2 percent target figure.

Identifying cases that are subject to monthly reporting. For the purpose of estimating the effect on overpayment error of monthly reporting as a method of interim case maintenance, it is also necessary to identify those cases that are required to submit a monthly report. While the integrated quality control review schedule contains a separately-coded entry for whether the case's most recent action is a monthly report, this item is recorded for food stamp cases on an optional basis, and it greatly understates the number of food stamp cases that are subject to monthly reporting. While program data indicate that about one-third of all active cases are monthly reporters, only

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EXHIBIT 2.1

CASE CLOSURES, BY REASON, ALABAMA, 1987-1988

Reason for case closure	Number of closures	Percentage of closures (%)
At recertification:		
Expiration of certification period	1,640	41.2
Recertification denied	236	5.9
Subtotal		1,87647.1
Prior to recertification:		
Failure to submit monthly report	1,975	49.6
Other termination	134	3.4
Subtotal		2,10852.9
TOTAL		3,985100.0

SOURCE: Abt Associates Inc., Study of Food Stamp Certification Cost, unpublished tabulation based on State-provided data on monthly administrative transactions during the period March 1987-February 1988. Does not include suspensions or unexplained closures.

4 percent of the quality control sample is reported as having a monthly report as the most recent action. (Another reason for the discrepancy is that any monthly reporting case that has been initially certified, reopened, or recertified in the sample month will be not be coded as having a monthly report as its most recent action.)

In conjunction with the Study of Food Stamp Certification Cost being conducted for the Food and Nutrition Service, Abt Associates has now imputed the monthly reporting status for each case in the 1986 national quality control sample. This imputation is based on three sources of information: the administrative survey conducted by Abt under its earlier study for FNS on program operations; the Monthly Reporting and Retrospective Budgeting (MRRB) Status Report prepared by FNS; and State AFDC plans. The status of each sample case is constructed on the basis of the descriptive case information reported on the quality control review schedule.

To the extent that the information on the review schedule is insufficient to replicate each State's decision rules, and to the extent that the above program sources may be ambiguous or even conflicting, there is some imprecision in the imputation. A case may be misclassified by either (a) identifying it as a monthly reporter when it is not, or (b) not identifying it as a monthly reporter when it is. The latter type of misidentification is probably more prevalent. For instance, while many States assign cases to monthly reporting if there is "recent work history" in the household, the review schedule indicates only whether household members currently have earnings. In total, the data indicate that 30.9 percent of the national caseload is subject to monthly reporting. This estimate is certainly in the range of other benchmark administrative estimates.

2.3 Determinants of the National Case Error Rate

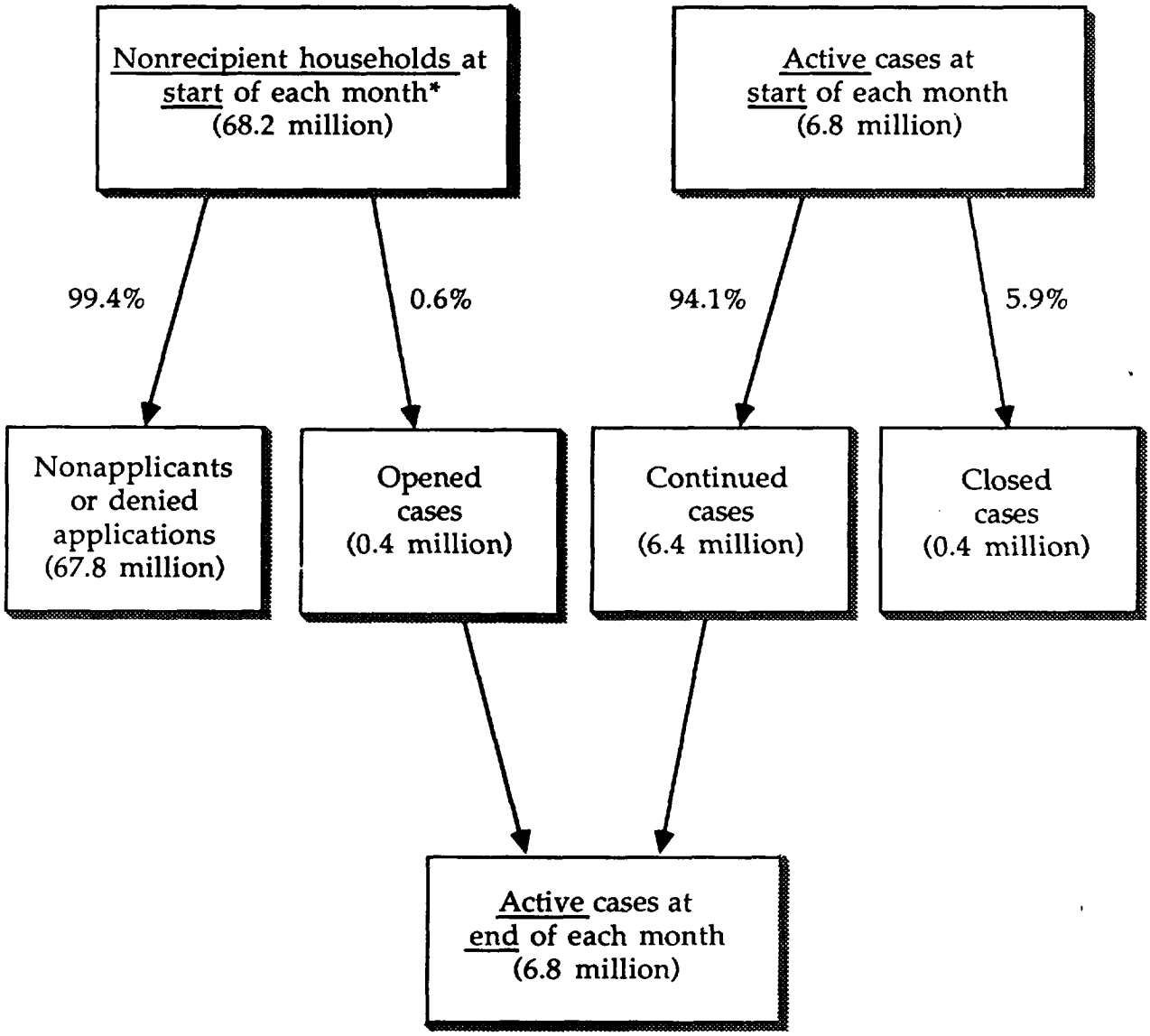
Households participating in the Food Stamp Program are assumed here to have prior-year annual incomes below $50,000 (money income in 1986 dollars). This monthly universe of all such "at-risk" households numbered 75.0 million in fiscal year 1986. At the start of each month, an estimated 6.8 million of these households were active food stamp cases; the remaining 68.2 million were nonrecipient households.

In the course of each month, 0.4 million cases--or 5.9 percent of the start-of-the-month caseload--are closed, while the other 6.4 million cases

start-of-the-month nonrecipient households. The other nonrecipient households, totalling 67.8 million, remain off the active caseload, either as nonapplicants or as households whose application is denied. The active caseload at the end of the month (and therefore at the start of the following month) is unchanged at 6.8 million. (Note that the number of households who are certified at some time during each month is thus 7.2 million, consistent with other program counts.) These monthly caseload flows are shown in Exhibit 2.2.

Exhibit 2.2

Monthly Case Flows, Fiscal Year 1986



*Among households with prior-year income under $50,000 in 1986 dollars

11.9 percent are overpaid. This figure predominantly reflects the inaccuracy of benefit determinations reached at the time of the case action. In addition, however, it reflects some extent of further error arising among cases in the course of their first month of payment. (Only about 10 percent of the intake error cases are of the latter type.)

Error introduction rate. Among active cases that are "correct" at the start of one month (either correctly paid or underissued), 2.2 percent become in error (either ineligible or overissued) by the start of the next month. The remaining 97.8 percent either remain as correct active cases or are closed.

Error correction rate. Among active cases with an overpayment error at the start of one month, 16.0 percent either become correct cases or are closed by the start of the next month. The other 84.0 percent remain active as error cases. This estimate implies that the expected total duration of an error--the time elapsed from the arrival of the error (via either intake or error introduction) to its departure (via either closure or benefit adjustment)--is 1/.160, or 6.2 months. Another implication of this estimate is that 4.0 months is the median duration or "half-life" of an overpayment error, the time elapsed before one-half of errors have departed through either benefit adjustment or closure.

Exhibit 2.3 displays schematically the estimated pattern of monthly case error flows. For the intake error rate, the error introduction rate, and the error correction rate, Exhibit 2.4 shows the value that each would have to attain, all other things equal, in order for the expected error rate to decline from its current level of 15.9 percent to specified levels as low as 8.0 percent.[1]

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[1]As described in Section A.1, one can use the expression for the expected case error rate to derive an "elasticity" of the error rate with respect to each of the basic parameters of the model. These elasticities--which indicate the percentage change in the expected case error rate in response to a one-percent change in each parameter, holding all other conditions constant--are as follows, when evaluated at the sample means:

with respect to the intake case error rate	.24
with respect to the error introduction rate	.64
with respect to the error correction rate	-.88

Thus, the error rate is most responsive, in proportional terms, to changes in the error correction rate. Even here, however, the error rate responds less than proportionally to changes in the error correction rate, as the estimated elasticity of -.88 is less than one in absolute value.

Exhibit 2.3

Monthly Error Flows, Fiscal Year 1986

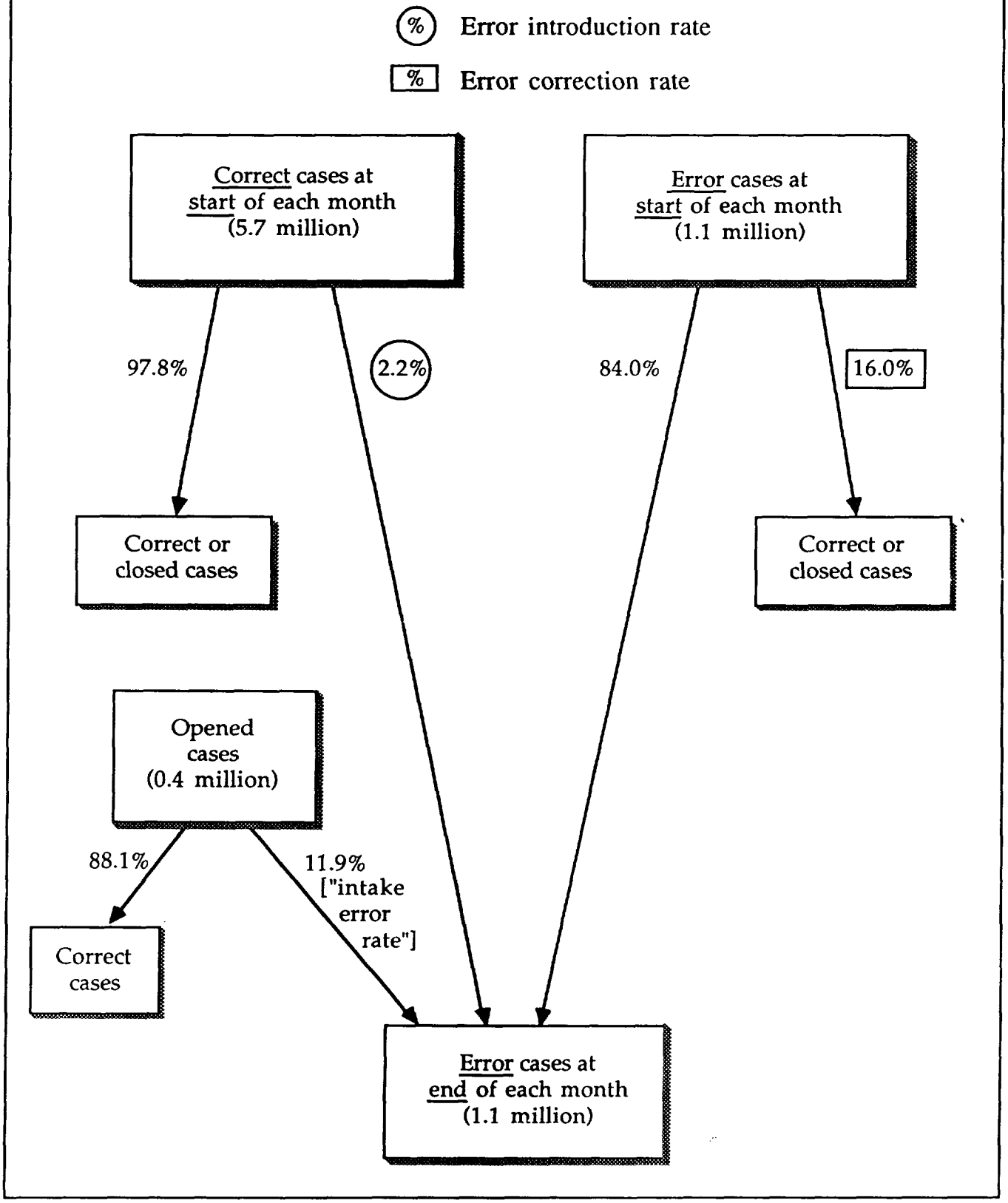

EXHIBIT 2.4

PARAMETER VALUES CORRESPONDING TO SPECIFIED TARGET LEVELS OF THE EXPECTED CASE ERROR RATE

	Expected case error rate (%)				
	15.9[a]	14.0	12.0	10.0	8.0
	Corresponding parameter value[b]				
Basic parameter					
Intake error rate	.119[a]	.059	---[c]	---[c]	---[c]
Error introduction rate	.022[a]	.018	.014	.010	.006
Error correction rate	.160[a]	.185	.220	.268	.341

[a]Presently-estimated value.

[b]Assuming no change in the case closure rate or other basic parameters from their presently-estimated values.

[c]The lowest value of the expected case error rate that can be attained through reductions in the intake error rate is 12.1%, assuming no other parameter changes.

2.4 Effectiveness of Recertification and Monthly Reporting

As described earlier, an estimated 13.2 percent of all active cases in any month are subject to a recertification, while 30.2 percent of all active cases are monthly reporters. Exhibit 2.5 shows the estimated distribution of active cases in any month, according to both whether they are subject to a recertification and whether they are subject to monthly reporting. This two-by-two classification establishes the four caseload subgroups whose error characteristics are of specific interest to this study.

Exhibit 2.6 displays this four-way classification in a branching diagram, where the indicated percentages sum to one at each branch. This diagram also shows the way in which the 5.9 percent closure rate can be considered a weighted average of the closure rates for each of the four caseload subgroups. For cases subject to monthly reporting, the probability of closure is about twice as high in the month of a recertification as in other months (12.5 percent versus 5.9 percent). For nonmonthly reporters, the closure rate at recertification is more than ten times higher than in other months (25.9 percent versus 2.2 percent).

Exhibit 2.7 shows the estimated value of the error introduction rate for each caseload subgroup. To reiterate, the error introduction rate indicates the percentage of correct cases (correctly-paid or underpaid) that become overpaid the following month. As noted in Appendix B, these rates are estimated under the assumption of no month-to-month changes in the case error rate and caseload population. This allows the observed current-month number of correct cases in each caseload segment to be used as a proxy for the corresponding unobserved prior-month number. These imputed prior-month values are then used to form the appropriate denominators in computing the subgroup-specific rates of error introduction.

The indicated pattern of error introduction rates by caseload subgroup appears at first to be counterintuitive. The rate is highest for monthly reporting cases subject to recertification and lowest for nonmonthly reporting cases not subject to recertification. For instance, monthly reporting cases have error introduction rates that are approximately twice

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EXHIBIT 2.5

DISTRIBUTION OF ACTIVE CASES, WITH RESPECT TO RECERTIFICATION AND MONTHLY REPORTING STATUS, FISCAL YEAR 1986

	Cases subject to recertification	Other cases	Total cases
	Distribution of active cases (%)		
Cases subject to monthly reporting	3.2	27.0	30.2
Cases subject to other reporting	10.0	59.8	69.8
Total cases	13.2	86.8	100.0

Exhibit 2.6

**MONTHLY CASE ACTION FLOWS,
FISCAL YEAR 1986**

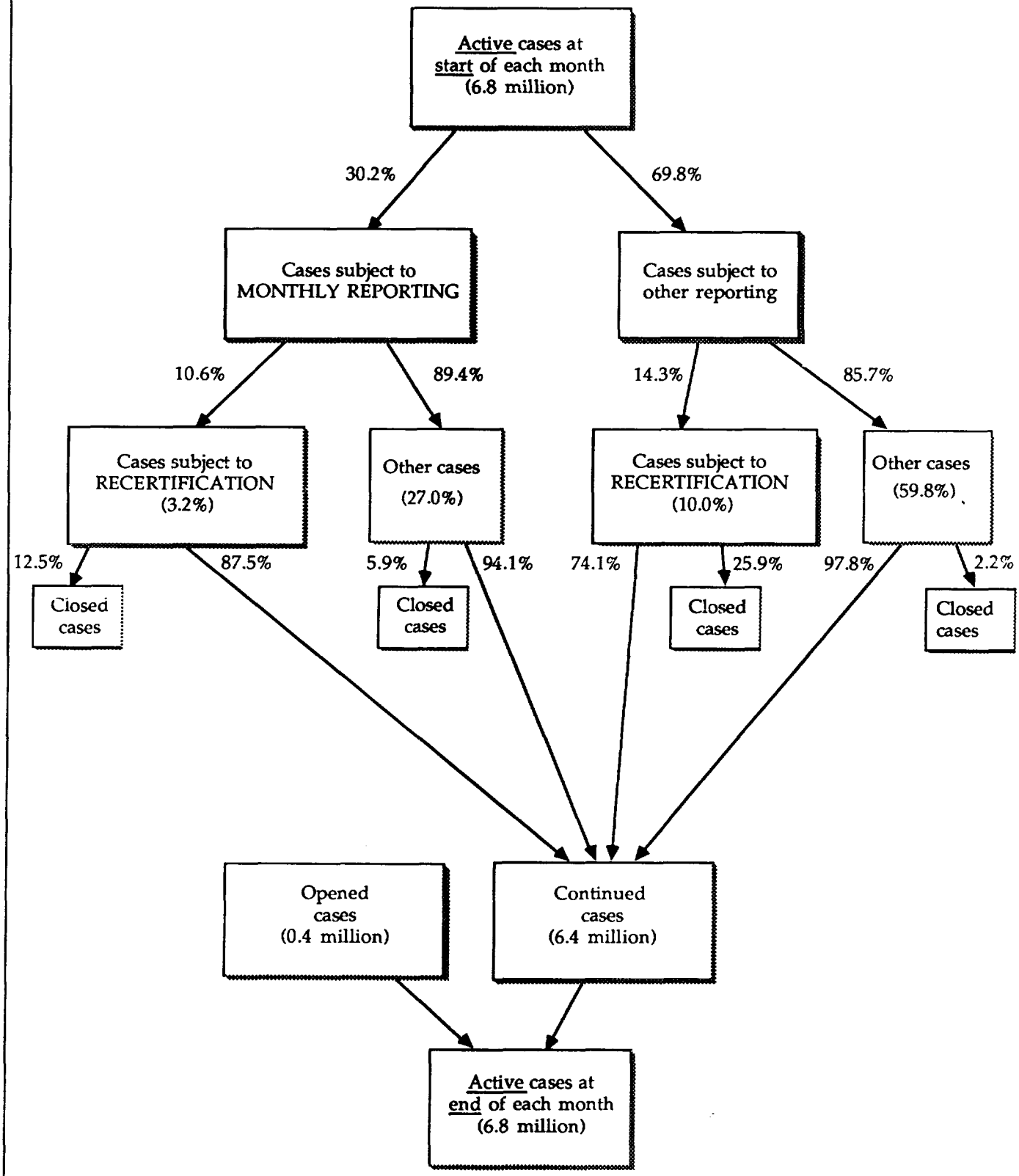

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EXHIBIT 2.7

ESTIMATED ERROR INTRODUCTION RATES, BY CASELOAD SUBGROUP, FISCAL YEAR 1986

	Cases subject to recertification	Other cases	Total cases
	Distribution of correct cases (%)		
Cases subject to monthly reporting	3.2	26.2	29.4
Cases subject to other reporting	10.0	60.6	70.6
Total cases	13.2	86.8	100.0
	Error introduction rate (%)*		
Cases subject to monthly reporting	4.3	3.2	3.3
Cases subject to other reporting	2.3	1.6	1.7
Total cases	2.7	2.1	2.2

*For any given month, the percentage of correct cases (correctly paid or underpaid) that become overpaid in the following month.

those of the nonmonthly reporters--4.3 versus 2.3 percent for those subject to recertification, and 3.2 versus 1.6 percent for those not subject to recertification. The observed pattern presumably reflects the differences in demographic characteristics between the four caseload subgroups. Those cases that are assigned to monthly reporting, or those cases subject to more frequent recertification (the latter disproportionately represented among those who in any given month are subject to recertification), tend to be cases with relatively unstable household circumstances. The cross-tabulation in Exhibit 2.7 may thus simply reflect the higher frequency of client changes among the households subject to monthly reporting or undergoing recertification. This points clearly to the need to control for caseload demographics in any subsequent analysis.

The corresponding pattern of error correction rates is shown in Exhibit 2.8. Recall that the error correction rate is the percentage of overpaid cases that are not overpaid the following month, as a result of either benefit adjustment or closure. Here, the rates show a plausible relationship to each other, perhaps less confounded by caseload demographics. The highest error correction rate is the estimated 59.0 percent for nonmonthly reporters who are subject to recertification. This figure might be viewed as surprisingly low, since it implies that 41.0 percent of the errors among nonmonthly reporters are not corrected at recertification. However, in contrast, the error correction rate is only 5.6 percent for cases neither assigned to monthly reporting nor undergoing recertification, and thus subject to other interim maintenance. Viewed from this perspective, a recertification increases by more than ten-fold the chances of correcting a pre-existing error in a nonmonthly reporting case.

For monthly reporters, the error correction rate is 24.3 percent for cases subject to recertification, not much higher than the 19.8 percent for those not undergoing recertification. The relatively modest effect of a recertification for such cases may simply indicate that a client is unlikely to report correct information during a recertification, if such information has already been inadvertantly misreported or knowingly withheld in prior monthly reports.

Among error cases not subject to recertification, the 19.8 percent error correction rate for monthly reporters is significantly higher than the

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EXHIBIT 2.8

**ESTIMATED ERROR CORRECTION RATES,
BY CASELOAD SUBGROUP,
FISCAL YEAR 1986**

	Cases subject to recertification	Other cases	Total cases
	Distribution of error cases (%)		
Cases subject to monthly reporting	3.5	31.4	34.9
Cases subject to other reporting	9.9	55.2	65.1
Total cases	13.4	86.6	100.0
	Error correction rate (%)*		
Cases subject to monthly reporting	24.3	19.8	20.3
Cases subject to other reporting	59.0	5.6	13.7
Total cases	49.9	10.8	16.0

*For any given month, the percentage of overpaid cases that become correct cases (correctly paid or underpaid) or closed cases in the following month.

5.6 percent cited above for nonmonthly reporters. This differential has several possible explanations. One is that monthly reporting indeed induces better client reporting of household changes, even though a delay in accurate reporting may already have caused an error to occur. Second, a monthly reporting household that experiences no change in circumstances might nonetheless misreport information on a single monthly report, causing an error one month that is corrected in the next. Third, monthly reporting error cases may opt not to file their report a month or more after experiencing a change that would disqualify the household, thus causing an error case to terminate for procedural reasons. Fourth, monthly reporting error cases may experience more self-correcting changes in circumstances such as a loss of unreported part-time earnings. Finally, computer wage matching or other agency-initiated efforts at error detection may have their effects disproportionately in correcting errors among monthly reporting cases.

Notwithstanding these caveats, the foregoing estimates suggest that both recertification and monthly reporting enhance the probability of error correction. While these administrative procedures also appear to increase the rate of error introduction, this latter finding may simply indicate that agencies currently apply these administrative procedures to the more error-prone cases, whose circumstances are expected to change. Until the assumption of case homogeneity can be tested, the model's predictions must be interpreted with caution. In the preliminary simulations reported below, it is assumed that an increase in the frequency of recertification or the coverage of monthly reporting will alter the caseload-wide error correction rate, but neither the caseload-wide error introduction rate nor the case closure rate.

Exhibits 2.9 and 2.10 are branching diagrams that highlight the derivation of the caseload-wide rates of error introduction and error correction, respectively. As in previous diagrams, the percentages sum to one at each branch.

Exhibit 2.11 shows preliminary estimates of the effect on the expected error rate of assumed increases in either the monthly percentage of cases subject to recertification or the percentage of cases assigned to monthly reporting. For either, a proportional change of as much as 50 percent yields a 1 to 2 percentage point drop in the expected case error rate, from

Exhibit 2.9

MONTHLY ERROR INTRODUCTION, FISCAL YEAR 1986

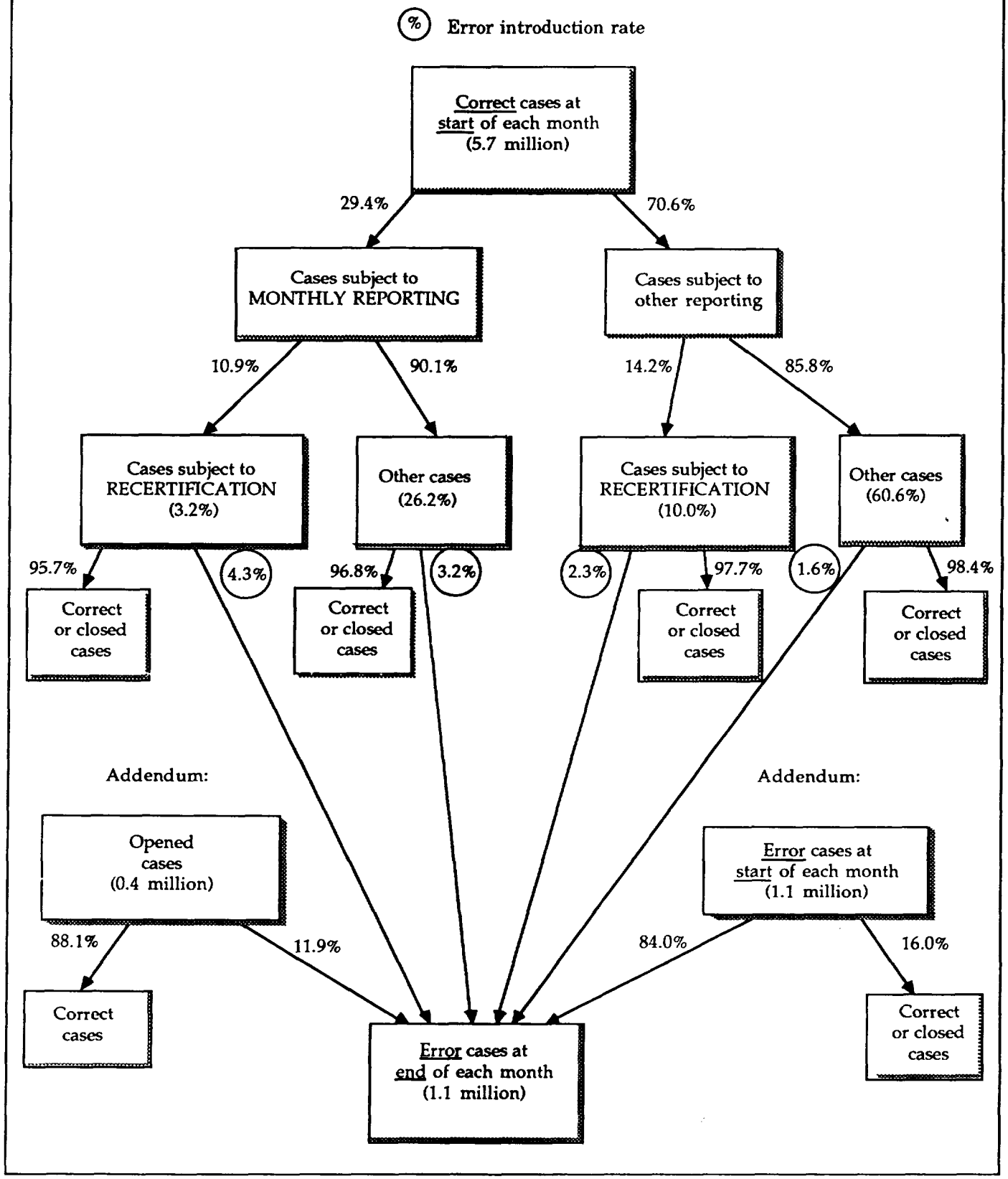

Exhibit 2.10

MONTHLY ERROR CORRECTION, FISCAL YEAR 1986

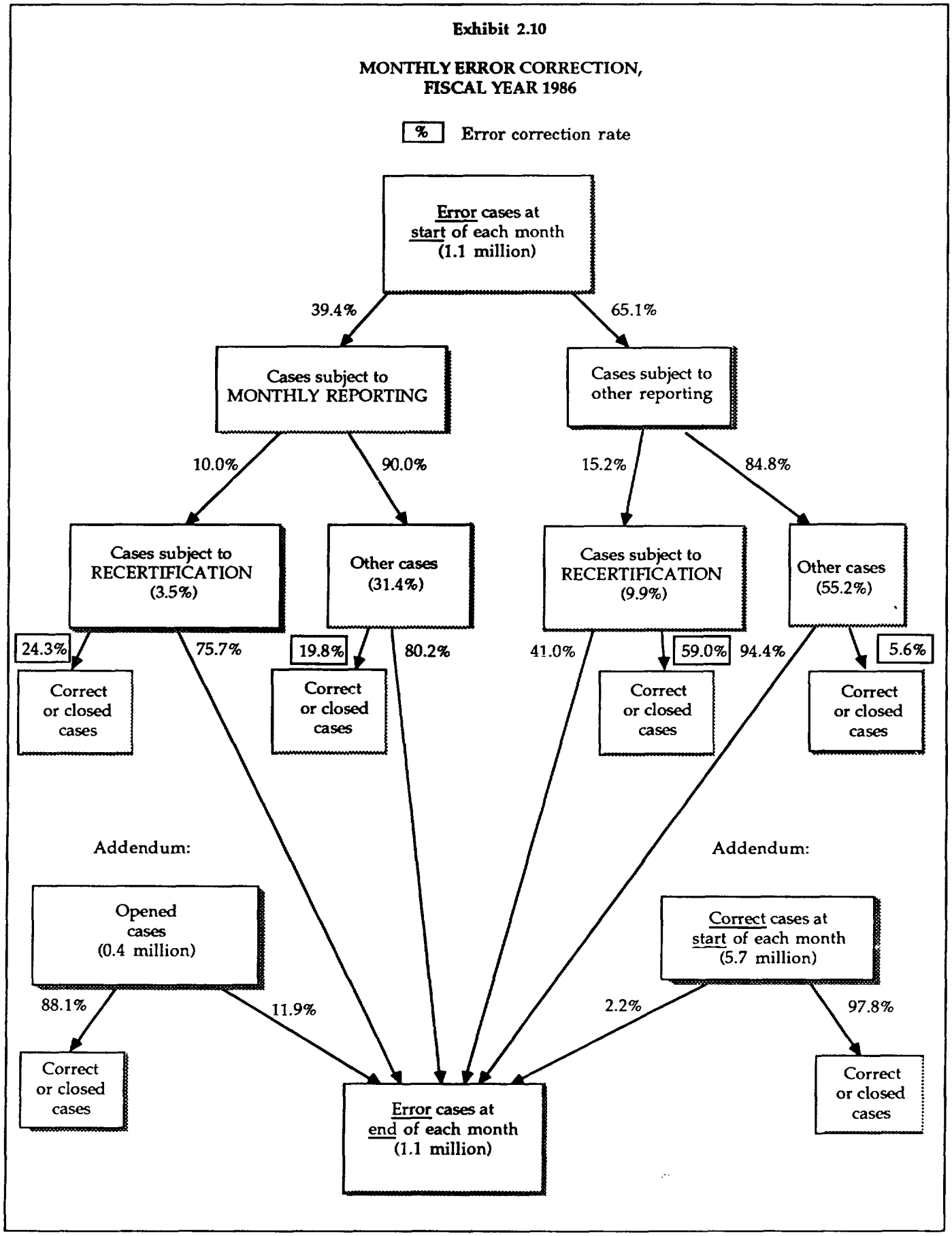

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EXHIBIT 2.11

EXPECTED CASE ERROR RATE UNDER DIFFERENT ADMINISTRATIVE SCENARIOS

Assumed administrative scenario	Expected case error rate[a]
Percentage of cases subject to recertification in any given month[b]	
No change (at 13.2%)	15.9%
25% increase (to 16.5%)	14.8%
50% increase (to 19.8%)	13.9%
Percentage of cases subject to monthly reporting in any given month[c]	
No change (at 30.2%)	15.9%
25% increase (to 37.8%)	15.3%
50% increase (to 45.3%)	14.6%

[a]Assuming no change in the error introduction rate or the case closure rate.

[b]Assuming no change in the percentage of cases subject to monthly reporting.

[c]Assuming no change in the percentage of cases subject to recertification.

its current level of 15.9 percent.[1] For either recertification or monthly reporting, such a change would entail a dramatic increase in administrative costs. While the estimated reduction in the error rate may seem modest, such a drop in the case error rate is roughly equivalent to the historical decline of 1.5 percentage points that occurred between 1982 and 1986.

Recognizing that these findings are very preliminary, one must still wonder why the error rate is so seemingly resistant to improvement through the kinds of administrative action examined here. The answer appears to lie in the fact that any given administrative measure affects only a very small cross-section of cases in any month. For instance, the degree of monthly turnover in the caseload is small enough (5.9 percent) that improvements in the intake error rate do not dramatically influence the caseload-wide error rate. In a situation of higher turnover, the overall error rate would be more sensitive to the error rate among opening cases.

With respect to recertification, it is estimated here that 13.2 percent of active cases undergo recertification in any month. Thus, even if the monthly volume of recertifications is increased by fully one-half, the change affects only one in every fifteen cases during any month. Moreover, for monthly reporting cases (30.2 percent of all active cases and 34.9 percent of error cases), a recertification is not much more effective in correcting error than the monthly report itself.

The effect of more frequent recertification is conservatively estimated, to the extent that it presumes an across-the-board, proportional reduction in the length of certification periods for all cases. (For example, an increase of 50 percent in the monthly share of cases subject to recertification would require a 33 percent reduction in certification periods.) However, there are clearly some cases whose circumstances are so stable that their certification periods should not be changed, while other types of cases are so error-prone that their certification periods should be disproportionately reduced. Any such targeting of the increased administrative effort

[1]The same can be said of the intake error rate; a drop from the current 11.9 percent to 6.0 percent yields an estimated drop in the expected case error rate from 15.9 percent to 14.0 percent. A change of this magnitude in the case error rate would correspond to a drop of about 1 percentage point in the dollar error rate for overpayment, from about 8 percent to 7 percent.

would enable a greater reduction in the error rate than is currently estimated.

Similar issues arise with increased use of monthly reporting. For instance, if monthly reporting coverage is expanded by one-half, a very substantial administrative change, only about one in six cases will be affected. While the error correction rate during the interim months of a certification period is indeed much higher for monthly reporting than for other interim maintenance (19.8 percent versus 5.6 percent), this appears to be largely offset by the lower effectiveness of recertifications among monthly reporters. For instance, based on the parameter values estimated here, the cumulative probability that an error remains uncorrected in the course of a six-month certification period is nearly as high for a monthly reporter (27 percent) as it is for a nonmonthly reporter (31 percent).

These findings raise questions about the sources of the decline in error rates that occurred in the early 1980s. During this period, the State-reported case error rate for ineligibility and overissuance dropped from above 18 percent to its current level of 16 percent. How does one reconcile this historical decline with the finding that substantial increases in the frequency of recertification or the use of monthly reporting would be required to achieve a further 1 to 2 percentage point reduction in the case error rate?

Several explanations might be offered. First, the error rate in 1980 may have reflected a substantial amount of readily-correctable agency error. Having successfully reduced these errors, what now remains are the less tractable kinds of error, notably client misreporting. Second, some amount of the error reduction that occurred during the early 1980s may be attributable to the changes in program policy that reduced the caseload share comprised by more error-prone cases, such as those with earned income. Third, improvements may have occurred during this earlier period in the error correction rate for recertification. For instance, in 1980 recertifications may only have been effective enough to correct one-third of the errors among nonmonthly reporting cases subject to recertification, rather than the currently estimated 59 percent. Such an administrative improvement would by itself explain the observed drop in the case error rate. Finally, there was a substantial increase during this period in the percentage of cases subject to monthly reporting, from less than 10 percent to more than 30 percent--in the terms of this study, a proportional increase of more than 200 percent.

Viewed otherwise, the decade of the 1980s is a period during which administrative costs in the Food Stamp Program have increased by perhaps 50 percent or more on an inflation-adjusted case-month basis. With threatened federal liabilities for overpayment and increased State attention to corrective action, one might more appropriately ask why the national error rate has come down so little. The analysis here provides some insight. While the error rate is indeed responsive to corrective actions, any appreciable reductions in error appear to require sizeable changes in administrative procedure.

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APPENDIX A:

MODELLING APPROACH

This research focuses on the State-reported case error rate for overpayment, the percentage of active cases found by State QC reviewers to be either ineligible or overissued. This error measure is closely correlated with the regressed dollar error rate that expresses issuances to ineligible cases and overissuances to eligible cases as a percentage of total issuances (and also reflects adjustments for federal re-review findings and sample noncompletion). Interstate differences in the reported case error rate explain nearly two-thirds of the interstate variation in the regressed dollar error rate. (In fiscal year 1986, the simple correlation between the two error rates was .809.) As detailed in Exhibit A.1, the arithmetic relationship between each State's reported case error rate and its regressed dollar error rate is as follows:

$$\left[\begin{array}{l}\text{reported}\\ \text{case}\\ \text{error}\\ \text{rate}\end{array}\right] \times \left[\begin{array}{l}\text{average}\\ \underline{\text{error}}\\ \text{average}\\ \text{issuance}\end{array}\right] + \begin{array}{c}\text{federal}\\ \text{re-review}\\ \text{adjustment}\end{array} + \begin{array}{c}\text{sample}\\ \text{noncompletion}\\ \text{adjustment}\end{array} = \begin{array}{c}\text{regressed}\\ \text{dollar}\\ \text{error}\\ \text{rate}\end{array}$$

A.1 General Features of the Error Rate Model

The annual case error rate for overpayment is the cross-sectional outcome of month-to-month household movement among three categories of "payment status":

- correct cases--active cases that are either correctly paid or eligible but underissued;[1]
- error cases--active cases that are either ineligible or eligible but overissued; and
- nonrecipient households.

[1]Note that the term "correct cases" thus refers to active cases that are not overpaid. This includes not only those that are correctly paid but also those that are underissued.

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EXHIBIT A.1

REGRESSED DOLLAR ERROR RATE FOR INELIGIBILITY AND OVERISSUANCE, BY STATE FOR FISCAL YEAR 1986

	Reported case error	Average error/ average	Federal re-review and noncompletion	Regressed dollar error
	[Col. 1	x Col. 2]	+ Col. 3	= Col. 4
Alabama	21.04	.530	1.48	12.64
Alaska	12.15	.506	.97	7.12
Arizona	15.12	.443	.85	7.55
Arkansas	12.27	.477	.86	6.71
California	15.07	.502	.74	8.31
Colorado	12.63	.371	.60	5.29
Connecticut	11.51	.483	.32	5.88
Delaware	16.29	.386	.23	6.52
Dist. of Col.	15.07	.603	.57	9.66
Florida	14.41	.403	.14	5.95
Georgia	20.34	.491	3.44	13.43
Guam	12.75	.311	.00	3.97
Hawaii	9.83	.416	.02	4.11
Idaho	12.17	.319	.58	4.46
Illinois	19.29	.431	.87	9.19
Indiana	22.32	.432	.31	9.96
Iowa	14.24	.435	.06	6.25
Kansas	13.19	.455	.16	6.16
Kentucky	10.83	.331	.52	4.10
Louisiana	20.28	.410	1.86	10.18
Maine	11.19	.454	.50	5.54
Maryland	17.42	.464	-.03	8.06
Massachusetts	13.15	.433	5.85	11.54
Michigan	16.35	.458	1.25	8.74
Minnesota	16.79	.483	.77	8.88
Mississippi	19.87	.359	.69	7.82
Missouri	12.45	.435	-.01	5.41
Montana	16.34	.512	-.05	8.31
Nebraska	14.35	.448	.10	6.53
Nevada	4.58	.485	.60	2.82
New Hampshire	10.45	.375	.10	4.02
New Jersey	15.04	.502	-.10	7.45
New Mexico	20.86	.462	.78	10.41
New York	13.72	.524	.85	8.04
North Carolina	10.77	.402	1.50	5.83

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EXHIBIT A.1 (continued)

State	Reported case error rate[a]	Average error/ average issuance	Federal re-review and noncompletion adjustments[b]	Official payment error rate[b]
	[Col. 1 x	Col. 2]	+ Col. 3	= Col. 4
North Dakota	5.79	.313	.32	2.13
Ohio	18.17	.428	.56	8.33
Oklahoma	24.62	.435	-.70	10.01
Oregon	13.70	.472	1.95	8.41
Pennsylvania	13.36	.418	1.17	6.75
Rhode Island	13.04	.482	-.35	5.93
South Carolina	27.57	.446	-.59	11.71
South Dakota	11.04	.380	-.68	3.51
Tennessee	12.25	.425	.82	6.03
Texas	18.54	.422	1.09	8.91
Utah	9.29	.510	.05	4.79
Vermont	11.33	.498	1.25	6.89
Virgin Islands	23.83	.408	-.56	9.15
Virginia	12.36	.441	.43	5.88
Washington	13.70	.639	2.13	9.99
West Virginia	14.40	.353	.53	5.62
Wisconsin	18.85	.541	.12	10.31
Wyoming	14.86	.385	.49	6.21
Total	16.03	.452	.89	8.13

[a]Percentage of total active cases.

[b]Percentage of total issuances.

SOURCE: U.S. Department of Agriculture, Food and Nutrition Service, "Food Stamp Quality Control Annual Report, Fiscal Year 1986," September 1987.

If administrative changes such as more frequent recertification or more extensive use of monthly reporting are to affect overpayment error, it is by altering the month-to-month flow of households between categories of payment status and thus shifting the cross-sectional distribution of households among these categories.

The case error rate is an aggregate measure, to the extent that it summarizes the payment status of the entire active caseload, as observed in a cross-sectional sample. However, one can better explain the case error rate--and better understand the role played by administrative procedures--by considering the case error rate as the collective outcome of numerous monthly events. For each case, the monthly events occur in a predictable sequence, as follows.

Initial certification. The first type of event is an initial certification, whereby the household moves from the nonrecipient population to the active caseload, becoming either a correct case or an error case. In the process of initial certification, the food stamp agency assigns the following to the case:

- a coupon allotment, that may be correct or in error;
- an interim maintenance procedure by which the client is to report household changes that might alter the allotment amount (most notably, either mandatory monthly reporting or some other procedure involving less frequent "periodic" reporting or voluntary "change" reporting); and
- a certification period that limits the receipt of benefits to a prescribed number of months, during which time the initial coupon allotment will be subject to change according to the interim maintenance procedure, and after which time the household can continue to participate in the program only if it receives a recertification.

The interim maintenance procedure and the certification period are not assigned independently. Most importantly, if a case is assigned to a mandatory monthly reporting procedure, the case will typically be assigned a longer certification period.

Interim maintenance. The second type of monthly event is a change in payment status occurring in the midst of a certification period, while the

case is subject to its interim maintenance procedure. Such events reflect several sets of factors:

- the stability of case circumstances, as to household composition, resources, income, and expenses;
- the accuracy of client reporting; and
- the extent of agency efforts to detect unreported household circumstances (as through computer matches) and the correctness of agency action in responding to client-reported changes in circumstances.

Such changes may occur with cases remaining active, while shifting from correct to error status or vice versa. Alternatively, changes may involve movement off the active caseload, from correct or error case to nonrecipient household.

Recertification. The third type of monthly event is a change in payment status occurring at recertification. Since the month of recertification is also a month in which the case remains subject to its interim maintenance procedure, the above sets of factors remain relevant. In addition, there are the administrative measures that constitute the recertification process, including a client interview, verification of case information, and review of the applicable program policies.

When each case is viewed as proceeding through such a sequence, it should be apparent that its payment status in any month will be a cumulative outcome of all previous payment events. Most importantly, the payment status of ongoing active cases is affected not simply by the administrative process specific to the month of observation. Rather, the status is conditional upon the preceding sequence of events. For instance, if two active cases are each observed three months after initial certification, where one was in error at initial certification and the other was not, we expect a higher probability of error in the third month for the case that was initially in error, all other things equal.

If administrative changes are to reduce error, they must necessarily do so either by preventing errors from occurring or by promptly correcting errors once they do occur. Error prevention serves to stem the flow of nonrecipient households or correct cases into the error category. This can be

done through improved intake procedures, ensuring that ineligible households do not enter the caseload and that eligible households are correctly certified. Errors are also prevented by systematic procedures--such as monthly reporting--that promote client reporting of household changes as they occur, coupled with prompt agency action to adjust the benefit prior to any occurrence of error. Among public assistance (PA) food stamp cases, error prevention is also served by timely adjustment of the food stamp benefit in response to any changes in PA benefits.

The correction of existing errors, on the other hand, is reflected in error cases becoming either correct cases or nonrecipient households. Some amount of error correction may occur even without agency action, as error cases voluntarily withdraw from the program, allow their certification to expire, or experience a "self-correcting" change in household circumstances (such as the loss of an unreported part-time job). More importantly, however, error correction is promoted by administrative procedures that serve to detect errors and enable the benefit to be adjusted or the case to be closed more promptly after errors occur. Such procedures include recertifications conducted more frequently or more intensively. In addition, error correction can occur through computer matching of wage data or other automated information.

The pattern of household movement that underlies the error rate can be characterized as follows. From one month to the next, any of the following events can occur:

- correct cases either remain so, become error cases, or become nonrecipient households;
- error cases either remain so, become correct cases, or become nonrecipient households; and
- nonrecipient households either remain so, become correct cases, or become error cases.

These household flows can be logically linked to administrative procedures in the following fashion. The movement of nonrecipient households will be influenced by the process of initial certification. The movement of active cases will be affected by the processes of interim maintenance and recertification, according to the percentage of cases that are subject to these respective processes in any month. For the purposes of this study,

procedures for interim maintenance are separated into "monthly reporting" and "other reporting."

In any month, the cross-sectional distribution of households across the three categories will depend on the following:

- the prior-month distribution of households; and
- for each category, the monthly transition probabilities that households will either retain their status or shift to one of the other two categories.

If the latter set of transition probabilities is stable over time, the cross-sectional distribution of households can be shown to approach an eventual steady state. In this steady state, there is no month-to-month change in the percentage of active cases that are in error (the case error rate) or the percentage of total households that are active cases (termed here the "program activity rate"). Perhaps surprisingly, the expected eventual distribution of households is independent of the initial distribution. The specific conditions of this expected distribution are derived below, with the aid of some notation and under the simplifying assumption that the total household population remains constant over time.

A.2 Derivation of the Expected Error Rate

The number of error cases at the start of each month t will be represented by E_t. Similarly, C_t and N_t will indicate the start-of-the-month number of correct cases and nonrecipient households, respectively. At the start of the month, the case error rate (e_t) equals $E_t/(C_t+E_t)$, and the program activity rate (a_t) equals $(C_t + E_t)/(C_t + E_t + N_t)$. In general, the conditional probability that households in category X at the start of one month will occupy category Y at the start of the next month will be represented by pXY (where pXX indicates the conditional probability of remaining in category X). One can thus express the cross-sectional "stock" of error cases in terms of the contributing household "flows" during the preceding month, as follows:

$$E_t = (C_{t-1})(pCE) + (E_{t-1})(pEE) + (N_{t-1})(pNE)$$

The steady-state condition is that $E_t=E_{t-1}$, implying that:

$$(E_{t-1})(1-pEE) = (C_{t-1})(pCE) + (N_{t-1})(pNE)$$

This relationship can be interpreted as follows. The left-hand side is the number of cases that have just left error status during the prior month--i.e., the prior-month number of error cases multiplied by the "error correction rate." The latter term (1-pEE) is the probability that a case in error one month will either be closed or will become a correct active case the following month. The right-hand side of the equation is the number of cases that have just entered error status during the prior month. The first term is the prior-month number of correct cases multiplied by the "error introduction rate." The latter transition rate (pCE) indicates the probability that a case not in error one month will become in error the following month. The equation thus simply expresses a necessary condition of the steady state--that in any month the number of "arriving" and "departing" error cases must be equal.

Dividing the above equation by the number of active cases at the start of the prior month ($C_{t-1}+E_{t-1}$), and letting e and a represent the expected steady-state values of the case error rate and the program activity rate, respectively, then:

$$(e)(1-pEE) = (1-e)(pCE) + [(1-a)/a](pNE)$$

The following equation for the "expected error rate" can then be derived:

$$e = \frac{[(1-a)/a](pNE) + pCE}{(1-pEE) + pCE} \qquad \text{[Equation 1]}$$

One can simplify the first term of the numerator above, in which (1-a)/a equals the expected ratio of nonrecipient households to active cases and pNE equals the conditional probability that nonrecipient households become error cases by being initially certified in error. The product of these two is the fraction of all active cases that have just been initially certified in error. This can be re-expressed as the product of the percentage of active cases that have just been initially certified or reopened (the "intake portion of the caseload," or b) and the case error rate at initial certification or reopening (the "intake error rate," or e^0). We thus have:

$$e = \frac{be^0 + pCE}{(1-pEE) + pCE} \qquad \text{[Equation 2]}$$

$$= \frac{\begin{array}{c}\text{intake} \\ \text{portion} \\ \text{of caseload}\end{array} \times \begin{array}{c}\text{intake} \\ \text{error rate}\end{array} + \begin{array}{c}\text{error} \\ \text{introduction} \\ \text{rate}\end{array}}{\begin{array}{c}\text{error} \\ \text{correction} \\ \text{rate}\end{array} + \begin{array}{c}\text{error} \\ \text{introduction} \\ \text{rate}\end{array}}$$

This expected relationship, whose parameters can be estimated from current quality control data, is the basis of the error rate analysis presented in this report. The derived expression provides a yardstick by which alternative administrative practices can be compared. Because the expected error rate is not conditional upon the initial error rate, as noted earlier, the expected outcome of a new administrative procedure will be independent of the error rate prevailing at the time it is implemented. In addition, one's assessment will be placed in the appropriate framework of a system's long-term performance. As one might expect, implemented changes do not cause abrupt shifts in the error rate, but have their full effects only after a transitional period. For instance, a change in recertification procedure will take time to work its way through the caseload, as cases progressively "age" and then become subject to the new procedure only at the close of their current certification period.

The specific form of the expected error rate equation makes intuitive sense, in the following respects. The expected error rate will be reduced with lower values of either the intake error rate or the error introduction rate, or with higher values of the error correction rate. It is possible to compute the "elasticity" of the error rate with respect to changes in either of the three parameters, indicating the percentage change in the error rate corresponding to a percentage change in the particular parameter. These elasticities are as follows:

with respect to the intake error rate--

$$\frac{be^0}{be^0 + pCE}$$

with respect to the error introduction rate--

$$\frac{(1-e)pCE}{be^0 + pCE}$$

with respect to the error correction rate--

$$\frac{-e(1-pEE)}{be^0 + pCE}$$

As implied above, the first two of these elasticities each has positive sign, while the third is negative. One can also demonstrate that the absolute value of the third equals the sum of the first two, indicating that the expected error rate is more sensitive to a proportional reduction in the error correction rate than it is to an equivalent proportional increase in either the intake error rate or the error introduction rate.

Bear in mind that the elasticities for the error introduction rate and the error correction rate assume that the rate of case closure is unaffected by whatever administrative action causes the basic parameter to shift. Such a scenario would occur, for instance, if the error correction rate rose due to overissued cases receiving benefit adjustments more promptly. If, in contrast, the error correction rate rose due to ineligible cases being discovered and closed more readily, thus causing the closure rate to increase, the case error rate would decline less than in first scenario. One should hasten to add, however, that the program activity rate would be lower than in the first scenario, as a result of the higher rate of closure. This serves to illustrate that the error rate should not be the sole criterion for evaluating corrective actions. One should also consider the impact on the size of the caseload.

Several other relationships deserve mention. As one expects, the effect of a lower intake error rate will depend on the extent to which the caseload is comprised of newly-certified cases. Also, a by-product of estimating the error correction rate is that the inverse of this parameter value indicates the expected number of months between an error's occurrence and its correction through either benefit adjustment or closure.

One important caveat must be made with respect to the predictive use of the above-derived equation for the expected error rate. Predictions based

on the above expression would assume the intake portion of the caseload (the parameter b) to be unaffected by the administrative change. In fact, however, if an administrative change increases case closures, the parameter b will increase. Specifically, a higher rate of case closure will cause the monthly cohort of entering (or reopening) cases to comprise a higher portion of the active caseload. Thus, while the above equation is correct as a descriptive expression, it understates the error rate that would result from a change in administrative procedure that increases case closures. Because this would be expected for either more frequent recertification or more extensive use of monthly reporting, the model is developed further below to incorporate the closure rate explicitly.

As it turns out, the more generalized, "predictive" equation for the expected error rate differs from its descriptive counterpart (Equation 2) only in that the closure rate (the percentage of the start-of-the-month caseload that closes during the month, or k) is substituted for the intake portion of the caseload (b) in the numerator. This is shown below, by returning to Equation 1 and demonstrating that the first term in the numerator, $[(1-a)/a](pNE)$, simply equals ke^0.

As indicated earlier, a stable process of monthly transition will eventually lead the system to a steady state in which both the program activity rate and the case error rate remain unchanged. In the context of a stable household population, this means that the absolute number of total households that participate in the program approaches a steady-state value. A constant caseload size implies that the monthly number of closures equals the monthly number of initial certifications. Stated otherwise, the product of the closure rate (k) and the program activity rate (a) equals the product of the "intake rate" (i) and the complement of the program activity rate (1-a). The intake rate is defined here as the monthly percentage of nonrecipient households that become newly-certified cases. This balance between monthly openings and closings allows the expected steady-state value of the program activity rate to be expressed as a function of the intake and closure rates, as follows.

$$ka = i(1-a)$$

$$a(i+k) = i$$

$$a = \frac{i}{i + k} \qquad \text{[Equation 3]}$$

One can thus show that (1-a)/a equals k/i. Since pNE/i equals e^0, it follows that [(1-a)/a](pNE) equals ke^0. Substituting this term in Equation 1 then leads to the "predictive" form of the expected error rate:

$$e = \frac{ke^0 + pCE}{(1-pEE) + pCE} \qquad \text{[Equation 4]}$$

$$= \frac{\text{case closure rate} \times \text{intake error rate} + \text{error introduction rate}}{\text{error correction rate} + \text{error introduction rate}}$$

As will be discussed below, the case closure rate can not be explicity modeled using the quality control data, because case closures are not observed in the data. However, if the caseload can be considered currently in steady state, the monthly closure rate equals the observed intake portion of the caseload.

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APPENDIX B:

ESTIMATION PROCEDURE

This appendix discusses the technical approach and the data sources used to estimate the model described in Appendix A.

B.1 Estimating the Parameters of the Error Rate Model

Consider that households in the U.S. are distributed in any month within the following matrix, with respect to their status as food stamp recipients or nonrecipients in the current month (t) and the previous month (t-1):

		Payment status at start of month t			
		Correct cases	Error cases	Nonrecipient households	Total
Payment status at start of month t-1	Correct cases	xCC*	xCE	xCN*	C_{t-1} [$=C_t$]
	Error cases	xEC*	xEE	xEN*	E_{t-1} [$=E_t$]
	Non-recipient households	xNC	xNE	xNN	N_{t-1} [$=N_t$]
	Total	C_t	E_t	N_t	H_{t-1} [$=H_t$]

*Unobserved.

As indicated in the matrix, each row total is assumed to equal its corresponding column total, so that the distribution of households across the three categories (and the total number of households) remains unchanged from one month to the next. Under this assumption, the case error rate is in a steady state [at the value e=C/(C+E)], as is the program activity rate [at the value a=(C+E)/H].

As shown below, the parameters of the steady-state expressions for both the case error rate and the program activity rate can be estimated from the entries in the above matrix. The following entries are observed in the national quality control data, on an average monthly basis for a fiscal year:

the total monthly number of correct cases (C_t);

the total monthly number of error cases (E_t);

the monthly number of correct cases that have just been initially certified or reopened (xNC);

the monthly number of error cases that have just been initially certified or reopened (xNE);

the monthly number of error cases that were not in error during the previous month (xCE); and

the monthly number of error cases that were in error during the previous month (xEE).

The latter four are observed on the basis of information recorded on the quality control review schedule as to the nature and timing of the most recent case action and (for error cases) the timing of error occurrence. However, because the quality control data contain no information on the prior payment status of cases that are currently correct, the entries xCC and xEC are unobserved. Similarly, because case closures are not observed in the quality control data, neither xCN nor xEN can be derived.

The entries N_t and xNN can be derived if one has an estimate of the total number of households (H_t), defined in such a fashion as to be consistent with the assumption of a stable month-to-month population. Because the total U.S. household population rises appreciably each year, at a trend rate of 1.4 percent per year during 1982-1987, a somewhat more restrictive, income-based household definition was adopted--those whose annual Census money income in the previous calendar year was less than $50,000, in constant (1986) dollars. This defined population has remained more nearly stable during the last five years, with an annualized growth rate of only 0.4 percent during 1982-1987. See Exhibit B.1.

The basic parameters of the expected error rate are estimated as follows:

the intake portion of the caseload (b) is computed directly as $(xNC+xNE)/(C_t+E_t)$;

the intake error rate (e^0) is computed directly as the fraction xNE/(xNC+xNE);

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EXHIBIT B.1

U.S. HOUSEHOLD POPULATION, 1980 TO 1987[a]

Month and year	Total households	Households with prior-year income under $50,000[b]
	Households, in millions	
March 1980	80.830	69.352
March 1981	82.423	71.955
March 1982	83.583	73.219
March 1983	83.976	73.395
March 1984	85.350	73.828
March 1985	86.851	74.121
March 1986	88.520	74.976
March 1987	89.543	74.500

[a]Includes the 50 States, District of Columbia, Guam, and the Virgin Islands. Data for Guam and the Virgin Islands have been estimated on the basis of July resident population, the number of persons per household in the 1980 Census, and the income distribution reported for the 50 States and the District of Columbia.

[b]Census money income in constant (1986) dollars, for the previous calendar year.

SOURCES: U.S. Department of Commerce, Bureau of the Census--"Estimates of the Population of Puerto Rico and the Outlying Areas: 1980 to 1986," Series P-25, Number 1009, July 1986; "Households, Families, Marital Status, and Living Arrangements: March 1987 (Advance Report)," Series P-20, Number 417, August 1987; "Money Income and Poverty Status of Families and Persons in the United States: 1986," Series P-60, Number 157, July 1987; and "Statistical Abstract of the United States," 1987.

the error introduction rate (pCE) is derived, on the basis of the steady-state assumptions, as xCE/C_t; and

the error correction rate (1-pEE) is derived, on the basis of the steady-state assumptions, as $1-(xEE/E_t)$.

The latter two derivations require some explanation. For the error introduction rate, recall that this parameter indicates the percentage of cases not in error one month that become in error the following month. The numerator is directly observed in the quality control data as the monthly number of cases that were both in error for the review month and not in error for the prior month (xCE). The denominator of the fraction, the number of cases that were not in error for the prior month, is not directly observed. However, if the system is in a steady state, the observed number of cases not in error for the prior month equals the unobserved number not in error for the current month (C_t).

For the error correction rate, similar logic applies. This rate can be viewed as the complement of the percentage of cases in error one month that continue in error the following month. The numerator of this error continuation rate, the monthly number of cases in error this month that were also in error last month (xEE), is directly observed, but the denominator, the number of cases that were in error last month, is not. If one assumes a steady state, however, this unobserved number of cases in error last month equals the observed number of cases in error this month (E_t).

Is it reasonable to assume that the case error rate has reached a steady-state level? The most recent national error rate data, for fiscal year 1986, show a State-reported case error rate of 16.03 percent. This 1986 rate is not significantly different from the preceding year's value of 16.28 percent, based on an approximate calculation of the standard errors of the two measures (assuming simple random samples with no stratification). In fact, the error rate has shown little variation since 1984, following implementation of the major legislative changes enacted in 1981 and 1982. See Exhibit B.2.

B.2 Data Sources

Information from the national quality control sample. The primary data source is the fiscal year 1986 Food Stamp quality control sample. The entire national sample consists of 67,000 active cases selected at random and

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EXHIBIT B.2

NATIONAL CASE ERROR RATE FOR INELIGIBILITY AND OVERISSUANCE, FISCAL YEARS 1980 TO 1986

Fiscal year	State-reported case error rate (percentage of cases in error)
1980	18.76
1981	18.61
1982	17.67
1983	16.53
1984	15.94
1985	16.28
1986	16.03

NOTE: The annual error rates for 1980 to 1982 are each a weighted average of semiannual error rates, weighted by the active caseload in each six-month period. Data for Puerto Rico were excluded in these earlier years, to make the estimates consistent with the subsequent data.

SOURCES: U.S. Department of Agriculture, Food and Nutrition Service, "Food Stamp Quality Control Annual Report," for fiscal years 1983 to 1986, and "Semiannual Summary Report of Food Stamp Quality Control Reviews," for fiscal years 1980 to 1982.

reviewed by State quality control reviewers for purposes of estimating annual error rates for each State. The review schedule completed for each case contains basic descriptive information drawn from the case record, as well as the findings of the quality control review. While a subsample of cases is also subject to subsequent federal re-review, the data used here are the original State findings.

The following items, as recorded on the review schedule for all sample cases, are used in this analysis:

the State code (two-digit FIPS code)

the stratum code, for States that draw a stratified sample

the date (month and year) of the quality control review

the date (month, day, and year) of the most recent action completed on the case prior to the review date

the type of most recent action--recorded as follows:

- initial certification
- reopening (following a termination)
- recertification
- monthly report

the number of months in the current certification period

the amount of the monthly coupon allotment

the finding of the quality control review--recorded as follows:

- amount correct
- overissuance
- underissuance
- totally ineligible

In addition, for cases in which the issuance amount for the review month is

Weighting of case observations. The State and stratum codes are used--in conjunction with data supplied by FNS on the caseload universe by State and substate stratum--to construct an appropriate sampling weight for each case observation. The case weight equals the inverse of the sampling fraction for the corresponding stratum (or for the entire State, if the sample is not stratified). Unless otherwise indicated, all estimates reported here are on a weighted basis.

The master file of sample cases for which quality control reviews were completed contains 67,685 households participating in the program during fiscal year 1986. After making the deletions discussed above, the file used to estimate the model includes 63,623 observations. (The single largest category of deleted cases is those initially certified or reopened in the sample month.) The analysis file corresponds to a weighted household count of 6,813,067. While this is somewhat less than other benchmark totals for the caseload universe, it is in large part because of the first-day-of-the-month reference point used here. Specifically, cases whose initial certification (or reopening) occurs after the first day of a month are subject to quality control sampling for that month, but are excluded from this analysis.