FROM: RONALD D. SNEE
366-3951 Engineering Department
Louviers 5185

2/24/84

TO: Karrh

Please return this when you are finished with it. This is another example (recall Hugh Campbell's Tech Review of 2/22/84) of CGP's fine work on environmental problems

Ron

2.27.84.
I'll be interested in EPA's response to Anderson's report
bwk

N33755.01

EN-1028 REV. 5-82

DU PONT
ESTABLISHED 1802
E. I. DU PONT DE NEMOURS & COMPANY
INCORPORATED
WILMINGTON, DELAWARE 19898

ENGINEERING DEPARTMENT
LOUVIERS BUILDING

February 14, 1984

Project Officer for Lead
Environmental Criteria and Assessment Office
U. S. EPA
MD-52
Research Triangle Park, NC 27711

In accordance with 48FR43724 and 48FR56639, E. I. du Pont de Nemours and Company herewith submits comments on External Review Draft No. 1, Air Quality Criteria for Lead, Docket No. ECAO-CD-81-2.

John M. Pierrard
Environmental Manager
Chemicals and Pigments Department
John M. Pierrard

Charles G. Pfeifer
Consultant Statistician
Engineering Department
Charles G. Pfeifer

Ronald D. Snee
Consultant Supervisor
Engineering Department
Ronald D. Snee/mai

N33755.02

TEH 0530003

DUP050030916

DOCUMENT REVIEW FORM

Title/Draft	Return to:
Air Quality Criteria for Lead (External Review Draft #1)	Project Officer for Lead Environmental Criteria and Assessment Office, U.S. EPA MD-52 Research Triangle Park, NC 27711

Commenter/Organization/Address *	Chapter No./Title
John M. Pierrard E. I. du Pont de Nemours and Co., Inc. Wilmington, DE 19898	Chapter 11. Assessment of Lead Exposures and Absorption in Human Populations

RECOMMENDATIONS	Additional Contributors to Document Review (Name and Affiliation)
☐ (1) Acceptable as is ☐ (2) Acceptable after minor revision ☒ (3) Acceptable after major revision ☐ (4) Not acceptable If you have checked either 3 or 4, please specifically state reason(s) in the comments space below. John M. Pierrard 2/14/84 Reviewer's Signature Date	Prof. Richard L. Anderson Statistical Consultant Lexington, KY 40502 Charles G. Pfeifer Ronald D. Snee E. I. du Pont de Nemours and Co., Inc. Wilmington, DE 19898

General Comments (use extra pages if needed, but please be concise)

These comments relate to the treatment of the NHANES II blood lead results and the associated report of the Time Trend Analysis Review Group, and the Billick analysis of blood lead screening data. We are convinced that major changes in the criteria document are required to accurately portray the meanings of these studies. Du Pont has conducted comprehensive separate analyses of the studies and is submitting, as part of this document review, the reports, "Analysis of Reported Blood Lead Level Declines During NHANES II and Their Relationship To The Survey Design and Gasoline Lead Exposure" and "Analysis of a Study by The Department of Housing and Urban Development on Blood Lead Levels of Children in New York City". We are further submitting the report "Comments on January, 1984 Draft of Du Pont's Analysis of Blood Lead Level Declines", by Dr. R. L. Anderson, Professor of Statistics in the Statistics Department and Assistant to the Dean for Statistical Services, College of Agriculture, University of Kentucky, and former President of the American Statistical Association.

*If comments being submitted on behalf of another organization, include that information.

TEH 0530004

DUP050030917

General Comments (Continued)

As noted in our report on the NHANES II blood lead study, we believe that the report of the Time Trend Analysis Review Group leaves the misleading impression that the reported 5-6 μg/dl blood lead decrease actually occurred, whereas our analysis, making use of statistical techniques and site location data beyond those in the analyses reviewed by the Group, shows that up to 70 percent of the reported decline in blood lead levels is explainable by survey demographics.

Our analysis of the NHANES II data and our review of the CDC, NCHS and EPA analyses lead to the further conclusions that (1) the analyses reported by CDC, et al, which formed the basis for the Group review, are flawed by technical error and their conclusions are misleading, (2) national gasoline lead use is an inappropriate measure of gasoline lead exposure; site specific gasoline lead use is more appropriate, (3) when site specific gasoline lead is used as the exposure measure, gasoline lead use accounts for only 0.25 to 0.75 μg/dl of the reported blood lead decline, and (4) factors in addition to differential site demographics and gasoline lead exposure are responsible for some of the reported blood lead decline.

As noted in his review, Prof. Anderson concurs with our findings on the technical errors in the analyses of CDC, et al, as well as the superiority of our analytic approach. The January, 1984 draft of our report, reviewed by Prof. Anderson, contained the identical technical substance as the edited version submitted as part of this review.

For these reasons, we strongly recommend that the Review Group make appropriate amendments to their report after review of our analyses, and that the Criteria Document also be appropriately amended.

Based on Du Pont's analysis of the New York City blood lead study, we conclude that neither HUD's gasoline lead data nor the New York City blood lead data are adequate to determine a meaningful blood lead-gasoline lead relationship. As detailed in our report, we maintain that EPA's reliance on the HUD study is improper because (1) HUD used the wrong data to represent gasoline lead use in New York City, (2) the HUD blood lead data are seriously flawed by sampling irregularities, procedure changes and data handling inconsistencies, (3) HUD's treatment of the blood lead data suffers from serious deficiencies which further contribute to the already formidable difficulties in proper interpretation, (4) HUD's blood lead-gasoline lead relationship is unreliable.

Accordingly, we recommend that the Criteria Document be appropriately amended to more accurately reflect the significant limitations of the Billick studies.

COMMENTS ON JANUARY 1984 DRAFT OF

DUPONT'S ANALYSIS OF BLOOD LEAD LEVEL DECLINES

R. L. Anderson*

1. Model (1) in Section IIIA is better than that presumably used by CDC/EPA, because it includes between site effects of the within site X-variables.

2. The use of a two stage procedure is approved because the between-site X and Z values are orthogonal to the within-site X variables. If we have an X'X matrix as follows:

$$X'X = \left[\begin{array}{c|cc} X_s' X_s & X_s' X_w & X_s' Z_w \\ \hline & X_w' X_w & X_w' Z_w \\ & & Z_w' Z_w \end{array}\right]$$

$X_s' X_w = X_s' Z_w = 0$; therefore, it is permissible to use a two-stage procedure. This two-stage procedure avoids the necessity of using a more complicated weight matrix. The latter would be needed in a single-stage analysis because a two-stage sampling plan involves both within and between site variance components. It is quite possible that the use of between site regression coefficients as well as within site regression coefficients will reduce the size of the trend decline in blood lead levels.

---

*Statistical Consultant, 3349 Braemer Dr., Lexington, Ky. 40502.
February 10, 1984

3. When we now append a vector, say T, for the linear trend to the W-part of the above matrix, we note that $(X_w' T)$ and $(Z_w' T)$ will not be null. It appears from the discussion of the CSMB - procedure that T was not adjusted for X_w and Z_w; if so, the CSMB - procedure probably will produce a biased estimate of the linear time trend of blood lead levels.

On the other hand, the unbiased estimate of this linear time trend by adjusting for $X_w' T$ and $Z_w' T$ (as I presume was done in the CDC/EPA procedure) may not provide an unbiased estimate of the change in blood lead level per unit time. In a multiple regression model with a number of X's and T,

$$EY = \sum_i \beta_i X_i + \beta_t T \hat{=} \sum b_i X_i + b_t T;$$

b_i represents the predicted change in Y when X_i is increased by one unit, provided the other X's remain fixed. Unfortunately in the blood lead problem, if we change T by one unit, many of the X's will change; hence, an unbiased effect of a unit change in time probably is not b_t.

There is no known statistical technique to handle the last problem, but I would examine the X, Z and T vectors to see if it is possible to obtain sets for which the row elements of the (X,Z) vectors are nearly alike. Determine the population weight and the value of b_t for each set. Then weight the b_t's by the population weights. This weighted average b_t should have less bias than the over-all b_t; however, its variance might be increased so much that its mean square error is not improved. This is a problem which should have been understood before the survey design was selected. I believe it would have been possible to select a survey design which would have minimized the bias in b_t as an estimator of the true time trend in blood lead level.

4. An important aspect of this investigation should be an attempt to explain the decline in blood lead levels over time by one or more causitive variables. Time is an innocent surrogate for unidentified causitive variables. One such possible causitive variable is the amount of gas lead explosure. I would hope that something better could be used than site exposure based on National Gas Pb. The site specific variable suggested by the Dupont investigators appears to be more useful. I would like to see how much of the decline in blood lead level can be attributed to this site specific gas lead variable, when the proper adjustment mentioned above for T is used. One computational procedure is to determine the value of b_t after adjustment for gas lead as well as the other site variables.

5. I would also suggest that we analyze gas lead in the same way as blood lead (i.e., gas lead as the dependent variable, y); then perhaps we should consider a canonical correlation between the two regressions. In other words one essentially has three regressions:

$$E(\text{blood lead}) = \Sigma \beta_i X_i + \beta_t T;$$

$$E(\text{gas lead}) = \Sigma \beta_i^* X_i + \beta_t^* T$$

$$E(\text{blood lead}) = \beta E(\text{gas lead}).$$

I am not an expert in multivariable analysis, but it appears we have here two random variables (amount of blood lead and amount of gas lead), with a large number of non-random causitive variables plus T, the surrogate for other unnamed causitive variables. Perhaps there is a better procedure to analyze such data than using multiple regression. I feel that the CDC/EPA report dodges the many important aspects of this problem. I sympathize with anyone who attempts to analyze data based on a poor survey design. I cannot understand why there were not some revisits to the same sites and if possible to the same respondents. I thought that the use of overlapping samples was almost obligatory for detecting time trends (see the work of Kulldorff, among others).

6. In this respect, I was asked to comment on the need to consider the survey design in the analysis. I realize that many of my colleagues would advocate such, but I doubt that the improvement in estimates would even compensate for the added variability induced by the use of estimated weights; for this reason, I applaud the two-step procedure by the Dupont statisticians.

7. Finally, it appears that even with the use of the amount of gas lead in the analysis, there may remain a large unexplained downward trend in blood lead levels. I suggest that the model include a(0,1) dummy variable for before and after the late 1979 regulation. I would also attempt to discover if there were some other variables which might explain some of the extremely high and low blood lead site values (Figure 1, 2 and 3 in Section III).

DOCUMENT REVIEW FORM

<table>
<tr><td>Title/Draft
Air Quality Criteria for Lead
(External Review Draft #1)</td><td>Return to:
Project Officer for Lead
Environmental Criteria and Assessment Office, U.S. EPA
MD-52
Research Triangle Park, NC 27711</td></tr>
<tr><td>Commenter/Organization/Address *
Ronald D. Snee
Charles G. Pfeifer
E. I. du Pont de Nemours and Co., Inc.
Wilmington, DE 19898</td><td>Chapter No./Title
Chapter 11. Assessment of Lead Exposures and Absorption in Human Populations</td></tr>
<tr><td>RECOMMENDATIONS
☐ (1) Acceptable as is
☐ (2) Acceptable after minor revision
☒ (3) Acceptable after major revision
☐ (4) Not acceptable
If you have checked either 3 or 4, please specifically state reason(s) in the comments space below.

Charles G. Pfeifer 2/14/84
Reviewer's Signature Date</td><td>Additional Contributors to Document Review (Name and Affiliation)</td></tr>
</table>

General Comments (use extra pages if needed, but please be concise)

1. Refer to end of Section 11.3.5, page 31.

   Reference to analytical variability and associated impact on misclassifications is important. This discussion needs to be extended to other studies as well. In our comments of January 31, 1983 to David Weil on the December 15, 1982 draft of Chapter 11, we offered a table (Table B.1, page 31) comparing variance components for six studies. We regard such a table and improved discussion of analytical and person-to-person variance components as essential to the Criteria Document. Attached is a copy of this table.

*If comments being submitted on behalf of another organization, include that information.

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General Comments (Continued)

2. Refer to Table 11-62

   Reference is made to Snee, R. D.; Pfeifer, C. (1983) regarding a statistical test that detected no differences among blood lead-air lead slopes over many studies for adult males, adult females and children. This reference is based on our comments of January 31, 1983 to David Weil on the December 15, 1982 draft of Chapter 11. However, in spite of this conclusion, Table 11-62 presents a summary of blood lead-air lead slopes for several studies without putting these slopes in context according to our result. Further, the Roels, et al (1980), and Yankel, et al (1980), are inappropriate for inclusion here because of their inherent problems.

3. Omission

   Charles G. Pfeifer should be included as a member of the Scientific Peer Review Panel and contributor to Chapter 11.

TABLE B1
VARIABILITY SUMMARIES OF BLOOD LEAD VALUES

Study	Geometric Standard Deviation: Overall (1)	Analytical (2)	Person-to-Person (3)	Number of Subjects	Number of Populations
NHANES II	1.365(4)	1.155(5)	1.317		
Azar, et al (1975)	1.354(6) 1.301(7)	1.227(6)	1.250(6) 1.180(8)	149	5
Yankel, et al (1977)	1.293(7)	1.155(9)	1.237	880	7
Tepper and Levin (1975)	1.304(6) 1.313(7)	1.268(6)	1.127(6) 1.143(8)	1935	11
McLaughlin, et al (1973)	1.531(6)	1.493(6)	1.156(6)	217	23
Johnson, et al (1976)	1.549(6)	1.476(6)	1.222(6)	241	6

(1) GSD overall = $\exp[(\sigma_a^2 + \sigma_t^2)^{1/2}]$

(2) GSD analytical = $\exp(\sigma_a)$

(3) GSD person-to-person = $\exp(\sigma_t)$

(4) Computed by Du Pont (see November 12, 1982 letter to Dr. Weil regarding comments on Chapter 11)

(5) Computed from NHANES II blind QC data by Annest, et al

(6) From Lucas (1981)

(7) Pooled from GSD's presented in December 15, 1982 Criteria Document Draft of Chapter 11

(8) Estimated from (6) and (7)

(9) Value obtained from NHANES II and used as a conservative approximation to evaluate the person-to-person component.

ANALYSIS OF REPORTED BLOOD LEAD LEVEL DECLINES DURING NHANES II AND THEIR RELATIONSHIP TO THE SURVEY DESIGN AND GASOLINE LEAD EXPOSURE

by

Charles G. Pfeifer
Engineering Department

John M. Pierrard
Chemicals and Pigments Department

Ronald D. Snee
Engineering Department

February 14, 1984

E. I. du Pont de Nemours and Company, Inc.
Wilmington, Delaware 19898

EXECUTIVE SUMMARY

In its External Review Draft of Air Quality Criteria for Lead, EPA has cited the report of the NHANES II Time Trend Review Group as the authority for the conclusions that a substantial (5-6 μg/dl) decrease in blood lead levels occurred in the U.S. population from 1976 to 1980, and that the reduction of gasoline lead emissions during the same period is a prime suspect causative factor. The Review Group's conclusions were based in turn on analyses of the NHANES II blood lead data by CDC, NCHS and EPA.

This report presents Du Pont's analysis of the NHANES II blood lead data, making use of information on site locations which was first released by NCHS at a Review Group workshop, and was not incorporated in the CDC, NCHS and EPA analyses considered by the Review Group. Based on the analyses reported here, and on further review of the CDC, NCHS and EPA analyses, we conclude that

- Up to 70 percent of the 5-6 μg/dl reported decline in blood lead levels is explainable by survey demographics.
- National gasoline lead use is an inappropriate measure of gasoline lead exposure.
- Site specific gasoline lead exposure is significantly ($p \leq 0.05$) related to blood lead levels and accounts for 0.25 to 0.75 μg/dl of the reported decline.
- A significant ($p \leq 0.05$) time trend remains after accounting for both survey demographics and gasoline lead exposure, suggesting an effect from one or more of the inadequately documented potential causative factors.
- Analyses reported by CDC, NCHS and EPA are flawed because they fail properly to account for site-to-site demographic effects. Their use of the regression coefficient for a time variable is technically incorrect and leads them to misleading conclusions.

Du Pont recommends that the necessary amendments be made to the report of the NHANES II Time Trend Analysis Review Group and to the Criteria Document, based on the analyses presented in this report.

N33755.04

TEH 053001

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ANALYSIS OF REPORTED BLOOD LEAD LEVEL DECLINES DURING NHANES II AND THEIR RELATIONSHIP TO THE SURVEY DESIGN AND GASOLINE LEAD EXPOSURE

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ANALYSIS OF REPORTED BLOOD LEAD LEVEL DECLINES DURING NHANES II AND THEIR RELATIONSHIP TO THE SURVEY DESIGN AND GASOLINE LEAD EXPOSURE

I. Introduction and Summary

The second National Health and Nutrition Examination Survey (NHANES II) has provided a body of health and nutritional information, including blood lead data, on a sample of individuals designed to be representative of the noninstitutionalized U.S. population [1]. The survey period covered four years (1976-1980) during which time each of 64 geographic sampling sites was visited once. These sites reflected a design structure of 32 strata with two primary sampling units per stratum.

The blood lead data from this survey have received prominent national and international attention regarding the health effects of body burden lead and the associated need to regulate environmental lead exposure. In particular, these data were used in the gasoline lead deregulation proceedings (March 1982 to October 1982) and the ongoing review and update of the Air Quality Criteria for Lead (August 1982-), both under the direction of the Environmental Protection Agency (EPA).

During the four-year survey period a nearly linear decline of blood lead levels has been noted [2], resulting in a total drop of 5-6 μg/dl. Since this decline was coincident with decreasing use of lead in gasoline, some have contended that gasoline lead exposure was mainly, if not totally, responsible for this decline [3,4,5,6]. As a result of continued controversy on this contention among members of a Scientific Review Panel formed by EPA to update the document on Air Quality Criteria for Lead prior to external review, the EPA formed the NHANES II Time Trend Analysis Review Group, which consisted of independent statisticians. After two meetings and review of relevant documents, including references [3], [5] and [6], the review group issued a report [7] on this assessment regarding

(1) whether a blood lead time trend occurred during the NHANES II survey period, and

(2) the validity of correlation analyses relating blood lead levels to gasoline lead levels.

This report, dated June 15, 1983, is included as an appendix in Chapter 11 of the external (public) review draft of the updated Air Quality Criteria for Lead.

The Time Trend Review Group Report broadly investigates many issues and aspects of performing within-survey time trend analyses on NHANES II blood lead data and attempts to elucidate the associated limitations. The report concludes that strong evidence exists that a decline in blood lead levels occurred and a strong correlation exists between blood lead and gasoline lead levels.

Du Pont presented no analyses to the special review group relating blood lead levels to gasoline lead exposure. The reason for this was the refusal of the National Center for Health Statistics (NCHS) to provide information identifying the survey site location associated with each blood lead record. It was felt this information on geographic site was essential in order to do a credible analysis correlating blood lead and gasoline lead exposure. During the first meeting of the special panel (March 11, 1983), the panel asked for this information and NCHS released it.

Subsequent to the second special panel meeting (March 31, 1983), Du Pont felt neither the NHANES II blood lead data nor the methods used by the Centers for Disease Control [5] or EPA [6] supported conclusions being promoted that gasoline lead exposure was responsible for the reported blood lead decline. Two inconsistencies persisted. First, it was hard to believe that survey design did not exaggerate any <u>true</u> decline in blood lead levels that may have occurred in view of accompanying large changes as the survey proceeded in subject urbanization, income and other characteristics, shown to be correlated with blood lead. Second, if the blood lead decline were entirely due to declines of gasoline lead exposure, this would suggest that the slope of the blood lead-air lead relationship would be 10 $\mu g/dl$ per $\mu g/m^3$ or more, because national ambient air lead levels were (roughly) estimated to have dropped .32 $\mu g/m^3$ during the survey period [8] and reductions in air lead are nearly directly proportional to reductions in gasoline lead. This value of 10 is inconsistent with the vast and independently assessed literature which concludes the blood lead-air lead slope is between 1 and 2 m^3/dl [9]. In fact, EPA used a conservative value of 2 m^3/dl in determining the National Ambient Air Quality Standard for Lead [10]. Expressed another way, based on air lead reductions, it would be expected that blood lead levels would decline between .32 and .64 $\mu g/dl$.

This report presents Du Pont's investigation of trends in the NHANES II blood lead data using statistical methods that account for the site information. It is believed that these methods are more appropriate for analyses of these data than those used by other investigators. The report incorporates and supplements our preliminary results summarized in the paper, "Assessment of Blood Lead Levels in the U.S.A. From NHANES II Data", by J. M. Pierrard, C. G. Pfeifer, and R. D. Snee, which was presented at and published in the Proceedings of The International Conference on Heavy Metals in the Environment, Heidelberg, West Germany, September 1983.

I.A Objectives of Analysis

This analysis investigates factors associated with the reported blood lead time trend during the four year NHANES II survey period. Of all the potential factors influencing the trend (see Table II-2), suitable data exists only for two factors; namely, survey demographics/itinerary and gasoline lead use. Data on other potential factors are either nonexistent or so poor as to be of little value.

The three key objectives were to:

(1) Evaluate and quantify the contribution of time-related effects of survey demographics/itinerary to the reported blood lead decline.

(2) Determine a site specific measure of gasoline lead exposure and compare it to national gasoline lead consumption, which is not site specific.

(3) Evaluate and quantify the contribution of time-related effects of gasoline lead to the reported blood lead decline.

In pursuing these objectives, insight was gained concerning which statistical issues are important and which are not when analyzing these data. This insight has resulted in better understanding of the methods, results and implications of the findings of the Centers for Disease Control (CDC) and EPA [4,5,6]. It has also enabled an assessment of the report of the Time Trend Analysis Review Group [7].

I.B Methodology and Distinguishing Features from Other Reported Analyses

The analyses presented here differ from the analyses of the CDC and EPA [4,5,6] in two key ways that are critical to the results reported. First, the regression model used to account for variation in blood lead levels contains explanatory demographic and itinerary terms that distinguish within-site variation from between-site variation. This model may be described as a split plot analysis of covariance model. Such a model accounts for the structure of the data where individuals (split plots) are sampled from different sites (whole plots). This aspect of the site structure has not been adequately modelled in other analyses of these data.

The second critical difference is the approach to assessing the potential contribution of survey demographics and itinerary to the reported blood lead decline. Using a split-plot analysis of covariance model, which included terms for survey demographics but not a time variable, regression residuals were calculated. The residuals represent corrected blood lead data after the effects of all model terms have been removed. These residuals were then regressed on a time variable to determine the blood lead time trend after removing the effects of survey demographics. If the residual time trend is less than the reported time trend, then the difference between the two is an indication of the <u>potential</u> magnitude of the time trend attributable to time-related effects of survey demographics.

EPA [4,5] attempted to address, in quantitative terms, whether differential survey demographics influenced the reported blood lead decline. The procedure used was to add term(s) for a time variable in regression models with survey demographic terms (that did not isolate between-site effects). The resulting time coefficient, adjusted for survey demographics, was then used to estimate the decline. Since the decline estimated in this way was approximately the same as the reported decline unadjusted for survey demographics, the conclusion was drawn that differential survey demographics had little influence on the reported blood lead trend.

This procedure to evaluate the time-related effect of survey demographics is not appropriate. It can mathematically be demonstrated, for example, that such a linear time term will necessarily capture the linear time component of all other variables in the model not corrected linearly for time. Rao and Miller [11] provide a demonstration of this fact. Since none of the variables were so corrected for time in [4,5], a conclusion of no time related survey effects was guaranteed. Thus, the least squares estimate for the time regression coefficient, adjusted for survey demograpics not corrected for time themselves, is an incorrect estimate to use to evaluate time-related contributions of survey demographics.

There are several other features that distinguish the analyses presented here from those of references [4,5,6]. They are the gasoline lead exposure measure used, the method of assessing the contribution of gasoline lead to the reported blood lead decline, and the use of the survey design (ie, using the strata/PSU structure and weighting factors accounting for selection probabilities and adjustments for nonresponse). Of these, only the first two have any effect on the conclusions reached.

With few exceptions, the analyses presented in this report (except for Section V.C) use a site specific measure of gasoline lead exposure which accounts for site-to-site variation in exposure. Analyses reported in [4,5,6] all use national gasoline lead use as the exposure measure which is insensitive to between-site variation in exposure.

The arguments addressing the contribution of gasoline lead exposure in [4,5,6] are more qualitative than quantitative. For example, in [4], it is argued that (1) survey demographics did not affect the decline (see discussion above on approach to this); (2) there is no evidence heuristically on the basis of sparse available data that factors other than gasoline lead could have been largely responsible for the decline; and (3) gasoline lead is highly correlated with blood lead levels. Therefore, by implication, declines in gasoline lead exposure were taken to be largely responsible for (all) the decline in reported blood lead levels.

Two approaches were used here to estimate the contribution of gasoline lead exposure to the reported blood lead decline. In the first, the residual time decline from a fitted regression model including only survey demographics was compared to the residual decline from a model where both survey demographic terms and gasoline lead exposure was included. The difference between the two residual declines provided the desired estimate. The second approach was to apply the gasoline lead exposure regression coefficient adjusted for survey demographics to the four year change in gasoline lead exposure that collectively occurred over the NHANES II survey sites.

I.C Summary of Conclusions

The findings presented are at large variance with those of CDC and EPA [4,5,6] and, to some extent, with the report of the special panel. The key conclusions are given below.

1. Seventy percent of the 5-6 μg/dl reported decline in blood lead levels is explainable by survey demographics

   Analyses of residual time declines showed that as much as 4 μg/dl is explainable by differential survey demographics and site itinerary. This result suggests that survey design impacted highly on the reported decline. It further strongly suggests that the true blood lead decline occurring in the U.S. during the survey period is substantially less than the reported decline and that declines in gasoline lead exposure are not causative of a large portion of the reported blood lead decline.

2. National Gasoline Lead Use is an Inappropriate Measure of Gasoline Lead Exposure

   Analyses demonstrated that the trend in national gasoline lead use during the survey period differed considerably from a site specific trend in gasoline lead exposure corresponding to the sequential site itinerary. Thus, it appears the actual decline in exposure experienced during the survey period is exaggerated downward by national gasoline lead use. Consequently, site-to-site variation in exposure needs to be reflected when correlating gasoline lead exposure to NHANES II blood lead data.

3. <u>Site specific gasoline lead exposure is significantly ($p \leq .05$) related to blood lead levels and accounts for between .25 and .75 µg/dl of the reported decline</u>

   Analyses were performed with many variations in site specific exposure accounting for current, as well as, lagged values. Contributions of gasoline lead exposure were estimated by residual trend comparison method and the regression coefficient method (see Section I.B). All results consistently suggest that these contributions to the reported blood lead decline were between .25 and .75 µg/dl or about 10 percent of the reported decline. This result is consistent with what would have been expected, based on estimated national declines in air lead levels during the survey period [8,9].

4. <u>Evidence persists that factors, in addition to differential site demographics and gasoline lead exposure, are responsible for some of the reported blood lead decline</u>

   Residual time trend analyses from models, including terms for both survey demographics and gasoline lead exposure, show a significant ($p \leq .05$) time decline remains. This may be due to one or more of the factors in Table II-2 for which little or inadequate data exists.

5. <u>Analyses reported by CDC and EPA are flawed and their conclusions are misleading</u>.

   The key difficulties in approach are that their models fail to adequately account for site-to-site demographic effects and their use of the regression coefficient for a time variable is technically incorrect (see Section I.B). Further, their correlation analyses with gasoline lead are based on national lead use which does not adequately reflect exposure to gasoline lead as encountered by survey site itinerary (see item 3 above).

6. Based on the findings presented here, a key conclusion in the report of the special statistics panel is misleading

The first sentence of the Summary states, "The Review Group finds strong evidence that there was a substantial decline in the average level of blood lead in the U.S. population during NHANES II survey period." To the average person, this statement implies that the reported decline in blood lead levels truly occurred in the target population. The conclusions reached here (item 1 above) suggest that a substantial portion of the decline is likely to be an artifact of the manner in which the survey was conducted.

I.D Recommendations

In view of the methods and results presented in this report, and the identified flaws and limitations of analyses of CDC and EPA, it is recommended that the NHANES II Time Trend Analysis Review Group amend, as appropriate, their report of July 29, 1983 to be included in the revised Air Quality Criteria for Lead.

It is further recommended that EPA update statements, implications, and interpretations in the revised Air Quality Criteria for Lead associated with the NHANES II blood lead levels and their association with gasoline lead as appropriate.

Our analyses indicate that the NHANES II blood lead data provide no new evidence suggesting a stronger than anticipated relationship between gasoline lead and its influence in blood lead levels. Rather, these results confirm that a blood lead-air lead slope of between 1 and 2 provides a realistic and reliable way to evaluate the impact of gasoline lead on blood lead levels.

I.E Organization of Report

Section II provides background information on the NHANES II sample survey, sample site information, and the reported blood lead decline. Sections III, IV and V contain the main results. Section III presents the results for evaluating the effect of the survey design on the blood lead time trend; preliminary to this discussion, the modelling approach and data base used for the analyses reported here and in Sections V and VI are reviewed. Section IV addresses the construction of a site-specific measure of gasoline lead exposure and compares it to national gasoline lead use. Section V presents the results of two approaches for evaluating the contribution of gasoline lead exposure to the reported blood lead decline. Section VI provides results of supplementary analyses to those of Sections III and V; they include variance component analyses of strata/PSU structure, comparison of within- and between-site demographic effects, one stage (pass) fits to the entire split-plot model, and ridge regression analyses. Section VII discusses and compares the methods and results found with those of other reported analyses. Section VIII provides the references, listed in order of citation. Five appendices follow which offer analysis detail to the results highlighted in Sections III and V.

II. NHANES II and the Reported Blood Lead Decline

II.A. Description of Survey

The NHANES II program was a stratified, multistage probability cluster sample survey designed to gather health and nutritional data representative of the noninstitutionalized U.S. population [1]. The cross-sectional survey encompassed four years, from February 1976 to February 1980, where 64 sampling sites - 16 in each of 4 approximately equipopulated regions of the U.S. were visited. The design structure of these sites was 32 strata with two primary sampling units (PSUs) per stratum. The objective of the survey was to provide estimates of the prevalence of specifically defined diseases in the U.S. population, and to permit estimation of a broad variety of health-related measurements, at the midpoint of the survey period.

The NHANES II protocol called for a probability sample of the U.S. population for persons 6 months to 74 years of age. Subgroups of special interest were preschool children (6 months to 5 years), the aged (60-74 years), and persons living in poverty areas. These groups were oversampled to improve the reliability of the statistics for the subgroups. The total sample size was 27,801 persons with each PSU being 300-600 persons. Of this total, 20,322 (73.1 percent) were examined and of these, 9936 venous blood leads were taken. The survey was designed so that precise statistics could be produced for the four broad geographic regions of the United States and for the total population by age, sex, race, and income classifications.

A final examined lead subsample weight was associated with each sample person providing a blood lead measurement. This weight reflected the number of people in the target population represented by the individual. It accounted for probability of selection, adjustment for nonresponse, and post-stratification of the blood lead subsample. Blood lead determinations were requested on all children through the age of 6 and on a half sample of all examinees over that age.

Each of the 64 geographic sites was visited once by a mobile caravan at some point during the survey period. Table II-1 provides a chronological summary of these sites with some additional information on the number of individuals sampled for blood lead and sampling period. This site information was released by the National Center for Health Statistics on March 11, 1983 at a meeting of the NHANES II Time Trend Analysis Review Group (see Section I).

II.B Reported Blood Lead Decline

The blood lead data exhibit a nearly linear, decreasing time trend during the survey period. Figure II-1 illustrates this decline where site mean blood lead is plotted against mean examination date based on the venous blood lead subsample from NHANES II. This within study trend presents formidable difficulties in the interpretation of the blood lead data because no within-survey control of demographic representation was exercised in the design. The inherent time trend introduces a bias in the blood lead distribution statistics when all the survey data are combined to obtain a snapshot picture at the survey midpoint. Although this difficulty is not addressed in detail in the analyses presented in subsequent sections, it needs to be recognized that differential survey demographics and time effects, which inflate standard errors based on the survey design, will necessarily compromise inferences drawn from these data, such as those presented in [4].

Of more direct concern in this report is whether the reported blood lead (BPb) decline of 5-6 μg/dl during the four year survey period is an accurate reflection of the magnitude of the decline (if any) which truly occurred in the target U.S. population. The reported decline can be described by the following equation:

$$\underset{\text{Decline}}{\text{Reported BPb}} = \underset{\text{in Population}}{\underset{\text{Decline}}{\text{True BPb}}} + \underset{\text{Related to BPb}}{\underset{\text{Factors}}{\text{Decline Due to}}}$$

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Table II-1

NHANES II Venous Blood Lead Summary
In Chronological Order of Start of Sampling

Sampling Period	Stratum, Pseudo PSU	County, State	Stand Site	N	Mean Date
02/20/76-03/25/76	1,1	Dade, FL	Miami	141	03/06/76
03/04/76-03/19/76	2,2	Santa Clara, CA	San Jose	80	03/12/76
03/26/76-05/04/76	4,2	Fresno, CA	Fresno	256	04/14/76
04/02/76-05/08/76	3,1	Caddo, LA	Shreveport	161	04/19/76
05/13/76-06/05/76	6,2	Pierce, WA	Tacoma	124	05/22/76
05/18/76-06/16/76	5,1	Newport News (city) Hampton (city), VA	Newport News-Hampton	135	05/30/76
06/19/76-07/16/76	8,2	Bingham, ID	Blackfoot	202	07/01/76
06/24/76-08/05/76	7,1	New Madrid, Stoddard, MO	Dexter	225	07/15/76
07/21/76-08/12/76	10,2	Laramie, WY	Cheyenne	121	07/29/76
08/13/76-09/08/76	9,1	Polk, IA	Des Moines	107	08/24/76
08/20/76-09/15/76	12,2	Hennepin, MN	Minneapolis-St. Paul	151	08/31/76
09/15/76-10/07/76	11,1	Dakota, MN	Farmington	129	09/24/76
09/23/76-11/03/76	13,1	Cook, IL	Chicago	156	10/09/76
10/14/76-11/05/76	9,2	Lake, IL	Waukegan	94	10/24/76
11/11/76-12/18/76	15,1	Bledsoe, McMinn, Meigs, Rhea, TN	Athens Pikeville	223	11/29/76
11/13/76-12/18/76	14,2	Craven, Pitt, NC	Greenville, New Bern	202	11/30/76
01/19/77-02/12/77	3,2	Brevard, FL	Cocoa	122	01/27/77
01/20/77-03/03/77	16,2	Lafayette, LA	Lafayette	199	02/07/77
02/19/77-03/30/77	18,2	Blount, St. Clair, AL	Oneonta, Pell City	197	03/10/77
03/10/77-04/12/77	17,1	Banks, Hall, Towns, White, GA	Gainesville, Cleveland	178	03/23/77
04/07/77-05/24/77	19,2	Manhattan, NY	New York City	130	04/24/77
04/21/77-06/02/77	19,1	Bronx, NY	New York City	146	05/05/77
05/25/77-06/17/77	21,1	Bergen, NJ	Patterson-Clifton-Passaic	107	06/04/77
05/25/77-06/30/77	20,2	Union, NJ	Plainfield	87	06/17/77
07/07/77-08/06/77	22,1	Hartford (part), New Haven (part), CT	New Britain, Meriden	153	07/19/77
07/20/77-08/06/77	22,2	Norfolk (part), MA	Braintree	93	07/29/77
08/12/77-09/15/77	23,2	Cumberland (part), ME	Portland	157	08/26/77
08/19/77-09/24/77	23,1	Briston (part) Norfolk (part), MA	Taunton	176	09/04/77
10/13/77-11/08/77	26,2	Erie, PA	Erie	149	10/24/77
10/13/77-11/12/77	25,1	Allegheny, PA	McKees Rocks	117	10/25/77

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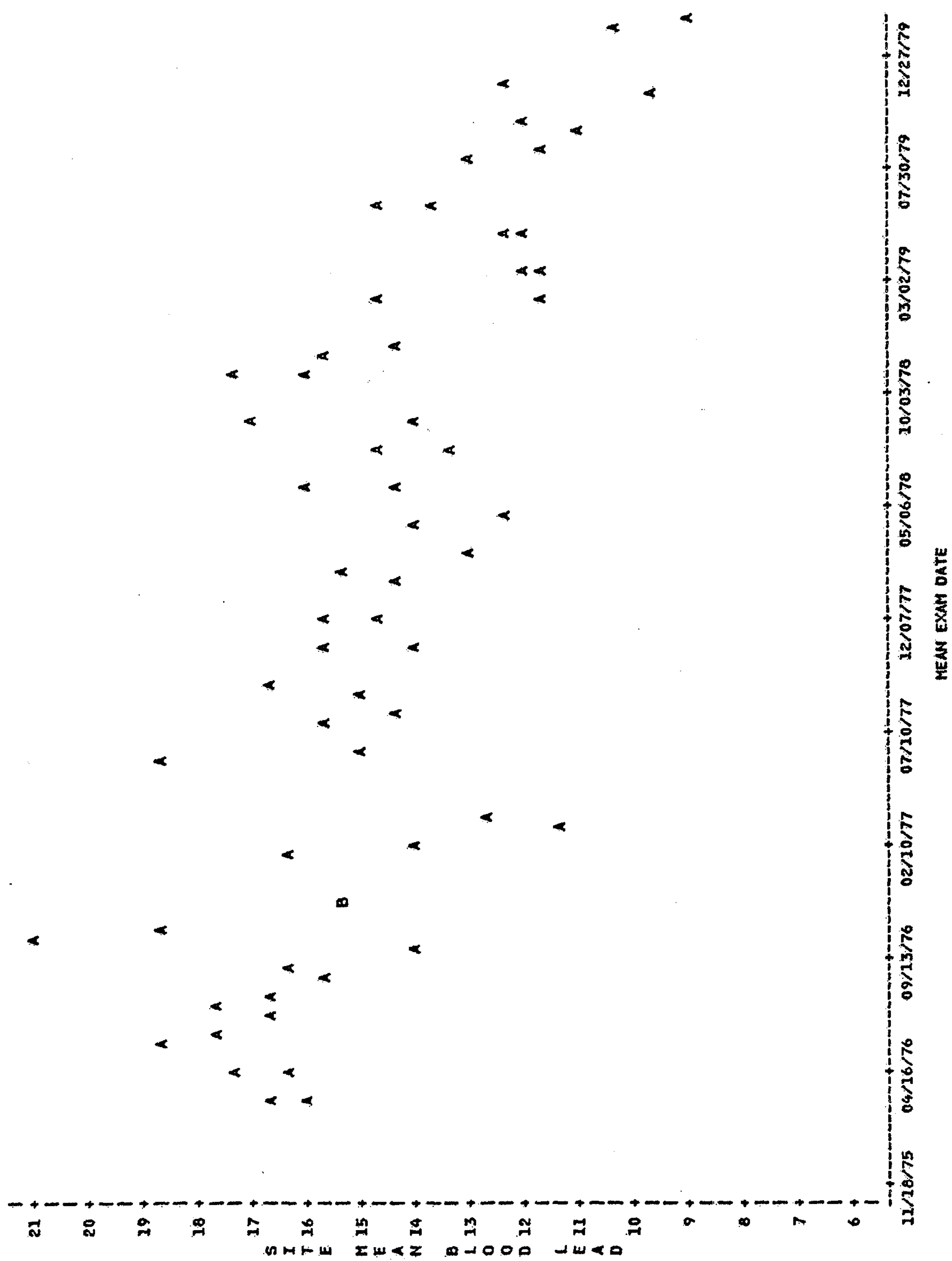
Sampling Period	Stratum, Pseudo PSU	County, State	Stand Site	N	Mean Date
11/19/77-12/17/77	18,1	Hardin, Larue, Nelson, KY	Elizabethtown, Bordstown	145	12/02/77
11/28/77-12/17/78	5,2	DeKalb, GA	Atlanta	122	12/06/77
01/19/78-02/18/78	27,1	Los Angeles, CA	Los Angeles	127	01/31/78
01/19/78-02/18/78	27,2	Los Angeles, CA	Los Angeles	127	02/02/78
02/25/78-03/23/78	2,1	Honolulu, HI	Honolulu	129	03/08/78
02/25/78-03/28/78	28,2	San Diego, CA	San Diego	120	03/10/78
03/31/78-05/04/78	4,1	Yolo, CA	Sacramento	190	04/13/78
04/06/78-05/03/78	8,1	Linn, OR	Lebanon	132	04/17/78
05/17/78-06/17/78	6,1	Sedgwick, KS	Wichita	142	05/30/78
05/17/78-06/29/78	29,1	Hickory, St. Clair, MO	Osceola	226	06/06/78
06/28/78-08/05/78	7,2	Cheboygan, Emmett, MI	Cheboygan	201	07/16/78
07/07/78-08/05/78	11,2	Racine, WI	Racine	179	07/21/78
08/11/78-09/02/78	13,2	Wayne, MI	Detroit	236	08/29/78
08/11/78-09/16/78	30,2	Ionia, Montcalm, MI	Greenville	179	08/27/78
10/12/78-11/07/78	21,2	Westchester, NY	Mt. Kisco	83	10/22/78
10/12/78-11/11/78	26,1	Orange, NY	Middletown	113	10/24/78
11/15/78-12/12/78	20,1	Mercer, NJ	Trenton	141	11/26/78
11/17/78-12/14/78	25,2	Montgomery, PA	Norristown	87	11/28/78
01/18/79-02/21/79	28,1	Harris, TX	Houston	143	01/30/79
01/18/79-03/01/79	29,2	Parmer, TX	Bovena	236	02/04/79
03/01/79-04/11/79	15,2	Poinsett, AK	Marked Tree	240	03/19/79
03/08/79-04/03/79	10,1	Potter, Randall, TX	Amarillo	138	03/18/79
04/12/79-05/24/79	32,1	Coles, Cumberland, IL	Mattoon	190	04/28/79
04/18/79-05/24/79	32,2	Greene, Monroe, IN	Bloomington	186	05/01/79
05/31/79-07/01/79	31,1	Marion, IN	Indianapolis	147	06/13/79
06/01/79-07/05/79	31,2	Hamilton, OH	Cincinnati	155	06/14/79
08/01/79-08/31/79	12,1	Montgomery, OH	Dayton	147	08/13/79
08/03/79-09/08/79	24,1	Lycoming, PA	Williamsport	183	08/17/79
09/08/79-10/13/79	30,1	Richland, OH	Mansfield	156	09/21/79
09/18/79-10/27/79	24,2	Delaware, NY	Oneonta	170	10/01/79
10/20/79-12/05/79	14,1	Floyd, Johnson, Magoffin, KY	Saylersville, Prestonburg	218	11/12/79
11/03/79-12/14/79	1,2	District of Columbia	Washington, DC	112	11/21/79
01/15/80-02/23/80	17,2	Cherokee, York, SC	Rock Hill	118	01/31/80
01/30/80-02/26/80	16,1	Greene, Harrisonburg (city), Rockingham, VA	Harrisonburg	127	02/10/80

Figure II-1

Site Mean Blood Lead Versus
Mean Examination Date



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The true decline and the decline due to time-related factor effects may be further represented as a sum of the declines attributable to individual factors. The addends in the above equation may assume either positive or negative values so long as their sum equals the reported decline.

A variety of factors could be responsible for reported BPb decline. These are summarized in Table II-2. Exposure and public awareness categories impact on the true blood lead decline while survey design and survey execution categories impact on biasing the true decline.

Table II-2

Identifiable Factors Potentially Influencing the Reported Blood Lead Decline

Exposure

- Gasoline
- Food and beverages
- Paint
- Dust
- Water

Survey Design

- Personal Demographics
- Residence Demographics
- Site Demographics
- Survey Itinerary

Public Awareness

- Avoidance of Lead Exposure

Study Execution

- Sample Handling
- Laboratory Analysis

Ideally, it is of interest to know the magnitude of the true decline and the magnitude of the components contributing to it. Unfortunately, three major difficulties compromise one's ability to do this.

(1) NHANES II was cross-sectional with no control for differential demographic distributions within subtime periods.

(2) Factors varying with time and also correlated with blood lead levels are invariably partially confounded which limits the accuracy and precision of inferences drawn.

(3) Of all the factors listed in Table II-2, suitable data on only survey design and gasoline lead use are available.

The approaches used in this analysis attempt to understand the impacts that differential survey demographics and gasoline lead exposure have on the reported blood lead decline.

III. Effect of Survey Design on Reported Blood Lead Time Trend

It was noted in Section II that the NHANES II survey was designed to provide data on nutrition and health variables to estimate characteristics of the target population at the midpoint of the survey. The survey design did not control for potential time-related changes in sample demographics during the four year survey period. In view of the fact that a blood lead decline of 5-6 μg/dl was reported and survey locations sampled during NHANES II were not individually representative, but only collectively representative of the target population, a distinct possibility exists that the survey design itself contributed to this decline.

Before one attempts to ascribe the decline to lead exposure, it is prudent to investigate the biasing factors of the blood lead time trend. This analysis attempts to quantify the amount of the decline that could be due to differential survey demographics. Tables 6, 7, 8 and 9 provide the key results.

Sections III.A, III.B and III.C describe the details of the model and analysis used for evaluating the effect of survey design (discussed in Sections III.D and III.E) and the effect of gasoline lead (discussed in Section V).

III.A. Modelling Approach

The approach used is to develop an empirical model that best predicts an individual's blood lead based only on survey demographics reflecting personal attributes, residence characteristics, and sample site characteristics. The time slope of the residuals (observed minus predicted blood leads) from such a model then provides an indication of the contribution to the reported blood lead decline that cannot be accounted for by differential survey demographics.

In developing the model, it was necessary to account for the structure of the blood lead data. In particular, certain demographic characteristics for the 9000+ available records have the same value for all records within a sampling site while other characteristics vary within sites. This suggests a nested or split-plot analysis is appropriate where two sources of variation in blood lead values are present; viz, between-site and within-site variation.

It is important to recognize that any valid analysis of the NHANES II blood lead data which addresses time-related biasing must account for this structure whether or not the survey design (strata, PSU and lead weights) is reflected in the analysis. To date, apparently no other reported analyses of the NHANES II blood lead data account for this structure. As will be shown, this structure has considerable impact on the results.

The complete NHANES II data base contains information on a variety of survey demographics that may have an effect on the blood lead time trend insofar as the prevalence of these characteristics was correlated with time. For example, it is well-documented that blacks have higher average blood lead levels than whites. Therefore, if the proportion of blacks sampled early in the study was higher than the average black representation over the entire study, then this alone would exaggerate negatively the true blood lead time trend.

The available study demographics, or covariates, may be classified as one of two types - either split-plot covariates or whole-plot covariates. A split plot covariate is one whose values vary within a sampling site and, for subsequent reference, will be referred to as an X-type variable. A whole plot covariate is one whose values vary among sampling sites but are constant, or nearly so, for all individuals within a site. For subsequent reference, these will be referred to as Z-type variables.

For purposes of presenting the model simply, let X_{ij} refer to the value of an <u>arbitrary</u> X-type covariate for the <u>jth</u> individual at the <u>ith</u> sampling site and let Z_i refer to the value of an arbitrary Z-type covariate at the <u>ith</u> sampling site. Excepting interaction terms, the form of the fitted model for dependent variable Y_{ij} is

$$\hat{Y}_{ij} = \hat{\mu} + \hat{\beta}_W(X_{ij} - \overline{X}_{i.}) + \hat{\beta}_{Bx}(\overline{X}_{i.} - \overline{X}_{..}) + \hat{\beta}_{Bz}(Z_i - \overline{Z}_{.}) \quad (1)$$

where the term $\hat{\beta}_W(X_{ij} - \overline{X}_{i.})$ accounts for within site variation due to covariate effects and the terms $\hat{\beta}_{Bx}(\overline{X}_{i.} - \overline{X}_{..})$ and $\hat{\beta}_{Bz}(Z_i - \overline{Z}_{.})$ account for variation due to between-site covariate effects. The actual model also included certain two-way interaction terms among distinct split plot covariates X and X' as follows:

$$\hat{\alpha}_W(X_{ij} - \overline{X}_{i.})(X'_{ij} - \overline{X}'_{i.})$$

$$\hat{\alpha}_{Bx}(\overline{X}_{i.} - \overline{X}_{..})(\overline{X}'_{i.} - \overline{X}'_{..})$$

No interactions between Z-type covariates or between X-type and Z-type covariates were investigated.

An important feature of model (1) is that it includes two linear terms for each X-type covariate. In the special case where the within-site X-effect is the same as the between-site X-effect, ie, $\beta_W = \beta_{Bx} = \beta$, the two terms reduce to $\beta(X_{ij} - \overline{X}_{..})$, the more commonly used explanatory term for a split plot covariate. As is shown in Sections V and VI, there are several X-type covariates where $\beta_W \neq \beta_{Bx}$. This observation is a key reason why previous analyses have not identified study characteristics as important contributors to the reported blood lead decline. Kempthorne [12] and Federer [13] discuss split-plot analysis of covariance models such as those described by Equation (1).

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Because there was no available statistical software that enables a single regression analysis to be performed where two error terms are present, as well as split plot and whole plot covariates, the model given by equation (1) was fitted in two stages, as illustrated in Daniel and Wood [14].

The first stage was a within-site analysis resulting in fitted equation

$$\hat{Y}_{ij} = \hat{\mu}_i + \hat{\beta}_W(X_{ij} - \overline{X}_{i.}) \qquad (2)$$

where μ_i is the true mean of the ith sampling location. A term of the form $\beta_W(X_{ij} - \overline{X}_{i.})$ was included for each X-type covariate as well as certain two-way interactions. By specifying the model in this way, with no intercept term, the $\hat{\mu}_i$'s represent the adjusted site mean blood leads – adjusted to each site covariate mean by the within-site average covariate effect, $\hat{\beta}_W$.

The second stage analysis was the between-site analysis where the adjusted site means, $\hat{\mu}_i$, were regressed on the terms accounting for between-site effects resulting in fitted equation

$$\hat{\hat{\mu}}_i = \hat{\mu} + \hat{\beta}_{Bx}(\overline{X}_{i.} - \overline{X}_{..}) + \hat{\beta}_{Bz}(\overline{Z}_i - \overline{Z}_{.}) \qquad (3)$$

Again, the actual model included similar terms for each X and Z-type covariate, along with certain two-way interactions among the X-type site mean covariates.

To estimate the remaining blood lead trend after allowing survey demographics to explain as much of the trend as possible, the following approach was used. Corrected site mean blood lead values (CSMB) were formed from residuals from (3) as follows:

$$\text{CSMB} = \hat{\mu}_i - \hat{\hat{\mu}}_i + \overline{Y} \qquad (4)$$

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These corrected means have the effect of survey demographics removed. The grand mean, $\overline{Y}$, is added back merely to make the average of the CSMB's approximately the same as the Y-average. These corrected means were then regressed on "time" (ie, average blood lead examination date at each site), resulting in the fitted equation

$$\widehat{CSMB} = \hat{\alpha} + \hat{\beta}\,(\text{time}) \tag{5}$$

The difference between the predicted CSMBs at the average exam date of all individuals in the first site sampled and the average exam date of all individuals in the last site sampled then represents an estimate of the blood lead drop remaining after accounting for time-related survey demographics.

III.B Discussion of Analyses

III.B.1 Preparation of the Data

Only data records having venous blood leads with information complete for lead weight (see below), examination date, race, sex, age, income, urbanization, SMSA category, season at time of examination, region in U.S. of sampling site, and sampling site (PSU and strata) were considered. These comprised 9616 records of the 9936 available with venous blood lead values. All 320 records not complete for the information above lacked data on income.

A lead weight value is associated with each final examined blood lead. The lead weight value refers to the number of individuals represented in the target population by that record and takes into account probability of selection, adjustments for nonresponse, and poststratification of the blood lead subsample.

The analyses reported in this section excluded survey sites for Honolulu, HI and New York City (two sites) in order for the results here to be fairly compared to the results based on analyses including terms for exposure to gasoline lead (see Section V). Summaries for these sites are

Site	Strata	PSU	Number of Records: With Venous BPb	Number of Records: Complete for all designated variables
Honolulu, HI	2	1	129	116
New York, NY	19	1	146	135
New York, NY	19	2	130	124

Analyses which excluded the above sites, therefore, were based on either 9241 (= 9616 - 116 - 135 - 124) individual records or 61 adjusted site averages.

Demographic characteristics considered from the data record for estimating within- and/or between-site effects are defined in Table III-1, where they are grouped as personal (P), residence (R), or itinerary (I) characteristics. The P and R characteristics are considered X-type while the I characteristics are considered Z-type.

Table III-1
Names of Demographic Covariates

X-type Covariate		Z-type
Personal	Residence	Itinerary
White	Urban (Classes 1-4)	Winter
Black	SMSA Central City	Spring
Male	SMSA Not Central City	Summer
Child (.5-5 yrs)		South
Teen (6-17 yrs)		West
Income ($\leq$$10,000)		Northeast

Each of the above covariates assumed a value of 1 if the characteristic applies, 0 otherwise. Thus, if White=0 and Black=0, this implies the individual is of another race; if Male=0, this implies the individual is female; if Child=0 and Teen=0, this implies the individual is 18-74 years of age; if SMSA Central City=0 and SMSA Not Central City=0, this implies the individual does not live in an SMSA; if Winter=Spring=Summer=0, this implies the individual was examined in the fall; and, if South=West=Northeast=0, this implies the individual lived in the Midwest region. An individual is classified as living in an urban area if, on the original NHANES II data tape, he is designated as living in one of urbanization categories 1-4. Additional information on the original data tape is given in [15].

Exposure covariates may be considered another class of Z-type covariates not presented in Table III-1. These are time (which would act as a general surrogate for all types of time-related effects), food lead exposure, gasoline lead exposure, paint lead exposure, etc. In some analyses reported in this section time was used, whereas in Section V both various measures of gasoline lead exposure and time were included in the models analyzed.

Table III-2 provides a summary of averages for blood lead, lead weight, examination date, and demographic covariates shown in Table III-1 for each of the 64 NHANES II survey sites.

III.B.2 Within- and Between-Site Model Terms

Inspection of the data in Table III-2 indicates that "White" and "Black" are highly correlated since the sum of the two site averages (ie, proportions represented in site) is nearly always 1, except for Honolulu which is not considered in these analyses. "SMSA Central City" and "SMSA Not Central City" are similarly correlated. Consequently, for the purposes of analysis "White" and "SMSA Not Central City" were not used as model terms. Interpretation of the regression coefficient for "Black" and "SMSA Central City" is therefore altered. For example, if Black=0 this implies that an individual is either white or of a race other than black or white.

Table III-2

NHANES II Site Averages of Demographic Variables

NHANES II SURVEY LOCATION SUMMARIES

SITE ID	STRATA	PSU	SITE LOCATION	N	BLOOD LEAD	EXAM DATE	WHITE	BLACK	MALE	CHILD	TEEN	INCOME
1	01	1	MIAMI, FL	134	16.57	03/06/76	0.724	0.269	0.567	0.082	0.149	0.575
2	02	1	HONOLULU, HI	116	16.64	03/08/78	0.310	0.034	0.578	0.310	0.190	0.371
3	03	1	SHREVEPORT, LA	153	17.20	04/20/76	0.471	0.529	0.490	0.163	0.261	0.595
4	04	1	WOODLAND, CA	187	14.10	04/14/78	0.941	0.011	0.508	0.203	0.102	0.444
5	05	1	NEWPORT NEWS, VA	134	17.62	05/30/76	0.530	0.470	0.515	0.246	0.231	0.396
6	06	1	WICHITA, KS	138	15.96	05/31/78	0.906	0.072	0.493	0.196	0.167	0.326
7	07	1	DEXTER, MO	220	17.70	07/15/76	0.850	0.150	0.495	0.191	0.136	0.664
8	08	1	ALBANY, OR	129	12.44	04/17/78	0.992	0.000	0.519	0.171	0.155	0.279
9	09	1	DES MOINES, IA	104	15.55	08/24/76	0.952	0.048	0.510	0.173	0.183	0.404
10	10	1	AMARILLO, TX	135	11.93	03/19/79	0.911	0.067	0.533	0.259	0.163	0.289
11	11	1	FARMINGTON, MN	126	14.05	09/24/76	0.992	0.000	0.532	0.222	0.238	0.198
12	12	1	DAYTON, OH	147	13.12	08/13/79	0.769	0.224	0.469	0.211	0.156	0.293
13	13	1	CHICAGO, IL	151	21.07	10/10/76	0.543	0.444	0.490	0.311	0.185	0.444
14	14	1	SAYLERSVILLE, KY	214	9.68	11/12/79	0.986	0.005	0.519	0.294	0.173	0.495
15	15	1	ATHENS, TN	218	15.45	11/30/76	0.972	0.028	0.486	0.330	0.183	0.550
16	16	1	HARRISONBURG, VA	123	9.16	02/11/80	0.951	0.049	0.415	0.089	0.179	0.382
17	17	1	GAINESVILLE, GA	169	12.82	03/23/77	0.935	0.065	0.491	0.243	0.154	0.533
18	18	1	ELIZABETHTOWN, KY	145	14.52	12/03/77	0.890	0.076	0.434	0.228	0.207	0.559
19	19	1	NEW YORK, NY	135	15.77	05/05/77	0.600	0.393	0.459	0.259	0.193	0.689
20	20	1	TRENTON, NJ	137	15.77	11/27/78	0.650	0.321	0.504	0.182	0.146	0.416
21	21	1	PATTERSON, NJ	103	18.51	06/04/77	0.961	0.029	0.544	0.282	0.194	0.165
22	22	1	NEW BRITAIN, CT	153	15.75	07/19/77	0.967	0.033	0.549	0.268	0.137	0.307
23	23	1	TAUTON, MA	171	16.52	09/04/77	0.971	0.006	0.497	0.281	0.211	0.339
24	24	1	WILLIAMSPORT, PA	180	11.68	08/18/79	0.994	0.006	0.444	0.128	0.167	0.283
25	25	1	MCKEES ROCK, PA	115	15.51	10/26/77	0.843	0.157	0.470	0.113	0.174	0.209
26	26	1	MIDDLETOWN, NY	108	15.85	10/25/78	0.898	0.102	0.546	0.139	0.194	0.324
27	27	1	LOS ANGELES, CA	122	14.34	02/01/78	0.844	0.057	0.467	0.238	0.156	0.295
28	28	1	HOUSTON, TX	136	14.74	01/30/79	0.581	0.368	0.566	0.294	0.132	0.368
29	29	1	OSCEOLA, MO	218	14.17	06/06/78	1.000	0.000	0.427	0.193	0.142	0.679
30	30	1	MANSFIELD, OH	152	10.87	09/22/79	0.888	0.112	0.493	0.243	0.211	0.296
31	31	1	INDIANAPOLIS, IN	144	14.54	06/14/79	0.701	0.299	0.528	0.292	0.167	0.319
32	32	1	MATTOON, IL	184	12.23	04/29/79	0.984	0.016	0.511	0.141	0.152	0.342

Table III-2 (Pg. 2 of 4)

NHANES II Site Averages of Demographic Variables

NHANES II SURVEY LOCATION SUMMARIES

SITE ID	STRATA	PSU	SITE LOCATION	N	BLOOD LEAD	EXAM DATE	WHITE	BLACK	MALE	CHILD	TEEN	INCOME
33	01	2	WASHINGTON, DC	102	12.22	11/21/79	0.196	0.735	0.480	0.059	0.137	0.402
34	02	2	SAN JOSE, CA	78	15.83	03/13/76	0.910	0.013	0.474	0.295	0.218	0.231
35	03	2	COCOA, FL	121	16.26	01/28/77	0.843	0.149	0.554	0.215	0.157	0.554
36	04	2	FRESNO, CA	247	16.47	04/14/76	0.907	0.061	0.563	0.316	0.202	0.522
37	05	2	ATLANTA, GA	113	15.63	12/06/77	0.584	0.416	0.451	0.372	0.221	0.398
38	06	2	TACOMA, WA	121	18.70	05/22/76	0.868	0.058	0.504	0.322	0.198	0.355
39	07	2	CHEBOYGEN, MI	186	13.23	07/17/78	0.989	0.000	0.425	0.177	0.188	0.306
40	08	2	BLACKFOOT, ID	197	16.76	07/02/76	0.975	0.000	0.528	0.360	0.208	0.355
41	09	2	WAUKEGAN, IL	93	18.53	10/24/76	0.914	0.086	0.591	0.161	0.280	0.204
42	10	2	CHEYENNE, WY	121	16.75	07/30/76	0.926	0.058	0.438	0.372	0.165	0.405
43	11	2	RACINE, WI	178	14.70	07/22/78	0.826	0.174	0.517	0.303	0.185	0.275
44	12	2	MINNEAPOLIS, MN	147	16.22	09/01/76	0.946	0.041	0.544	0.286	0.143	0.388
45	13	2	DETROIT, MI	233	17.15	08/29/78	0.554	0.433	0.459	0.403	0.150	0.373
46	14	2	GREENVILLE, NC	192	15.32	12/01/76	0.630	0.370	0.495	0.219	0.156	0.604
47	15	2	MARKED TREE, AR	229	11.69	03/19/79	0.913	0.087	0.441	0.192	0.214	0.533
48	16	2	LAFAYETTE, LA	195	13.89	02/07/77	0.687	0.292	0.492	0.359	0.236	0.518
49	17	2	ROCK HILL, SC	180	10.38	01/31/80	0.778	0.222	0.500	0.267	0.117	0.317
50	18	2	ONEONTA, AL	196	11.20	03/11/77	0.939	0.061	0.490	0.245	0.184	0.566
51	19	2	NEW YORK, NY	124	14.04	04/25/77	0.581	0.363	0.500	0.242	0.121	0.694
52	20	2	PLAINSFIELD, NJ	87	14.99	06/18/77	0.943	0.057	0.471	0.115	0.138	0.218
53	21	2	MT. KOSCO, NY	81	17.26	10/22/78	0.790	0.198	0.494	0.086	0.222	0.185
54	22	2	BRAINTREE, MA	91	14.36	07/29/77	0.989	0.000	0.429	0.066	0.220	0.165
55	23	2	PORTLAND, ME	153	14.86	08/27/77	1.000	0.000	0.516	0.288	0.190	0.405
56	24	2	ONEONTA, NY	161	12.09	10/01/79	1.000	0.000	0.528	0.118	0.124	0.360
57	25	2	NORRISTOWN, PA	84	14.36	11/28/78	0.976	0.012	0.524	0.048	0.214	0.155
58	26	2	ERIE, PA	144	13.88	10/24/77	0.979	0.021	0.535	0.333	0.167	0.326
59	27	2	LOS ANGELES, CA	122	15.41	02/02/78	0.902	0.041	0.467	0.295	0.197	0.443
60	28	2	SAN DIEGO, CA	112	13.08	03/11/78	0.938	0.018	0.446	0.134	0.179	0.313
61	29	2	BOVENA, TX	223	11.63	02/04/79	0.946	0.031	0.529	0.341	0.170	0.390
62	30	2	GREENVILLE, MI	174	14.02	08/27/78	1.000	0.000	0.506	0.161	0.230	0.270
63	31	2	CINCINNATI, OH	146	13.65	06/14/79	0.781	0.212	0.445	0.212	0.171	0.281
64	32	2	BLOOMINGTON, IN	184	12.01	05/01/79	0.940	0.033	0.533	0.201	0.120	0.527

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Table III-2 (Pg. 3 of 4)

NHANES II Site Averages of Demographic Variables

NHANES II SURVEY LOCATION SUMMARIES

SITE ID	STRATA	PSU	URBAN	SMSA CC	SMSA NOT CC	WINTER	SPRING	SUMMER	SOUTH	WEST	NORTHEAST	LEAD WEIGHT
1	01	1	0.970	0.231	0.769	0.933	0.067	0.000	1.000	0.000	0.000	24270
2	02	1	0.578	0.371	0.629	0.957	0.043	0.000	0.000	1.000	0.000	24074
3	03	1	0.824	0.778	0.222	0.000	1.000	0.000	1.000	0.000	0.000	20328
4	04	1	0.326	0.000	1.000	0.000	1.000	0.000	0.000	1.000	0.000	19474
5	05	1	1.000	1.000	0.000	0.000	1.000	0.000	1.000	0.000	0.000	23137
6	06	1	0.906	0.797	0.203	0.000	1.000	0.000	0.000	1.000	0.000	21595
7	07	1	0.000	0.000	0.000	0.000	0.000	1.000	0.000	0.000	0.000	10078
8	08	1	0.000	0.000	0.000	0.000	1.000	0.000	0.000	1.000	0.000	23298
9	09	1	0.913	0.654	0.346	0.000	0.000	1.000	0.000	0.000	0.000	21574
10	10	1	0.926	0.926	0.074	0.659	0.341	0.000	0.000	1.000	0.000	28528
11	11	1	0.730	0.000	1.000	0.000	0.000	0.373	0.000	0.000	0.000	27836
12	12	1	0.816	0.361	0.639	0.000	0.000	1.000	0.000	0.000	0.000	18441
13	13	1	1.000	0.689	0.311	0.000	0.000	0.000	0.000	0.000	0.000	20937
14	14	1	0.000	0.000	0.000	0.000	0.000	0.000	1.000	0.000	0.000	14927
15	15	1	0.000	0.000	0.000	0.000	0.000	0.000	1.000	0.000	0.000	12372
16	16	1	0.000	0.000	0.000	1.000	0.000	0.000	1.000	0.000	0.000	26056
17	17	1	0.000	0.000	0.000	0.414	0.586	0.000	1.000	0.000	0.000	18516
18	18	1	0.000	0.000	0.000	0.000	0.000	0.000	1.000	0.000	0.000	15294
19	19	1	1.000	1.000	0.000	0.000	1.000	0.000	0.000	0.000	1.000	18915
20	20	1	0.723	0.387	0.613	0.000	0.000	0.000	0.000	0.000	1.000	18960
21	21	1	1.000	0.000	1.000	0.000	1.000	0.000	0.000	0.000	1.000	24272
22	22	1	0.915	0.647	0.353	0.000	0.000	1.000	0.000	0.000	1.000	18632
23	23	1	0.023	0.000	0.000	0.000	0.000	0.936	0.000	0.000	1.000	17132
24	24	1	0.000	0.000	0.000	0.000	0.000	1.000	0.000	0.000	1.000	15634
25	25	1	0.913	0.383	0.617	0.000	0.000	0.000	0.000	0.000	1.000	20098
26	26	1	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1.000	20133
27	27	1	0.975	0.418	0.582	1.000	0.000	0.000	0.000	1.000	0.000	22843
28	28	1	0.787	0.669	0.331	1.000	0.000	0.000	0.000	1.000	0.000	25816
29	29	1	0.000	0.000	0.000	0.000	0.867	0.133	0.000	1.000	0.000	14062
30	30	1	0.533	0.428	0.500	0.000	0.000	0.526	0.000	0.000	0.000	19136
31	31	1	1.000	0.979	0.021	0.000	0.778	0.222	0.000	0.000	0.000	15649
32	32	1	0.000	0.000	0.000	0.000	1.000	0.000	0.000	0.000	0.000	14820

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Table III-2 (Pg. 4 of 4)
NHANES II Site Averages of
Demographic Variables

NHANES II SURVEY LOCATION SUMMARIES

SITE ID	STRATA	PSU	URBAN	SMSA CC	SMSA NOT CC	WINTER	SPRING	SUMMER	SOUTH	WEST	NORTHEAST	LEAD WEIGHT
33	01	2	1.000	1.000	0.000	0.000	0.000	0.000	1.000	0.000	0.000	20110
34	02	2	0.987	0.538	0.462	1.000	0.000	0.000	0.000	1.000	0.000	22690
35	03	2	0.000	0.000	0.000	1.000	0.000	0.000	1.000	0.000	0.000	21707
36	04	2	0.559	0.356	0.644	0.000	1.000	0.000	0.000	1.000	0.000	17769
37	05	2	0.938	0.159	0.841	0.000	0.000	0.000	1.000	0.000	0.000	23825
38	06	2	0.843	0.430	0.570	0.000	1.000	0.000	0.000	1.000	0.000	21368
39	07	2	0.000	0.000	0.000	0.000	0.000	1.000	0.000	0.000	0.000	15422
40	08	2	0.000	0.000	0.000	0.000	0.061	0.939	0.000	1.000	0.000	13953
41	09	2	0.559	0.000	1.000	0.000	0.000	0.000	0.000	0.000	0.000	25833
42	10	2	0.000	0.000	0.000	0.000	0.000	1.000	0.000	1.000	0.000	18169
43	11	2	0.730	0.584	0.416	0.000	0.000	1.000	0.000	0.000	0.000	16998
44	12	2	1.000	0.524	0.476	0.000	0.000	1.000	0.000	0.000	0.000	15974
45	13	2	0.953	0.631	0.369	0.000	0.000	1.000	0.000	0.000	0.000	16452
46	14	2	0.000	0.000	0.000	0.000	0.000	0.000	1.000	0.000	0.000	15291
47	15	2	0.000	0.000	0.000	0.555	0.445	0.000	1.000	0.000	0.000	11239
48	16	2	0.621	0.564	0.436	1.000	0.000	0.000	1.000	0.000	0.000	14785
49	17	2	0.000	0.000	0.000	1.000	0.000	0.000	1.000	0.000	0.000	20104
50	18	2	0.000	0.000	0.000	0.760	0.240	0.000	1.000	0.000	0.000	14182
51	19	2	1.000	1.000	0.000	0.000	1.000	0.000	0.000	0.000	1.000	18733
52	20	2	1.000	0.000	1.000	0.000	0.690	0.310	0.000	0.000	1.000	26605
53	21	2	1.000	0.000	1.000	0.000	0.000	0.000	0.000	0.000	1.000	22972
54	22	2	0.945	0.000	1.000	0.000	0.000	1.000	0.000	0.000	1.000	24672
55	23	2	0.758	0.516	0.484	0.000	0.000	1.000	0.000	0.000	1.000	17654
56	24	2	0.000	0.000	0.000	0.000	0.000	0.224	0.000	0.000	1.000	15547
57	25	2	0.690	0.000	1.000	0.000	0.000	0.000	0.000	0.000	1.000	31232
58	26	2	0.556	0.451	0.549	0.000	0.000	0.000	0.000	0.000	1.000	16281
59	27	2	0.926	0.393	0.607	1.000	0.000	0.000	0.000	1.000	0.000	22498
60	28	2	0.786	0.464	0.536	0.857	0.143	0.000	0.000	1.000	0.000	24025
61	29	2	0.000	0.000	0.000	1.000	0.000	0.000	0.000	1.000	0.000	9462
62	30	2	0.000	0.000	0.000	0.000	0.000	1.000	0.000	0.000	0.000	16575
63	31	2	0.938	0.534	0.466	0.000	0.801	0.199	0.000	0.000	0.000	17075
64	32	2	0.000	0.000	0.000	0.000	1.000	0.000	0.000	0.000	0.000	13719

Model terms and corresponding notation used in the computer runs for the within-site and between-site analyses are shown in Table III-3. The within-site model terms include "Site Effect" through "Lead Weight". The between-site model terms use the same notation, although their values differ, and include all terms shown except "Site Effect".

The within-site linear terms reflect the form shown in the within-site regression equation (Eq. 2), where each covariate value is centered about the mean value of the site sampled from. Interaction terms are then created from these centered linear terms. The site effect variables "X_i" (not to be confused with X-type covariates) assume a value of one if the data record is from the ith site and zero otherwise. The subscript i, i=1,...,64, corresponds to the site ID given in Table III-2.

The between-site linear terms are of the form shown in the between-site regression equation (Eq. 3), where each site average is centered about the mean of the 9241 values. Interactions among X-type covariates were created from these centered linear terms. Values of the Z-type covariates reflect centering about the mean of the 9241 values. In some cases, a Z-type variable varied within a site (eg, Summer), and in such cases the value of Z for that site was taken as the average value within that site.

The coefficients of the site effect terms in the within-site regressions are the adjusted site blood lead means. These regression models have no intercept so that an effect and its standard error is estimated separately for each site. The reciprocals of the standard errors squared were then used as weights (not to be confused with Lead_Wt) in a weighted least squares analysis of the adjusted site blood lead means.

Centering of variable terms was done to eliminate nonessential confounding among model terms. Terms were left unscaled (ie, were not divided by their standard deviations) in order to preserve easy interpretation of regression coefficients.

Table III-3

Terms and Notations for Within-Site and Between-Site Analyses

Term	Notation on Computer Output
Site effect	X_i
Black	Black
Male	Male
Child	Child
Teen	Teen
Income	Income
Black x Male Interaction	BL_MA
Black x Child	BL_CH
Black x Teen	BL_TN
Black x Income	BL_IN
Male x Child	MA_CH
Male x Teen	MA_TN
Male x Income	MA_IN
Child x Income	CH_IN
Teen x Income	TN_IN
Urbanization	Urban
SMSA Central City	CC
Lead Weight	Lead_Wt
Winter	Winter
Spring	Spring
Summer	Summer
South	South
West	West
Northeast	Norteast
Time	Days_Pb

III.C Discussion of Within-Site Results

Four within-site regression analyses were performed on the 9241 record data base, as shown in Table III-4, representing combinations of blood lead and ln(blood lead) as the dependent variable in models including and excluding a covariate term for "Lead_Wt". The Lead_Wt variable is described in Section III.B.1. When using the survey design in an analysis (ie, strata/PSU structure) the Lead_Wt term is used as the weight in a weighted least squares analysis. Due to within-survey time trends, the need for incorporating the survey design in the analysis is questionable (see Section VII.B). It is included in some within-site models as a covariate to investigate the differential time influence it may have on blood lead levels. Since Lead_Wt is a factor designed to make the sample representative of the target noninstitutionalized U.S. population, it was felt that inclusion of such a covariate is an approach for evaluating and comparing trend results as they apply to the NHANES II blood lead sample only and to the target population.

Table III-4

Within-Site Regression Analyses

Within-Site Model	Dependent Variable	Incl. "Lead Wt" Term
1	blood lead	No
1W	blood lead	Yes
2	ln(blood lead)	No
2W	ln(blood lead)	Yes

It is easily demonstrated that these blood lead data are better described by a lognormal distribution than a normal distribution. Models 1 and 1W are included for direct ease of interpretation of the regression coefficients. With respect to evaluating time trend effects, it makes little difference whether blood lead or ln(blood lead) is the dependent variable, although analyses based on Models 2 and 2W better satisfy the normal distribution requirement of the regressions.

The ordinary least squares regression summaries for the four within-site analyses are provided in Appendix 1. The principal purpose of these analyses is to obtain adjusted site means (effects) and corresponding standard errors. Inspection of the Within-site Regression Model (Eq. 2), shows that each site effect ($\hat{\mu}_i$) reflects the site blood lead mean adjusted to each site covariate mean by the average (within-site) covariate effect ($\hat{\beta}_w$).

Table III-5 highlights some results from the within-site analyses. There is little effect on the results by including a "Lead Wt" term, although it is significant in Models 1W and 2W. Models 2 and 2W provide improved explanatory power (R^2-adjusted) and much reduced residual standard deviation (Root MSE), when converted to blood lead (μg/dl) units, over Models 1 and 1W. Little confounding among estimated effects appears to be present as evidenced by the small variance inflation factors (VIF). The R^2-adjusted summaries on the computer output in Appendix 1 are misleading because they are not corrected for the nonzero blood lead mean in the no intercept model. The R^2-adjusted summaries in Table III-5 are correct.

The detailed results in Appendix 1 indicate that the site effects between Models 1 and 1W and between Models 2 and 2W are essentially the same. To assess the effect of the adjustment process, Figures III-1 and III-2 display a labeled plot of the unadjusted and adjusted site blood lead means against site mean examination data for Models 1W and 2W, respectively. In effect, the adjustment process appears to have little impact on the blood lead time trend. Refer to Table III-8 for a summary of time trends comparing reported and adjusted site means.

Of the four within-site models, Models 2 and 2W use the preferred dependent variable ln(blood lead). Also, as noted above, these models provide similar summaries. Therefore, because of the high cost of calculating residuals and influence diagnostics for 9241 records, these items were calculated only for Model 2w. A histogram of the studentized residuals for Model 2W is given in Figure III-3. The range of these residuals is -4.16 to 5.11 with 73 values larger than 3 or less than -3.

Table III-5

Within-Site Regression Results Summaries

	Model 1	Model 1W	Model 2	Model 2W
Dependent Var.	BPb	BPb	Ln(BPb)	Ln(BPb)
Root MSE	5.22	5.23	.327	.327
R^2-adjusted	.33	.33	.37	.37
N	9241	9241	9241	9241
Max VIF	1.33	1.66	1.33	1.66
Coefficients				
Black	2.99*	2.94*	.175*	.170*
Male	3.43*	3.42*	.246*	.245*
Child	1.59*	1.25*	.113*	.083*
Teen	-1.84*	-1.85*	-.119*	-.119*
Income	1.37*	1.33*	.082*	.079*
BL_MA	1.79*	1.79*	.058	.058
BL_CH	2.74*	2.81*	.119*	.124*
BL_TN	-0.49	-0.48	.00616	.00670
BL_IN	0.60	.59	.0137	.012
MA_CH	-4.61*	-4.59*	-.321*	-.319*
MA_TN	-3.04*	-3.04*	-.185*	-.184*
MA_IN	0.30	0.30	.00234	.00226
CH_IN	2.24*	2.29*	.131*	.135*
TN_IN	.92*	.99*	.080*	.086*
Urban	.78*	.81*	.061*	.063*
CC	1.12*	1.08*	.059*	.056*
Lead Wt		$-1.80(x10^{-5})$*		$-0.15(x10^{-5})$*

*Effects flagged as significant ($p \leq .01$)

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Figure III-1

Adjusted (A) and Unadjusted (B)
Site Blood Lead Means Versus
Mean Examination Date - Model 1W

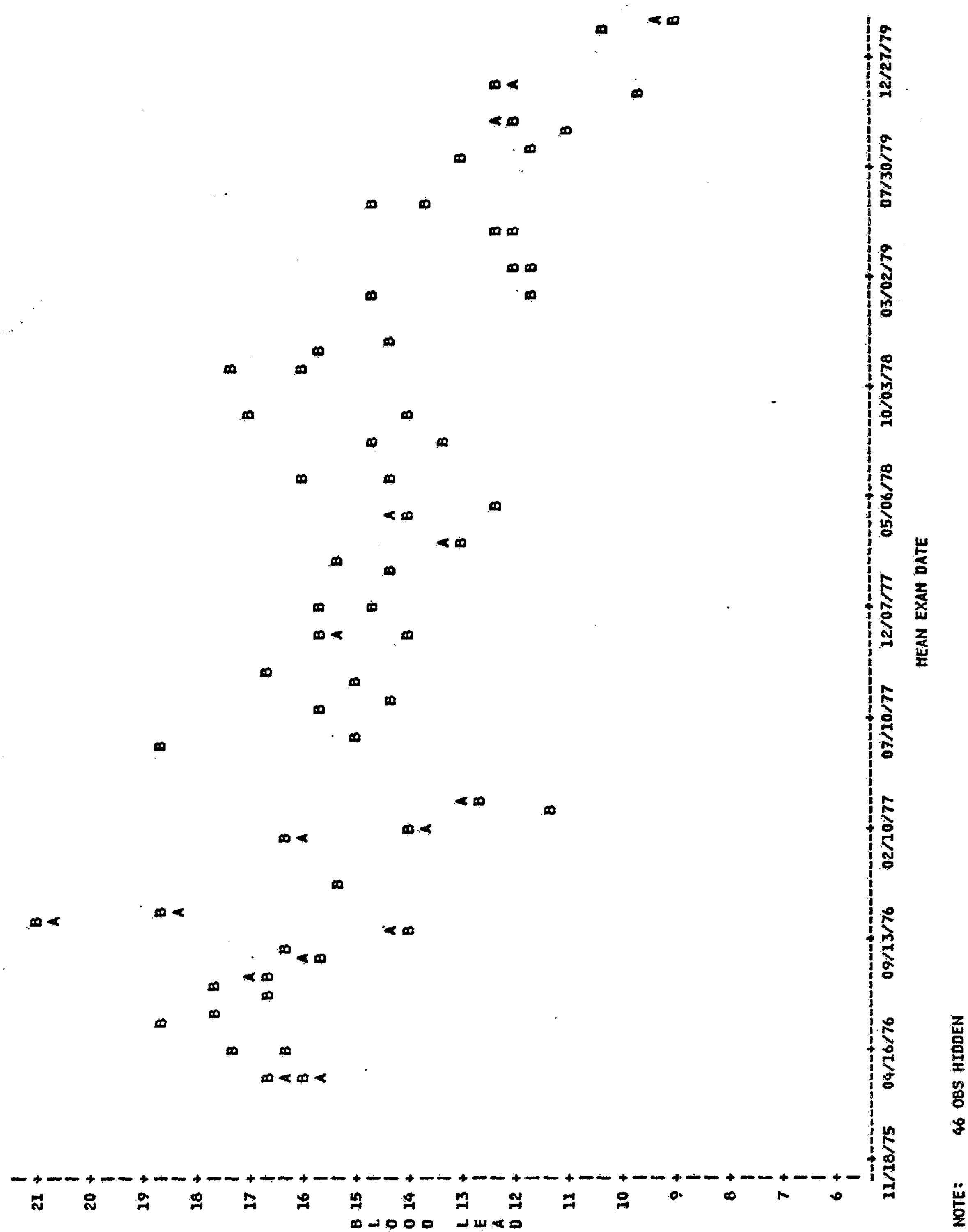

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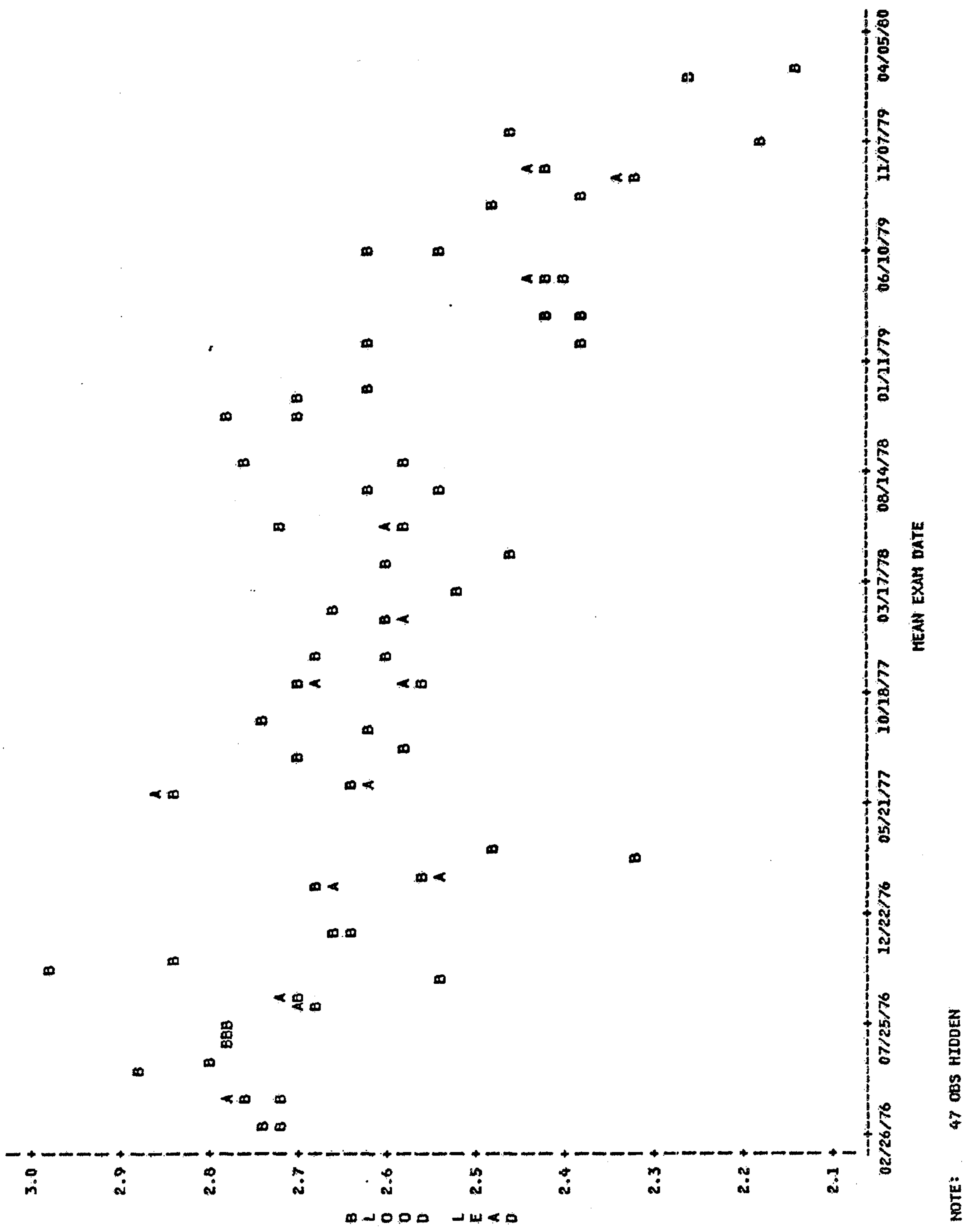
Figure III-2

Adjusted (A) and Unadjusted (B)
Site Blood Lead Means Versus
Mean Examination Date - Model 2W



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                                    FREQUENCY BAR CHART
MIDPOINT
STUDENT   STUDENTIZED RESIDUAL                                                     FREQ   CUM.   PERCENT    CUM.
                                                                                          FREQ            PERCENT
          |
  -4.8    |                                                                           0      0     0.00      0.00
          |
  -4.0    |                                                                           9      9     0.10      0.10
          |
  -3.2    |*                                                                         41     50     0.44      0.54
          |
  -2.4    |***                                                                      161    211     1.74      2.28
          |
  -1.6    |***************                                                          746    957     8.07     10.36
          |
  -0.8    |*******************************************                             2154   3111    23.31     33.67
          |
   0.0    |************************************************************            2989   6100    32.34     66.01
          |
   0.8    |*******************************************                             2160   8260    23.37     89.38
          |
   1.6    |***************                                                          770   9030     8.33     97.72
          |
   2.4    |***                                                                      161   9191     1.74     99.46
          |
   3.2    |*                                                                         37   9228     0.40     99.86
          |
   4.0    |                                                                           8   9236     0.09     99.95
          |
   4.8    |                                                                           5   9241     0.05    100.00
          |
   5.6    |                                                                           0   9241     0.00    100.00
          |
          --------+-------+-------+-------+-------+-------+-------+----
                 400     800     1200    1600    2000    2400    2800

                                FREQUENCY
```

Figure III-3

Histogram of Studentized Residuals
for Model 2W

Since only 25 such values would be expected in this category from a normal distribution, there was some concern as to whether the large residuals are time related. Figure III-4 presents these large residuals plotted against examination date (Days_Pb), and no time-related influence is apparent. Cook's D influence statistics were all much less than the .0005 F-distribution percentile, indicating no single influential observations.

III.D Discussion of Between-Site Results

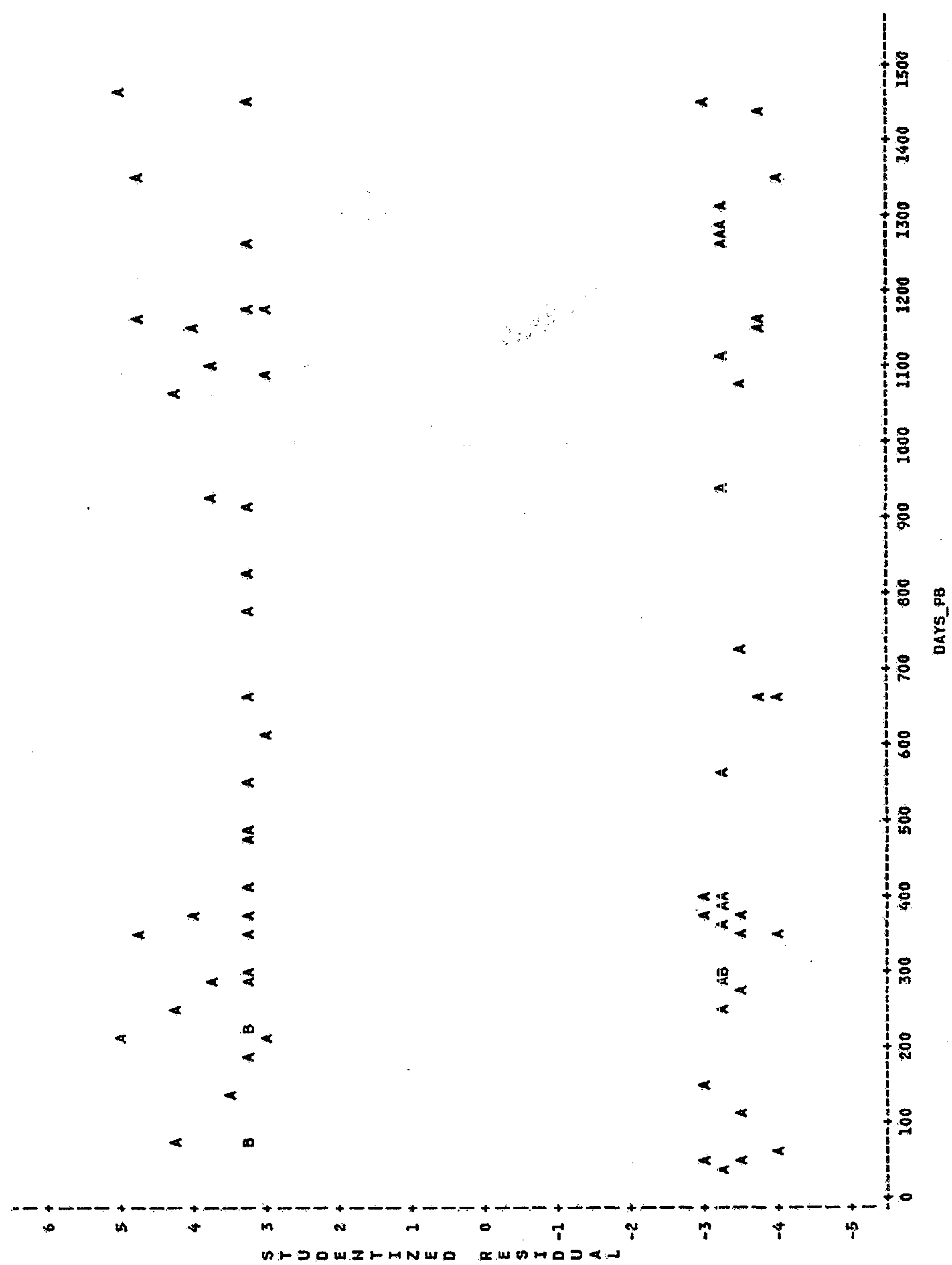
The adjusted site blood lead means and corresponding standard errors from the within-site analyses were merged to the site mean data base (see Table III-2). For subsequent reference, these sets of adjusted site blood lead means will be referred to as Adjustment Sets 1, 1W, 2 or 2W corresponding to the within-site model analyzed. These adjusted site blood lead means are used as the dependent variables in the between-site analyses discussed here and in Section V.

For the between-site analyses, Honolulu and the two New York City sites were excluded as before, leaving 61 site mean records for analysis. All of the terms listed in Table III-3 are included in these analyses, except now each linear X-type term reflects deviations of the covariate site mean from the overall mean based on the 9241 records. See Eq. (3) for the between-site model form. Interaction terms were created from the centered linear terms. Additional to these X-type terms are linear Z-type terms (see Table III-1) centered about their overall average.

Between-site analyses were performed on each set of adjusted site blood lead values resulting from the within-site analyses on Models 1, 1W, 2 and 2W. Each of these four sets were analyzed by weighted least squares and ordinary least squares. Weighting was by reciprocal of the variance of the estimated site effects from the within-site analyses. The between-site analyses based on adjusted site means from models 1W and 2W also included a linear term for the Lead_Wt variable in the same manner as other X-type covariates. The regression summaries and residual listings for the four weighted least squares

<u>Figure III-4</u>

Studentized Residuals Exceeding $\pm$ 3
from Model 2W Versus
Examination Date



analyses are given in Appendix 2 and for the four ordinary least squares analyses are given in Appendix 3.

Summaries of the weighted least squares analyses are shown in Table III-6. Results between Models 1 and 1W and between 2 and 2W were similar with the Lead_Wt term not affecting coefficient values meaningfully. No serious intercorrelations among model terms (see VIF) or highly influential points (see Cook's D) were noted. The results from the ordinary least squares analyses are comparable. Root MSE is the residual standard deviation.

By putting the fitted between-site regression (Eq. (3)) back into Eq. (1), the result is an equation that enables predictions of blood lead values based on an individual's demographics and site characteristics. If such an equation were a good prediction equation, then it should show no residual time trend. If a time related pattern in the residuals exists, then this suggests that factors, in addition to study demographics, are influencing the reported blood lead trend.

Table III-6

Between-Site Regression Summaries
Weighted Least Squares

	Adjustment Set			
	1	1W	2	2W
Dependent Variable	Adj BPb	Adj BPb	Adj Ln(BPb)	Adj Ln(BPb)
Root MSE	3.83	3.88	4.37	4.44
R^2-adjusted	.53	.52	.55	.54
N	61	61	61	61
Error Degrees of Freedom	38	37	38	37
Max. VIF	5.39	6.28	5.39	6.28
Max. Cook's D	.31	.29	.23	.21
Coefficients				
Black	4.78*	4.85*	.34*	.34*
Male	7.60	6.72	.42	.41
Child	7.26	8.18	.52	.54
Teen	14.90	15.21	1.09	1.09
Income	7.84*	8.64*	.52*	.53*
BL_MA	107.38	102.51	8.68*	8.59*
BL_CH	2.66	-.68	-.23	-.30
BL_TN	-16.25	-15.27	-1.29	-1.26
BL_IN	24.20	22.51	1.77	1.74
MA_CH	-121.04	-116.93	-11.57*	-11.48*
MA_TN	120.64	104.18	2.66	2.28
MA_IN	3.14	3.16	-.42	-.43
CH_IN	-1.68	-.04	.46	.50
TN_IN	-29.61	-25.42	-2.43	-2.35
Urban	3.31*	3.01*	.23*	.22*
CC	-2.82	-2.78	-.18	-.17
Winter	-1.62	-1.56	-.13	-.12
Spring	.42	.46	.04	.04
Summer	.72	.76	.06	.06
South	-1.13	-1.43	-.08	-.09
West	.96	.72	.09	.09
Northeast	1.22	1.18	.10	.10
Lead Wt		4.76(x10^{-5})		9.70(x10^{-7})

*Significant at $p \leq .05$

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III.E Estimation of Blood Lead Decline Explainable by Survey Demographics

It is a formidable problem to accurately estimate the portion of the reported blood lead decline attributable to time-related effects of survey variables. More commonly, in problems such as this, the investigator is interested in accurately estimating the true demographic effects when the time component is eliminated from them. Approaches to that objective are well documented. Here, however, the objective is to accurately estimate the collective impact of the demographic effects on time.

The following two approaches to evaluate the contribution to the reported blood lead decline by survey demographics were employed.

(1) Compute the difference in the blood lead time decline before and after removing the effects of the survey variables.

(2) Incorporate one or more terms involving "time" in the between-site analyses and use the time coefficient adjusted for survey demographics to evaluate the blood lead decline not attributable to survey demographics.

Approach (1) provides an estimate of how much of the blood lead time trend could be explained by differential survey demographics. It does not necessarily represent the best estimate of what portion of the time trend is attributable to survey demographics. Approach (2) is considered because, intuitively, it is a natural approach and is the approach used in [4,5] to determine the influence of survey demographics. It can be shown that approach (2) is incorrect (see, eg, [11]). Inclusion of a catchall surrogate such as time will necessarily capture the linear time effects of all demographics in the model not corrected for time. Results based on this approach are provided to illustrate this fact.

III.E.1 Comparison of Blood Lead Time Declines

To establish baseline values, the blood lead decline, before removal of effects of survey variables, was estimated by regressing reported site blood lead means and adjusted site blood lead means on site mean examination date (Days_Pb). The decline (µg/dl) is computed by subtracting the predicted blood lead value at the mean examination date associated with all venous blood leads taken at the last survey site sampled (1452.93 days after start of survey) from the corresponding value at the mean examination date at the first survey site sampled (16.46 days after start of survey). In all analyses, the single linear term for Days_Pb adequately quantified the relationship between the dependent variable and site mean examination date.

To estimate the blood lead decline after removal of survey demographic effects (ie, residual decline), corrected site mean blood leads (CSMB) were first calculated (see Eq. 5) from the analyses reported in Table III-6, and then regressed on Days_Pb. The difference between predicted values at the first and last mean examination date then represents an estimate of the blood lead decline not explainable by survey demographics. Figure III-5 shows a plot of CSMB versus mean examination date based on Adjustment Set 2W. (Refer to Appendix 4 for similar plots from adjustment sets 1, 1W and 2.)

The results of the CSMB regressions of residuals are summarized in Table III-7. The conditional results show that a significant blood lead time trend remains after removing the effects of survey variables. Consequently, to the extent that the within- and between-site models adequately account for effects of survey variables, it appears that the blood lead trend is due to other factors as well.

TIME PLOTS OF CORRECTED (B) SITE MEAN BLOOD LEADS (CORRECTED VALUES FROM MODEL "2W") 96

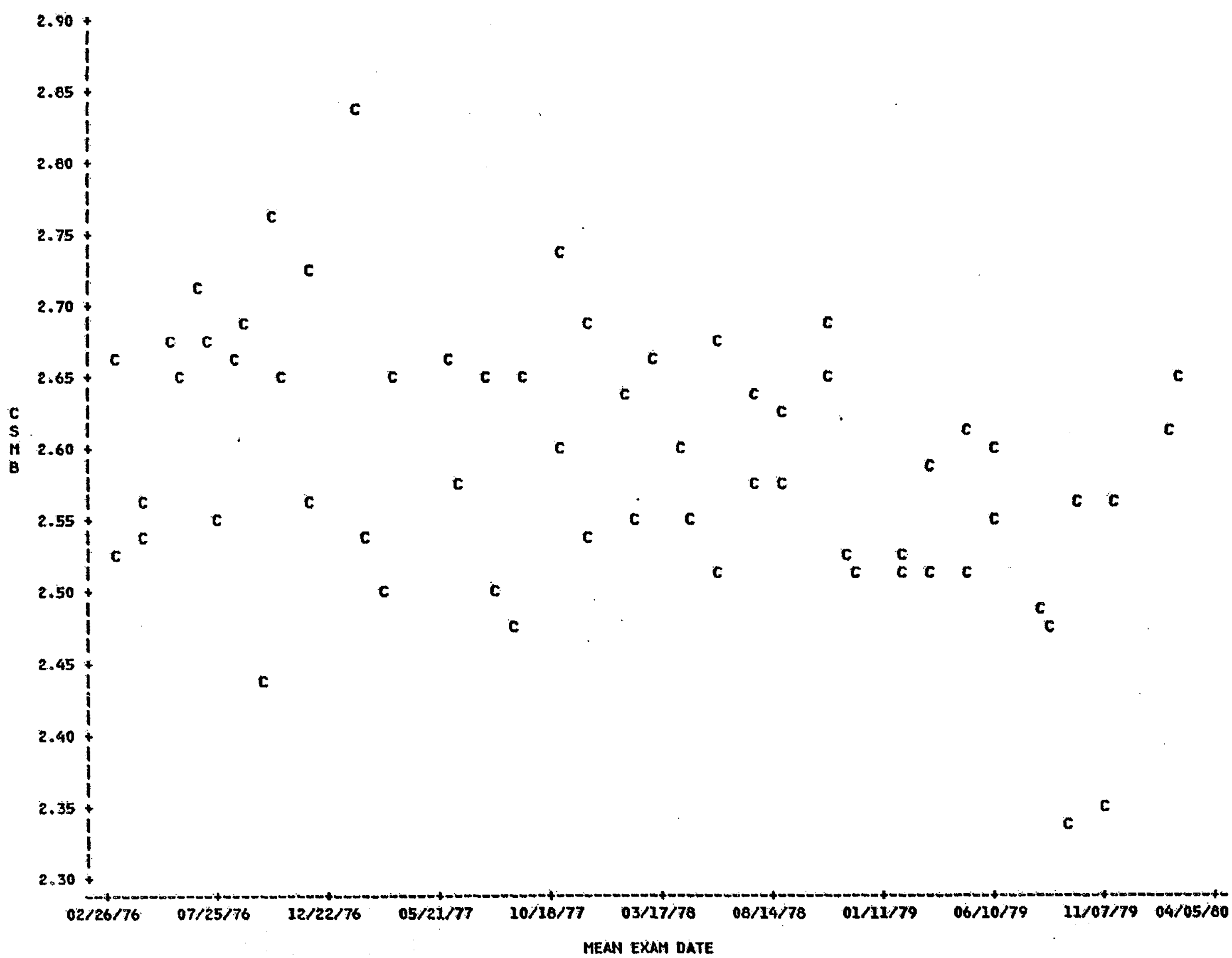

Figure III-5

Corrected Site Blood Lead Means Versus
Site Mean Examination Date

TEH 0530065

DUP050030978

Table III-7

Results of Corrected Site Means Regressed on Time

	CSMBs Based on Adjustment Set			
	1	1W	2	2W
R^2-adjusted	.12	.12	.13	.13
N	61	61	61	61
Max Cook's D	.15	.15	.16	.16
Days_Pb Coeff.	-.00113	-.00113	-.0000816	-.0000816
P-level of Coeff.	.0030	.0030	.0024	.0025

Table III-8 provides a summary of the estimated blood lead declines resulting from the previously described analyses on reported (unadjusted), adjusted and corrected site blood lead means.

The analyses of reported site means for Models 1 and 2 used weighted least squares - weighted by the reciprocal of the estimated site mean variance. For reported results on Models 1W and 2W, a similar weighted least squares analysis was done by first regressing reported site mean blood lead and natural log blood lead, respectively, on "Lead Wt". Then the residuals from this analysis (corrected by adding back the overall mean for convenience) were regressed on mean examination date using ordinary least squares. The analyses of adjusted site means were analogous to those of reported site means except that site effects estimated from the within-site analyses were used and the weights were the reciprocals of estimated variances of these effects. These preliminary analyses on Lead_Wt were performed to achieve fair comparisons among results.

Table III-8

Estimated Blood Lead Decline (µg/dl) During NHANES II

Dependent Variable	Effects Removed	Based on Model Form: 1	1W	2**	2W**
Reported Site Means	none	5.80	5.51	5.42	5.12
Adjusted Site Means	none	5.66	5.44	5.40	5.17
Corrected Site Means	P,R and I*	1.62	1.62	1.56	1.56

* Refers to the personal, residence and itinerary study variables in Table III-3 as accounted for by the between-site analyses on the adjusted blood lead values.

** Results of log analyses converted to µg/dl

All results shown in Table III-8 are consistent regardless of model used. The within-site adjustment process has little effect on the reported blood lead decline, as was previously observed in Figures III-1 and III-2. However, after removing the effects of the survey variables from blood lead, the resulting time trend is substantially decreased (but not to zero as noted from the results in Table III-7). The inclusion of a "Lead_Wt" term appears to have a slight effect on the blood lead trend for analyses of the reported and adjusted site means, where effects of survey variables were not removed. When removing the survey variable effects, this slight effect has been reduced to nothing. Thus, it appears that whatever time related influence "Lead_Wt" has on blood lead is accountable through time related behavior of survey variable effects.

The amount and proportion of the blood lead decline explainable by differential survey demographics is estimated by comparing the blood lead declines between trends based on adjusted and corrected site means. Table III-9 summarizes these computations. These results offer strong evidence that the survey design is likely responsible for a large fraction of the 5-6 μg/dl decline reported during NHANES II.

Table III-9

Blood Lead Decline Explainable by Survey Design

	Model			
	1	1W	2	2W
Drop (μg/dl)	4.04	3.82	3.84	3.61
Percent of Total	71.3	70.2	71.1	69.8

III.E.2 Use of Time Coefficient

In approach (2), a term accounting for time (Days_Pb) was included in the between-site model. The objective was to estimate a blood lead-time slope adjusted for survey variables. Time was included as a Z-type covariate where the site mean examination date (ie, Days_Pb) was centered about the overall examination date mean. The analyses were performed analogous to those summarized in Table III-6, only with the term for time added. Table III-10 highlights results from tnese analyses which may be compared to those in Table III-6.

Table III-10

Between-Site Regression Results Including a Time Term
Weighted Least Squares

	Adjustment Set			
	1	1W	2	2W
Dependent Variable	Adj BPb	Adj BPb	Adj Ln(BPb)	Adj Ln(BPb)
Root MSE	2.64	2.67	2.91	2.94
R^2-adjusted	.78	.77	.80	.80
N	61	61	61	61
Error Degrees of Freedom	37	36	37	36
Max VIF	6.00	6.37	6.00	6.37
Max Cook's D	.17	.16	.12	.12
Time Coefficient	-.00404	-.00404	-.000296	-.000298
Time VIF	3.40	3.44	3.40	3.44

In general, the inclusion of a term for time greatly improved the prediction precision of the models summarized in Table III-6. The centered time term has a relatively low variance inflation factor (VIF) and the coefficient, consequently, appears to be not seriously contaminated by correlations with the other model terms. However, these estimated time coefficients are three to four times larger than those obtained from the CSMB analyses (see Table III-7).

The time coefficients from Table III-10 were used to evaluate the blood lead decline between the first and last site mean examination date. This calculation is straightforward for Adjustment Sets 1 and 1W. (For the other adjustment sets where the dependent variable is on a natural log scale, an additional piece of data was needed. That used was the predicted site mean blood lead value at the first mean examination, which was obtained from the equation resulting from regressing adjusted site mean blood lead on time only. The values used were 16.184 µg/dl for Set 2 and 16.087 µg/dl for Set 2W.)

The blood lead declines (μg/dl) estimated from the time coefficient were 5.81, 5.81, 5.61, and 5.60, based on Adjustment Sets 1, 1W, 2 and 2W, respectively. These values may be compared to those in Table III-8. Note that use of a time coefficient adjusted for survey demographics provides similar estimates to the declines associated with the reported and adjusted site means. The conclusion from such analyses as drawn by [4,5] is that survey demographics have no effect on the reported blood lead trend, because the time coefficient is adjusted for survey demographic effects. This conclusion is incorrect. Rao and Miller [11] show that such a time coefficient will necessarily account for the linear time component associated with all other terms in the model as long as these have not been adjusted for time.

The results based on analyses of residuals after removing the effects of survey demographics (see Tables III-8 and III-9) strongly suggest that the survey design influenced the reported blood lead trend. To further address the potential influence of time-related survey effects, survey demographic coefficients are compared in Table III-11, based on between-site analyses with and without time.

It is apparent from the results shown in Table III-11 that the inclusion of a "time" term alters some of the coefficients substantially. For eight of the model terms the t-statistic has changed by more than one unit (standard deviation). It is interesting to note that of the five terms flagged as significant from the analyses without time, four of these were associated with a t-statistic change of more than one. This observation suggests that the between-site effects most correlated with site mean blood lead are also time dependent. Further, of these five terms, only one remained significant in a model with time, while three other terms were flagged as significant that were not so noted in the model without time.

Table III-11

Coefficients Compared in Between-Site Analyses of Adjustment Set 2W
With and Without a Time Term

	Without "Time"		With "Time"		t-values differing
	Coefficient	t-value	Coefficient	t-value	by at least 1
Black	.34*	2.00	.52*	4.49	x
Male	.41	.78	-.05	-.13	
Child	.54	1.65	-.08	-.34	x
Teen	1.09	1.78	.55	1.34	
Income	.53*	2.43	-.12	-.71	x
BL_MA	8.59*	2.08	3.85	1.36	
BL_CH	-0.30	-.23	.68	.76	
BL_TN	-1.26	-.41	-1.60	-.78	
BL-IN	1.74*	1.34	-1.21	-1.26	x
MA_CH	-11.49	-2.16	-7.81*	-2.18	
MA_TN	2.28	.16	-11.16	-1.17	x
MA_IN	-0.43	-.12	-2.58	-1.09	
CH_IN	0.50	.21	-1.06	-.67	
TN_IN	-2.35	-.49	.65	.20	
Urban	.22*	2.61	.04	.65	x
CC	-0.17	-1.56	-.06	-.73	
Winter	-0.12	-1.83	-.09*	-2.06	
Spring	.04	.61	.00	.02	
Summer	.06	1.05	-.02	-.44	x
South	-.09	-1.05	-.13*	-2.40	x
West	.09	1.27	.06	1.18	
Northeast	.10	1.71	.07	1.97	
Lead Wt	$9.70(x10^{-7})$	.14	$2.32(x10^{-6})$	-.52	
Time			$2.98(x10^{-4})$*	-6.93	

*Flagged as significant at $p \leq .05$

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If the time term were orthogonal to the survey demographic terms, inclusion of time would have no effect on the coefficients. A variance inflation factor of 3.44 for time (see Table III-10) implies 71 percent of the time variation is explainable by survey variables. Consequently, the set of survey demographics contain strong time components.

III.F Summary

Before lead exposure-related causes of a blood lead decline experienced in the U.S. during the NHANES II survey can be properly considered, it should be determined if the survey had any biasing effect on the true decline. The true decline is subject to bias of time-related survey factors falling into two categories

(1) Sample handling and measurement
(2) Survey design and site characteristics

Owing to the length of the survey period and the lack of design control of potential time varying demographics, the survey factors deserve careful evaluation. In this section, the time related effects of survey factors of category (2) were evaluated.

Two methods for estimating the amount of the blood lead decline explainable by survey design and site characteristics were examined. The first compared trends of site mean blood lead (or $\log_e$ blood lead) before and after removing the effects of the survey design and site characteristics. The second incorporated a term for time in the between-site models and used the estimated blood lead-time coefficient (estimated in the presence of terms reflecting study variables and site demographics) to evaluate the decline. The second approach, as noted, is incorrect for isolating time-related effects of survey demographics.

The results of the first method suggest that the influence of time-related survey effects is considerably more important than first believed. These results consistently suggested that 70 percent of the reported decline of 5-6 μg/dl (ie, 4 μg/dl) is explainable by survey variables, leaving an unexplained drop of 1.6 μg/dl during NHANES II. This result deviates considerably from the widely held public perception that U.S. blood lead levels (truly) declined by 35-40 percent (ie, 5-6 μg/dl) during the NHANES II survey period.

Two further points are important to note. First, the method of comparing time trends before and after removal of survey design effects, in no way forces the reported blood lead decline to be dampened. If it had turned out that survey variables varied with time in the opposite way, then the result would have been an estimated real decline greater than the reported decline. Second, because survey variables inflate the real decline, they are positively correlated with reductions in other sources of lead exposure during the survey period. As a result, the estimated time-related survey variable effects may include contributions to the decline of reductions in lead exposure, in the same way as the term for time dominated time-related study effects. Consequently, it is expected that the blood lead decline, unexplained by survey variables, is probably larger than 1.6 μg/dl, but undoubtedly considerably less than 5-6 μg/dl.

The implications of the present findings are substantially different from other reported results [4,5,6]. These other results were based on models not adequately accounting for between-site effects and employing a time coefficient. The importance of the between-site effects is demonstrated by the large differences between the within-site effect (see Table III-5) and between-site effect (see Table III-6) for some X-type covariates. For further discussion on these differences refer to Sections I and VII.

The apparent severity of the time-related survey effects on the blood lead decline raises the larger issue of the usefulness of estimates of any other population blood lead characteristics from NHANES II (eg, percent of children with elevated blood leads). Clearly, the inherent biases present and the

IV. Gasoline Lead Exposure

Gasoline lead consumption data are obtainable by state and calendar quarter. Summing over all states provides quarterly national lead consumption data which have been correlated to NHANES II blood lead data [3,4,5,6]. Such data are insensitive to variations in gasoline lead exposure, both within sites and between sites. In this section, a site specific measure of gasoline lead exposure is discussed and compared to national gasoline lead use. The site specific measure helps to minimize the insensitivity to between-site variation in exposure although it remains insensitive to within-site variations.

The results discussed in this section indicate that national gasoline lead use is an unsuitable measure of gasoline lead exposure for correlation with NHANES II blood lead data.

IV.A Site Specific Measure of Gasoline Lead Exposure

Gasoline lead use for each of the states containing a sampling site was derived by combining the Ethyl monthly gasoline sales data [17] with the Department of Energy (DOE) semiannual gasoline lead content survey data [18]. The Ethyl data were combined into calendar quarters to give the amount of leaded regular and leaded premium grade gasoline sold each quarter in each state. The DOE semiannual data were used to derive the lead concentration in regular and premium gasolines for the winter and summer quarters for each state. The lead concentrations for the spring and fall quarters were estimated by linear interpolation between the adjacent winter and summer quarters. The total lead used by quarter by state was calculated by multiplying the gasoline volumes by the corresponding gasoline lead concentration values for the regular and premium grades and summing the two values.

Table IV-1 provides the state lead use data (billions of grams) from fourth quarter 1975 through first quarter 1980 for those states which contained a NHANES II sampling site. (Table IV-2 gives city and state names associated with site identifications.)

Associated with each NHANES II blood lead record was a gasoline lead exposure value (billions of grams per square mile) derived using the formula

$$\frac{\text{(State Gasoline Lead Use)} \times \text{(1975 County Populations)}}{\text{(1975 State Population)} \times \text{(County Square Miles)}} \qquad (1)$$

The value for state gasoline lead use was based on a linear interpolation to the individual's examination date between adjacent quarterly values. The values for county populations and square miles were the same for all individuals at a site and were based on those counties in which the individuals sampled in each site lived. Such individual exposure values were averaged and those average values were used as Z-type covariates (see Section III.A) in the between-site analyses discussed in Section V. This measure of exposure is a site-specific gasoline lead density and reflects between-site variation in exposure.

Table IV-2 presents a summary of these current site exposure averages, referred to as Gas Cur 75 (or GCUR75 as used in analyses reported in Section V). Also included are values of state and county population, county area, and some additional information.

The construction of this site specific measure of gasoline lead exposure is based on results from [19]. It was found that state gasoline sales and state population were highly correlated (r=.97), whereas gasoline sales were poorly correlated with population density (r=.10), percent urban dwellers (r=.42), and per capita income (r=.29). Similar correlations were found for Standard Metropolitan Statistical Areas (SMSAs). Based on these results, it was

Table IV-1

Quarterly State Gasoline Lead Use Associated with NHANES II Survey Sites

BLOOD LEAD AND GASOLINE LEAD SUMMARIES FOR NHANES II SITES

STATE GASOLINE LEAD USED (BILLIONS OF GRAMS)

SITE ID	STRATA	PSU	4Q75	1Q76	2Q76	3Q76	4Q76	1Q77	2Q77	3Q77	4Q77
1	01	1	1.7862	1.7678	1.8561	1.8986	1.8064	1.7186	1.7580	1.7664	1.6979
2	02	1	.	.	.	.	.	.	.	.	.
3	03	1	0.8440	0.7776	0.8913	0.9403	0.8361	0.6704	0.8447	0.8564	0.8090
4	04	1	3.6828	3.6535	4.1469	4.2899	3.9069	3.5567	3.5246	3.4401	2.9677
5	05	1	0.8738	0.7828	1.0016	1.1180	0.9999	0.8504	1.0355	1.1139	0.9749
6	06	1	0.6439	0.5874	0.7221	0.7244	0.6363	0.5523	0.6397	0.5807	0.5481
7	07	1	1.0956	0.9599	1.2060	1.2567	1.0451	0.8351	1.0149	1.0814	0.9101
8	08	1	0.3982	0.3530	0.4440	0.5198	0.4202	0.3415	0.4368	0.5354	0.4123
9	09	1	0.6639	0.5285	0.7480	0.8456	0.7606	0.5825	0.7195	0.7100	0.6362
10	10	1	3.6086	3.3936	3.9435	3.8010	3.3770	3.0704	3.4414	3.3078	2.9384
11	11	1	0.6347	0.4497	0.6434	0.7754	0.7130	0.6180	0.7498	0.8289	0.6270
12	12	1	1.7774	1.4593	1.8205	2.0299	1.8625	1.5451	1.9279	2.0980	1.6396
13	13	1	1.6453	1.2970	1.8029	2.0688	1.9437	1.5607	1.7846	1.8862	1.6256
14	14	1	0.7024	0.6127	0.7454	0.8080	0.7007	0.5598	0.6901	0.7376	0.6414
15	15	1	1.0737	0.9807	1.1135	1.1850	1.0231	0.8488	1.0393	1.1001	0.9802
16	16	1	0.8738	0.7828	1.0016	1.1180	0.9999	0.8504	1.0355	1.1139	0.9749
17	17	1	1.1927	1.0747	1.2646	1.3412	1.1896	1.0536	1.1947	1.2041	1.1382
18	18	1	0.7024	0.6127	0.7454	0.8080	0.7007	0.5598	0.6901	0.7376	0.6414
19	19	1	1.9731	1.7184	2.0749	2.3527	2.0812	1.7826	1.9923	2.2345	1.8432
20	20	1	1.0439	0.9522	1.1536	1.2758	1.1532	0.9667	1.1464	1.2235	1.1117
21	21	1	1.0439	0.9522	1.1536	1.2758	1.1532	0.9667	1.1464	1.2235	1.1117
22	22	1	0.4390	0.3944	0.4895	0.5362	0.4986	0.4355	0.4642	0.4769	0.4484
23	23	1	0.7889	0.6814	0.8577	0.9337	0.9614	0.8384	0.9441	0.9984	0.8207
24	24	1	1.7770	1.5233	1.9046	2.1204	1.9153	1.5560	1.8543	2.0098	1.8068
25	25	1	1.7770	1.5266	1.9046	2.1204	1.9153	1.5560	1.8543	2.0098	1.8068
26	26	1	1.9731	1.7184	2.0749	2.3527	2.0812	1.7826	1.9923	2.2345	1.8432
27	27	1	3.6828	3.6535	4.1469	4.2899	3.9069	3.5567	3.5246	3.4401	2.9677
28	28	1	3.6086	3.3936	3.9435	3.8010	3.3770	3.0704	3.4414	3.3078	2.9384
29	29	1	1.0956	0.9599	1.2060	1.2567	1.0451	0.8351	1.0149	1.0814	0.9101
30	30	1	1.7774	1.4593	1.8205	2.0299	1.8625	1.5451	1.9279	2.0980	1.6396
31	31	1	0.9619	0.7770	1.0917	1.2621	1.1375	0.9171	1.0959	1.1663	0.9939
32	32	1	1.6453	1.2970	1.8029	2.0688	1.9437	1.5607	1.7846	1.8862	1.6256

Table IV-1 (Pg. 2 of 4)

Quarterly State Gasoline Lead Use Associated with NHANES II Survey Sites

BLOOD LEAD AND GASOLINE LEAD SUMMARIES FOR NHANES II SITES

STATE GASOLINE LEAD USED (BILLIONS OF GRAMS)

SITE ID	STRATA	PSU	4Q75	1Q76	2Q76	3Q76	4Q76	1Q77	2Q77	3Q77	4Q77
33	01	2	0.0759	0.0657	0.0735	0.0783	0.0760	0.0637	0.0700	0.0704	0.0636
34	02	2	3.6828	3.6535	4.1469	4.2899	3.9069	3.5567	3.5246	3.4401	2.9677
35	03	2	1.7862	1.7678	1.8561	1.8986	1.8064	1.7186	1.7580	1.7664	1.6979
36	04	2	3.6828	3.6535	4.1469	4.2899	3.9069	3.5567	3.5246	3.4401	2.9677
37	05	2	1.1927	1.0747	1.2646	1.3142	1.1896	1.0536	1.1947	1.2041	1.1382
38	06	2	0.6007	0.5704	0.6964	0.7700	0.6300	0.5305	0.6659	0.7524	0.5877
39	07	2	1.3622	1.0622	1.3582	1.5438	1.4585	1.2548	1.4432	1.5110	1.3895
40	08	2	0.1343	0.1134	0.1558	0.1885	0.1423	0.1127	0.1400	0.1626	0.1214
41	09	2	1.6453	1.6970	1.8029	2.0688	1.9437	1.5607	1.7846	1.8862	1.6256
42	10	2	0.0817	0.0652	0.0958	0.1381	0.0914	0.0650	0.0867	0.1253	0.0784
43	11	2	0.7118	0.5725	0.8130	0.9588	0.8208	0.6592	0.7994	0.8985	0.7283
44	12	2	0.6347	0.4497	0.6434	0.7754	0.7130	0.6180	0.7498	0.8289	0.6270
45	13	2	1.3622	1.0622	1.3582	1.5438	1.4585	1.2548	1.4432	1.5110	1.3895
46	14	2	1.2153	1.0977	1.3281	1.3598	1.2313	1.0800	1.2130	1.2680	1.1779
47	15	2	0.5669	0.5075	0.6289	0.6781	0.5446	0.4080	0.5482	0.6529	0.5705
48	16	2	0.8440	0.7776	0.8913	0.9403	0.8361	0.6704	0.8447	0.8564	0.8090
49	17	2	0.6396	0.5853	0.6837	0.7236	0.6450	0.5655	0.6561	0.6634	0.6058
50	18	2	0.7919	0.7114	0.8226	0.8722	0.7954	0.7000	0.7988	0.8209	0.7734
51	19	2	1.9731	1.7184	2.0749	2.3527	2.0812	1.7826	1.9923	2.2345	1.8432
52	20	2	1.0439	0.9522	1.1536	1.2758	1.1532	0.9667	1.1464	1.2235	1.1117
53	21	2	1.9731	1.7184	2.0749	2.3527	2.0812	1.7826	1.9923	2.2345	1.8432
54	22	2	0.7889	0.6814	0.8577	0.9337	0.9614	0.8384	0.9441	0.9984	0.8207
55	23	2	0.2002	0.1675	0.2246	0.2898	0.2348	0.2075	0.2448	0.2969	0.2281
56	24	2	1.9731	1.7184	2.0749	2.3527	2.0812	1.7826	1.9923	2.2345	1.8432
57	25	2	1.7770	1.5233	1.9046	2.1204	1.9153	1.5560	1.8543	2.0098	1.8068
58	26	2	1.7770	1.5233	1.9046	2.1204	1.9153	1.5560	1.8543	2.0098	1.8068
59	27	2	3.6828	3.6535	4.1469	4.2899	3.9069	3.5567	3.5246	3.4401	2.9677
60	28	2	3.6828	3.6535	4.1469	4.2899	3.9069	3.5567	3.5246	3.4401	2.9677
61	29	2	3.6086	3.3936	3.9435	3.8010	3.3770	3.0704	3.4414	3.3078	2.9384
62	30	2	1.3622	1.0622	1.3582	1.5438	1.4585	1.2548	1.4432	1.5110	1.3895
63	31	2	1.7774	1.4593	1.8205	2.0299	1.8625	1.5451	1.9279	2.0980	1.6396
64	32	2	0.9619	0.7770	1.0917	1.2621	1.1378	0.9171	1.0959	1.1663	0.9939

Table IV-1 (Pg. 3 of 4)

Quarterly State Gasoline Lead Use
Associated with NHANES II
Survey Sites

BLOOD LEAD AND GASOLINE LEAD SUMMARIES FOR NHANES II SITES

STATE GASOLINE LEAD USED (BILLIONS OF GRAMS)

SITE ID	STRATA	PSU	1Q78	2Q78	3Q78	4Q78	1Q79	2Q79	3Q79	4Q79	1Q80
1	01	1	1.7339	1.6875	1.6116	1.6375	1.7182	1.6449	1.6218	1.3087	1.0339
2	02	1	.	.	.	.	.	.	.	.	.
3	03	1	0.7471	0.7837	0.7532	0.7405	0.7044	0.6848	0.6441	0.5168	0.3596
4	04	1	2.5649	2.8015	2.7442	2.5105	2.3136	2.1429	2.0798	1.8015	1.5183
5	05	1	0.8105	0.9335	0.9763	0.9538	0.8712	0.8858	0.9002	0.7062	0.4945
6	06	1	0.4871	0.6375	0.6188	0.5981	0.5186	0.5506	0.5098	0.3696	0.2429
7	07	1	0.7059	0.8645	0.9060	0.9764	0.8574	0.9522	0.9655	0.7660	0.5111
8	08	1	0.3139	0.3301	0.3253	0.2986	0.2723	0.3013	0.3321	0.2462	0.1697
9	09	1	0.4865	0.6043	0.6105	0.6097	0.5225	0.5741	0.5606	0.4675	0.2779
10	10	1	2.6924	3.3949	3.7043	3.9183	3.7595	3.3075	3.1488	2.4445	2.0065
11	11	1	0.4120	0.5649	0.6733	0.5417	0.6829	0.4945	0.6148	0.4527	0.2586
12	12	1	1.0872	1.3185	1.3881	1.4096	1.3261	1.3912	1.4004	1.1039	0.7650
13	13	1	1.2842	1.3550	1.3254	1.4278	1.3003	1.2979	1.2790	1.0666	0.7351
14	14	1	0.4871	0.6175	0.6267	0.6353	0.5716	0.6659	0.7025	0.5447	0.3500
15	15	1	0.8046	0.9544	0.9729	0.9490	0.8266	0.8826	0.8959	0.7219	0.5039
16	16	1	0.8105	0.9335	0.9763	0.9538	0.8712	0.8858	0.9002	0.7065	0.4945
17	17	1	1.0584	1.1265	1.1554	1.0994	1.0729	1.1397	1.1423	0.9212	0.6598
18	18	1	0.4871	0.6175	0.6267	0.6353	0.5716	0.6659	0.7025	0.5447	0.3500
19	19	1	1.4568	1.5648	1.6023	1.6376	1.5682	1.5301	1.5402	1.2231	0.8626
20	20	1	1.0006	0.9985	1.0084	1.0306	0.9922	0.9185	0.9274	0.7402	0.5400
21	21	1	1.0006	0.9985	1.2284	1.0306	0.9922	0.9185	0.9274	0.7402	0.5400
22	22	1	0.4120	0.4097	0.4087	0.4333	0.4221	0.3846	0.3855	0.3167	0.2250
23	23	1	0.6646	0.7532	0.7704	0.7276	0.6863	0.7046	0.7783	0.6163	0.4848
24	24	1	1.4857	1.6433	1.6826	1.6809	1.5780	1.5624	1.5572	1.2459	0.8469
25	25	1	1.4857	1.6433	1.6826	1.6809	1.5780	1.5624	1.5572	1.2459	0.8469
26	26	1	1.4568	1.5648	1.6023	1.6376	1.5682	1.5301	1.5402	1.2231	0.8326
27	27	1	2.5649	2.8015	2.7442	2.5105	2.3136	2.1429	2.0798	1.8015	1.5183
28	28	1	2.6924	3.3949	3.7046	3.9183	3.7595	3.3075	3.1488	2.4445	2.0065
29	29	1	0.7059	0.8645	0.9060	0.9764	0.8574	0.9522	0.9655	0.7660	0.5111
30	30	1	1.0872	1.3185	1.3881	1.4096	1.3261	1.3912	1.4004	1.1039	0.7650
31	31	1	0.7546	0.8664	0.8460	0.8590	0.7756	0.8234	0.8172	0.6609	0.4499
32	32	1	1.2842	1.3550	1.3254	1.4278	1.3003	1.2979	1.2790	1.0666	0.7351

Table IV-1 (Pg. 4 of 4)
Quarterly State Gasoline Lead Use Associated with NHANES II Survey Sites

BLOOD LEAD AND GASOLINE LEAD SUMMARIES FOR NHANES II SITES

STATE GASOLINE LEAD USED (BILLIONS OF GRAMS)

SITE ID	STRATA	PSU	1Q78	2Q78	3Q78	4Q78	1Q79	2Q79	3Q79	4Q79	1Q80
33	01	2	0.0535	0.0555	0.0532	0.0566	0.0564	0.0565	0.0531	0.0438	0.0309
34	02	2	2.5649	2.8015	2.7442	2.5105	2.3136	2.1429	2.0798	1.8015	1.5183
35	03	2	1.7339	1.6875	1.6116	1.6375	1.7182	1.6449	1.6218	1.3087	1.0339
36	04	2	2.5649	2.8015	2.7442	2.5105	2.3136	2.1429	2.0798	1.8015	1.5183
37	05	2	1.0584	1.1265	1.1224	1.0994	1.0729	1.1397	1.1423	0.9212	0.6598
38	06	2	0.4617	0.4868	0.4928	0.4404	0.4145	0.4442	0.4765	0.3696	0.2565
39	07	2	1.1737	1.1590	1.0546	1.0441	0.9659	1.0706	1.1758	0.9210	0.6352
40	08	2	0.1060	0.1230	0.1293	0.1026	0.0864	0.0948	0.1029	0.0760	0.0550
41	09	2	1.2842	1.3550	1.3254	1.4278	1.3003	1.2979	1.2790	1.0666	0.7351
42	10	2	0.0637	0.0762	0.0930	0.0649	0.0556	0.0588	0.0713	0.0525	0.0360
43	11	2	0.5920	0.6621	0.6977	0.6888	0.6490	0.6485	0.6850	0.5213	0.3519
44	12	2	0.4120	0.5649	0.6733	0.5417	0.3829	0.4945	0.6148	0.4527	0.2586
45	13	2	1.1737	1.1590	1.0546	1.0441	0.9659	1.0706	1.1758	0.9210	0.6352
46	14	2	1.0950	1.2093	1.2172	1.1919	1.1541	1.1995	1.2416	0.9648	0.6932
47	15	2	0.4858	0.5652	0.5830	0.5160	0.4363	0.4634	0.4806	0.3788	0.2573
48	16	2	0.7471	0.7837	0.7532	0.7405	0.7044	0.6848	0.6441	0.5168	0.3596
49	17	2	0.5662	0.6171	0.6122	0.5892	0.5680	0.6144	0.6240	0.4847	0.3473
50	18	2	0.7065	0.7651	0.7642	0.7537	0.7175	0.7583	0.7888	0.6286	0.4483
51	19	2	1.4568	1.5648	1.6023	1.6376	1.5682	1.5301	1.5402	1.2231	0.8626
52	20	2	1.0006	0.9985	1.0084	1.0306	0.9922	0.9185	0.9274	0.7402	0.5400
53	21	2	1.4568	1.5648	1.6023	1.6376	1.5682	1.5301	1.5402	1.2231	0.8626
54	22	2	0.6646	0.7532	0.7704	0.7276	0.6863	0.7046	0.7783	0.6163	0.4848
55	23	2	0.1723	0.1839	0.2314	0.1941	0.1650	0.1786	0.2367	0.1775	0.1358
56	24	2	1.4568	1.5648	1.6023	1.6376	1.5682	1.5301	1.5402	1.2231	0.8626
57	25	2	1.4857	1.6433	1.6826	1.6809	1.5780	1.5624	1.5572	1.2459	0.8469
58	26	2	1.4857	1.6433	1.6826	1.6809	1.5780	1.5624	1.5572	1.2459	0.8469
59	27	2	2.5649	2.8015	2.7442	2.5105	2.3136	2.1429	2.0798	1.8015	1.5183
60	28	2	2.5649	2.8015	2.7442	2.5105	2.3136	2.1429	2.0798	1.8015	1.5183
61	29	2	2.6924	3.3949	3.7043	3.9183	3.7595	3.3075	3.1488	2.4445	2.0065
62	30	2	1.1737	1.1590	1.0546	1.0441	0.9659	1.0706	1.1758	0.9210	0.6352
63	31	2	1.0872	1.3185	1.3881	1.4096	1.3261	1.3912	1.4004	1.1039	0.7650
64	32	2	0.7546	0.8664	0.8460	0.8590	0.7756	0.8234	0.8172	0.6609	0.4499

other sources of lead exposure such as paint. However, while this could be true, it is not possible to separate these contributions from these data. Based on the results reported here, it is unlikely that gasoline lead exposure was responsible for all, or even the majority of, the decline. Even recognizing the interpretation limitations of these data, these results presented, along with the corroborating results from the use of the blood lead-air lead slope, strongly suggest that gasoline lead exposure accounted for only a small portion of the reported blood lead decline.

VI. Supplementary Analyses and Results

VI.A. Justification of Model Specification

The modelling approach presented is that of a split-plot analysis of covariance. Individuals are the split plots and sites are the whole plots. The covariates are the demographic and exposure factors.

The key aspects of the model to consider are the random effect terms and the fixed effect terms. The model assumes that two sources of blood lead variation are important - variation within sites and variation between sites. Corresponding to these random effects are demographic covariates (fixed effect terms) used to explain both within- and between-site variation in blood lead levels. Of particular note is that each X-type covariate (that is, a covariate that varies within sites - see Section III.A) is used to account for within-site variation using individual values as well as between-site variation using site means. In the special case where the within- and between-site effects of an X-type covariate are the same, the model reduces to a single term for the X-type effect. These aspects are discussed in more detail in Sections VI.A.1 and VI.A.2.

In all the results reported in Sections III and V, the complete model was fit, apart from variations accounting for addition of lead exposure terms. No selection process of model terms (eg, stepwise, best subsets, etc) was imposed. The advantages of this approach are

- the entire set of explanatory demographics are used to explain variation in blood lead levels.
- results among analyses can be compared on the same basis.
- a better understanding of individual demographic effects results by including all terms that may influence effects due to direct correlation and time-related correlation.
- controversy on appropriate model selection criteria is avoided.
- controversy on accuracy of significance levels of the effects is avoided.

The disadvantages are the potential confounding that may result and the loss of error degrees of freedom with so many terms. However, neither of these concerns proved to be a problem. Variance inflation factors (VIF) of centered terms were computed among the set of all 38 model terms which reflect both within- and between-site demographic effects. The maximum VIF was 4.78, associated with the between-site "CC" term. When $\log_{10}$GCUR75 was included, the maximum VIF was 8.70 for the between-site "urban" term, still fairly small among 39 terms. The degrees of freedom loss was also not a problem. By not incorporating the strata/PSU design structure (see Section VI.A.1), 61 degrees of freedom were available to use in the between-site analysis with 22 between-site demographic terms and one or more terms for gasoline lead exposure, leaving over 35 degrees of freedom to estimate the residual variation.

VI.A.1 The Two Error Terms

There is a clear need for at least two error terms because site-to-site differences in mean blood lead levels are present. An approximate test to show that the between-site variance component, σ_s^2, is significantly greater than zero is easily obtained from the two-stage analysis. The within-site analysis provides an estimate of the person-to-person variance, σ_p^2, within sites, and the between-site analysis provides the residual site mean square which has an expected value of $\sigma_s^2+(\sigma_p^2/k)$, where k is the harmonic mean of the number of individuals at each site. The variance components may then be estimated using these relationships and the residual mean squares from each analysis.

Consideration was given to specifying a model with three random effects corresponding to the structure associated with the survey design. These effects are strata, PSU within strata, and person-to-person within PSU. The survey design incorporates a created strata/PSU structure in order to increase the precision of estimated statistics for a given sample size. To realize this efficiency for any particular response variable, PSU pairs within strata should be more alike than between strata. For the blood lead data, no evidence of this was found.

To investigate the similarity between PSU pairs within strata, two approaches were investigated. In the first, an ordinary least squares analysis incorporating only the three random effect terms was used as well as a robust analogue (Fellner [21]) of the method of restricted maximum likelihood (Patterson and Thompson [22]). The estimated variance components are given in Table VI-1, where it is seen that the PSU component is considerably larger than the strata component:

Table VI-1

Results of Variance Component Analysis of Survey Design Structure*

Variance Component	Ordinary Least Squares	Robust Analysis
Strata	.0055194	.0063634
PSU/Strata	.022270	.021892
Person-to-Person	.13941	.13204

*Based on $\log_e$ blood lead

In the second approach, site means for blood lead and personal and residence demographics were calculated. For each variable, a variance ($\sigma^2_{strata}+\sigma^2_{PSU}$) of all site means was computed as well as a variance (σ^2_{PSU}) between PSU pairs within a stratum, pooled over all strata. These variances ignore the frequency variations in the site means. The results in Table VI-2 show that the variation between PSUs within strata is larger than between strata for all variables except urbanization.

Table VI-2

Strata/PSU Variances

Variable	$\sigma^2_{strata} + \sigma^2_{PSU}$	σ^2_{PSU}	σ^2_{strata}
Blood Lead (μg/dl)	5.485	4.109	1.376
Black	.0274	.0153	.0121
Male	.00159	.00194	-.000
Child	.00746	.00660	.00086
Teen	.00135	.00115	.00020
Income	.0193	.00871	.0106
Urban	.190	.0550	.135
CC	.118	.0927	.0253

On the basis that σ^2_{strata} is small relative to the variance sum, it was felt there was insufficient evidence to necessitate use of three random effect terms in the model.

VI.A.2 Fixed Effect Terms

The distinguishing feature of the nested covariate model is that each X-type covariate was incorporated as two terms as follows: For X_{ij} designating the value of the jth individual in the ith site, the within-site covariate term is $\beta_W(X_{ij}-\bar{X}_{i.})$ and the between-site term is $\beta_B(\bar{X}_{i.} - \bar{X}_{..})$. If $\beta_W = \beta_B = \beta$, then only the term $\beta(X_{ij} - \bar{X}_{..})$ is fit. Thus, there is no harm in using a more general model by including both terms. The necessity of including both terms here can be justified on two grounds.

(1) For several X-type covariates, $\beta_W \neq \beta_B$

(2) The residual time trends are substantially affected when only a term of the form $\beta(X_{ij} - \overline{X}_{..})$ is fit.

Evidence supporting (1) is given in Table VI-3. Here coefficients and their standard errors are compared between all X-type covariates that were included in both the within- and between-site analyses associated with within-site analysis 2W (dependent variable is $\log_e$ blood lead and lead weight is included as a covariate). To obtain a rough idea of whether the coefficient pairs are statistically different, a t-statistic was computed, assuming the estimates are independent. Six such t-statistics have values at about ± 2, the critical value of a 5 percent significance test. Comparisons of Models 1, 1W and 2 provide similar results. The assumption of independence is not strictly correct, but as noted above, the maximum VIF among the 38 demographics terms was 4.78, with most VIF's between 1 and 2; hence, correlations this small should have no practical importance.

Table VI-3

Comparison of Coefficients of Within- and Between-Site Effects for X-type Covariates

Term	Model 2W Within-Site Analysis		Between-Site Model* Demographics Only		t-value of difference
	Coefficient	Std. Error	Coefficient	Std. Error	
Black	.170	.013	.337	.169	-.98
Male	.245	.0069	.406	.521	-.31
Child	.083	.011	.537	.326	-1.39
Teen	-.119	.0094	1.092	.615	-1.97
Income	.079	.0075	.533	.220	-2.06
BL_MA	.058	.024	8.586	4.131	-2.06
BL_CH	.124	.029	-.304	1.324	.32
BL_TN	.0067	.032	-1.264	3.010	.42
BL_IN	.012	.026	1.738	1.300	-1.33
MA_CH	-.319	.017	-11.488	5.330	-2.22
MA_TN	-.184	.019	2.282	14.073	-.17
MA_IN	.0023	.015	-.428	3.530	.12
CH_IN	.135	.019	.500	2.358	-.15
TN_IN	.086	.021	-2.350	4.850	.50
Urban	.063	.015	.224	.086	-1.84
CC	.056	.013	-.174	.111	2.06
Lead_Wt	$15.6(X10^{-7})$	$3.3(X10^{-7})$	$9.7(X10^{-7})$	$67.3(X10^{-7})$	.09

* Results based on Weighted Least Squares, weighted by reciprocal of estimated variances of adjusted site means.

To address (2) above, an ordinary least squares analysis of the 9241 individual records used in the analyses in Section III was performed in a <u>single stage</u> - once with one term for each X-type covariate (ie, one term of form $\beta(X_{ij}-\bar{X}_{..})$ was fit) and then with two terms for each X-type covariate (ie, terms $\beta_W(X_{ij}-\bar{X}_{i.})$ and $\beta_B(\bar{X}_{i.}-\bar{X}_{..})$ were fit). Each analysis also included all Z-type covariates as used in analyses of Section III. A time term was not used. Neither analysis provides correct error terms to test all effects in the model. The primary purpose here is to gain insight on whether or not inclusion of both X-type terms impacts on the explanation of time-related behavior of blood lead. Statistically correct tests for the different terms in the model were not a consideration in this analysis.

Table VI-4 presents some key summaries from analyses regressing blood lead and $\log_e$ blood lead on the two model forms. "Lead Wt" was included as an X-type covariate in each analysis. The regression model statistics indicate an improvement when including two linear terms per X-type covariate. While numerically, the improvement in fit is not substantial, it should be noted that the largest component of variation is person-to-person (see Table VI-1) and inclusion of between-site terms principally decreases the between-site error. More importantly, the residual declines between model forms differ considerably. (The residual declines were computed, as in Sections III and V, by regressing the residuals from each analysis on a linear time term and then evaluating the predicted blood lead difference between the mean examination dates of the first and last sites sampled.) The unexplained blood lead decline is 2.5 times larger for the models with one term per X-covariate than with two. This observation suggests that when evaluating time characteristics of blood lead data, the fixed effect site covariates in the model have a substantial effect on interpretation.

On the basis of the results in Table VI-4 and the demonstrated need for including two terms per X-covariate, it is concluded that the results shown in Sections III and V based on the two-term X-covariate model are far more informative with respect to understanding the blood lead time variation within the survey than when a one term X-covariate model is used. The fact that the residual blood lead declines differ so in Table VI-4 between models strongly suggests that site means of X-type covariates are strongly correlated with time and mainly account for the time decline attributable to survey demographics.

Table VI-4

Comparison of Analyses based on Models with One and Two Linear Terms per X-type Covariate - One Stage Fit

	Dependent Variable			
	BPb		$\log_e$ BPb	
	One-Term	Two-Term	One-Term	Two-Term
Regression Summaries				
N	9241	9241	9241	9241
No. of Model Terms	24	40	24	40
Root MSE	5.51	5.37	.350	.339
R^2-adjusted	.250	.286	.275	.321
Residual BPb Declines (μg/dl)	4.45	1.73	4.13	1.65

The one X-term models are similar to those used by CDC and EPA [4,5,6]. The results in Table VI-4 clearly show the limitation of using such models in understanding time-related effects of survey demographics on the reported blood lead decline.

It is important to note another observation from Table VI-4. The residual blood lead declines estimated from the complete model of within- and between-site covariate effects in one stage are essentially the same as those obtained using the same model, but fit in two stages (see Table III.8). Consequently, the two-stage fit procedure has no impact on the residual decline results.

VI.B Results on Time-Related Site Effects

It was noted in Section VI.A.2 that site means of X-type covariates appear to be able to account for much of the blood lead decline attributable to survey demographics. Their relationship with time has previously been suggested in Table III-11 and Table V-18 where regression coefficients are compared in between-site models with and without time. Two additional analyses were performed to gain further insight into time-related associations of site mean demographics and exposure. These are regressions of time on site mean covariates and ridge regression analyses. They are discussed below.

VI.B.1 Time as the Dependent Variable Using Between-Site Models

A direct way of identifying key site effects that are time-related is to regress site mean examination data on terms accounting for site demographics and/or exposure. Ten such analyses were performed, representing variations of between-site models with site demographics only and with one or two gasoline lead exposure terms included either in raw or transformed form. All analyses used ordinary least squares and model terms are based on centered site means.

Table VI-5 presents the results of these ten analyses. It is concluded that several of the terms are strongly associated with time. In models including only survey demographics, site effects for Child, Income, BL_IN, and Urban are identified as being strongly related to time, with Black, BL_MA and NA_TN somewhat less so. Income and Urban show the strongest individual time effect. Further, the coefficients for Child, Income and Urban are all negative. This implies that as time increases the proportion of children, low incomes and high urbanized declined. Since children, low incomes and high urbanized areas have higher blood lead levels than teens/adults, high incomes, and rural areas, respectively, the biasing effect on the blood lead decline is apparent. Results on site effects were fairly consistent in models which also included terms for gasoline lead exposure.

Table VI-5

Results of Between-Site Analyses with "Time" the Dependent Variable

Model Terms	Survey Dem. Variations		Between-Site Model A Variations				Between-Site Model G Variations			
Black	*	*	**	**	**	**	**	**	**	**
Male	-	-	-	-	-	-	-	-	-	-
Child	**	**	*	*	*	*	*	-	-	-
Teen	-	-	-	-	-	-	-	-	-	-
Income	**	**	**	**	**	**	**	**	**	**
BL_MA	*	-	-	-	-	-	-	-	-	-
BL_CH	-	-	-	-	-	-	-	-	-	-
BL_TN	-	-	-	-	-	-	-	-	-	-
BL_IN	**	**	**	**	**	**	**	**	**	**
MA_CH	-	-	-	-	-	-	-	-	-	-
MA_TN	*	-	-	-	*	-	-	-	**	**
MA_IN	-	-	-	-	-	-	-	-	-	-
CH_IN	-	-	-	-	-	-	-	-	-	-
TN_IN	-	-	-	-	-	-	-	-	-	-
Urban	**	**	**	*	-	-	*	-	-	-
CC	-	-	-	-	-	-	-	-	-	-
Winter	-	-	-	-	-	-	-	-	-	-
Spring	-	-	-	-	-	-	-	-	**	**
Summer	-	-	-	-	-	-	-	-	-	-
South	-	-	*	-	-	-	-	-	-	-
West	-	-	-	-	-	-	*	-	-	-
Northeast	-	-	-	-	-	-	-	-	-	-
Lead Wt		-		-		-		-		-
GCUR75			**	**			-	-		
$\log_{10}$GCUR75					-	-			**	**
GLAG 375							-	-		
$\log_{10}$GLAG 375									**	**

*Flagged as significant at $.05 \le p < .10$
**Flagged as significant at $p < .05$
-term included in model but not significant at $p < .10$

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Figures Vl-1 to VI-4 illustrate these relationships among blood lead, time and income/urban terms. Here site averages are plotted based on the data grouped by six-month intervals (January to June and July to December) during the survey period. Figures VI-1 and VI-2 show the time behavior of the income and urban variables while Figures VI-3 and VI-4 show their relationship to blood lead.

To carry this analysis one step further, two between-site analyses, based on blood lead Adjustment Set 2W, were performed on models depending only on the key time-related site demographics identified from Table VI-5. Residuals from these analyses were regressed on time, as was done in Section III, to evaluate the blood lead decline unaccounted for by these site demographics. (See Section III.E.1 for details on this procedure.) The results of these two reduced between-site models are given in Table VI-6 along with the comparable results from the complete between-site model taken from Tables III-5, III-6, III-7 and III-8. The results show that the four or five term reduced models account for about half the portion of the reported blood lead decline attributable to the complete model of survey demographics. These results underscore the complex time-related behavior among survey demographics. It is unreasonable to expect that the decline attributable to survey demographics can be summarized by only a few key time-related terms.

Figure VI-1

Income Versus Time
Grouped by Six Month Intervals

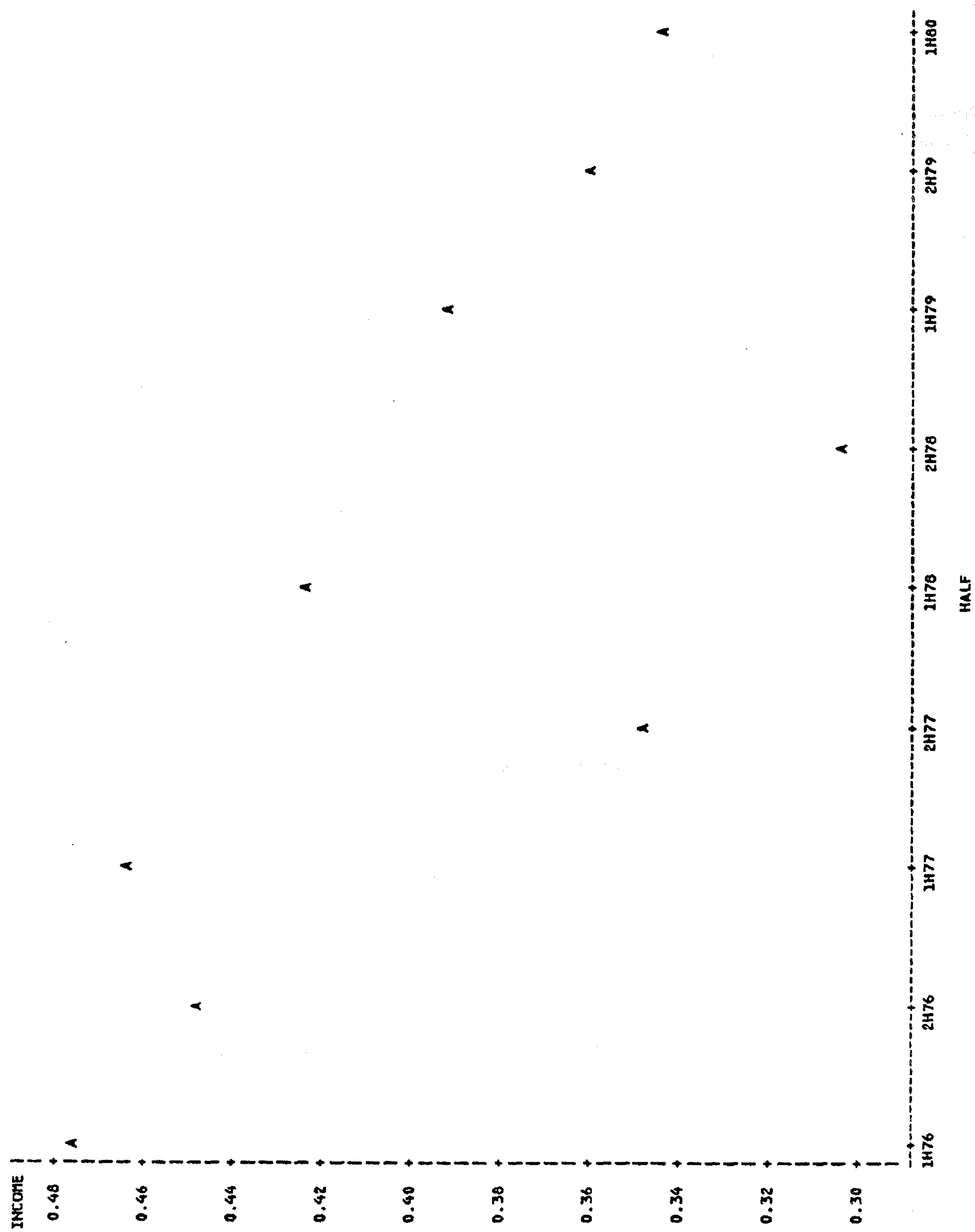

Figure VI-2

Urban Versus Time
Grouped by Six Month Intervals

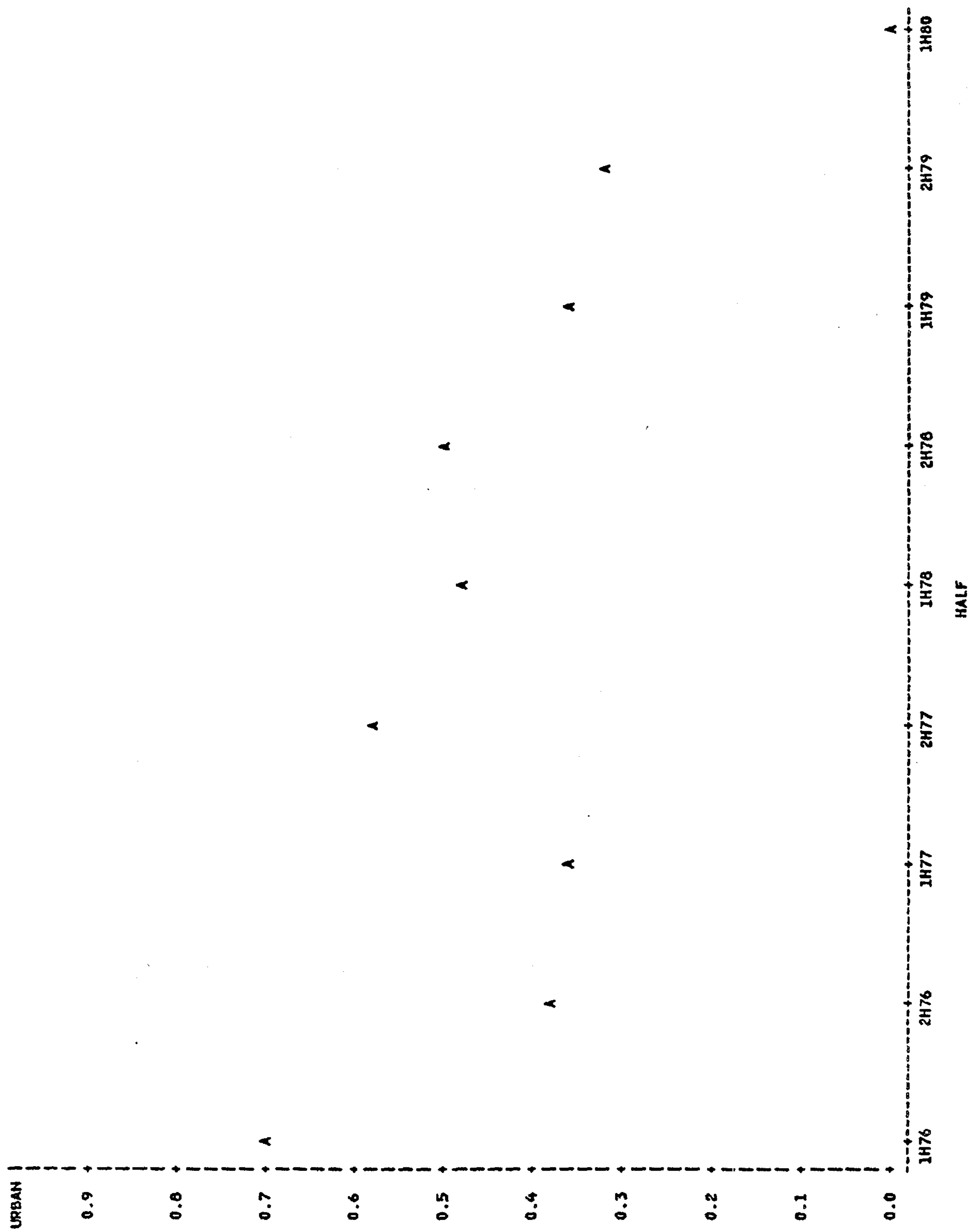

Figure VI-3

Blood Level Versus Income
Grouped by Six Month Intervals

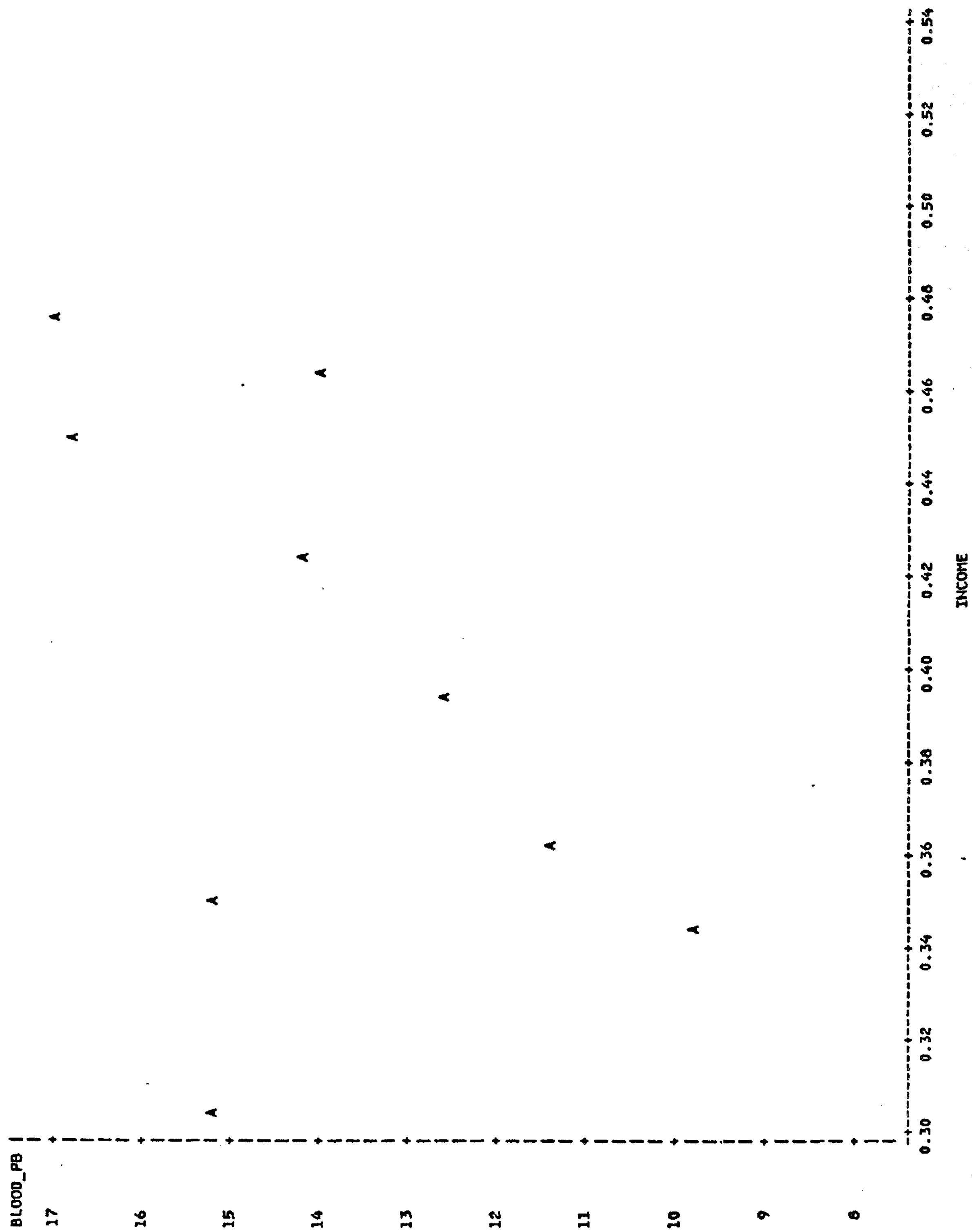

Figure VI-4

Blood Level Versus Urban
Grouped by Six Month Intervals

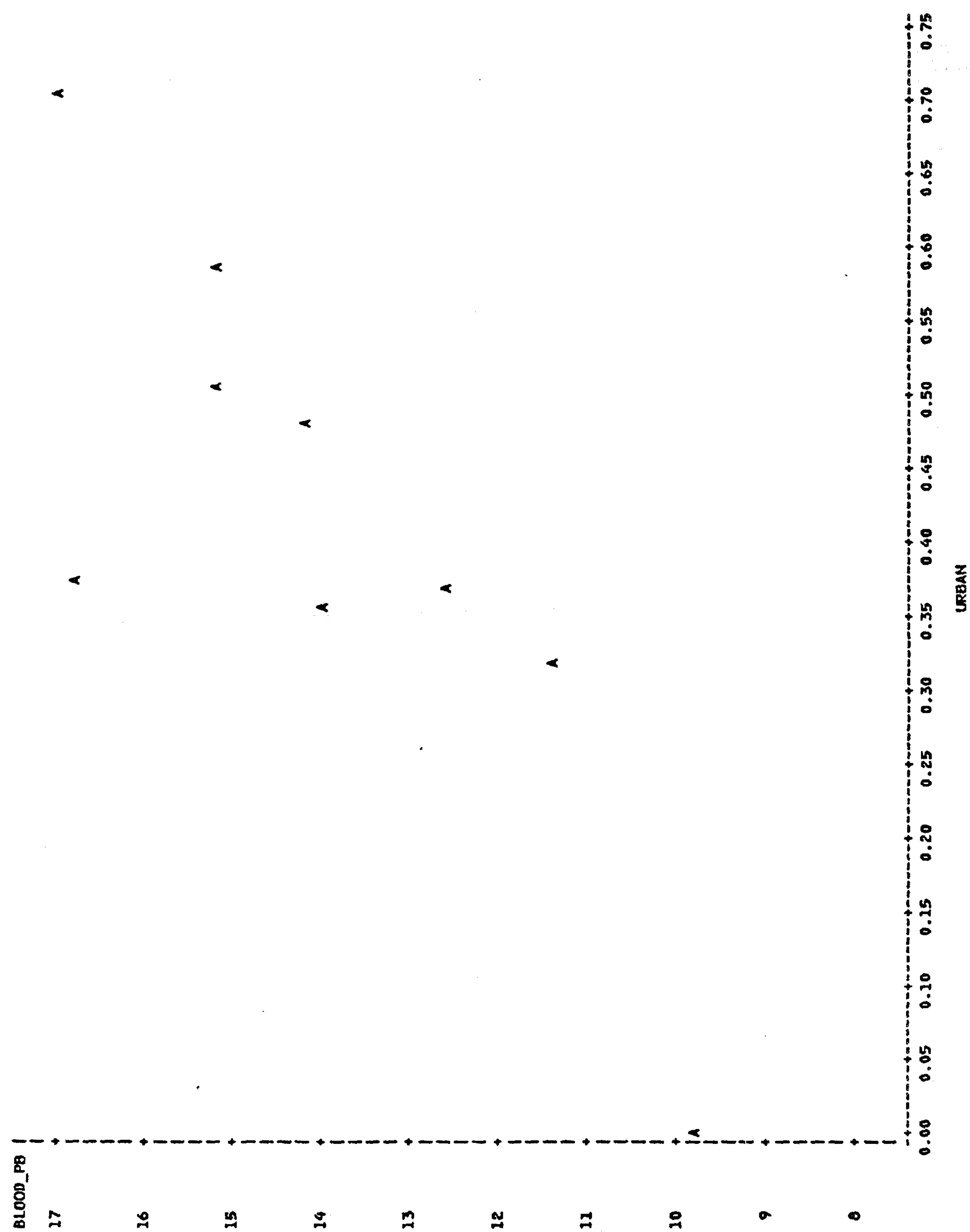

Table VI-6

Between-Site Regression Results
Based on Blood Lead Adjustment Set 2W*

Terms	Models: all	Models: Child Income BL_IN Urban	Models: Black Child Income BL_IN Urban
Regression Summaries			
Root MSE	4.44	5.61	5.65
R^2-adjusted	.54	.26	.25
N	61	61	61
Error Degrees of Freedom	37	56	55
Max VIF	6.28	1.24	1.76
Max Cook's D	.21	.12	.11
Residual Time Slope	-.0000816	-.000176	-.000171
Residual Blood Lead Decline(μg/dl)	1.56	3.34	3.26
Decline Accounted for by Model	3.61	1.83	1.91

*weighted least squares - weighted by reciprocal of adjusted site effect variances

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VI.B.2 Ridge Regression Results

Ridge regression analyses were performed on between-site models based on blood lead Adjustment Set 2W. Four models were investigated with the following between-site terms:

- Survey demographics only
- Survey demographics plus $\log_{10}$GCUR75
- Survey demographics plus time (ie, "Days_PB")
- Survey demographics plus $\log_{10}$GCUR75 and time

The estimated coefficients for each model are presented in Table VI-7 for K=0 (the ordinary least squares solution) and K=.5. Comparisons between the K-values among models provide information on the stability of the least squares estimates. (The results here for K=0 differ slightly from those presented in Table III-11 and Table V-18 because no weighting is possible in the SAS ridge regression analyses.) Of particular interest is the stability of the coefficients for $\log_{10}$GCUR75 and time. Note that the stabilized values for both terms (at K=.5) are approximately half of the least squares values.

The stabilized ridge coefficients of "time" may be used to estimate the contribution of gasoline lead to the blood lead decline. Noting, as before, if a term for time effectively separates the time contribution of all other factors from the effects explicitly used in the model, then an estimate of the gasoline lead contribution can be made by comparing the blood lead decline using the time coefficient in a model without gasoline lead exposure with one accounting for gasoline lead exposure. Three time coefficients (at K=.5) are

Table VI-7

Ridge Regression Results of Between-Site Models
Based on Adjustment Set 2W

Model Terms	Survey Demographics Coefficients K=0	K=.5	Stable*	Model A Coefficients K=0	K=.5	Stable*	Survey Dem. with Time Coefficients K=0	K=.5	Stable*	Model A with Time Coefficients K=0	K=.5	Stable*
Black	.31	.14		.17	.10		.52	.18		.42	.14	
Male	.46	.27		.57	.27	x	.05	.12	x	.15	.13	x
Child	.47	.27		.16	.24	x	-.09	.13	x	-.27	.11	x
Teen	1.16	.64		1.45	.67		.67	.35	x	.89	.38	x
Income	.51	.17		.47	.19		-.06	.050	x	-.05	.070	x
BL_MA	8.09	2.88		6.70	2.96		3.35	1.99	x	2.70	2.10	x
BL_CH	-.05	.01	x	.33	-.02	x	.71	.19	x	.92	.16	x
BL_TN	.65	.94	x	.32	1.18	x	-1.40	.16	x	-.70	.39	x
BL_IN	1.32	1.04	x	1.29	1.08	x	-1.39	.24	x	-1.24	.31	
MA_CH	-10.75	-7.82		-9.22	-7.34		-7.50	-6.43	x	-6.66	-6.11	x
MA_TN	7.04	5.17	x	6.29	5.26	x	-8.83	1.84	x	-8.38	2.08	
MA_IN	.70	.046	x	.45	-.32		-2.65	-.93	x	-2.62	-1.17	
CH_IN	-.29	-.44	x	-1.27	-.53	x	-.99	-.27	x	-1.61	-.35	x
TN_IN	-2.44	-3.31	x	-1.43	-3.00	x	.47	-2.11	x	.98	-1.92	x
Urban	.23	.088		.064	.055	x	.047	.062	x	-.050	.04	x
CC	-.16	.006		-.13	-.008		-.064	.015	x	-.045	.003	
Winter	.12	-.07		-.15	-.074		-.073	.064	x	-.091	-.065	
Spring	.027	.015	x	-.003	.014	x	.010	.011	x	-.009	.010	x
Summer	.043	.024	x	.04	.027	x	-.015	.010	x	-.013	.012	x
South	-.077	-.049		-.06	-.048		-.14	-.058		-.12	-.057	
West	.099	.042		-.16	.053		.05	.029		.10	.038	
Norteast	.11	.052		.08	.043		.09	.051		.07	.044	
Lead Wt**	-2.83	11.42	x	42.23	1.86		22.38	3.98		47.76	6.17	
$\log_{10}$GCUR75				.131	.054					.088	.043	
Days_Pb***							-2.87	-1.48		-2.69	-1.41	

* An "x" is indicated for terms whose ridge trace has stabilized at or before K=.5, as judged visually
** Coefficients expressed $\times 10^{-7}$
***Coefficients expressed $\times 10^{-4}$

given in Table VI-8 along with the associated blood lead decline calculated in the usual manner.

Table VI-8

Ridge Time Coefficient (K=.5) and Blood Lead Decline

Model	Time Coeff (μg/day)	BPb Drop (μg/dl)
Time Only	-.000148	3.156
Time plus $\log_{10}$GCUR75	-.000141	3.022
Time plus $\log_{10}$GCUR75, $\log_{10}$GLAG375	-.000139	2.983

Thus, the decline attributable to gasoline lead exposure is estimated at .134 μg/dl (=3.156-3.022) for the comparison using one gasoline lead exposure term and .173 μg/dl (=3.156-2.983) for the comparison using the two terms.

Another approach to evaluating the contribution of gasoline lead is through the gasoline lead exposure coefficients directly, as was done in Section V.B.2. Since the stabilized ridge estimates shown in Table VI-5 are smaller than the ordinary least squares estimates (and also smaller than the weighted least squares estimates given in Table V-11), the contribution estimates of gasoline lead exposure will be smaller than those previously given in Table V-13, which ranged between .23 and .56 μg/dl.

The gasoline lead contributions to the blood lead decline, using the ridge estimates of time and gasoline lead exposure, do not change the general conclusions presented in Section V. The reliability of an approach based on coefficients has its limitations and should be used with caution.

VI.C Contributions to Blood Lead Decline Other than Survey Demographics and Exposure to Gasoline Lead

One of the limitations in accounting for factors contributing to the reported blood lead decline within the NHANES II survey period is that data on factors other than survey demographics and gasoline lead exposure are either unavailable, incomplete or questionable. These other factors include

- Survey demographics and associated correlates not recorded
- Survey execution variables including sample handling and testing
- Exposure variables including food, water, paint and dust

The use of a "time" term in the models is ideally intended to collectively capture the time-related effects of all factors not specifically accounted for in the model. It has been noted in Sections III.E.2 and V.B.3 that a time term included in the model is ineffective in isolating time-related effects of the factors not in the model from those in the model. In effect, the term time accounts for some of the time-related effects of those factors accounted for as well as those not. This is not surprising as the blood lead within survey time trend is remarkably linear and a single linear term for time captures nearly all the time effects, regardless of other terms in the models which are not individually as strongly time-related.

The question persists, however, of whether factors other than survey demographics and gasoline lead exposure have contributed to the reported blood lead decline. Evidence (see Table 4 of Section V) based on residual blood lead time trends from between-site models A-K suggests that at least between .93 and 1.51 μg/dl of the decline is attributable to "other" factors. These estimates reflect the residual trend <u>after</u> survey demographics and gasoline lead exposure have been allowed to account for as much of the trend as possible. In each regression of the residuals on time (which produced the estimates above) the time coefficient was significantly less than zero at $p \leq .05$, and in most cases at $p \leq .02$. To the extent that the measure of gasoline lead exposure used adequately reflects true gasoline lead exposure, the fact that the conditional test is significant offers strong evidence that "other" factors are responsible for the reported blood lead decline as well.

It should be noted that if time were included in the between-site first stage analysis, the unconditional "time" coefficient would also be significant since the conditional tests were found to be [23]. However, this significance is of less importance than the conditional significance because of the problems in interpreting the meaning of the time coefficient in models with time (see discussion above).

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VII. Comparison of Results to Those of Other Reported Analyses

To put the results here in better perspective with those reported by others on NHANES II blood lead time trend analyses, the fundamental differences in approach are discussed along with the impact of these differences on the results. The key results of others to be referred to are:

- ICF Report. The relationship between gasoline lead usage and blood lead levels in Americans: A statistical analysis of the NHANES II Data. December 1982. (Ref. [3].)

- Pirkle, J. L. Chronological trend in blood lead levels of the second NHANES, February 1976-February 1980. February 26, 1983. (Ref. [5].)

- Schwartz, J. Analysis of NHANES II data to determine the relationship between gasoline lead and blood lead. Memo to David Weil (ECAO). March 18, 1983. (Ref. [6].)

- Annest, J. L., Pirkle, J. L., Makuc, D., Neese, J. W., Bayse, D. D., and Kovar, M. G. Chronological trend in blood lead levels between 1976 and 1980. The New England Journal of Medicine. June 9, 1983. (Ref. [4].)

References [3,6] reflect some commonality as do References [4,5]. References [3,5,6] are the key results from the EPA and CDC that are reviewed in "Report of the NHANES II Time Trend Analysis Review Group", June 15, 1983, included as Appendix 11-D in the public review preliminary draft of the Air Quality Criteria for Lead (Volume III). Henceforth, this review group summary will be referred to as the "Stat Panel Report".

Below is a brief summary of the paraphrased conclusions reached and general methods of analysis used in the four references above.

Reference [3]: ICF Report

- The reduction in the use of lead in gasoline, imposed by EPA, has significantly reduced the average amount of lead in the blood.

- During the period 1976-80 57.5 percent of the blood lead of the average American was due to gasoline lead emissions.

- By removing gasoline lead regulation standards, there would be an estimated 82,000 more black children with blood lead levels above 30 μg/dl in 1983.

- Lead in paint and lead in food have little or no potential bias to the results of the models fitted.

The basis of the first three results above is the use of the estimated gasoline lead coefficient. All regression models were fitted using SURREGR which incorporates use of survey (lead) weights and strata/PSU structure. The form of the fixed effect demographic terms in the model was a single term (and, possibly interactions) for each covariate selected. Up to 15 terms were incorporated in the various models investigated. No fixed effect terms were included to account for differences between sites. The sampling site structure was only reflected in the calculation of the error term by SURREGR. A surrogate time term was included in models with current and, possibly, lagged gasoline lead. The gasoline lead value reflects national lead use. Models were fit to the 9000+ available blood lead records.

Reference [5]: Pirkle, J. L.

- Downward trend in NHANES II blood lead data cannot be accounted for by chance, demographic covariates or laboratory measurement error.

- No significant trend in lead levels of adult diet over the survey period.

- Unlikely that a change in exposure to leaded paint accounted for much of the trend since consumption was predominantly associated with children and the downward trend was noted in adults.

- Gasoline lead was significantly and consistently related to blood lead levels across population subgroups defined by race, sex and age after adjusting for the effects of demographic covariates.

- When grouping the blood lead data by six-month intervals after adjusting for demographic covariates, these six-month averages were highly correlated with six-month gasoline lead values for the subgroups noted above.

- In white children .5-5 years old, after adjusting for the effects of demographic covariates, 93 percent of the variation of six-month average blood lead levels can be explained by gasoline lead exposure.

The above results are based on models with single terms (and possibly interactions) reflecting each demographic effect. Terms were selected based on preliminary ordinary least square analyses. Final models were analyzed using SURREGR, the 9000+ available records, and contained up to 15 terms. No fixed effect terms were included to account for differences between sites. A term (or terms) for "time" was incorporated in several analyses (without gasoline lead) to demonstrate that a significant and consistent blood lead level drop occurred during the survey in various demographic subgroups. A single linear term for gasoline lead was used in some models, but never with terms for time. Gasoline lead values reflected national gasoline lead use.

Reference [6]: Schwartz, J.

The methodology and results reported for that portion dealing with the NHANES II data correspond to that discussed in Reference [3] above. Additional emphasis is placed on the observation that lagged national gasoline lead is more significantly associated with blood lead levels than is current gasoline lead.

Reference [4]: Annest, J. L., et al

The methodology and results reported are a part of those described in Reference [5] above.

The Stat Panel Report identifies six factors that capture the main differences among the reported time trend analyses with gasoline lead exposure of the NHANES II data. Table VII-1 provides a list of these six factors and a summary of how References [3] and [5] dealt with them as well as the present analysis.

Table VII-1

Comparison of Features of Du Pont Analyses and Analyses Reviewed by NHANES II Time Trend Analysis Review Group

Factor	Ref. [3]	Ref. [5]	Du Pont
1. Measure of Gasoline Lead	Monthly national	Quarterly national	Site specific
2. Scale of Dependent Var.	raw	$\log_e$	both
3. Unit of Analysis	individual	individual	individual and site
4. Control Variables include time	yes	no	both
5. Weighting by Selection Probabilities	yes	both	not formally accounted for by model terms
6. Design Based Standard Errors	yes	yes	no, but uses a similar between-site error

The Stat Panel Report concluded that only Factors 1 and 4 have a substantial impact on the final results where Factor 4 includes the larger concerns of model specification. From observations on the present analyses, it is concurred that these are the key factors. In the sections that follow, the fundamental differences between the approach reported here and the approaches used in these references are discussed under headings model specification, use of survey design, use of time surrogate, and gasoline lead exposure measure.

VII.A Model Specifications

The specification of the model is fundamental to the differences in results between the analysis here and those reported by others. In particular, the fixed effect X-type covariates are accounted for here by both within-site model terms, $\beta_W(X_{ij}-\overline{X}_{i.})$, and between-site model terms, $\beta_B(\overline{X}_{i.}-\overline{X}_{..})$. The details are discussed in Section III. It is important to note that the two levels of terms for each X-type covariate reflects the natural nesting in the data where sites are distinguished from one another as well as individuals within sites. It was pointed out in Section III that there is no loss of generality by having two terms rather than one, since if the effects are equal the two terms reduce to one, $\beta(X_{ij}-\overline{X}_{..})$. Further, evidence was given in Section VI.A that, in fact, these two levels of terms are necessary because $\beta_W \neq \beta_B$ for some X-type covariates and that the time-related explanatory capability of the between-site effects is substantial.

None of the models used in References [3,4,5,6] above account for this model structure. All simply use a term of the form αX_i (or $\alpha(X_i-\overline{X}_.)$) to estimate the effect of covariate X averaged over all individuals in the survey. In this formulation, α fails to distinguish properly among differences between sites. Examples of conclusions drawn from such models, which include a number of demographic covariates and two-way interactions, along with a surrogate "time" term or gasoline lead exposure term, is that either

(i) the time trend remains after adjustment for demographics, or
(ii) gasoline lead is significant after adjustment for demographics.

The shortcoming of these models is that this kind of adjustment does not account for any time-related variation of survey demographics (see [11]). It only adjusts the collective set of blood lead data to the mean covariate effect in the presence of a term for time or gasoline lead.

There appear to be several different model formulations that would better address time varying behavior of survey demographics than the one used in References [3,4,5,6]. One would be to include demographic by time interaction terms, in addition to main and two-way interaction effect demographic terms. Another would be to include demographic effects as variables nested within designated time periods. This would allow differential demographic effects between time periods. The first approach was not used because of the reluctance to add additional terms dependent on time and the second was avoided because of subjectivity of choosing the time period.

A third approach is that used here. In effect, this approach is a variation of the second above where the time periods are the survey sites. The survey sites provide the "natural" time unit of analysis because of geographical differences as well as being visited sequentially during the study period. While separate demographic effects could be estimated for each site, this is not feasible due to limited data in some demographic categories and the large number of model effects to be estimated. Rather, the model used incorporates a single linear covariate effect (for each X-type covariate), which represents the average of all site effects through the terms $\beta_W(X_{ij}-\bar{X}_{i.})$. The between-site effects are then captured through the terms $\beta_B(\bar{X}_{i.}-\bar{X}_{..})$.

It is concluded that the models used in References [3,4,5,6] are ineffective in accounting for differential survey demographics. The effects of survey demographics must be evaluated as they change over time and these models fail to properly do this. It is felt that the covariate structure used here, which reflects variation both within and between sites (or strata and PSU), helps to properly account for the natural lead exposure and demographic differences that are bound to occur among vastly different geographic sites.

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The above modelling considerations are not to be confused with the issue of whether or not the survey design (eg, via SURREGR) should be used in the analysis of these data. Any of the models proposed could be analyzed by a survey design regression program, as long as the number of model terms is smaller than the available degrees of freedom.

VII.B Use of Survey Design

The Stat Panel Report concludes (on the basis of results in Reference [5] that results from blood lead time trend analyses are affected little by whether or not the survey design was used in the analysis. The uniform experience here supports that conclusion.

The complete use of the survey design, by a computer program such as SURREGR, accounts for the following:

- The weights associated with individual records that account for probability of selection and adjustment for nonresponse.
- The uncertainty of the weights, which are estimated quantities, as they impact on the effect standard errors.
- The strata/PSU structure of the survey design in evaluating standard errors. This structure utilizes variation between PSUs within strata, pooled over all strata.

For a given regression model, the use of the survey design in the analysis will produce the same estimates as would a weighted least squares (WLS) analysis. The difference then between a weighted least squares analysis and an analysis which reflects the three points above is in the estimated standard errors of the estimated regression coefficients. The chief argument for using the survey design is that smaller standard errors will result than if a model is analyzed with a single error term using the 9000+ observations. Thus, the chance of incorrectly flagging an effect as significant is greater if the survey design is not used for such models.

Use of the survey design is strictly proper when the response distribution remains unchanged over the survey period. For the blood lead data this clearly did not occur. Further, since standard errors are based on pooled between-PSU within-strata variation after eliminating effects of the model, this variation would be contaminated with time effects if the PSU pairs (in each stratum) were not sampled in the same time frame. Figure VII-1 illustrates the mean examination time differences between PSU pairs where uncorrected blood lead site averages are plotted with a straight line connecting the PSU pairs from each stratum. This suggests that if the survey design were used in the analysis, the standard errors would be biased upward.

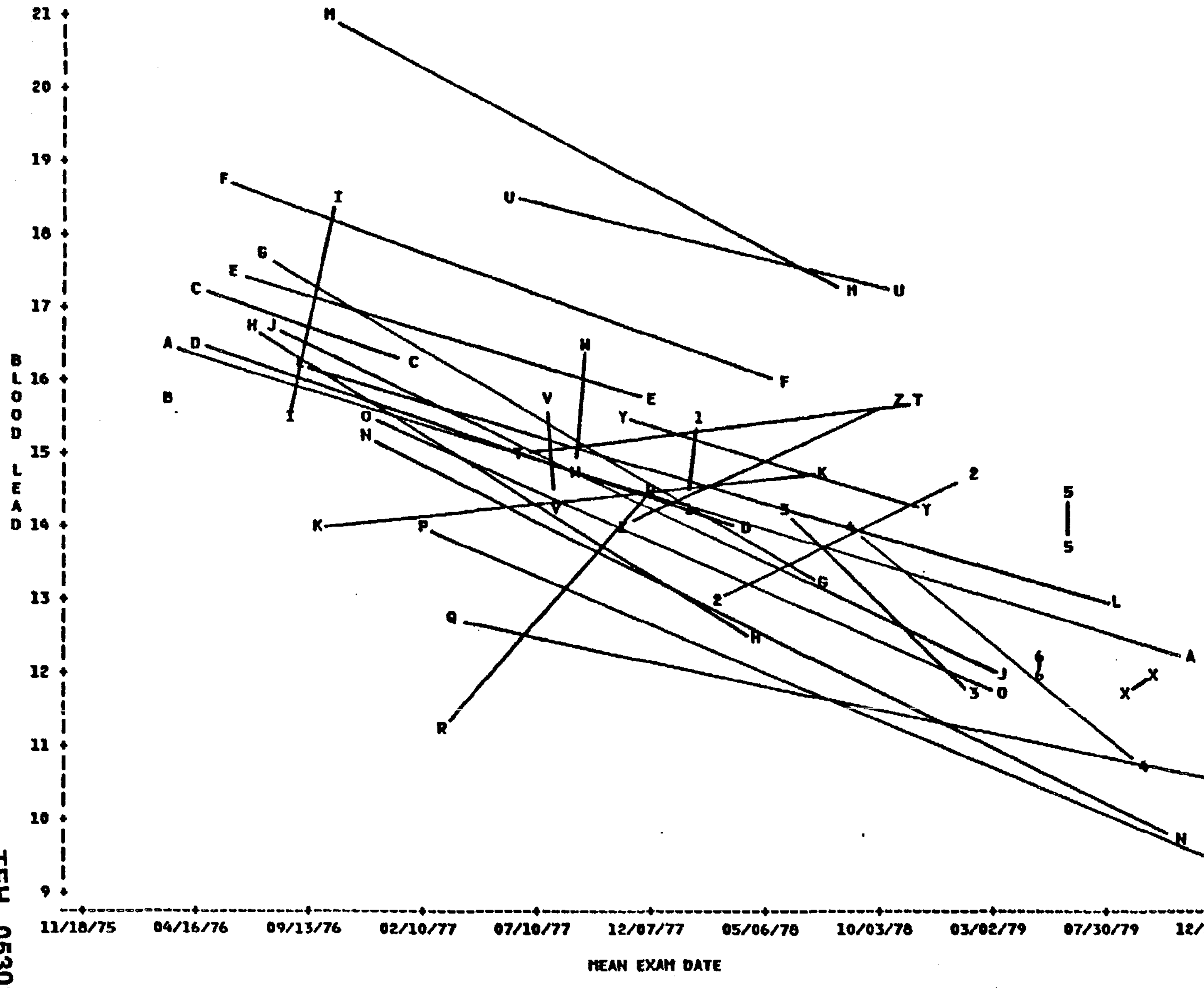
Results of variance component analyses for strata, PSU and person-to-person were given in Table VI-1. These results, along with the corresponding results, where the variance components were estimated in the presence of a single covariate "time" reflecting all time-related effects, are given in Table VII-2. Note that only the PSU within strata component is affected in the presence of a time surrogate. This observation underscores the limitations of using the survey design error in evaluating the blood lead data from NHANES II.

Table VII-2

Variance Component Analyses of Survey Design Structure*
With and Without a Time Surrogate

Variance Component	Ordinary Least Squares w/o Time	Ordinary Least Squares w/Time	Robust Analysis w/o Time	Robust Analysis w/Time
Strata	.0055194	.0060257	.0063634	.0063001
PSU/Strata	.022270	.0081510	.021892	.0081116
Person-to-Person	.13941	.13944	.13204	.13208

*based on $\log_e$ blood lead



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Because the PSU variance component is inflated by time-related effects, the use of a survey regression analysis would be improper unless the model adequately removes these correlated time-related demographic effects from this error. The models analyzed in References [3,4,5,6] by SURREGR have not done this. In fact, any analysis of the NHANES II data, whether addressing within survey time trends or not, needs to properly account for time varying effects that occurred. It is expected, therefore, that general survey results as reported by Mahaffey, et al, [16] are biased.

The analyses presented in Sections III and V have not incorporated the use of a survey regression program. On the basis of the above arguments, there was no demonstrated need to do this. The models used here, by accounting for the nested structure of both random effect terms (site and person-to-person within site) and fixed effect terms, result in the use of a realistic between-site error term, estimated in the presence of time-related demographic effects. This between-site error term, while not addressing the strata/PSU design structure, is similar to a survey design error where all the survey sites (PSUs) are nested within one stratum. Finally, since no model term selection was employed in preliminary analyses, there is no concern on potential biasing of a subset model because the significance levels are not dependent on the error term.

VII.C Use of Time Surrogate

Since survey demographics and exposure to gasoline lead do not account for all the reported blood lead decline and suitable data on other potential factors contributing to the decline are not available, use of a time surrogate seems to be a plausible approach. The estimated time regression coefficient, adjusted for other model effects, is intended to account for time-related effects of all factors not accounted for by other model terms explicitly present. However, this desired end result does not occur. Such a time regression coefficient will account for time-related effects of all terms in the model not themselves corrected for time [11]. Therefore, a time surrogate will not isolate the time-related contributions of the other terms present in the model. This fact was demonstrated by example in Section III.E.2 and Section V.B.2.

Most of the emphasis in References [3,4,5,6] is on demonstrating a relationship between blood lead levels and (national) gasoline lead use. Little attention has been given to addressing the question of how much of the within study blood lead trend is attributable to survey demographics, in spite of the fact that no within-survey control of demographic factors was exercised in the design. Although all references include demographic terms in their models, only References [4,5] explicitly consider the question of whether the trend is present when adjusting for survey demographics. In these instances, the approach was to consider all the data or only data within major demographic subsets (eg, whites, white children) and include a time term as well as other demographic terms. By use of the time coefficient the results consistently showed that a blood lead level decline between 31.1 and 41.8 percent occurred (Reference [5], page 26) for the subsets analyzed, when adjusting for demographic covariates. Because of the problems associated with use of a time surrogate, these results fail to confirm that differential survey demographics were not responsible for any substantial decline in blood lead levels. Further, it was noted in Section VII.B that the models used are inappropriate for accounting for time-related demographics.

It is concluded that the analyses reviewed by the NHANES II Time Trend Analysis Review Group have not adequately addressed the potential role of differential survey demographics in explaining the blood lead decline. The conclusion that survey demographics had little or no impact on this decline is contrary to evidence presented in Section III. Summaries on changing urban representation (see table on page 4 of Stat Panel Report [7]) and results of regressions of time on demographic terms (see Section V.B.1), which identified children, income, black-income interaction and urban as being the key between-site time-related effects, provide telling intuitive evidence.

VII.D Gasoline Lead Exposure Measure

The gasoline lead exposure measures used in References [3,4,5,6] are based on national gasoline lead use. The corresponding values reflect an exposure to gasoline lead that is insensitive to between-site variation in exposure. The measure used in the analyses reported in Section V is site specific (billions of grams per site square miles).

In Section IV, a detailed discussion is given on the construction of this site specific measure and why national lead use inappropriately reflects exposure to gasoline lead as encountered by the survey itinerary. The inappropriateness is based on the argument that the time trend of the site specific exposure is considerably less than that of national lead use. Yet these same site specific measures, when evaluated for each site during the entire four-year period, show comparable trends to the national values. This demonstrates that the calculated site specific exposure measure conforms to the trend seen nationally and that order of site visitation resulted in a different time-related exposure during the survey period.

It is concluded that national gasoline lead use is not the best exposure measure of gasoline lead available and, therefore, the results of analyses in References [3,4,5,6], based on national use, are of limited value in assessing the contribution of gasoline lead to the blood lead decline.

VIII. References

1. "Plan and Operation of the Second National Health and Nutrition Examination Survey", 1976-1980. National Center for Health Statistics, Series 1, No. 15, July 1981.

2. U.S. Centers for Disease Control. "Blood Lead Levels in U.S. Population," Morbidity and Mortality Weekly Report 31, pp. 132-4, 1982.

3. ICF Incorporated (EPA Contract 68-01-5845). "The Relationship Between Gasoline Lead Usage and Blood Lead Levels in Americans: A Statistical Analysis of the NHANES II Data", December, 1982.

4. Annest, J. L, J. L. Pirkle, D. Makuc, J. W. Neese, D. D. Bayse, and M. G. Kovar. "Chronological Trend in Blood Lead Levels Between 1976 and 1980", N. Engl. J. Med., 308, June 9, 1983.

5. Swartz, J. "The Use of NHANES II to Investigate the Relationship Between Gasoline Lead and Blood Lead", Memo to David Weil (EPA, ECAO), March 3, 1983.

6. Pirkle, J. L. "Chronological Trend in Blood Lead Levels of the Second National Health and Nutrition Examination Survey", February 26, 1983.

7. Report of the NHANES II Time Trend Analysis Review Group, June 15, 1983.

8. "National Trend in the Maximum Quarterly Average Lead Levels, 1970-1979", EPA Office of Air Quality Standards, Data Monitoring Branch.

9. Snee, R. D. "Evaluation of Studies of the Relationship Between Blood Lead and Air Lead", Int. Arch. Occup. Environ. Health, 48, pp. 219-42, 1981.

10. "National Ambient Air Quality Standard for Lead", Federal Register, 43, No. 194, October 5, 1978.

11. Rao, P. and R. L. Miller. Applied Econometrics, Wadsworth, 1971.

12. Kempthorne, O. The Design and Analysis of Experiments, Wiley, 1952.

13. Federer, W. T. Experimental Design Theory and Application, MacMillan Company, 1955.

14. Daniel, C. and F. S. Wood. Fitting Equations to Data, Wiley, 1980.

15. Public Use Data Tape Documentation. Hematology and Biochemistry, Catalog Number 5411. NHANES II Survey, 1976-1980, National Center for Health Statistics. July 1982.

16. Mahaffey, K. R., J. L. Annest, J. Roberts, R. S. Murphy. "National Estimates of Blood Lead Levels: United States, 1976-1980: Association with Selected Demographics and Socioeconomic Factors", N. Engl. J. Med., 307, pp. 573-9, 1982.

17. Monthly Report of U.S. Gasoline Sales by States. Ethyl Corporation.

18. Motor Gasolines, Bartlesville Energy Technology Center, U.S. Department of Energy.

19. Pierrard, J. M. "Vehicle Emissions Controls and Ambient Air Quality", SAE Australasia, Jubilee Year Conference, Melbourne, 1977.

20. Azar, A., R. D. Snee and K. Habibi. "An Epidemiologic Approach to Community Air Lead Using Personal Air Samplers", In: Lead Environ. Qual. Saf. Suppl., 2, pp. 254-88, 1975.

21. Fellner, W. H. "Robust Estimation of Variance Components", Engineering Department Accession Report 16717, E. I. du Pont de Nemours and Company, Wilmington, Delaware 19898, 1983.

22. Patterson, H. D. and R. Thompson. "Recovery of Interblock Information When Block Sizes are Unequal", Biometrika, 58, pp. 545-54, 1974.

23. Freund, R. J., R. W. Vail and C. W. Clunies-Ross. "Residual Analysis" J. of Amer. Stat. Assoc., 56, pp. 98-104, 1961.

APPENDIX 1

Within Site Regression Summaries
Models 1, 1W, 2 and 2W

COMPLETE RECORDS FOR BLOOD_PB, VARIABLES 1-6, 22-30, DAYS_PB, LEAD_WT, & GCUR75

MODEL 1

MODEL: EQ1
DEP VARIABLE: BLOOD_PB

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F VALUE	PROB>F
MODEL	77	2057523	26721.074	977.297	0.0001
ERROR	9164	250560	27.341804		
U TOTAL	9241	2308083			

ROOT MSE	5.228939	R-SQUARE	0.8914
DEP MEAN	14.468672	ADJ R-SQ	0.8905
C.V.	36.13973		

NOTE: NO INTERCEPT TERM IS USED. R-SQUARE IS REDEFINED.

VARIABLE	DF	PARAMETER ESTIMATE	STANDARD ERROR	T FOR H0: PARAMETER=0	PROB > |T|	TOLERANCE	VARIANCE INFLATION
X1	1	16.482899	0.453604	36.338	0.0001	1.006265	0.993774
X3	1	17.337324	0.425967	40.701	0.0001	1.001461	0.998541
X4	1	14.194815	0.382490	37.112	0.0001	1.020057	0.980337
X5	1	17.530473	0.453524	38.654	0.0001	1.006621	0.993423
X6	1	15.885349	0.445587	35.650	0.0001	1.013021	0.987146
X7	1	17.601652	0.353109	49.848	0.0001	1.021061	0.979373
X8	1	12.487550	0.460448	27.120	0.0001	1.013866	0.986323
X9	1	15.854592	0.513212	30.893	0.0001	1.009522	0.990568
X10	1	12.013619	0.450255	26.682	0.0001	1.013835	0.986353
X11	1	14.163769	0.466052	30.391	0.0001	1.012860	0.987303
X12	1	12.864887	0.432603	29.738	0.0001	1.009937	0.990161
X13	1	20.769737	0.430252	48.273	0.0001	0.994395	1.005637
X14	1	9.679757	0.357464	27.079	0.0001	1.023588	0.976956
X15	1	15.463850	0.354340	43.641	0.0001	1.023056	0.977464
X16	1	9.274572	0.471736	19.660	0.0001	1.012378	0.987774
X17	1	12.931487	0.402439	32.133	0.0001	1.017552	0.982751
X18	1	14.547008	0.434556	33.476	0.0001	1.014463	0.985743
X20	1	15.732916	0.449201	35.024	0.0001	1.003949	0.996067
X21	1	18.653247	0.515381	36.193	0.0001	1.010650	0.989463
X22	1	15.670099	0.422923	37.052	0.0001	1.015932	0.984318
X23	1	16.588825	0.400031	41.469	0.0001	1.018018	0.982301
X24	1	11.690279	0.389911	29.982	0.0001	1.018980	0.981374
X25	1	15.445420	0.487840	31.661	0.0001	1.011608	0.988525
X26	1	16.009814	0.503554	31.794	0.0001	1.010221	0.989882
X27	1	14.276346	0.473729	30.136	0.0001	1.011997	0.988145
X28	1	14.714411	0.449933	32.704	0.0001	1.007934	0.992128
X29	1	14.251359	0.354216	40.234	0.0001	1.023772	0.976780
X30	1	10.893061	0.424497	25.661	0.0001	1.014933	0.985286
X31	1	14.641679	0.436865	33.515	0.0001	1.010629	0.989483
X32	1	12.415052	0.385907	32.171	0.0001	1.018073	0.982248
X33	1	12.111403	0.518814	23.344	0.0001	1.006986	0.993062
X34	1	15.746275	0.592342	26.583	0.0001	1.007556	0.992500

Within Site Model 1
Dep. Var.: Blood Lead

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DUP05003108 3

COMPLETE RECORDS FOR BLOOD_PB, VARIABLES 1-6, 22-30, DAYS_PB, LEAD_WT, & GCUR75

MODEL 1

VARIABLE	DF	PARAMETER ESTIMATE	STANDARD ERROR	T FOR H0: PARAMETER=0	PROB > |T|	TOLERANCE	VARIANCE INFLATION
X35	1	16.099850	0.476373	33.797	0.0001	1.008954	0.991125
X36	1	16.407196	0.333118	49.253	0.0001	1.024943	0.975664
X37	1	15.592857	0.494890	31.508	0.0001	1.000172	0.999828
X38	1	18.560486	0.475779	39.011	0.0001	1.011477	0.988653
X39	1	13.360516	0.383682	34.822	0.0001	1.019065	0.981291
X40	1	16.779201	0.372753	45.014	0.0001	1.020652	0.979766
X41	1	18.499573	0.542517	34.100	0.0001	1.009044	0.991037
X42	1	16.920179	0.475895	35.554	0.0001	1.010984	0.989135
X43	1	14.529218	0.392924	36.977	0.0001	1.014465	0.985741
X44	1	16.304670	0.431663	37.772	0.0001	1.014340	0.985863
X45	1	17.021896	0.345205	49.310	0.0001	1.010201	0.989902
X46	1	15.368370	0.379591	40.487	0.0001	1.009284	0.990801
X47	1	11.786709	0.345949	34.071	0.0001	1.022976	0.977540
X48	1	13.735299	0.376418	36.490	0.0001	1.010915	0.989203
X49	1	10.287058	0.390718	26.329	0.0001	1.014777	0.985438
X50	1	11.297096	0.373747	30.227	0.0001	1.020296	0.980108
X52	1	14.867971	0.560787	26.513	0.0001	1.008836	0.991241
X53	1	17.243921	0.581136	29.673	0.0001	1.008348	0.991721
X54	1	14.368285	0.548330	26.204	0.0001	1.009254	0.990831
X55	1	14.843979	0.422842	35.105	0.0001	1.016320	0.983942
X56	1	12.237900	0.412185	29.690	0.0001	1.017301	0.982993
X57	1	14.334642	0.570640	25.120	0.0001	1.008765	0.991312
X58	1	14.037242	0.436080	32.190	0.0001	1.014270	0.985931
X59	1	15.377449	0.474082	32.436	0.0001	1.010492	0.989617
X60	1	13.285346	0.494462	26.868	0.0001	1.010739	0.989375
X61	1	11.546231	0.350283	32.963	0.0001	1.023982	0.976580
X62	1	14.087041	0.396543	35.525	0.0001	1.018479	0.981856
X63	1	13.760866	0.432878	31.789	0.0001	1.015452	0.984784
X64	1	12.116158	0.386075	31.383	0.0001	1.017188	0.983103
BLACK	1	2.986455	0.203778	14.655	0.0001	0.834349	1.198539
MALE	1	3.432821	0.110015	31.203	0.0001	0.991462	1.008611
CHILD	1	1.591878	0.137528	11.575	0.0001	0.913667	1.094490
TEEN	1	-1.843529	0.151202	-12.192	0.0001	0.904740	1.105290
INCOME	1	1.366170	0.119530	11.430	0.0001	0.933980	1.070687
BL_MA	1	1.792689	0.385645	4.649	0.0001	0.931776	1.073219
BL_CH	1	2.744473	0.460787	5.956	0.0001	0.812850	1.230239
BL_TN	1	-0.487742	0.513820	-0.949	0.3425	0.829735	1.205204
BL_IN	1	0.604579	0.408972	1.478	0.1394	0.849595	1.177031
MA_CH	1	-4.609935	0.275044	-16.761	0.0001	0.911717	1.096831
MA_TN	1	-3.036758	0.301416	-10.075	0.0001	0.908916	1.100212
MA_IN	1	0.299371	0.238761	1.254	0.2099	0.937611	1.066541
CH_IN	1	2.244334	0.297786	7.537	0.0001	0.856108	1.168077
TN_IN	1	0.923821	0.339990	2.717	0.0066	0.847471	1.179982
URBAN	1	0.784138	0.246768	3.178	0.0015	0.779896	1.282222
CC	1	1.119106	0.209490	5.342	0.0001	0.750824	1.331870

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COMPLETE RECORDS FOR BLOOD_PB, VARIABLES 1-6, 22-30, DAYS_PB, LEAD_WT, & GCUR75

MODEL 1W

MODEL: EQ1W
DEP VARIABLE: BLOOD_PB

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F VALUE	PROB>F
MODEL	78	2057844	26382.610	966.050	0.0001
ERROR	9163	250239	27.309770		
U TOTAL	9241	2308083			

ROOT MSE	5.225875	R-SQUARE	0.8916
DEP MEAN	14.468672	ADJ R-SQ	0.8907
C.V.	36.11855		

NOTE: NO INTERCEPT TERM IS USED. R-SQUARE IS REDEFINED.

VARIABLE	DF	PARAMETER ESTIMATE	STANDARD ERROR	T FOR H0: PARAMETER=0	PROB > |T|	TOLERANCE	VARIANCE INFLATION
X1	1	16.480614	0.453339	36.354	0.0001	1.006263	0.993776
X3	1	17.339615	0.425718	40.730	0.0001	1.001459	0.998543
X4	1	14.194903	0.382266	37.134	0.0001	1.020057	0.980337
X5	1	17.529132	0.453258	38.674	0.0001	1.006620	0.993424
X6	1	15.886809	0.445326	35.675	0.0001	1.013020	0.987147
X7	1	17.600163	0.352902	49.873	0.0001	1.021060	0.979375
X8	1	12.489894	0.460179	27.141	0.0001	1.013864	0.986326
X9	1	15.858924	0.512913	30.919	0.0001	1.009516	0.990574
X10	1	12.013759	0.449991	26.698	0.0001	1.013835	0.986353
X11	1	14.167331	0.465780	30.416	0.0001	1.012855	0.987308
X12	1	12.863553	0.432350	29.753	0.0001	1.009936	0.990162
X13	1	20.767596	0.430001	48.297	0.0001	0.994393	1.005639
X14	1	9.679662	0.357254	27.095	0.0001	1.023588	0.976956
X15	1	15.466790	0.354133	43.675	0.0001	1.023050	0.977469
X16	1	9.277635	0.471461	19.678	0.0001	1.012374	0.987777
X17	1	12.932510	0.402203	32.154	0.0001	1.017551	0.982752
X18	1	14.547435	0.434301	33.496	0.0001	1.014463	0.985743
X20	1	15.730445	0.448939	35.039	0.0001	1.003946	0.996069
X21	1	18.654256	0.515079	36.216	0.0001	1.010649	0.989463
X22	1	15.669825	0.422675	37.073	0.0001	1.015932	0.984318
X23	1	16.589743	0.399797	41.495	0.0001	1.018017	0.982301
X24	1	11.691964	0.389683	30.004	0.0001	1.018978	0.981376
X25	1	15.447196	0.487555	31.683	0.0001	1.011607	0.988526
X26	1	16.009600	0.503259	31.812	0.0001	1.010221	0.989882
X27	1	14.275018	0.473451	30.151	0.0001	1.011997	0.988145
X28	1	14.715330	0.449669	32.725	0.0001	1.007934	0.992129
X29	1	14.252596	0.354008	40.261	0.0001	1.023771	0.976781
X30	1	10.894478	0.424248	25.679	0.0001	1.014932	0.985287
X31	1	14.646667	0.436611	33.546	0.0001	1.010617	0.989494
X32	1	12.417661	0.385681	32.197	0.0001	1.018069	0.982252
X33	1	12.111772	0.518510	23.359	0.0001	1.006986	0.993062
X34	1	15.748995	0.591995	26.603	0.0001	1.007554	0.992502

Within Site Model 1W
Dep. Var.: Blood Lead

TEH 0530172

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COMPLETE RECORDS FOR BLOOD_PB, VARIABLES 1-6, 22-30, DAYS_PB, LEAD_WT, & GCUR75

MODEL 1W

VARIABLE	DF	PARAMETER ESTIMATE	STANDARD ERROR	T FOR H0: PARAMETER=0	PROB > |T|	TOLERANCE	VARIANCE INFLATION
X35	1	16.100372	0.476094	33.818	0.0001	1.008954	0.991126
X36	1	16.404641	0.332924	49.274	0.0001	1.024938	0.975669
X37	1	15.594616	0.494600	31.530	0.0001	1.000171	0.999829
X38	1	18.560837	0.475500	39.034	0.0001	1.011477	0.988653
X39	1	13.362915	0.383458	34.848	0.0001	1.019062	0.981295
X40	1	16.781114	0.372535	45.046	0.0001	1.020649	0.979768
X41	1	18.497515	0.542200	34.116	0.0001	1.009043	0.991038
X42	1	16.921911	0.475616	35.579	0.0001	1.010983	0.989136
X43	1	14.529683	0.392694	37.000	0.0001	1.014465	0.985741
X44	1	16.306377	0.431411	37.798	0.0001	1.014339	0.985864
X45	1	17.018165	0.345004	49.327	0.0001	1.010191	0.989912
X46	1	15.368153	0.379368	40.510	0.0001	1.009284	0.990801
X47	1	11.787772	0.345746	34.094	0.0001	1.022975	0.977541
X48	1	13.735477	0.376197	36.511	0.0001	1.010915	0.989203
X49	1	10.287359	0.390489	26.345	0.0001	1.014777	0.985438
X50	1	11.298324	0.373528	30.248	0.0001	1.020295	0.980109
X52	1	14.868632	0.560458	26.529	0.0001	1.008836	0.991241
X53	1	17.245390	0.580795	29.693	0.0001	1.008347	0.991722
X54	1	14.372278	0.548009	26.226	0.0001	1.009249	0.990836
X55	1	14.844952	0.422594	35.128	0.0001	1.016320	0.983942
X56	1	12.239122	0.411944	29.711	0.0001	1.017301	0.982994
X57	1	14.334919	0.570305	25.136	0.0001	1.008764	0.991312
X58	1	14.038914	0.435824	32.212	0.0001	1.014269	0.985932
X59	1	15.376778	0.473804	32.454	0.0001	1.010492	0.989617
X60	1	13.285618	0.494172	26.885	0.0001	1.010739	0.989375
X61	1	11.545578	0.350078	32.980	0.0001	1.023982	0.976580
X62	1	14.088985	0.396311	35.550	0.0001	1.018477	0.981858
X63	1	13.762018	0.432625	31.811	0.0001	1.015451	0.984784
X64	1	12.121901	0.385852	31.416	0.0001	1.017169	0.983121
BLACK	1	2.935927	0.204191	14.378	0.0001	0.830001	1.204818
MALE	1	3.421633	0.109999	31.106	0.0001	0.990590	1.009500
CHILD	1	1.252279	0.169433	7.391	0.0001	0.601265	1.663160
TEEN	1	-1.848706	0.151121	-12.233	0.0001	0.904650	1.105400
INCOME	1	1.330539	0.119911	11.096	0.0001	0.926961	1.078794
BL_MA	1	1.787604	0.385422	4.638	0.0001	0.931762	1.073235
BL_CH	1	2.806036	0.460867	6.089	0.0001	0.811615	1.232111
BL_TN	1	-0.481545	0.513522	-0.938	0.3484	0.829725	1.205219
BL_IN	1	0.587916	0.408761	1.438	0.1504	0.849475	1.177197
MA_CH	1	-4.593502	0.274925	-16.708	0.0001	0.911440	1.097165
MA_TN	1	-3.036396	0.301239	-10.080	0.0001	0.908915	1.100212
MA_IN	1	0.298545	0.238621	1.251	0.2109	0.937610	1.066542
CH_IN	1	2.294741	0.297974	7.701	0.0001	0.854023	1.170929
TN_IN	1	0.986229	0.340278	2.898	0.0038	0.845044	1.183370
URBAN	1	0.814309	0.246781	3.300	0.0010	0.778904	1.283855
CC	1	1.078361	0.209705	5.142	0.0001	0.748411	1.336164
LEAD_WT	1	-.0000179593	.00000523942	-3.428	0.0006	0.625419	1.598928

TEH 0530173

DUP05003I086

COMPLETE RECORDS FOR BLOOD_PB, VARIABLES 1-6, 22-30, DAYS_PB, LEAD_WT, & GCUR75

MODEL 2

MODEL: EQ2
DEP VARIABLE: NL_BPB

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F VALUE	PROB>F
MODEL	77	62430.876	810.791	7584.786	0.0001
ERROR	9164	979.604	0.106897		
U TOTAL	9241	63410.480			

ROOT MSE	0.326951	R-SQUARE	0.9846
DEP MEAN	2.587062	ADJ R-SQ	0.9844
C.V.	12.63793		

NOTE: NO INTERCEPT TERM IS USED. R-SQUARE IS REDEFINED.

VARIABLE	DF	PARAMETER ESTIMATE	STANDARD ERROR	T FOR H0: PARAMETER=0	PROB > |T|	TOLERANCE	VARIANCE INFLATION
X1	1	2.745030	0.028363	96.783	0.0001	1.006265	0.993774
X3	1	2.777397	0.026635	104.278	0.0001	1.001461	0.998541
X4	1	2.602724	0.023916	108.828	0.0001	1.020057	0.980337
X5	1	2.799297	0.028358	98.714	0.0001	1.006621	0.993423
X6	1	2.716312	0.027861	97.494	0.0001	1.013021	0.987146
X7	1	2.771210	0.022079	125.514	0.0001	1.021061	0.979373
X8	1	2.462917	0.028791	85.546	0.0001	1.013866	0.986323
X9	1	2.706111	0.032090	84.330	0.0001	1.009522	0.990568
X10	1	2.428153	0.028153	86.248	0.0001	1.013835	0.986353
X11	1	2.539835	0.029141	87.157	0.0001	1.012860	0.987303
X12	1	2.476505	0.027049	91.555	0.0001	1.009937	0.990161
X13	1	2.974861	0.026902	110.579	0.0001	0.994395	1.005637
X14	1	2.182413	0.022351	97.642	0.0001	1.023588	0.976956
X15	1	2.663590	0.022156	120.221	0.0001	1.023056	0.977464
X16	1	2.138970	0.029496	72.516	0.0001	1.012378	0.987774
X17	1	2.482639	0.025163	98.661	0.0001	1.017552	0.982751
X18	1	2.597439	0.027172	95.594	0.0001	1.014463	0.985743
X20	1	2.693127	0.028087	95.884	0.0001	1.003949	0.996067
X21	1	2.855216	0.032225	88.602	0.0001	1.010650	0.989463
X22	1	2.690510	0.026444	101.743	0.0001	1.015932	0.984318
X23	1	2.746135	0.025013	109.789	0.0001	1.018018	0.982301
X24	1	2.386031	0.024380	97.868	0.0001	1.018980	0.981374
X25	1	2.689229	0.030503	88.162	0.0001	1.011608	0.988525
X26	1	2.708853	0.031486	86.034	0.0001	1.010221	0.989882
X27	1	2.588266	0.029621	87.380	0.0001	1.011997	0.988145
X28	1	2.623023	0.028133	93.236	0.0001	1.007934	0.992128
X29	1	2.592765	0.022148	117.065	0.0001	1.023772	0.976780
X30	1	2.332820	0.026543	87.890	0.0001	1.014933	0.985286
X31	1	2.621740	0.027316	95.978	0.0001	1.010629	0.989483
X32	1	2.440092	0.024130	101.124	0.0001	1.018073	0.982248
X33	1	2.450271	0.032440	75.532	0.0001	1.006986	0.993062
X34	1	2.719902	0.037037	73.436	0.0001	1.007556	0.992500

Within Site Model 2
Dep. Var.: Ln Blood Lead

TEH 0530174

DUP050031087

COMPLETE RECORDS FOR BLOOD_PB, VARIABLES 1-6, 22-30, DAYS_PB, LEAD_WT, & GCUR75

MODEL 2

VARIABLE	DF	PARAMETER ESTIMATE	STANDARD ERROR	T FOR H0: PARAMETER=0	PROB > |T|	TOLERANCE	VARIANCE INFLATION
X35	1	2.664771	0.029786	89.463	0.0001	1.008954	0.991125
X36	1	2.717323	0.020829	130.459	0.0001	1.024943	0.975664
X37	1	2.687194	0.030944	86.840	0.0001	1.000172	0.999828
X38	1	2.876813	0.029749	96.702	0.0001	1.011477	0.988653
X39	1	2.543946	0.023991	106.039	0.0001	1.019065	0.981291
X40	1	2.781397	0.023307	119.336	0.0001	1.020652	0.979766
X41	1	2.846601	0.033922	83.916	0.0001	1.009044	0.991037
X42	1	2.785360	0.029756	93.606	0.0001	1.010984	0.989135
X43	1	2.615114	0.024568	106.442	0.0001	1.014465	0.985741
X44	1	2.714138	0.026991	100.558	0.0001	1.014340	0.985863
X45	1	2.750400	0.021585	127.424	0.0001	1.010201	0.989902
X46	1	2.650904	0.023735	111.689	0.0001	1.009284	0.990801
X47	1	2.389690	0.021631	110.474	0.0001	1.022976	0.977540
X48	1	2.549381	0.023536	108.317	0.0001	1.010915	0.989203
X49	1	2.250405	0.024431	92.115	0.0001	1.014777	0.985438
X50	1	2.316288	0.023369	99.116	0.0001	1.020296	0.980108
X52	1	2.629704	0.035064	74.996	0.0001	1.008836	0.991241
X53	1	2.788411	0.036337	76.738	0.0001	1.008348	0.991721
X54	1	2.588766	0.034286	75.506	0.0001	1.009254	0.990831
X55	1	2.622012	0.026439	99.172	0.0001	1.016320	0.983942
X56	1	2.431521	0.025773	94.344	0.0001	1.017301	0.982993
X57	1	2.617530	0.035681	73.360	0.0001	1.008765	0.991312
X58	1	2.580550	0.027267	94.641	0.0001	1.014270	0.985931
X59	1	2.663360	0.029643	89.848	0.0001	1.010492	0.989617
X60	1	2.526165	0.030917	81.707	0.0001	1.010739	0.989375
X61	1	2.373560	0.021902	108.371	0.0001	1.023982	0.976580
X62	1	2.576679	0.024795	103.920	0.0001	1.018479	0.981856
X63	1	2.547922	0.027067	94.135	0.0001	1.015452	0.984784
X64	1	2.413246	0.024140	99.968	0.0001	1.017188	0.983103
BLACK	1	0.174774	0.012742	13.717	0.0001	0.834349	1.198539
MALE	1	0.246182	0.006878914	35.788	0.0001	0.991462	1.008611
CHILD	1	0.112757	0.008599234	13.112	0.0001	0.913667	1.094490
TEEN	1	-0.118950	0.009454239	-12.582	0.0001	0.904740	1.105290
INCOME	1	0.081607	0.007473877	10.919	0.0001	0.933980	1.070687
BL_MA	1	0.058320	0.024113	2.419	0.0156	0.931776	1.073219
BL_CH	1	0.119150	0.028812	4.135	0.0001	0.812850	1.230239
BL_TN	1	0.006162864	0.032128	0.192	0.8479	0.829735	1.205204
BL_IN	1	0.013696	0.025572	0.536	0.5923	0.849595	1.177031
MA_CH	1	-0.320825	0.017198	-18.655	0.0001	0.911717	1.096831
MA_TN	1	-0.184511	0.018847	-9.790	0.0001	0.908916	1.100212
MA_IN	1	0.002335875	0.014929	0.156	0.8757	0.937611	1.066541
CH_IN	1	0.130785	0.018620	7.024	0.0001	0.856108	1.168077
TN_IN	1	0.080326	0.021259	3.779	0.0002	0.847471	1.179982
URBAN	1	0.060718	0.015430	3.935	0.0001	0.779896	1.282222
CC	1	0.059302	0.013099	4.527	0.0001	0.750824	1.331870

TEH 0530175

DUP050031088

COMPLETE RECORDS FOR BLOOD_PB, VARIABLES 1-6, 22-30, DAYS_PB, LEAD_WT, & GCUR75

MODEL 2W

MODEL: EQ2W
DEP VARIABLE: NL_BPB

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F VALUE	PROB>F
MODEL	78	62433.294	800.427	7505.537	0.0001
ERROR	9163	977.187	0.106645		
U TOTAL	9241	63410.480			

ROOT MSE	0.326565	R-SQUARE	0.9846
DEP MEAN	2.587062	ADJ R-SQ	0.9845
C.V.	12.62302		

NOTE: NO INTERCEPT TERM IS USED. R-SQUARE IS REDEFINED.

VARIABLE	DF	PARAMETER ESTIMATE	STANDARD ERROR	T FOR H0: PARAMETER=0	PROB > |T|	TOLERANCE	VARIANCE INFLATION
X1	1	2.744832	0.028329	96.891	0.0001	1.006263	0.993776
X3	1	2.777596	0.026603	104.409	0.0001	1.001459	0.998543
X4	1	2.602732	0.023888	108.957	0.0001	1.020057	0.980337
X5	1	2.799181	0.028324	98.827	0.0001	1.006620	0.993424
X6	1	2.716438	0.027828	97.614	0.0001	1.013020	0.987147
X7	1	2.771081	0.022053	125.656	0.0001	1.021060	0.979375
X8	1	2.463120	0.028757	85.654	0.0001	1.013864	0.986326
X9	1	2.706487	0.032052	84.441	0.0001	1.009516	0.990574
X10	1	2.428165	0.028120	86.350	0.0001	1.013835	0.986353
X11	1	2.540144	0.029107	87.270	0.0001	1.012855	0.987308
X12	1	2.476389	0.027018	91.658	0.0001	1.009936	0.990162
X13	1	2.974675	0.026871	110.703	0.0001	0.994393	1.005639
X14	1	2.182405	0.022325	97.757	0.0001	1.023588	0.976956
X15	1	2.663845	0.022130	120.374	0.0001	1.023050	0.977469
X16	1	2.139235	0.029462	72.611	0.0001	1.012374	0.987777
X17	1	2.482728	0.025134	98.781	0.0001	1.017551	0.982752
X18	1	2.597476	0.027140	95.708	0.0001	1.014463	0.985743
X20	1	2.692913	0.028054	95.990	0.0001	1.003946	0.996069
X21	1	2.855304	0.032187	88.709	0.0001	1.010649	0.989463
X22	1	2.690486	0.026413	101.862	0.0001	1.015932	0.984318
X23	1	2.746215	0.024983	109.922	0.0001	1.018017	0.982301
X24	1	2.386177	0.024351	97.990	0.0001	1.018978	0.981376
X25	1	2.689383	0.030467	88.271	0.0001	1.011607	0.988526
X26	1	2.708835	0.031449	86.135	0.0001	1.010221	0.989882
X27	1	2.588151	0.029586	87.479	0.0001	1.011997	0.988145
X28	1	2.623103	0.028100	93.349	0.0001	1.007934	0.992129
X29	1	2.592872	0.022122	117.208	0.0001	1.023771	0.976781
X30	1	2.332943	0.026511	87.998	0.0001	1.014932	0.985287
X31	1	2.622173	0.027284	96.107	0.0001	1.010617	0.989494
X32	1	2.440319	0.024101	101.253	0.0001	1.018069	0.982252
X33	1	2.450303	0.032402	75.623	0.0001	1.006986	0.993062
X34	1	2.720138	0.036994	73.530	0.0001	1.007554	0.992502

Within Site Model 2W
Dep. Var.: Ln Blood Lead

TEH 0530176

DUP050031089

COMPLETE RECORDS FOR BLOOD_PB, VARIABLES 1-6, 22-30, DAYS_PB, LEAD_WT, & GCUR75

MODEL 2W

VARIABLE	DF	PARAMETER ESTIMATE	STANDARD ERROR	T FOR H0: PARAMETER=0	PROB > |T|	TOLERANCE	VARIANCE INFLATION
X35	1	2.664816	0.029751	89.570	0.0001	1.008954	0.991126
X36	1	2.717102	0.020804	130.602	0.0001	1.024938	0.975669
X37	1	2.687346	0.030908	86.948	0.0001	1.000171	0.999829
X38	1	2.876844	0.029714	96.818	0.0001	1.011477	0.988653
X39	1	2.544154	0.023962	106.173	0.0001	1.019062	0.981295
X40	1	2.781563	0.023280	119.484	0.0001	1.020649	0.979768
X41	1	2.846422	0.033882	84.010	0.0001	1.009043	0.991038
X42	1	2.785510	0.029721	93.721	0.0001	1.010983	0.989136
X43	1	2.615154	0.024539	106.569	0.0001	1.014465	0.985741
X44	1	2.714286	0.026959	100.682	0.0001	1.014339	0.985864
X45	1	2.750076	0.021559	127.558	0.0001	1.010191	0.989912
X46	1	2.650885	0.023707	111.820	0.0001	1.009284	0.990801
X47	1	2.389782	0.021606	110.609	0.0001	1.022975	0.977541
X48	1	2.549397	0.023509	108.445	0.0001	1.010915	0.989203
X49	1	2.250431	0.024402	92.224	0.0001	1.014777	0.985438
X50	1	2.316394	0.023342	99.238	0.0001	1.020295	0.980109
X52	1	2.629761	0.035023	75.087	0.0001	1.008836	0.991241
X53	1	2.788538	0.036294	76.832	0.0001	1.008347	0.991722
X54	1	2.589112	0.034245	75.605	0.0001	1.009249	0.990836
X55	1	2.622097	0.026408	99.292	0.0001	1.016320	0.983942
X56	1	2.431627	0.025742	94.460	0.0001	1.017301	0.982994
X57	1	2.617554	0.035638	73.448	0.0001	1.008764	0.991312
X58	1	2.580695	0.027235	94.758	0.0001	1.014269	0.985932
X59	1	2.663302	0.029608	89.952	0.0001	1.010492	0.989617
X60	1	2.526189	0.030881	81.804	0.0001	1.010739	0.989375
X61	1	2.373503	0.021876	108.496	0.0001	1.023982	0.976580
X62	1	2.576848	0.024766	104.050	0.0001	1.018477	0.981858
X63	1	2.548022	0.027035	94.250	0.0001	1.015451	0.984784
X64	1	2.413744	0.024112	100.106	0.0001	1.017169	0.983121
BLACK	1	0.170389	0.012760	13.353	0.0001	0.830001	1.204818
MALE	1	0.245211	0.006873824	35.673	0.0001	0.990590	1.009500
CHILD	1	0.083282	0.010588	7.866	0.0001	0.601265	1.663160
TEEN	1	-0.119400	0.009443554	-12.644	0.0001	0.904650	1.105400
INCOME	1	0.078514	0.007493267	10.478	0.0001	0.926961	1.078794
BL_MA	1	0.057879	0.024085	2.403	0.0163	0.931762	1.073235
BL_CH	1	0.124493	0.028800	4.323	0.0001	0.811615	1.232111
BL_TN	1	0.006700757	0.032090	0.209	0.8346	0.829725	1.205219
BL_IN	1	0.012249	0.025544	0.480	0.6316	0.849475	1.177197
MA_CH	1	-0.319399	0.017180	-18.591	0.0001	0.911440	1.097165
MA_TN	1	-0.184479	0.018824	-9.800	0.0001	0.908915	1.100212
MA_IN	1	0.002264205	0.014911	0.152	0.8793	0.937610	1.066542
CH_IN	1	0.135160	0.018620	7.259	0.0001	0.854023	1.170929
TN_IN	1	0.085743	0.021264	4.032	0.0001	0.845044	1.183370
URBAN	1	0.063337	0.015421	4.107	0.0001	0.778904	1.283855
CC	1	0.055766	0.013104	4.256	0.0001	0.748411	1.336164
LEAD_WT	1	-.0000015587	3.27412E-07	-4.761	0.0001	0.625419	1.598928

TEH 0530177

DUP05003109 0

APPENDIX 2

Between Site Regression Summaries
With Survey Demographic Terms Only

Weighted Least Squares

Based on Adjustment Sets 1, 1W, 2 and 2W

COMPLETE RECORDS FOR BLOOD_PB, VARIABLES 1-6, 22-30, DAYS_PB, LEAD_WT, & GCUR75

BETWEEN SITE REGRESSION ANALYSES (#31A: 6 ----- WEIGHT = 1 / BSD1 ** 2

MODEL: EQ1AS
DEP VARIABLE: BPB1

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F VALUE	PROB>F
MODEL	22	1304.560	59.298163	4.032	0.0001
ERROR	38	558.851	14.706594		
C TOTAL	60	1863.410			

ROOT MSE	3.834918	R-SQUARE	0.7001
DEP MEAN	14.473045	ADJ R-SQ	0.5265
C.V.	26.49697		

VARIABLE	DF	PARAMETER ESTIMATE	STANDARD ERROR	T FOR H0: PARAMETER=0	PROB > |T|	TOLERANCE	VARIANCE INFLATION
INTERCEP	1	14.472126	0.238823	60.598	0.0001	.	0.000000
BLACK	1	4.780675	2.330054	2.052	0.0471	0.330225	3.028242
MALE	1	7.596147	7.000612	1.085	0.2847	0.580846	1.721625
CHILD	1	7.257087	4.142428	1.752	0.0879	0.361991	2.762499
TEEN	1	14.898839	8.485507	1.756	0.0872	0.477991	2.092088
INCOME	1	7.839337	2.593773	3.022	0.0045	0.392113	2.550286
BL_MA	1	107.384	56.352853	1.906	0.0643	0.561232	1.781793
BL_CH	1	2.661992	17.156698	0.155	0.8775	0.489137	2.044417
BL_TN	1	-16.251733	42.815632	-0.380	0.7064	0.498497	2.006032
BL_IN	1	24.202403	17.681906	1.369	0.1791	0.493227	2.027462
MA_CH	1	-121.035	73.328006	-1.651	0.1071	0.644134	1.552472
MA_TN	1	120.638	192.302	0.627	0.5342	0.551633	1.812798
MA_IN	1	3.139969	48.841219	0.064	0.9491	0.592004	1.689177
CH_IN	1	-1.677282	32.480529	-0.052	0.9591	0.393120	2.543753
TN_IN	1	-29.614256	66.579685	-0.445	0.6590	0.382265	2.615988
URBAN	1	3.312716	1.025613	3.230	0.0026	0.225541	4.433782
CC	1	-2.824035	1.542487	-1.831	0.0750	0.185363	5.394812
WINTER	1	-1.623935	0.932109	-1.742	0.0896	0.342566	2.919143
SPRING	1	0.417102	0.892630	0.467	0.6430	0.341574	2.927627
SUMMER	1	0.723637	0.844854	0.857	0.3971	0.331119	3.020066
SOUTH	1	-1.131969	1.006833	-1.124	0.2679	0.212370	4.708774
WEST	1	0.961115	0.868875	1.106	0.2756	0.310288	3.222813
NORTEAST	1	1.219942	0.786660	1.551	0.1292	0.455412	2.195813

OBS	ID	ACTUAL	PREDICT VALUE	STD ERR PREDICT	LOWER95% PREDICT	UPPER95% PREDICT	RESIDUAL	STD ERR RESIDUAL	STUDENT RESIDUAL	-2-1-0 1 2	COOK'S D
1	1	16.483	17.537	1.490	12.901	22.173	-1.054	0.898369	-1.173	**	0.165
2	3	17.337	17.878	1.427	13.487	22.268	-.540383	0.795473	-0.679	*	0.065
3	4	14.195	14.240	0.821275	10.836	17.643	-.044782	1.215	-0.037		0.000
4	5	17.530	16.401	1.270	12.041	20.761	1.129	1.188	0.951	*	0.045
5	6	15.885	14.493	0.874112	10.608	18.379	1.392	1.468	0.948	*	0.014
6	7	17.602	16.048	0.886703	12.771	19.325	1.553	1.023	1.518	***	0.075

Between Site Model
Survey Demographics Only
Weighted Least Squares
Dep. Var.: Adj. Set 1

TEH 0530179

DUP050031092

COMPLETE RECORDS FOR BLOOD_PB, VARIABLES 1-6, 22-30, DAYS_PB, LEAD_WT, & GCUR75

BETWEEN SITE REGRESSION ANALYSES (#31A: 6 ----- WEIGHT = 1 / BSD1 ** 2

OBS	ID	ACTUAL	PREDICT VALUE	STD ERR PREDICT	LOWER95% PREDICT	UPPER95% PREDICT	RESIDUAL	STD ERR RESIDUAL	STUDENT RESIDUAL	-2-1-0 1 2	COOK'S D
7	8	12.488	12.863	0.915977	8.836	16.890	-.375065	1.510	-0.248	| | |	0.001
8	9	15.855	14.895	0.856414	10.550	19.240	0.959391	1.772	0.541	| |* |	0.003
9	10	12.014	12.864	0.892211	8.930	16.799	-.850586	1.478	-0.575	| *| |	0.005
10	11	14.164	16.111	0.943876	12.019	20.203	-1.947	1.518	-1.283	| **| |	0.028
11	12	12.865	14.341	0.793331	10.618	18.064	-1.476	1.457	-1.013	| **| |	0.013
12	13	20.770	17.586	0.920221	13.761	21.411	3.184	1.370	2.325	| |**** |	0.106
13	14	9.680	12.428	0.799613	9.215	15.641	-2.748	1.113	-2.468	| ****| |	0.137
14	15	15.464	13.688	0.872324	10.419	16.957	1.776	1.042	1.705	| |*** |	0.089
15	16	9.275	7.952	1.141	3.622	12.281	1.323	1.404	0.942	| |* |	0.026
16	17	12.931	12.378	0.673746	8.969	15.787	0.553067	1.388	0.398	| | |	0.002
17	18	14.547	13.100	0.970340	9.196	17.004	1.447	1.355	1.068	| |** |	0.025
18	20	15.733	16.680	0.824079	12.815	20.546	-.947531	1.513	-0.626	| *| |	0.005
19	21	18.653	17.219	1.375	12.345	22.093	1.435	1.420	1.010	| |** |	0.042
20	22	15.670	14.667	0.973243	10.838	18.496	1.003	1.297	0.773	| |* |	0.015
21	23	16.589	15.653	0.833422	12.119	19.188	0.935592	1.288	0.726	| |* |	0.010
22	24	11.690	13.102	0.865502	9.605	16.600	-1.412	1.219	-1.158	| **| |	0.029
23	25	15.445	13.582	0.813260	9.453	17.712	1.863	1.685	1.106	| |** |	0.012
24	26	16.010	14.652	0.954519	10.291	19.013	1.358	1.679	0.809	| |* |	0.009
25	27	14.276	13.719	0.872666	9.639	17.799	0.556958	1.593	0.350	| | |	0.002
26	28	14.714	15.728	1.396	11.235	20.221	-1.014	1.014	-1.000	| *| |	0.082
27	29	14.251	15.467	1.150	11.864	19.070	-1.216	0.723059	-1.682	| ***| |	0.311
28	30	10.893	14.328	0.621296	10.801	17.855	-3.435	1.505	-2.283	| ****| |	0.039
29	31	14.642	15.317	0.889883	11.476	19.157	-.674979	1.419	-0.476	| | |	0.004
30	32	12.415	12.128	0.828749	8.694	15.562	0.287088	1.226	0.234	| | |	0.001
31	33	12.111	12.594	1.813	7.145	18.042	-.482111	0.819840	-0.588	| *| |	0.074
32	34	15.746	14.785	1.171	9.611	19.959	0.961425	1.946	0.494	| | |	0.004
33	35	16.100	12.483	0.817116	8.432	16.535	3.617	1.634	2.213	| |**** |	0.053
34	36	16.407	16.765	1.083	13.375	20.156	-.358264	0.677516	-0.529	| *| |	0.031
35	37	15.593	16.758	1.400	11.983	21.533	-1.165	1.281	-0.910	| *| |	0.043
36	38	18.560	16.899	0.739855	12.914	20.885	1.661	1.668	0.996	| |* |	0.008
37	39	13.361	12.939	0.854091	9.495	16.383	0.421498	1.198	0.352	| | |	0.003
38	40	16.779	15.367	0.896554	11.951	18.783	1.412	1.113	1.268	| |** |	0.045
39	41	18.500	17.799	1.620	12.461	23.137	0.700354	1.305	0.537	| |* |	0.019
40	42	16.920	16.831	1.278	12.321	21.340	0.089607	1.303	0.069	| | |	0.000
41	43	14.529	14.967	0.686736	11.615	18.319	-.437832	1.341	-0.326	| | |	0.001
42	44	16.305	14.915	0.983357	11.017	18.813	1.390	1.332	1.044	| |** |	0.026
43	45	17.022	17.191	1.100	13.707	20.674	-.168827	0.737267	-0.229	| | |	0.005
44	46	15.368	16.106	1.092	12.422	19.789	-.737463	0.962972	-0.766	| *| |	0.033
45	47	11.787	11.849	0.898593	8.605	15.093	-.062454	0.976026	-0.064	| | |	0.000
46	48	13.735	14.841	0.988706	11.299	18.383	-1.106	1.052	-1.052	| **| |	0.042
47	49	10.287	9.760	0.953876	6.164	13.356	0.526968	1.156	0.456	| | |	0.006
48	50	11.297	12.197	0.617777	9.038	15.357	-.900197	1.293	-0.696	| *| |	0.005
49	52	14.868	15.227	1.254	10.187	20.266	-.358560	1.747	-0.205	| | |	0.001
50	53	17.244	16.022	1.324	10.774	21.269	1.222	1.793	0.682	| |* |	0.011
51	54	14.368	15.429	1.487	10.216	20.643	-1.061	1.487	-0.713	| *| |	0.022
52	55	14.844	16.392	0.811925	12.721	20.063	-1.548	1.404	-1.103	| **| |	0.018
53	56	12.238	12.466	0.936193	8.747	16.185	-.227874	1.274	-0.179	| | |	0.001
54	57	14.335	15.403	1.316	10.234	20.572	-1.068	1.749	-0.611	| *| |	0.009
55	58	14.037	14.365	0.997966	10.423	18.308	-.328066	1.342	-0.244	| | |	0.001
56	59	15.377	15.641	0.914451	11.521	19.761	-.263473	1.571	-0.168	| | |	0.000

TEH 0530180

DUP05003093

COMPLETE RECORDS FOR BLOOD_PB, VARIABLES 1-6, 22-30, DAYS_PB, LEAD_WT, & GCUR75

BETWEEN SITE REGRESSION ANALYSES (#31A: 6 ----- WEIGHT = 1 / BSD1 ** 2

OBS	ID	ACTUAL	PREDICT VALUE	STD ERR PREDICT	LOWER95% PREDICT	UPPER95% PREDICT	RESIDUAL	STD ERR RESIDUAL	STUDENT RESIDUAL	-2-1-0 1 2	COOK'S D
57	60	13.285	12.444	0.858452	8.231	16.658	0.841014	1.691	0.497		0.003
58	61	11.546	12.552	0.882369	9.299	15.806	-1.006	1.013	-0.993	*	0.033
59	62	14.087	13.744	0.818635	10.248	17.240	0.342826	1.282	0.268		0.001
60	63	13.761	13.664	0.831497	9.906	17.423	0.096725	1.437	0.067		0.000
61	64	12.116	13.148	0.981378	9.552	16.744	-1.032	1.109	-0.931	*	0.030

SUM OF RESIDUALS 1.570961
SUM OF SQUARED RESIDUALS 20.066

TEH 0530181

DUP050031094

COMPLETE RECORDS FOR BLOOD_PB, VARIABLES 1-6, 22-30, DAYS_PB, LEAD_WT, & GCUN75

BETWEEN SITE REGRESSION ANALYSES (#31A: 6 ----- WEIGHT = 1 / BSD1W ** 2

MODEL: EQ1WAS
DEP VARIABLE: BPB1W

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F VALUE	PROB>F
MODEL	23	1309.074	56.916263	3.790	0.0002
ERROR	37	555.590	15.015935		
C TOTAL	60	1864.664			

ROOT MSE	3.875040	R-SQUARE	0.7020
DEP MEAN	14.473802	ADJ R-SQ	0.5168
C.V.	26.77279		

VARIABLE	DF	PARAMETER ESTIMATE	STANDARD ERROR	T FOR H0: PARAMETER=0	PROB > |T|	TOLERANCE	VARIANCE INFLATION
INTERCEP	1	14.478353	0.241444	59.966	0.0001	.	0.000000
BLACK	1	4.852184	2.357792	2.058	0.0467	0.328899	3.040448
MALE	1	6.716793	7.275698	0.923	0.3619	0.548424	1.823408
CHILD	1	8.176569	4.557001	1.794	0.0809	0.305057	3.278073
TEEN	1	15.213796	8.591924	1.771	0.0848	0.475474	2.103165
INCOME	1	8.643564	3.069851	2.816	0.0078	0.285478	3.502902
BL_MA	1	102.512	57.735085	1.776	0.0840	0.545289	1.833889
BL_CH	1	-0.675369	18.511944	-0.036	0.9711	0.428475	2.333856
BL_TN	1	-15.265913	43.277538	-0.353	0.7263	0.497592	2.009678
BL_IN	1	22.505493	18.173311	1.238	0.2234	0.476178	2.100057
MA_CH	1	-116.933	74.490065	-1.570	0.1250	0.636578	1.570899
MA_TN	1	104.179	196.699	0.530	0.5995	0.537710	1.859740
MA_IN	1	3.164889	49.323626	0.064	0.9492	0.591997	1.689199
CH_IN	1	-0.042189	32.952249	-0.001	0.9990	0.389523	2.567246
TN_IN	1	-25.417320	67.774730	-0.375	0.7098	0.376222	2.658006
URBAN	1	3.005130	1.199114	2.506	0.0167	0.168269	5.942872
CC	1	-2.784271	1.559522	-1.785	0.0824	0.184933	5.407350
WINTER	1	-1.561017	0.949505	-1.644	0.1086	0.336678	2.970199
SPRING	1	0.457125	0.904665	0.505	0.6163	0.339143	2.948606
SUMMER	1	0.758228	0.855957	0.886	0.3814	0.328985	3.039656
SOUTH	1	-1.429438	1.174015	-1.218	0.2311	0.159291	6.277820
WEST	1	0.723341	0.993485	0.728	0.4711	0.242040	4.131540
NORTEAST	1	1.181705	0.797775	1.481	0.1470	0.451595	2.214372
LEAD_WT	1	.00004763093	.00009407442	0.506	0.6156	0.240135	4.164319

OBS	ID	ACTUAL	PREDICT VALUE	STD ERR PREDICT	LOWER95% PREDICT	UPPER95% PREDICT	RESIDUAL	STD ERR RESIDUAL	STUDENT RESIDUAL	-2-1-0 1 2	COOK'S D
1	1	16.481	17.390	1.532	12.667	22.112	-.908916	0.860408	-1.056	| **| |	0.147
2	3	17.340	17.968	1.452	13.516	22.421	-.628627	0.783613	-0.802	| *| |	0.092
3	4	14.195	14.219	0.830529	10.778	17.660	-.023912	1.227	-0.019	| | |	0.000
4	5	17.529	16.353	1.287	11.942	20.765	1.176	1.196	0.983	| |* |	0.047
5	6	15.887	14.351	0.927356	10.381	18.320	1.536	1.455	1.056	| |** |	0.019

Between Site Model
Survey Demographics Only
Weighted Least Squares
Dep. Var.: Adj. Set 1W

TEH 0530182

DUP050031095

COMPLETE RECORDS FOR BLOOD_PB, VARIABLES 1-6, 22-30, DAYS_PB, LEAD_WT, & GCUR75

BETWEEN SITE REGRESSION ANALYSES (#31A: 6 ----- WEIGHT = 1 / BSD1W ** 2

OBS	ID	ACTUAL	PREDICT VALUE	STD ERR PREDICT	LOWER95% PREDICT	UPPER95% PREDICT	RESIDUAL	STD ERR RESIDUAL	STUDENT RESIDUAL	-2-1-0 1 2	COOK'S D
6	7	17.600	16.032	0.896062	12.719	19.344	1.569	1.033	1.518	| |*** |	0.072
7	8	12.490	12.950	0.940343	8.866	17.035	-.460335	1.515	-0.304	| | |	0.001
8	9	15.859	14.997	0.887768	10.586	19.408	0.861950	1.778	0.485	| | |	0.002
9	10	12.014	13.082	0.997675	9.012	17.153	-1.068	1.430	-0.747	| *| |	0.011
10	11	14.167	16.291	1.016	12.094	20.487	-2.123	1.492	-1.423	| **| |	0.039
11	12	12.864	14.357	0.801770	10.593	18.120	-1.493	1.471	-1.015	| **| |	0.013
12	13	20.768	17.735	0.975215	13.823	21.647	3.033	1.351	2.245	| |**** |	0.109
13	14	9.680	12.394	0.810464	9.144	15.644	-2.714	1.122	-2.419	| ****| |	0.127
14	15	15.467	13.647	0.684889	10.339	16.956	1.820	1.049	1.735	| |*** |	0.089
15	16	9.278	8.242	1.285	3.716	12.768	1.036	1.298	0.798	| |* |	0.026
16	17	12.933	12.500	0.720412	9.021	15.979	0.432540	1.382	0.313	| | |	0.001
17	18	14.547	13.139	0.982589	9.190	17.087	1.409	1.366	1.031	| |** |	0.023
18	20	15.730	16.696	0.832882	12.788	20.604	-.965559	1.527	-0.632	| *| |	0.005
19	21	18.654	17.216	1.388	12.289	22.142	1.438	1.434	1.003	| |** |	0.039
20	22	15.670	14.638	0.984658	10.766	18.510	1.032	1.309	0.788	| |* |	0.015
21	23	16.590	15.819	0.902383	12.186	19.452	0.770576	1.259	0.612	| |* |	0.008
22	24	11.692	13.007	0.894384	9.451	16.563	-1.315	1.217	-1.081	| **| |	0.026
23	25	15.447	13.453	0.860141	9.247	17.659	1.994	1.682	1.185	| |** |	0.015
24	26	16.010	14.730	0.976325	10.311	19.149	1.279	1.688	0.758	| |* |	0.008
25	27	14.275	13.639	0.895339	9.502	17.775	0.636502	1.601	0.397	| | |	0.002
26	28	14.715	15.861	1.434	11.289	20.434	-1.146	0.989641	-1.158	| **| |	0.117
27	29	14.253	15.460	1.161	11.818	19.102	-1.207	0.730031	-1.654	| ***| |	0.288
28	30	10.894	14.410	0.646847	10.830	17.989	-3.515	1.511	-2.326	| ****| |	0.041
29	31	14.647	15.152	0.956716	11.214	19.091	-.505763	1.395	-0.362	| | |	0.003
30	32	12.418	12.072	0.844920	8.594	15.551	0.345325	1.233	0.280	| | |	0.002
31	33	12.112	12.634	1.833	7.124	18.144	-.522250	0.823999	-0.634	| *| |	0.083
32	34	15.749	14.668	1.206	9.417	19.919	1.081	1.952	0.554	| |* |	0.005
33	35	16.100	12.698	0.927819	8.514	16.882	3.403	1.595	2.134	| |**** |	0.064
34	36	16.405	16.828	1.101	13.391	20.265	-.423466	0.672228	-0.630	| *| |	0.044
35	37	15.595	16.846	1.425	12.007	21.685	-1.251	1.282	-0.976	| *| |	0.049
36	38	18.561	16.902	0.747161	12.873	20.930	1.659	1.684	0.985	| |* |	0.008
37	39	13.363	12.962	0.863388	9.480	16.444	0.400838	1.209	0.331	| | |	0.002
38	40	16.781	15.304	0.913967	11.842	18.766	1.477	1.117	1.322	| |** |	0.049
39	41	18.498	17.701	1.647	12.291	23.110	0.796632	1.304	0.611	| |* |	0.025
40	42	16.922	17.014	1.340	12.397	21.631	-.092243	1.266	-0.073	| | |	0.000
41	43	14.530	14.919	0.700246	11.525	18.313	-.389707	1.351	-0.288	| | |	0.001
42	44	16.306	14.853	1.001	10.905	18.801	1.454	1.339	1.086	| |** |	0.027
43	45	17.018	17.143	1.114	13.618	20.669	-.125039	0.739454	-0.169	| | |	0.003
44	46	15.368	15.982	1.129	12.226	19.738	-.613593	0.941293	-0.652	| *| |	0.025
45	47	11.788	11.692	0.960699	8.351	15.032	0.096119	0.933845	0.103	| | |	0.000
46	48	13.735	14.733	1.021	11.127	18.339	-.997782	1.040	-0.959	| *| |	0.037
47	49	10.287	9.825	0.971861	6.182	13.469	0.461959	1.160	0.398	| | |	0.005
48	50	11.298	12.185	0.624416	8.991	15.379	-.886344	1.306	-0.679	| *| |	0.004
49	52	14.869	15.321	1.280	10.213	20.428	-.452015	1.755	-0.258	| | |	0.001
50	53	17.245	15.944	1.346	10.631	21.257	1.302	1.804	0.721	| |* |	0.012
51	54	14.372	15.359	1.508	10.082	20.637	-.987147	1.495	-0.660	| *| |	0.019
52	55	14.845	16.461	0.831033	12.740	20.182	-1.616	1.411	-1.145	| **| |	0.019
53	56	12.239	12.358	0.969432	8.574	16.142	-.118787	1.268	-0.094	| | |	0.000
54	57	14.335	15.520	1.348	10.275	20.766	-1.185	1.751	-0.677	| *| |	0.011
55	58	14.039	14.370	1.008	10.385	18.355	-.331052	1.355	-0.244	| | |	0.001

TEH 0530183

DUP05003109б

COMPLETE RECORDS FOR BLOOD_PB, VARIABLES 1-6, 22-30, DAYS_PB, LEAD_WT, & GCUR75

BETWEEN SITE REGRESSION ANALYSES (#31A: 6 ----- WEIGHT = 1 / BSD1W ** 2

OBS	ID	ACTUAL	PREDICT VALUE	STD ERR PREDICT	LOWER95% PREDICT	UPPER95% PREDICT	RESIDUAL	STD ERR RESIDUAL	STUDENT RESIDUAL	-2-1-0 1 2	COOK'S D
56	59	15.377	15.783	0.965246	11.580	19.986	-.406106	1.562	-0.260	| | |	0.001
57	60	13.286	12.397	0.871995	8.134	16.660	0.888471	1.705	0.521	| |* |	0.003
58	61	11.546	12.322	1.001	8.907	15.738	-.776734	0.916048	-0.848	| *| |	0.036
59	62	14.089	13.691	0.833888	10.151	17.232	0.397544	1.290	0.308	| | |	0.002
60	63	13.762	13.614	0.845902	9.809	17.419	0.147928	1.447	0.102	| | |	0.000
61	64	12.122	13.257	1.013	9.598	16.916	-1.135	1.100	-1.032	| **| |	0.038

SUM OF RESIDUALS 1.42212
SUM OF SQUARED RESIDUALS 20.14276

TEH 0530184

DUP050031097

COMPLETE RECORDS FOR BLOOD_PB, VARIABLES 1-6, 22-30, DAYS_PB, LEAD_WT, & GCUR75

BETWEEN SITE REGRESSION ANALYSES (#31A: 6 ----- WEIGHT = 1 / LBSD2 ** 2

MODEL: EQ2AS
DEP VARIABLE: LBPB2

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F VALUE	PROB>F
MODEL	22	1833.404	83.336561	4.356	0.0001
ERROR	38	727.073	19.133501		
C TOTAL	60	2560.477			

ROOT MSE	4.374186	R-SQUARE	0.7160
DEP MEAN	2.588674	ADJ R-SQ	0.5516
C.V.	168.974		

VARIABLE	DF	PARAMETER ESTIMATE	STANDARD ERROR	T FOR H0: PARAMETER=0	PROB > |T|	TOLERANCE	VARIANCE INFLATION
INTERCEP	1	2.588879	0.017033	151.993	0.0001	.	0.000000
BLACK	1	0.335907	0.166179	2.021	0.0503	0.330227	3.028219
MALE	1	0.424165	0.499282	0.850	0.4009	0.580847	1.721624
CHILD	1	0.518440	0.295437	1.755	0.0873	0.361992	2.762489
TEEN	1	1.085553	0.605186	1.794	0.0808	0.477992	2.092085
INCOME	1	0.517807	0.184988	2.799	0.0080	0.392112	2.550294
BL_MA	1	8.681035	4.019080	2.160	0.0371	0.561235	1.781786
BL_CH	1	-0.233888	1.223613	-0.191	0.8494	0.489139	2.044407
BL_TN	1	-1.287193	3.053613	-0.422	0.6757	0.498502	2.006010
BL_IN	1	1.771719	1.261074	1.405	0.1682	0.493232	2.027445
MA_CH	1	-11.572312	5.229728	-2.213	0.0330	0.644140	1.552459
MA_TN	1	2.658988	13.714955	0.194	0.8473	0.551633	1.812799
MA_IN	1	-0.423854	3.483350	-0.122	0.9038	0.592003	1.689180
CH_IN	1	0.464225	2.316507	0.200	0.8422	0.393123	2.543732
TN_IN	1	-2.427667	4.748456	-0.511	0.6121	0.382267	2.615975
URBAN	1	0.229981	0.073147	3.144	0.0032	0.225541	4.433790
CC	1	-0.175066	0.110009	-1.591	0.1198	0.185365	5.394764
WINTER	1	-0.125503	0.066478	-1.888	0.0667	0.342567	2.919140
SPRING	1	0.038640	0.063662	0.607	0.5475	0.341576	2.927605
SUMMER	1	0.063443	0.060255	1.053	0.2990	0.331120	3.020054
SOUTH	1	-0.082234	0.071807	-1.145	0.2593	0.212370	4.708770
WEST	1	0.094860	0.061968	1.531	0.1341	0.310286	3.222831
NORTEAST	1	0.098250	0.056105	1.751	0.0880	0.455410	2.195824

```
                   PREDICT  STD ERR LOWER95% UPPER95%          STD ERR  STUDENT             COOK'S
 OBS    ID  ACTUAL   VALUE  PREDICT  PREDICT  PREDICT RESIDUAL RESIDUAL RESIDUAL -2-1-0 1 2      D

   1     1   2.745   2.806 0.106239    2.476    3.137 -.061187 0.064073   -0.955 |     *|     |  0.109
   2     3   2.777   2.829 0.101759    2.516    3.143 -.052020 0.056735   -0.917 |     *|     |  0.118
   3     4   2.603   2.587 0.058573    2.344    2.829 0.015964 0.086678    0.184 |      |     |  0.001
   4     5   2.799   2.732 0.090598    2.421    3.042 0.067774 0.084728    0.800 |      |*    |  0.032
   5     6   2.716   2.629 0.062341    2.351    2.906 0.087796 0.104717    0.838 |      |*    |  0.011
   6     7   2.771   2.683 0.063240    2.449    2.916 0.088708 0.072993    1.215 |      |**   |  0.048
```

Between Site Model
Survey Demographics Only
Weighted Least Squares
Dep. Var.: Adj. Set 2

TEH 0530185

DUP05003I098

COMPLETE RECORDS FOR BLOOD_PB, VARIABLES 1-6, 22-30, DAYS_PB, LEAD_WT, & GCUR75

BETWEEN SITE REGRESSION ANALYSES (#31A: 6 ----- WEIGHT = 1 / LBSD2 ** 2

OBS	ID	ACTUAL	PREDICT VALUE	STD ERR PREDICT	LOWER95% PREDICT	UPPER95% PREDICT	RESIDUAL	STD ERR RESIDUAL	STUDENT RESIDUAL	-2-1-0 1 2	COOK'S D
7	8	2.463	2.502	0.065328	2.215	2.790	-.039399	0.107668	-0.366	| | |	0.002
8	9	2.706	2.624	0.061079	2.314	2.934	0.082085	0.126382	0.650	| |* |	0.004
9	10	2.428	2.500	0.063632	2.219	2.780	-.071570	0.105433	-0.679	| *| |	0.007
10	11	2.540	2.692	0.067317	2.400	2.984	-.151975	0.108243	-1.404	| **| |	0.033
11	12	2.477	2.578	0.056580	2.313	2.844	-.101527	0.103912	-0.977	| *| |	0.012
12	13	2.975	2.796	0.065630	2.524	3.069	0.178470	0.097673	1.827	| |*** |	0.066
13	14	2.182	2.419	0.057028	2.190	2.648	-.236315	0.079412	-2.976	| *****| |	0.199
14	15	2.664	2.529	0.062214	2.296	2.762	0.134624	0.074309	1.812	| |*** |	0.100
15	16	2.139	2.076	0.081371	1.767	2.385	0.063257	0.100125	0.632	| |* |	0.011
16	17	2.483	2.420	0.048051	2.177	2.663	0.062677	0.099025	0.633	| |* |	0.004
17	18	2.597	2.493	0.069205	2.214	2.771	0.104566	0.096630	1.082	| |** |	0.026
18	20	2.693	2.752	0.058773	2.477	3.028	-.059138	0.107888	-0.548	| *| |	0.004
19	21	2.855	2.777	0.098055	2.430	3.125	0.077886	0.101265	0.769	| |* |	0.024
20	22	2.691	2.622	0.069411	2.349	2.895	0.068398	0.092530	0.739	| |* |	0.013
21	23	2.746	2.686	0.059439	2.434	2.938	0.060168	0.091858	0.655	| |* |	0.008
22	24	2.386	2.494	0.061727	2.245	2.744	-.108330	0.086962	-1.246	| **| |	0.034
23	25	2.689	2.536	0.058001	2.241	2.830	0.153395	0.120159	1.277	| |** |	0.017
24	26	2.709	2.608	0.068076	2.297	2.919	0.100397	0.119724	0.839	| |* |	0.010
25	27	2.588	2.545	0.062238	2.254	2.836	0.043700	0.113641	0.385	| | |	0.002
26	28	2.623	2.701	0.099560	2.380	3.021	-.077662	0.072328	-1.074	| **| |	0.095
27	29	2.593	2.667	0.082015	2.410	2.924	-.073993	0.051568	-1.435	| **| |	0.226
28	30	2.333	2.584	0.044311	2.332	2.836	-.251248	0.107316	-2.341	| ****| |	0.041
29	31	2.622	2.657	0.063466	2.383	2.931	-.035387	0.101236	-0.350	| | |	0.002
30	32	2.440	2.418	0.059107	2.173	2.663	0.021836	0.087447	0.250	| | |	0.001
31	33	2.450	2.480	0.129292	2.091	2.868	-.029586	0.058471	-0.506	| *| |	0.054
32	34	2.720	2.642	0.083530	2.273	3.011	0.077956	0.138812	0.562	| |* |	0.005
33	35	2.665	2.412	0.058276	2.123	2.700	0.253265	0.116530	2.173	| |**** |	0.051
34	36	2.717	2.738	0.077241	2.496	2.980	-.020551	0.048321	-0.425	| | |	0.020
35	37	2.687	2.737	0.099874	2.396	3.077	-.049521	0.091357	-0.542	| *| |	0.015
36	38	2.877	2.788	0.052766	2.503	3.072	0.089259	0.118949	0.750	| |* |	0.005
37	39	2.544	2.488	0.060914	2.242	2.733	0.056245	0.085452	0.658	| |* |	0.010
38	40	2.781	2.659	0.063942	2.416	2.903	0.121945	0.079405	1.536	| |*** |	0.066
39	41	2.847	2.792	0.115554	2.411	3.172	0.054999	0.093082	0.591	| |* |	0.023
40	42	2.785	2.815	0.091113	2.494	3.137	-.029821	0.092949	-0.321	| | |	0.004
41	43	2.615	2.625	0.048978	2.386	2.864	-.010005	0.095655	-0.105	| | |	0.000
42	44	2.714	2.618	0.070133	2.340	2.896	0.095771	0.094976	1.008	| |** |	0.024
43	45	2.750	2.769	0.078419	2.521	3.018	-.018781	0.052583	-0.357	| | |	0.012
44	46	2.651	2.681	0.077858	2.419	2.944	-.030438	0.068680	-0.443	| | |	0.011
45	47	2.390	2.392	0.064087	2.161	2.624	-.002608	0.069609	-0.037	| | |	0.000
46	48	2.549	2.596	0.070514	2.344	2.849	-.046820	0.075011	-0.624	| *| |	0.015
47	49	2.250	2.224	0.068031	1.968	2.480	0.026440	0.082414	0.321	| | |	0.003
48	50	2.316	2.401	0.044059	2.176	2.626	-.084770	0.092238	-0.919	| *| |	0.008
49	52	2.630	2.642	0.089414	2.283	3.001	-.012379	0.124617	-0.099	| | |	0.000
50	53	2.788	2.722	0.094392	2.348	3.096	0.066497	0.127881	0.520	| |* |	0.006
51	54	2.589	2.679	0.106030	2.307	3.051	-.090210	0.106064	-0.851	| *| |	0.031
52	55	2.622	2.737	0.057906	2.475	2.999	-.114819	0.100108	-1.147	| **| |	0.019
53	56	2.432	2.453	0.066769	2.188	2.718	-.021503	0.090836	-0.237	| | |	0.001
54	57	2.618	2.687	0.093824	2.318	3.055	-.069099	0.124726	-0.554	| *| |	0.008
55	58	2.581	2.574	0.071175	2.292	2.855	0.007027	0.095706	0.073	| | |	0.000
56	59	2.663	2.696	0.065218	2.403	2.990	-.033056	0.112068	-0.295	| | |	0.001

TEH 0530186

DUP05003109 9

COMPLETE RECORDS FOR BLOOD_PB, VARIABLES 1-6, 22-30, DAYS_PB, LEAD_WT, & GCUR75

BETWEEN SITE REGRESSION ANALYSES (#31A: 6 ----- WEIGHT = 1 / LBSD2 ** 2

OBS	ID	ACTUAL	PREDICT VALUE	STD ERR PREDICT	LOWER95% PREDICT	UPPER95% PREDICT	RESIDUAL	STD ERR RESIDUAL	STUDENT RESIDUAL	-2-1-0 1 2	COOK'S D
57	60	2.526	2.454	0.061224	2.154	2.755	0.071823	0.120584	0.596	| |* |	0.004
58	61	2.374	2.442	0.062930	2.210	2.674	-.068440	0.072236	-0.947	| *| |	0.030
59	62	2.577	2.543	0.058385	2.294	2.793	0.033250	0.091402	0.364	| | |	0.002
60	63	2.548	2.532	0.059302	2.263	2.800	0.016396	0.102474	0.160	| | |	0.000
61	64	2.413	2.484	0.069992	2.227	2.740	-.070263	0.079064	-0.889	| *| |	0.027

SUM OF RESIDUALS 0.0004036218
SUM OF SQUARED RESIDUALS 0.0003862216

TEH 0530187

DUP050031100

COMPLETE RECORDS FOR BLOOD_PB, VARIABLES 1-6, 22-30, DAYS_PB, LEAD_WT, & GCUR75

BETWEEN SITE REGRESSION ANALYSES (#31A: 6 ----- WEIGHT = 1 / LBSD2W ** 2

MODEL: EQ2WAS
DEP VARIABLE: LBPB2W

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F VALUE	PROB>F
MODEL	23	1836.841	79.862661	4.057	0.0001
ERROR	37	728.334	19.684715		
C TOTAL	60	2565.176			

ROOT MSE	4.436746	R-SQUARE	0.7161
DEP MEAN	2.588740	ADJ R-SQ	0.5396
C.V.	171.3863		

VARIABLE	DF	PARAMETER ESTIMATE	STANDARD ERROR	T FOR H0: PARAMETER=0	PROB > |T|	TOLERANCE	VARIANCE INFLATION
INTERCEP	1	2.589041	0.017275	149.873	0.0001	.	0.000000
BLACK	1	0.337085	0.168697	1.998	0.0531	0.328898	3.040456
MALE	1	0.405668	0.520563	0.779	0.4408	0.548424	1.823406
CHILD	1	0.537460	0.326046	1.648	0.1077	0.305056	3.278084
TEEN	1	1.091896	0.614740	1.776	0.0839	0.475473	2.103170
INCOME	1	0.533760	0.219642	2.430	0.0201	0.285480	3.502869
BL_MA	1	8.585501	4.130849	2.078	0.0447	0.545288	1.833894
BL_CH	1	-0.304289	1.324495	-0.230	0.8196	0.428478	2.333840
BL_TN	1	-1.263609	3.096432	-0.408	0.6856	0.497593	2.009673
BL_IN	1	1.738062	1.300275	1.337	0.1895	0.476174	2.100071
MA_CH	1	-11.487698	5.329632	-2.155	0.0377	0.636576	1.570905
MA_TN	1	2.281853	14.073486	0.162	0.8721	0.537708	1.859746
MA_IN	1	-0.427535	3.529015	-0.121	0.9042	0.591997	1.689198
CH_IN	1	0.500160	2.357683	0.212	0.8332	0.389518	2.567273
TN_IN	1	-2.349972	4.849173	-0.485	0.6308	0.376223	2.658001
URBAN	1	0.223611	0.085795	2.606	0.0131	0.168269	5.942856
CC	1	-0.174143	0.111581	-1.561	0.1271	0.184934	5.407346
WINTER	1	-0.124229	0.067936	-1.829	0.0755	0.336676	2.970216
SPRING	1	0.039548	0.064727	0.611	0.5449	0.339141	2.948626
SUMMER	1	0.064135	0.061243	1.047	0.3018	0.328982	3.039684
SOUTH	1	-0.088308	0.083999	-1.051	0.2999	0.159293	6.277751
WEST	1	0.089894	0.071082	1.265	0.2139	0.242039	4.131562
NORTEAST	1	0.097388	0.057079	1.706	0.0964	0.451594	2.214380
LEAD_WT	1	9.69729E-07	.00000673086	0.144	0.8862	0.240136	4.164306

OBS	ID	ACTUAL	PREDICT VALUE	STD ERR PREDICT	LOWER95% PREDICT	UPPER95% PREDICT	RESIDUAL	STD ERR RESIDUAL	STUDENT RESIDUAL	-2-1-0 1 2	COOK'S D
1	1	2.745	2.803	0.109581	2.465	3.141	-.058255	0.061560	-0.946	| *| |	0.118
2	3	2.778	2.831	0.103865	2.513	3.150	-.053728	0.056066	-0.958	| *| |	0.131
3	4	2.603	2.586	0.059423	2.340	2.833	0.016307	0.087759	0.186	| | |	0.001
4	5	2.799	2.731	0.092049	2.415	3.046	0.068530	0.085551	0.801	| |* |	0.031
5	6	2.716	2.626	0.066351	2.342	2.910	0.090740	0.104122	0.871	| |* |	0.013

Between Site Model
Survey Demographics Only
Weighted Least Squares
Dep. Var.: Adj. Set 2W

TEH 0530188

DUP05003110

COMPLETE RECORDS FOR BLOOD_PB, VARIABLES 1-6, 22-30, DAYS_PB, LEAD_WT, & GCUR75

BETWEEN SITE REGRESSION ANALYSES (#31A: 6 ----- WEIGHT = 1 / LBSD2W ** 2

OBS	ID	ACTUAL	PREDICT VALUE	STD ERR PREDICT	LOWER95% PREDICT	UPPER95% PREDICT	RESIDUAL	STD ERR RESIDUAL	STUDENT RESIDUAL	-2-1-0	1 2	COOK'S D
6	7	2.771	2.682	0.064112	2.445	2.919	0.088914	0.073912	1.203		**	0.045
7	8	2.463	2.504	0.067280	2.212	2.796	-.041113	0.108406	-0.379			0.002
8	9	2.706	2.626	0.063518	2.311	2.942	0.080366	0.127233	0.632		*	0.004
9	10	2.428	2.504	0.071382	2.213	2.795	-.076063	0.102323	-0.743	*		0.011
10	11	2.540	2.696	0.072695	2.395	2.996	-.155442	0.106736	-1.456	**		0.041
11	12	2.476	2.578	0.057366	2.309	2.848	-.101952	0.105254	-0.969	*		0.012
12	13	2.975	2.799	0.069775	2.519	3.079	0.175313	0.096668	1.814		***	0.071
13	14	2.182	2.418	0.057988	2.186	2.651	-.235718	0.080302	-2.935	*****		0.187
14	15	2.664	2.528	0.063313	2.292	2.765	0.135585	0.075045	1.807		***	0.097
15	16	2.139	2.082	0.091959	1.758	2.406	0.057501	0.092898	0.619		*	0.016
16	17	2.483	2.423	0.051545	2.174	2.671	0.060178	0.098886	0.609		*	0.004
17	18	2.597	2.494	0.070303	2.211	2.776	0.103685	0.097759	1.061		**	0.024
18	20	2.693	2.752	0.059591	2.473	3.032	-.059580	0.109276	-0.545	*		0.004
19	21	2.855	2.777	0.099342	2.425	3.130	0.077903	0.102590	0.759		*	0.023
20	22	2.690	2.622	0.070451	2.345	2.899	0.068867	0.093647	0.735		*	0.013
21	23	2.746	2.689	0.064564	2.430	2.949	0.056794	0.090099	0.630		*	0.009
22	24	2.386	2.492	0.063991	2.238	2.747	-.106313	0.087049	-1.221	**		0.034
23	25	2.689	2.533	0.061541	2.232	2.834	0.156136	0.120353	1.297		**	0.018
24	26	2.709	2.610	0.069854	2.294	2.926	0.098811	0.120786	0.818		*	0.009
25	27	2.588	2.543	0.064060	2.247	2.839	0.045288	0.114573	0.395			0.002
26	28	2.623	2.703	0.102613	2.376	3.031	-.080272	0.070808	-1.134	**		0.112
27	29	2.593	2.667	0.083097	2.406	2.927	-.073755	0.052232	-1.412	**		0.210
28	30	2.333	2.586	0.046281	2.330	2.842	-.252945	0.108135	-2.339	****		0.042
29	31	2.622	2.654	0.068451	2.372	2.936	-.031739	0.099840	-0.318			0.002
30	32	2.440	2.417	0.060453	2.168	2.666	0.022991	0.088202	0.261			0.001
31	33	2.450	2.481	0.131114	2.086	2.875	-.030359	0.058957	-0.515	*		0.055
32	34	2.720	2.640	0.086264	2.264	3.015	0.080447	0.139636	0.576		*	0.005
33	35	2.665	2.416	0.066384	2.116	2.715	0.248959	0.114090	2.182		****	0.067
34	36	2.717	2.739	0.078782	2.493	2.985	-.021922	0.048095	-0.456			0.023
35	37	2.687	2.738	0.101948	2.392	3.085	-.051099	0.091714	-0.557	*		0.016
36	38	2.877	2.788	0.053458	2.499	3.076	0.089170	0.120509	0.740		*	0.004
37	39	2.544	2.488	0.061774	2.239	2.738	0.055754	0.086525	0.644		*	0.009
38	40	2.782	2.658	0.065393	2.410	2.906	0.123385	0.079950	1.543		***	0.066
39	41	2.846	2.789	0.117856	2.402	3.177	0.056958	0.093315	0.610		*	0.025
40	42	2.786	2.819	0.095855	2.489	3.149	-.033459	0.090555	-0.369			0.006
41	43	2.615	2.624	0.050101	2.361	2.867	-.009086	0.096661	-0.094			0.000
42	44	2.714	2.617	0.071627	2.335	2.900	0.097068	0.095793	1.013		**	0.024
43	45	2.750	2.768	0.079689	2.516	3.020	-.017905	0.052905	-0.338			0.011
44	46	2.651	2.679	0.080792	2.410	2.948	-.027902	0.067349	-0.414			0.010
45	47	2.390	2.389	0.068737	2.150	2.628	5.5E-04	0.066816	0.008			0.000
46	48	2.549	2.594	0.073053	2.336	2.852	-.044602	0.074448	-0.599	*		0.014
47	49	2.250	2.225	0.069535	1.965	2.486	0.025127	0.082983	0.303			0.003
48	50	2.316	2.401	0.044676	2.172	2.629	-.084443	0.093430	-0.904	*		0.008
49	52	2.630	2.644	0.091563	2.279	3.009	-.014221	0.125545	-0.113			0.000
50	53	2.789	2.720	0.096284	2.340	3.101	0.068099	0.129070	0.528		*	0.006
51	54	2.589	2.678	0.107922	2.300	3.055	-.088693	0.106946	-0.829	*		0.029
52	55	2.622	2.738	0.059459	2.472	3.004	-.116126	0.100957	-1.150	**		0.019
53	56	2.432	2.451	0.069361	2.180	2.722	-.019245	0.090737	-0.212			0.001
54	57	2.618	2.689	0.096459	2.314	3.064	-.071581	0.125286	-0.571	*		0.008
55	58	2.581	2.574	0.072109	2.289	2.859	0.006986	0.096960	0.072			0.000

TEH 0530189

DUP05003102

COMPLETE RECORDS FOR BLOOD_PB, VARIABLES 1-6, 22-30, DAYS_PB, LEAD_WT, & GCUR75

BETWEEN SITE REGRESSION ANALYSES (#31A: 6 ----- WEIGHT = 1 / LBSD2W ** 2

OBS	ID	ACTUAL	PREDICT VALUE	STD ERR PREDICT	LOWER95% PREDICT	UPPER95% PREDICT	RESIDUAL	STD ERR RESIDUAL	STUDENT RESIDUAL	-2-1-0 1 2	COOK'S D
56	59	2.663	2.699	0.069062	2.399	3.000	-.035987	0.111744	-0.322	| | |	0.002
57	60	2.526	2.453	0.062390	2.148	2.758	0.072786	0.121982	0.597	| |* |	0.004
58	61	2.374	2.437	0.071588	2.193	2.682	-.063839	0.065540	-0.974	| *| |	0.047
59	62	2.577	2.543	0.059664	2.289	2.796	0.034330	0.092271	0.372	| | |	0.002
60	63	2.548	2.531	0.060523	2.258	2.803	0.017403	0.103558	0.168	| | |	0.000
61	64	2.414	2.486	0.072473	2.224	2.748	-.072213	0.078690	-0.918	| *| |	0.030

SUM OF RESIDUALS 0.000391408
SUM OF SQUARED RESIDUALS 0.0003863889

TEH 0530190

DUP05003103

APPENDIX 3

Between Site Regression Summaries
With Survey Demographic Terms Only

Ordinary Least Squares

Based on Adjustment Sets 1, 1W, 2 and 2W

Between Site Model
Survey Demographics Only
Ordinary Least Squares
Dep. Var.: Adj. Set 1

COMPLETE RECORDS FOR BLOOD_PB, VARIABLES 1-6, 22-30, DAYS_PB, LEAD_WT, & GCUR75

BETWEEN SITE REGRESSION ANALYSES (#31A: 6 ----- UNWEIGHTED)

MODEL: EQ1AN
DEP VARIABLE: BPB1

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F VALUE	PROB>F
MODEL	22	228.469	10.384953	3.915	0.0001
ERROR	38	100.797	2.652555		
C TOTAL	60	329.266			

ROOT MSE	1.628667	R-SQUARE	0.6939
DEP MEAN	14.632471	ADJ R-SQ	0.5166
C.V.	11.1305		

VARIABLE	DF	PARAMETER ESTIMATE	STANDARD ERROR	T FOR H0: PARAMETER=0	PROB > |T|	TOLERANCE	VARIANCE INFLATION
INTERCEP	1	14.567840	0.241251	60.385	0.0001	.	0.000000
BLACK	1	4.588540	2.221206	2.066	0.0457	0.340933	2.933126
MALE	1	7.973299	6.860293	1.162	0.2524	0.581248	1.720436
CHILD	1	6.922051	4.036655	1.715	0.0945	0.353161	2.831572
TEEN	1	16.147813	8.787884	1.838	0.0740	0.428349	2.334545
INCOME	1	7.735880	2.723932	2.840	0.0072	0.354241	2.822940
BL_MA	1	102.018	55.702747	1.831	0.0749	0.555371	1.800599
BL_CH	1	3.931015	16.708262	0.235	0.8153	0.440221	2.271588
BL_TN	1	-6.683053	43.173454	-0.155	0.8778	0.453040	2.207310
BL_IN	1	18.249028	17.110768	1.067	0.2929	0.549099	1.821167
MA_CH	1	-107.775	69.679887	-1.547	0.1302	0.619192	1.615008
MA_TN	1	173.737	178.347	0.974	0.3361	0.499299	2.002806
MA_IN	1	16.160992	49.155527	0.329	0.7441	0.550773	1.815629
CH_IN	1	-10.470169	30.363938	-0.345	0.7321	0.342894	2.916352
TN_IN	1	-31.668732	63.670093	-0.497	0.6218	0.375212	2.665162
URBAN	1	3.212158	0.952277	3.373	0.0017	0.259189	3.858191
CC	1	-2.697624	1.405868	-1.919	0.0625	0.213434	4.685285
WINTER	1	-1.538555	0.986072	-1.560	0.1270	0.294935	3.390579
SPRING	1	0.332855	0.877421	0.379	0.7065	0.361897	2.763218
SUMMER	1	0.482564	0.838163	0.576	0.5682	0.350737	2.851140
SOUTH	1	-1.111030	1.017348	-1.092	0.2817	0.217132	4.605502
WEST	1	1.002128	0.884822	1.133	0.2645	0.299525	3.338615
NORTEAST	1	1.376432	0.786317	1.750	0.0881	0.397716	2.514356

OBS	ID	ACTUAL	PREDICT VALUE	STD ERR PREDICT	LOWER95% PREDICT	UPPER95% PREDICT	RESIDUAL	STD ERR RESIDUAL	STUDENT RESIDUAL	-2-1-0 1 2	COOK'S D
1	1	16.483	17.593	1.407	13.237	21.950	-1.111	0.820953	-1.353	| **| |	0.234
2	3	17.337	17.877	1.434	13.484	22.271	-.540158	0.771766	-0.700	| *| |	0.074
3	4	14.195	14.343	0.857964	10.616	18.069	-.147868	1.384	-0.107	| | |	0.000
4	5	17.530	16.721	1.210	12.613	20.829	0.809682	1.090	0.743	| |* |	0.030
5	6	15.885	14.579	0.832345	10.876	18.282	1.306	1.400	0.933	| |* |	0.013
6	7	17.602	15.950	0.972520	12.110	19.790	1.652	1.306	1.264	| |** |	0.039

TEH 0530192

COMPLETE RECORDS FOR BLOOD_PB, VARIABLES 1-6, 22-30, DAYS_PB, LEAD_WT, & GCUR75

BETWEEN SITE REGRESSION ANALYSES (#31A: 6 ----- UNWEIGHTED)

OBS	ID	ACTUAL	PREDICT VALUE	STD ERR PREDICT	LOWER95% PREDICT	UPPER95% PREDICT	RESIDUAL	STD ERR RESIDUAL	STUDENT RESIDUAL	-2-1-0 1 2		COOK'S D
7	8	12.488	12.805	0.899143	9.039	16.571	-.317461	1.358	-0.234			0.001
8	9	15.855	14.834	0.819456	11.143	18.525	1.020	1.407	0.725		*	0.008
9	10	12.014	13.038	0.819590	9.347	16.729	-1.024	1.407	-0.728	*		0.008
10	11	14.164	16.042	0.852712	12.320	19.763	-1.878	1.388	-1.353	**		0.030
11	12	12.865	14.273	0.756122	10.637	17.908	-1.408	1.443	-0.976	*		0.011
12	13	20.770	17.568	0.933692	13.768	21.369	3.202	1.334	2.399		****	0.123
13	14	9.680	12.649	0.878360	8.903	16.395	-2.969	1.372	-2.165	****		0.084
14	15	15.464	13.715	0.955419	9.892	17.537	1.749	1.319	1.326		**	0.040
15	16	9.275	8.348	1.076	4.396	12.300	0.926758	1.222	0.758		*	0.019
16	17	12.931	12.538	0.700155	8.949	16.127	0.393229	1.470	0.267			0.001
17	18	14.547	13.057	1.020	9.166	16.948	1.490	1.269	1.174		**	0.039
18	20	15.733	16.794	0.787711	13.131	20.456	-1.061	1.426	-0.744	*		0.007
19	21	18.653	17.296	1.212	13.186	21.405	1.358	1.088	1.247		**	0.084
20	22	15.670	14.574	0.958489	10.749	18.400	1.096	1.317	0.832		*	0.016
21	23	16.589	15.712	0.833963	12.008	19.416	0.876835	1.399	0.627		*	0.006
22	24	11.690	13.175	0.851248	9.455	16.895	-1.485	1.388	-1.069	**		0.019
23	25	15.445	13.820	0.737828	10.201	17.440	1.625	1.452	1.119		**	0.014
24	26	16.010	14.900	0.880494	11.152	18.648	1.110	1.370	0.810		*	0.012
25	27	14.276	13.954	0.802675	10.279	17.630	0.321887	1.417	0.227			0.001
26	28	14.714	15.657	1.339	11.388	19.926	-.942208	0.926456	-1.017	**		0.094
27	29	14.251	15.723	1.309	11.494	19.953	-1.472	0.969692	-1.518	***		0.182
28	30	10.893	14.388	0.608134	10.869	17.907	-3.495	1.511	-2.313	****		0.038
29	31	14.642	15.378	0.872691	11.637	19.118	-.735874	1.375	-0.535	*		0.005
30	32	12.415	12.129	0.843314	8.416	15.842	0.286175	1.393	0.205			0.001
31	33	12.111	12.427	1.523	7.913	16.941	-.315764	0.576538	-0.548	*		0.091
32	34	15.746	14.982	1.013	11.099	18.864	0.764582	1.275	0.600		*	0.010
33	35	16.100	12.750	0.815297	9.062	16.437	3.350	1.410	2.376		****	0.082
34	36	16.407	17.094	1.262	12.923	21.265	-.686597	1.030	-0.667	*		0.029
35	37	15.593	16.836	1.286	12.635	21.037	-1.243	0.999429	-1.244	**		0.111
36	38	18.560	16.990	0.715928	13.388	20.591	1.571	1.463	1.074		**	0.012
37	39	13.361	12.804	0.864234	9.072	16.537	0.556028	1.380	0.403			0.003
38	40	16.779	15.415	0.964007	11.584	19.246	1.364	1.313	1.039		**	0.025
39	41	18.500	18.131	1.352	13.846	22.416	0.368775	0.908420	0.406			0.016
40	42	16.920	16.590	1.213	12.479	20.701	0.330209	1.087	0.304			0.005
41	43	14.529	14.974	0.683121	11.398	18.549	-.444340	1.478	-0.301			0.001
42	44	16.305	14.735	0.963374	10.904	18.566	1.570	1.313	1.195		**	0.033
43	45	17.022	17.029	1.239	12.887	21.172	-.007422	1.057	-0.007			0.000
44	46	15.368	15.863	1.132	11.848	19.879	-.494725	1.171	-0.423			0.007
45	47	11.787	11.918	0.966395	8.084	15.751	-.130983	1.311	-0.100			0.000
46	48	13.735	14.910	1.043	10.995	18.825	-1.175	1.251	-0.939	*		0.027
47	49	10.287	9.909	0.973722	6.067	13.750	0.378504	1.306	0.290			0.002
48	50	11.297	12.415	0.665356	8.853	15.977	-1.118	1.487	-0.752	*		0.005
49	52	14.868	15.205	1.093	11.235	19.176	-.337418	1.207	-0.279			0.003
50	53	17.244	16.187	1.116	12.191	20.184	1.057	1.187	0.890		*	0.030
51	54	14.368	15.150	1.246	10.999	19.301	-.781932	1.049	-0.745	*		0.034
52	55	14.844	16.479	0.823105	12.785	20.174	-1.635	1.405	-1.164	**		0.020
53	56	12.238	12.600	0.897260	8.836	16.364	-.362118	1.359	-0.266			0.001
54	57	14.335	15.148	1.129	11.136	19.160	-.813470	1.174	-0.693	*		0.019
55	58	14.037	14.683	0.967936	10.848	18.519	-.646088	1.310	-0.493			0.006
56	59	15.377	15.752	0.873410	12.011	19.493	-.374550	1.375	-0.272			0.001

TEH 0530193

DUP050031106

COMPLETE RECORDS FOR BLOOD_PB, VARIABLES 1-6, 22-30, DAYS_PB, LEAD_WT, & GCUR75

BETWEEN SITE REGRESSION ANALYSES (#31A: 6 ----- UNWEIGHTED)

OBS	ID	ACTUAL	PREDICT VALUE	STD ERR PREDICT	LOWER95% PREDICT	UPPER95% PREDICT	RESIDUAL	STD ERR RESIDUAL	STUDENT RESIDUAL	-2-1-0 1 2	COOK'S D
57	60	13.285	12.680	0.776695	9.027	16.332	0.605831	1.432	0.423	| | |	0.002
58	61	11.546	12.845	0.933443	9.045	16.645	-1.299	1.335	-0.973	| *| |	0.020
59	62	14.087	13.558	0.810395	9.875	17.241	0.528929	1.413	0.374	| | |	0.002
60	63	13.761	13.801	0.820290	10.109	17.493	-.040162	1.407	-0.029	| | |	0.000
61	64	12.116	13.291	1.037	9.383	17.200	-1.175	1.256	-0.936	| *| |	0.026

SUM OF RESIDUALS 1.90492E-12
SUM OF SQUARED RESIDUALS 100.7971

TEH 0530194

DUP050031107

Between Site Model
Survey Demographics Only
Ordinary Least Squares
Dep. Var.: Adj. Set 1W

COMPLETE RECORDS FOR BLOOD_PB, VARIABLES 1-6, 22-30, DAYS_PB, LEAD_WT, & GCUR75

BETWEEN SITE REGRESSION ANALYSES (#31A: 6 ----- UNWEIGHTED)

MODEL: EQ1WAN
DEP VARIABLE: BPB1W

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F VALUE	PROB>F
MODEL	23	228.620	9.940005	3.660	0.0002
ERROR	37	100.492	2.716008		
C TOTAL	60	329.112			

ROOT MSE	1.648031	R-SQUARE	0.6947
DEP MEAN	14.633314	ADJ R-SQ	0.5048
C.V.	11.26219		

VARIABLE	DF	PARAMETER ESTIMATE	STANDARD ERROR	T FOR H0: PARAMETER=0	PROB > |T|	TOLERANCE	VARIANCE INFLATION
INTERCEP	1	14.567505	0.244137	59.669	0.0001	.	0.000000
BLACK	1	4.613854	2.249424	2.051	0.0474	0.340385	2.937846
MALE	1	7.397123	7.154838	1.034	0.3079	0.547159	1.827621
CHILD	1	7.521906	4.472115	1.682	0.1010	0.294616	3.394250
TEEN	1	16.389822	8.922776	1.837	0.0743	0.425435	2.350536
INCOME	1	8.238875	3.163885	2.604	0.0132	0.268854	3.719493
BL_MA	1	99.635523	56.847056	1.753	0.0879	0.545993	1.831526
BL_CH	1	1.698057	18.190882	0.093	0.9261	0.380270	2.629710
BL_TN	1	-5.754088	43.769165	-0.131	0.8961	0.451336	2.215642
BL_IN	1	17.004545	17.732685	0.959	0.3438	0.523488	1.910263
MA_CH	1	-105.361	70.881901	-1.486	0.1456	0.612683	1.632164
MA_TN	1	164.700	182.280	0.904	0.3721	0.489421	2.043230
MA_IN	1	17.487860	49.917185	0.350	0.7281	0.546870	1.828588
CH_IN	1	-9.784805	30.790102	-0.318	0.7524	0.341445	2.928730
TN_IN	1	-30.030652	64.645474	-0.465	0.6450	0.372681	2.683257
URBAN	1	3.020262	1.125249	2.684	0.0108	0.190069	5.261243
CC	1	-2.659042	1.427075	-1.863	0.0704	0.212093	4.714917
WINTER	1	-1.512850	1.000927	-1.511	0.1392	0.293093	3.411888
SPRING	1	0.360297	0.891479	0.404	0.6884	0.358960	2.785828
SUMMER	1	0.495458	0.849065	0.584	0.5631	0.349963	2.857443
SOUTH	1	-1.300897	1.180751	-1.102	0.2777	0.165049	6.058820
WEST	1	0.847178	1.009952	0.839	0.4070	0.235402	4.248052
NORTEAST	1	1.356695	0.797615	1.701	0.0973	0.395775	2.526685
LEAD_WT	1	.00003064615	.00009350732	0.328	0.7450	0.234316	4.267737

OBS	ID	ACTUAL	PREDICT VALUE	STD ERR PREDICT	LOWER95% PREDICT	UPPER95% PREDICT	RESIDUAL	STD ERR RESIDUAL	STUDENT RESIDUAL	-2-1-0 1 2	COOK'S D
1	1	16.481	17.515	1.442	13.078	21.953	-1.035	0.797343	-1.298	| **| |	0.230
2	3	17.340	17.923	1.457	13.465	22.380	-.583035	0.769249	-0.758	| *| |	0.086
3	4	14.195	14.329	0.869322	10.554	18.105	-.134387	1.400	-0.096	| | |	0.000
4	5	17.529	16.713	1.225	12.552	20.874	0.816207	1.102	0.740	| |* |	0.028
5	6	15.887	14.497	0.879907	10.711	18.282	1.390	1.393	0.998	| |* |	0.017

TEH 0530195

DUP050031108

COMPLETE RECORDS FOR BLOOD_PB, VARIABLES 1-6, 22-30, DAYS_PB, LEAD_WT, & GCUR75

BETWEEN SITE REGRESSION ANALYSES (#31A: 6 ----- UNWEIGHTED)

OBS	ID	ACTUAL	PREDICT VALUE	STD ERR PREDICT	LOWER95% PREDICT	UPPER95% PREDICT	RESIDUAL	STD ERR RESIDUAL	STUDENT RESIDUAL	-2-1-0 1 2	COOK'S D
6	7	17.600	15.932	0.985726	12.041	19.823	1.669	1.321	1.263	|** |	0.037
7	8	12.490	12.844	0.916961	9.023	16.666	-.354499	1.369	-0.259	| |	0.001
8	9	15.859	14.899	0.851882	11.140	18.658	0.960090	1.411	0.681	|* |	0.007
9	10	12.014	13.172	0.923325	9.344	16.999	-1.158	1.365	-0.848	*| |	0.014
10	11	14.167	16.157	0.929762	12.323	19.991	-1.990	1.361	-1.462	**| |	0.042
11	12	12.864	14.277	0.765200	10.595	17.958	-1.413	1.460	-0.968	*| |	0.011
12	13	20.768	17.660	0.985859	13.769	21.551	3.108	1.321	2.353	|**** |	0.129
13	14	9.680	12.626	0.892059	8.829	16.423	-2.946	1.386	-2.126	****| |	0.078
14	15	15.467	13.681	0.972898	9.803	17.558	1.786	1.330	1.343	|** |	0.040
15	16	9.278	8.519	1.205	4.382	12.655	0.758897	1.125	0.675	|* |	0.022
16	17	12.933	12.610	0.739799	8.949	16.270	0.322897	1.473	0.219	| |	0.001
17	18	14.547	13.060	1.033	9.120	17.001	1.487	1.284	1.158	|** |	0.036
18	20	15.730	16.806	0.798240	13.096	20.517	-1.076	1.442	-0.746	*| |	0.007
19	21	18.654	17.295	1.226	13.133	21.457	1.360	1.101	1.234	|** |	0.079
20	22	15.670	14.545	0.974458	10.666	18.424	1.125	1.329	0.846	|* |	0.016
21	23	16.590	15.816	0.900192	12.011	19.621	0.773941	1.380	0.561	|* |	0.006
22	24	11.692	13.111	0.883974	9.322	16.900	-1.419	1.391	-1.020	**| |	0.018
23	25	15.447	13.746	0.780672	10.051	17.441	1.701	1.451	1.172	|** |	0.017
24	26	16.010	14.945	0.901759	11.139	18.752	1.064	1.379	0.772	|* |	0.011
25	27	14.275	13.898	0.830097	10.159	17.637	0.377393	1.424	0.265	| |	0.001
26	28	14.715	15.727	1.372	11.381	20.072	-1.011	0.912541	-1.108	**| |	0.116
27	29	14.253	15.713	1.324	11.429	19.997	-1.461	0.980724	-1.489	**| |	0.169
28	30	10.894	14.446	0.638415	10.865	18.027	-3.552	1.519	-2.338	****| |	0.040
29	31	14.647	15.283	0.930814	11.448	19.118	-.636280	1.360	-0.468	| |	0.004
30	32	12.418	12.083	0.866068	8.311	15.856	0.334207	1.402	0.238	| |	0.001
31	33	12.112	12.447	1.543	7.873	17.021	-.335289	0.580166	-0.578	*| |	0.098
32	34	15.749	14.918	1.044	10.964	18.871	0.831258	1.275	0.652	|* |	0.012
33	35	16.100	12.879	0.914574	9.060	16.698	3.222	1.371	2.350	|**** |	0.102
34	36	16.405	17.139	1.285	12.905	21.374	-.734832	1.032	-0.712	*| |	0.033
35	37	15.595	16.882	1.309	12.618	21.147	-1.288	1.001	-1.286	**| |	0.118
36	38	18.561	17.001	0.725074	13.353	20.649	1.560	1.480	1.054	|** |	0.011
37	39	13.363	12.819	0.875126	9.038	16.600	0.544009	1.396	0.390	| |	0.002
38	40	16.781	15.362	0.988917	11.468	19.256	1.419	1.318	1.076	|** |	0.027
39	41	18.498	18.074	1.378	13.722	22.427	0.423146	0.904184	0.468	| |	0.021
40	42	16.922	16.700	1.272	12.482	20.919	0.221760	1.047	0.212	| |	0.003
41	43	14.530	14.944	0.697793	11.318	18.570	-.414196	1.493	-0.277	| |	0.001
42	44	16.306	14.687	0.986558	10.795	18.579	1.619	1.320	1.226	|** |	0.035
43	45	17.018	16.983	1.261	12.779	21.187	0.035027	1.062	0.033	| |	0.000
44	46	15.368	15.766	1.183	11.655	19.877	-.397615	1.147	-0.347	| |	0.005
45	47	11.788	11.790	1.055	7.825	15.755	-.002489	1.266	-0.002	| |	0.000
46	48	13.735	14.814	1.095	10.805	18.823	-1.079	1.232	-0.876	*| |	0.025
47	49	10.287	9.923	0.986309	6.032	13.815	0.364048	1.320	0.276	| |	0.002
48	50	11.298	12.390	0.677953	8.779	16.000	-1.091	1.502	-0.726	*| |	0.004
49	52	14.869	15.262	1.120	11.225	19.300	-.393816	1.209	-0.326	| |	0.004
50	53	17.245	16.148	1.136	12.093	20.204	1.097	1.194	0.919	|* |	0.032
51	54	14.372	15.117	1.266	10.906	19.327	-.744378	1.055	-0.705	*| |	0.030
52	55	14.845	16.526	0.845101	12.774	20.279	-1.681	1.415	-1.188	**| |	0.021
53	56	12.239	12.517	0.942883	8.670	16.364	-.278279	1.352	-0.206	| |	0.001
54	57	14.335	15.210	1.157	11.130	19.291	-.875415	1.173	-0.746	*| |	0.023
55	58	14.039	14.692	0.979698	10.807	18.577	-.653033	1.325	-0.493	| |	0.006

TEH 0530196

DUP050031109

COMPLETE RECORDS FOR BLOOD_PB, VARIABLES 1-6, 22-30, DAYS_PB, LEAD_WT, & GCUR75

BETWEEN SITE REGRESSION ANALYSES (#31A: 6 ----- UNWEIGHTED)

OBS	ID	ACTUAL	PREDICT VALUE	STD ERR PREDICT	LOWER95% PREDICT	UPPER95% PREDICT	RESIDUAL	STD ERR RESIDUAL	STUDENT RESIDUAL	-2-1-0 1 2	COOK'S D
56	59	15.377	15.833	0.917539	12.011	19.654	-.455858	1.369	-0.333	| | |	0.002
57	60	13.286	12.646	0.792657	8.941	16.352	0.639289	1.445	0.442	| | |	0.002
58	61	11.546	12.675	1.079	8.683	16.666	-1.129	1.246	-0.907	| *| |	0.026
59	62	14.089	13.512	0.833336	9.770	17.254	0.576818	1.422	0.406	| | |	0.002
60	63	13.762	13.780	0.832933	10.039	17.522	-.018152	1.422	-0.013	| | |	0.000
61	64	12.122	13.368	1.073	9.383	17.352	-1.246	1.251	-0.996	| *| |	0.030

SUM OF RESIDUALS 1.87517E-12
SUM OF SQUARED RESIDUALS 100.4923

TEH 0530197

DUP050031110

Between Site Model
Survey Demographics Only
Ordinary Least Squares
Dep. Var.: Adj. Set 2

COMPLETE RECORDS FOR BLOOD_PB, VARIABLES 1-6, 22-30, DAYS_PB, LEAD_WT, & GCUR75

BETWEEN SITE REGRESSION ANALYSES (#31A: 6 ----- UNWEIGHTED)

MODEL: EQ2AN
DEP VARIABLE: LBPB2

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F VALUE	PROB>F
MODEL	22	1.246333	0.056651	4.284	0.0001
ERROR	38	0.502496	0.013224		
C TOTAL	60	1.748829			

ROOT MSE	0.114994	R-SQUARE	0.7127
DEP MEAN	2.601681	ADJ R-SQ	0.5463
C.V.	4.419984		

VARIABLE	DF	PARAMETER ESTIMATE	STANDARD ERROR	T FOR H0: PARAMETER=0	PROB > |T|	TOLERANCE	VARIANCE INFLATION
INTERCEP	1	2.595804	0.017034	152.392	0.0001	.	0.000000
BLACK	1	0.312831	0.156831	1.995	0.0533	0.340933	2.933126
MALE	1	0.458937	0.484379	0.947	0.3494	0.581248	1.720436
CHILD	1	0.474417	0.285013	1.665	0.1042	0.353161	2.831572
TEEN	1	1.163935	0.620479	1.876	0.0684	0.428349	2.334545
INCOME	1	0.513719	0.192326	2.671	0.0111	0.354241	2.822940
BL_MA	1	8.060615	3.932956	2.050	0.0474	0.555371	1.800599
BL_CH	1	-0.064136	1.179706	-0.054	0.9569	0.440221	2.271588
BL_TN	1	-0.641507	3.048311	-0.210	0.8344	0.453040	2.207310
BL_IN	1	1.304974	1.208125	1.080	0.2869	0.549099	1.821167
MA_CH	1	-10.731563	4.919828	-2.181	0.0354	0.619192	1.615008
MA_TN	1	7.019179	12.592386	0.557	0.5805	0.499299	2.002806
MA_IN	1	0.720213	3.470682	0.208	0.8367	0.550773	1.815629
CH_IN	1	-0.291242	2.143881	-0.136	0.8927	0.342894	2.916352
TN_IN	1	-2.413965	4.495500	-0.537	0.5944	0.375212	2.665162
URBAN	1	0.223752	0.067237	3.328	0.0020	0.259189	3.858191
CC	1	-0.162483	0.099263	-1.637	0.1099	0.213434	4.685285
WINTER	1	-0.122624	0.069623	-1.761	0.0862	0.294935	3.390579
SPRING	1	0.027338	0.061951	0.441	0.6615	0.361897	2.763218
SUMMER	1	0.043369	0.059179	0.733	0.4682	0.350737	2.851140
SOUTH	1	-0.078722	0.071831	-1.096	0.2800	0.217132	4.605502
WEST	1	0.097515	0.062474	1.561	0.1268	0.299525	3.338615
NORTEAST	1	0.109190	0.055519	1.967	0.0565	0.397716	2.514356

OBS	ID	ACTUAL	PREDICT VALUE	STD ERR PREDICT	LOWER95% PREDICT	UPPER95% PREDICT	RESIDUAL	STD ERR RESIDUAL	STUDENT RESIDUAL	-2-1-0 1 2	COOK'S D
1	1	2.745	2.815	0.099316	2.508	3.123	-.070286	0.057964	-1.213	| **| |	0.188
2	3	2.777	2.826	0.101263	2.516	3.136	-.048388	0.054491	-0.888	| *| |	0.118
3	4	2.603	2.593	0.060578	2.329	2.856	0.010116	0.097744	0.103	| | |	0.000
4	5	2.799	2.752	0.085466	2.462	3.042	0.047708	0.076936	0.620	| |* |	0.021
5	6	2.716	2.635	0.058769	2.373	2.896	0.081480	0.098842	0.824	| |* |	0.010
6	7	2.771	2.675	0.068666	2.404	2.946	0.096055	0.092242	1.041	| |** |	0.026

TEH 0530198

DUP050031111

COMPLETE RECORDS FOR BLOOD_PB, VARIABLES 1-6, 22-30, DAYS_PB, LEAD_WT, & GCUR75

BETWEEN SITE REGRESSION ANALYSES (#31A: 6 ----- UNWEIGHTED)

OBS	ID	ACTUAL	PREDICT VALUE	STD ERR PREDICT	LOWER95% PREDICT	UPPER95% PREDICT	RESIDUAL	STD ERR RESIDUAL	STUDENT RESIDUAL	-2-1-0 1 2	COOK'S D
7	8	2.463	2.496	0.063485	2.230	2.762	-.032695	0.095881	-0.341	|	0.002
8	9	2.706	2.624	0.057859	2.363	2.885	0.082116	0.099378	0.826	|*	0.010
9	10	2.428	2.513	0.057868	2.252	2.773	-.084710	0.099372	-0.852	*|	0.011
10	11	2.540	2.686	0.060207	2.423	2.949	-.146053	0.097973	-1.491	**|	0.036
11	12	2.477	2.575	0.053387	2.318	2.831	-.098137	0.101850	-0.964	*|	0.011
12	13	2.975	2.797	0.065924	2.528	3.065	0.178265	0.094221	1.892	|***	0.076
13	14	2.182	2.438	0.062018	2.174	2.703	-.255745	0.096837	-2.641	*****|	0.124
14	15	2.664	2.531	0.067458	2.261	2.801	0.132495	0.093129	1.423	|**	0.046
15	16	2.139	2.105	0.075982	1.826	2.384	0.034157	0.086315	0.396	|	0.005
16	17	2.483	2.431	0.049435	2.177	2.684	0.052006	0.103826	0.501	|*	0.002
17	18	2.597	2.491	0.072047	2.216	2.765	0.106839	0.089626	1.192	|**	0.040
18	20	2.693	2.762	0.055617	2.503	3.021	-.068888	0.100649	-0.684	*|	0.006
19	21	2.855	2.777	0.085546	2.487	3.067	0.077931	0.076847	1.014	|**	0.055
20	22	2.691	2.617	0.067675	2.346	2.887	0.073998	0.092971	0.796	|*	0.015
21	23	2.746	2.688	0.058883	2.426	2.949	0.058625	0.098774	0.594	|*	0.005
22	24	2.386	2.499	0.060103	2.236	2.761	-.112689	0.098037	-1.149	**|	0.022
23	25	2.689	2.555	0.052095	2.300	2.811	0.133764	0.102517	1.305	|**	0.019
24	26	2.709	2.629	0.062168	2.364	2.893	0.080191	0.096740	0.829	|*	0.012
25	27	2.588	2.562	0.056674	2.303	2.822	0.025998	0.100058	0.260	|	0.001
26	28	2.623	2.690	0.094576	2.388	2.991	-.066642	0.065413	-1.019	**|	0.094
27	29	2.593	2.680	0.092390	2.382	2.979	-.087358	0.068466	-1.276	**|	0.129
28	30	2.333	2.589	0.042938	2.340	2.837	-.255968	0.106677	-2.399	****|	0.041
29	31	2.622	2.660	0.061617	2.396	2.924	-.037972	0.097092	-0.391	|	0.003
30	32	2.440	2.417	0.059543	2.155	2.680	0.022666	0.098378	0.230	|	0.001
31	33	2.450	2.469	0.107548	2.150	2.788	-.018538	0.040707	-0.455	|	0.063
32	34	2.720	2.654	0.071519	2.380	2.928	0.065854	0.090048	0.731	|*	0.015
33	35	2.665	2.433	0.057565	2.172	2.693	0.232126	0.099548	2.332	|****	0.079
34	36	2.717	2.761	0.089093	2.466	3.055	-.043371	0.072705	-0.597	*|	0.023
35	37	2.687	2.746	0.090797	2.449	3.043	-.058847	0.070566	-0.834	*|	0.050
36	38	2.877	2.790	0.050549	2.536	3.045	0.086426	0.103288	0.837	|*	0.007
37	39	2.544	2.475	0.061020	2.212	2.739	0.068566	0.097469	0.703	|*	0.008
38	40	2.781	2.659	0.068065	2.389	2.930	0.122331	0.092686	1.320	|**	0.041
39	41	2.847	2.816	0.095444	2.513	3.119	0.030587	0.064140	0.477	|	0.022
40	42	2.785	2.793	0.085656	2.503	3.083	-.007611	0.076725	-0.099	|	0.001
41	43	2.615	2.625	0.048233	2.373	2.878	-.010029	0.104390	-0.096	|	0.000
42	44	2.714	2.606	0.068020	2.336	2.877	0.107690	0.092719	1.161	|**	0.032
43	45	2.750	2.762	0.087479	2.470	3.055	-.012094	0.074639	-0.162	|	0.002
44	46	2.651	2.664	0.079947	2.380	2.947	-.012856	0.082656	-0.156	|	0.001
45	47	2.390	2.395	0.068233	2.125	2.666	-.005696	0.092562	-0.062	|	0.000
46	48	2.549	2.599	0.073640	2.323	2.875	-.049632	0.088322	-0.562	*|	0.010
47	49	2.250	2.235	0.068751	1.964	2.506	0.015239	0.092179	0.165	|	0.001
48	50	2.316	2.417	0.046978	2.165	2.668	-.100581	0.104960	-0.958	*|	0.008
49	52	2.630	2.640	0.077184	2.359	2.920	-.010135	0.085242	-0.119	|	0.001
50	53	2.788	2.731	0.078769	2.449	3.013	0.057536	0.083780	0.687	|*	0.018
51	54	2.589	2.653	0.087957	2.360	2.946	-.064507	0.074076	-0.871	*|	0.046
52	55	2.622	2.744	0.058116	2.483	3.005	-.121983	0.099227	-1.229	**|	0.023
53	56	2.432	2.468	0.063352	2.202	2.733	-.036180	0.095969	-0.377	|	0.003
54	57	2.618	2.668	0.079709	2.384	2.951	-.050129	0.082886	-0.605	*|	0.015
55	58	2.581	2.598	0.068342	2.327	2.869	-.017535	0.092482	-0.190	|	0.001
56	59	2.663	2.702	0.061668	2.438	2.966	-.038798	0.097060	-0.400	|	0.003

TEH 0530199

DUP050031112

COMPLETE RECORDS FOR BLOOD_PB, VARIABLES 1-6, 22-30, DAYS_PB, LEAD_WT, & GCUR75

BETWEEN SITE REGRESSION ANALYSES (#31A: 6 ----- UNWEIGHTED)

OBS	ID	ACTUAL	PREDICT VALUE	STD ERR PREDICT	LOWER95% PREDICT	UPPER95% PREDICT	RESIDUAL	STD ERR RESIDUAL	STUDENT RESIDUAL	-2-1-0 1 2	COOK'S D
57	60	2.526	2.472	0.054839	2.214	2.730	0.054540	0.101075	0.540	| |* |	0.004
58	61	2.374	2.459	0.065907	2.191	2.727	-.085558	0.094233	-0.908	| *| |	0.018
59	62	2.577	2.528	0.057219	2.268	2.789	0.048186	0.099748	0.483	| | |	0.003
60	63	2.548	2.542	0.057918	2.281	2.803	0.006040	0.099344	0.061	| | |	0.000
61	64	2.413	2.493	0.073218	2.217	2.769	-.079916	0.088672	-0.901	| *| |	0.024

SUM OF RESIDUALS 3.77698E-13
SUM OF SQUARED RESIDUALS 0.5024964

TEH 0530200

DUP050031113

Between Site Model
Survey Demographics Only
Ordinary Least Squares
Dep. Var.: Adj. Set 2W

COMPLETE RECORDS FOR BLOOD_PB, VARIABLES 1-6, 22-30, DAYS_PB, LEAD_WT, & GCUR75

BETWEEN SITE REGRESSION ANALYSES (#31A: 6 ----- UNWEIGHTED)

MODEL: EQ2WAN
DEP VARIABLE: LBPB2W

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F VALUE	PROB>F
MODEL	23	1.245529	0.054153	3.988	0.0001
ERROR	37	0.502436	0.013579		
C TOTAL	60	1.747965			

ROOT MSE	0.116530	R-SQUARE	0.7126
DEP MEAN	2.601754	ADJ R-SQ	0.5339
C.V.	4.47892		

VARIABLE	DF	PARAMETER ESTIMATE	STANDARD ERROR	T FOR H0: PARAMETER=0	PROB > |T|	TOLERANCE	VARIANCE INFLATION
INTERCEP	1	2.595867	0.017263	150.375	0.0001	.	0.000000
BLACK	1	0.312190	0.159054	1.963	0.0572	0.340385	2.937846
MALE	1	0.463464	0.505911	0.916	0.3655	0.547159	1.827621
CHILD	1	0.469171	0.316218	1.484	0.1464	0.294616	3.394250
TEEN	1	1.161776	0.630920	1.841	0.0736	0.425435	2.350536
INCOME	1	0.508486	0.223715	2.273	0.0289	0.268854	3.719493
BL_MA	1	8.086332	4.019592	2.012	0.0516	0.545993	1.831526
BL_CH	1	-0.046659	1.286257	-0.036	0.9713	0.380270	2.629710
BL_TN	1	-0.645357	3.094869	-0.209	0.8360	0.451336	2.215642
BL_IN	1	1.317495	1.253858	1.051	0.3002	0.523488	1.910263
MA_CH	1	-10.750735	5.011980	-2.145	0.0386	0.612683	1.632164
MA_TN	1	7.041788	12.888787	0.546	0.5881	0.489421	2.043230
MA_IN	1	0.703115	3.529589	0.199	0.8432	0.546870	1.828588
CH_IN	1	-0.294759	2.177134	-0.135	0.8930	0.341445	2.928730
TN_IN	1	-2.438874	4.571010	-0.534	0.5968	0.372681	2.683257
URBAN	1	0.225385	0.079565	2.833	0.0074	0.190069	5.261243
CC	1	-0.162695	0.100907	-1.612	0.1154	0.212093	4.714917
WINTER	1	-0.122883	0.070774	-1.736	0.0908	0.293093	3.411888
SPRING	1	0.027192	0.063035	0.431	0.6687	0.358960	2.785828
SUMMER	1	0.043233	0.060036	0.720	0.4760	0.349963	2.857443
SOUTH	1	-0.077000	0.083490	-0.922	0.3624	0.165049	6.058820
WEST	1	0.098774	0.071413	1.383	0.1749	0.235402	4.248052
NORTEAST	1	0.109231	0.056398	1.937	0.0604	0.395775	2.526685
LEAD_WT	1	-2.83146E-07	0.0000066118	-0.043	0.9661	0.234316	4.267737

OBS	ID	ACTUAL	PREDICT VALUE	STD ERR PREDICT	LOWER95% PREDICT	UPPER95% PREDICT	RESIDUAL	STD ERR RESIDUAL	STUDENT RESIDUAL	-2-1-0 1 2	COOK'S D
1	1	2.745	2.816	0.101984	2.502	3.130	-.071049	0.056379	-1.260	| **| |	0.217
2	3	2.778	2.825	0.103057	2.510	3.141	-.047872	0.054393	-0.880	| *| |	0.116
3	4	2.603	2.593	0.061469	2.326	2.860	0.009875	0.099000	0.100	| | |	0.000
4	5	2.799	2.752	0.086631	2.458	3.046	0.047394	0.077938	0.608	| |* |	0.019
5	6	2.716	2.636	0.062217	2.368	2.903	0.080723	0.098531	0.819	| |* |	0.011

TEH 0530201

COMPLETE RECORDS FOR BLOOD_PB, VARIABLES 1-6, 22-30, DAYS_PB, LEAD_WT, & 6CUR75

BETWEEN SITE REGRESSION ANALYSES (#31A: 6 ----- UNWEIGHTED)

OBS	ID	ACTUAL	PREDICT VALUE	STD ERR PREDICT	LOWER95% PREDICT	UPPER95% PREDICT	RESIDUAL	STD ERR RESIDUAL	STUDENT RESIDUAL	-2-1-0 1 2	COOK'S D
56	59	2.663	2.701	0.064878	2.431	2.972	-.038096	0.096800	-0.394	| | |	0.003
57	60	2.526	2.472	0.056048	2.210	2.734	0.054200	0.102166	0.531	| |* |	0.004
58	61	2.374	2.461	0.076304	2.179	2.743	-.087237	0.088074	-0.991	| *| |	0.031
59	62	2.577	2.529	0.058924	2.265	2.794	0.047675	0.100535	0.474	| | |	0.003
60	63	2.548	2.542	0.058896	2.278	2.807	0.005768	0.100552	0.057	| | |	0.000
61	64	2.414	2.493	0.075854	2.211	2.775	-.079034	0.088462	-0.893	| *| |	0.024

SUM OF RESIDUALS 3.69926E-13
SUM OF SQUARED RESIDUALS 0.502436

TEH 0530203

DUP050031115

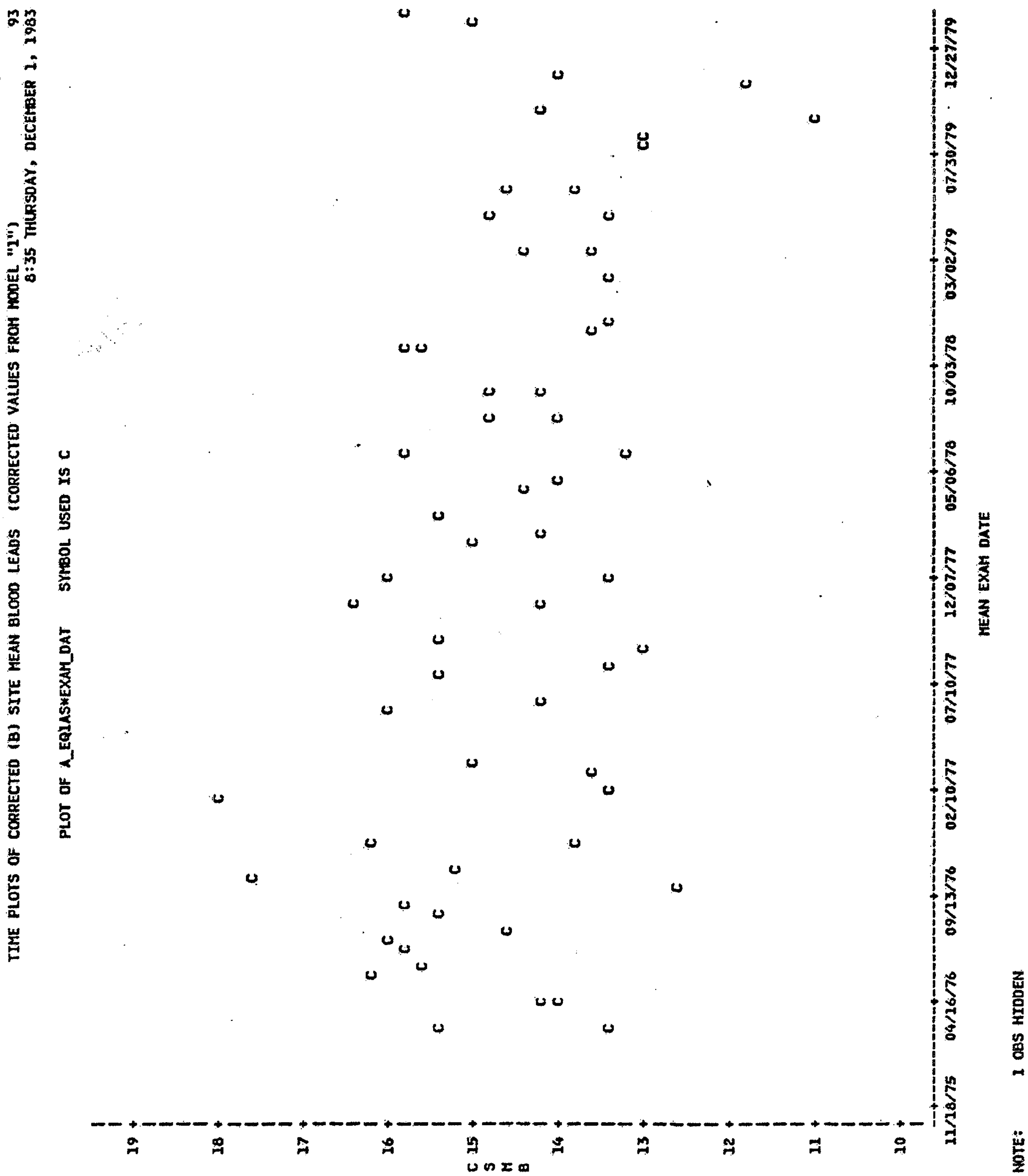
APPENDIX 4

Corrected Site Blood Lead Means Versus
Mean Examination Date

Based on Between Site Analyses With
Survey Demographic Terms Only

Adjustment Sets 1, 1W, and 2

Corrected Site Mean Blood Lead (CSMB)
Survey Demographics Only
Based on Adj. Set 1



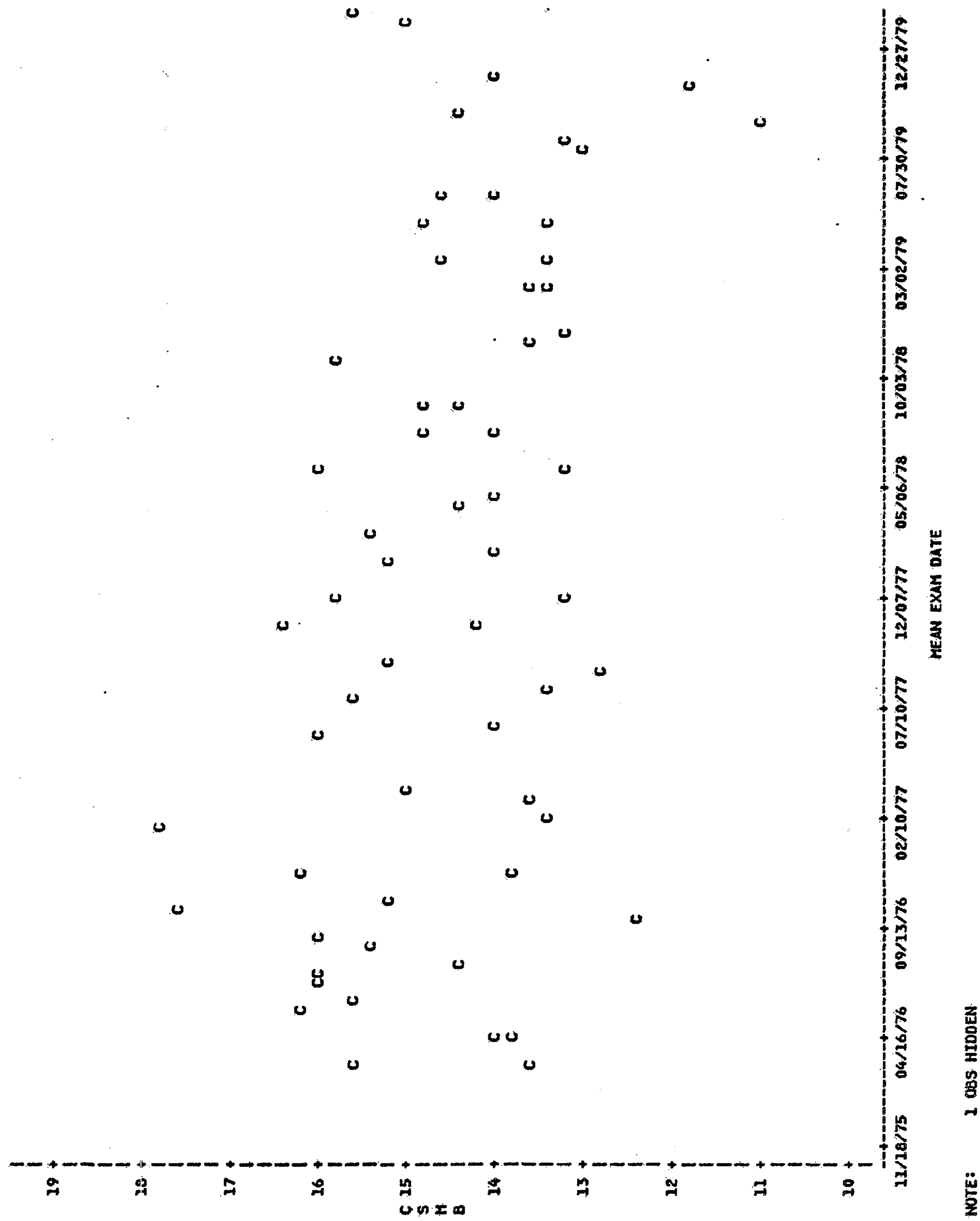
TEH 0530205

DUP050031117

Corrected Site Mean Blood Lead (CSMB)
Survey Demographics Only
Based on Adj. Set 1W

TIME PLOTS OF CORRECTED (B) SITE MEAN BLOOD LEADS (CORRECTED VALUES FROM MODEL "1W")
8:35 THURSDAY, DECEMBER 1, 1983 94

PLOT OF A_EQIWAS*EXAM_DAT SYMBOL USED IS C



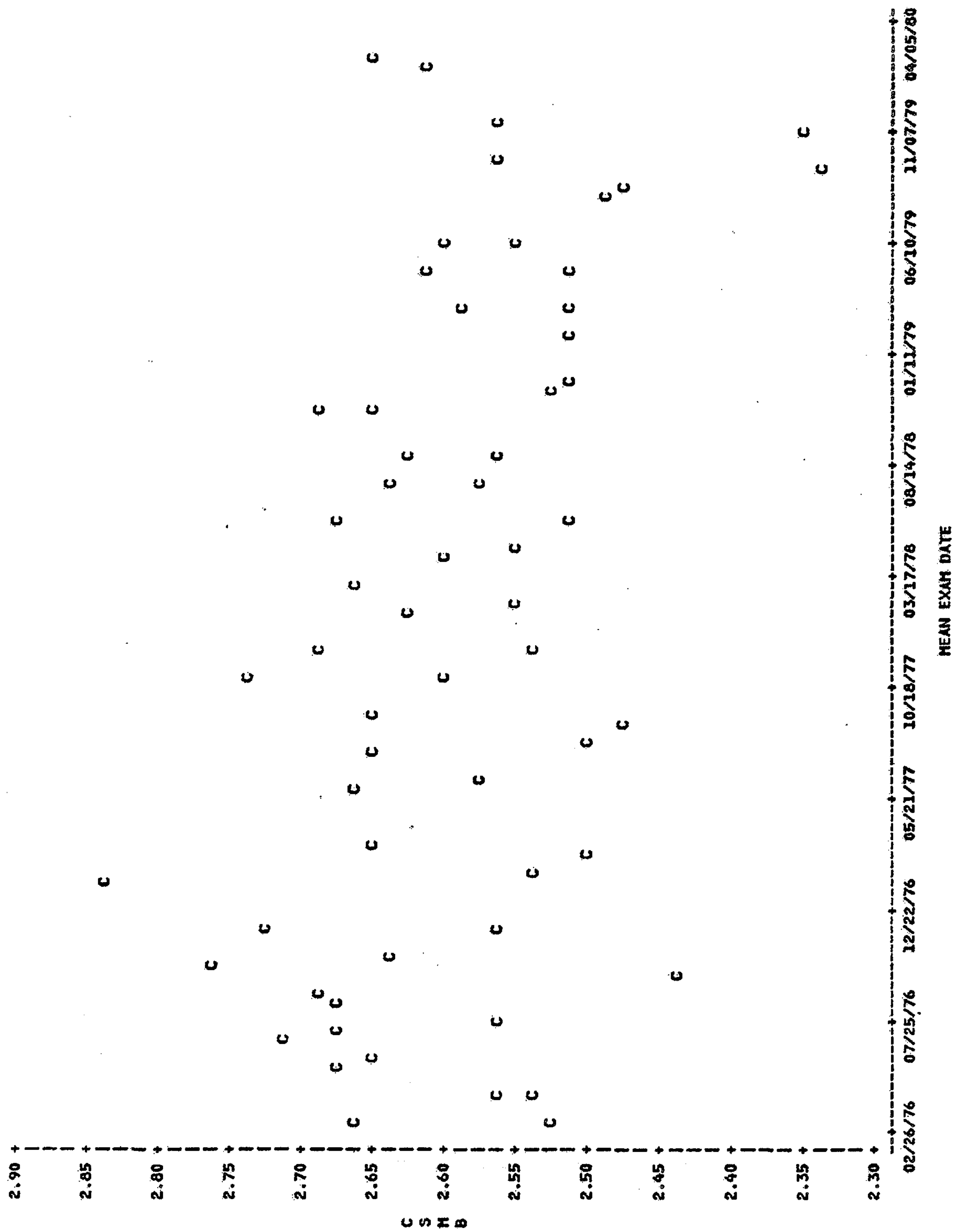
TEH 0530206

DUP050031118

Corrected Site Mean Blood Lead (CSMB)
Survey Demographics Only
Based on Adj. Set 2

TIME PLOTS OF CORRECTED (B) SITE MEAN BLOOD LEADS (CORRECTED VALUES FROM MODEL "2") 95
8:35 THURSDAY, DECEMBER 1, 1983

PLOT OF A_EQ2AS*EXAM_DAT SYMBOL USED IS C



NOTE: 1 OBS HIDDEN

TEH 0530207

DUP050031119

APPENDIX 5

Between Site Regression Summaries for
Models A, E, F and G

Weighted Least Squares

Based on Adjustment Set 2W

Between Site Model A
Untransformed Gas. Lead Exp.
Dep. Var.: Adj. Set 2W

COMPLETE RECORDS FOR BLOOD_PB, VARIABLES 1-6, 22-30, DAYS_PB, LEAD_WT, & GCUR75

BETWEEN SITE REGRESSION ANALYSES (#31A: 6 ----- WEIGHT = 1 / LBSO2W ** 2

MODEL: EQ2WCS
DEP VARIABLE: LBPB2W

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F VALUE	PROB>F
MODEL	24	1920.574	80.023937	4.469	0.0001
ERROR	36	644.601	17.905589		
C TOTAL	60	2565.176			

ROOT MSE	4.231500	R-SQUARE	0.7487
DEP MEAN	2.588740	ADJ R-SQ	0.5812
C.V.	163.4579		

VARIABLE	DF	PARAMETER ESTIMATE	STANDARD ERROR	T FOR H0: PARAMETER=0	PROB > |T|	TOLERANCE	VARIANCE INFLATION
INTERCEP	1	2.589547	0.016477	157.158	0.0001	.	0.000000
BLACK	1	0.142500	0.184345	0.773	0.4446	0.250536	3.991445
MALE	1	0.548373	0.500848	1.095	0.2808	0.538903	1.855620
CHILD	1	0.343388	0.323654	1.061	0.2958	0.281601	3.551119
TEEN	1	1.321623	0.595848	2.218	0.0329	0.460359	2.172217
INCOME	1	0.514390	0.209673	2.453	0.0191	0.284959	3.509273
BL_MA	1	7.943163	3.950935	2.010	0.0519	0.542206	1.844319
BL_CH	1	-0.169911	1.264751	-0.134	0.8939	0.427444	2.339488
BL_TN	1	-0.488209	2.974878	-0.164	0.8706	0.490364	2.039300
BL_IN	1	1.857705	1.241358	1.497	0.1432	0.475229	2.104251
MA_CH	1	-12.635890	5.110736	-2.472	0.0183	0.629705	1.588045
MA_TN	1	2.960867	13.426110	0.221	0.8267	0.537414	1.860764
MA_IN	1	0.464371	3.390937	0.137	0.8918	0.583239	1.714563
CH_IN	1	-0.105323	2.265980	-0.046	0.9632	0.383571	2.607078
TN_IN	1	-3.089581	4.637476	-0.666	0.5095	0.374176	2.672538
URBAN	1	0.144055	0.089716	1.606	0.1171	0.139974	7.144173
CC	1	-0.101426	0.111606	-0.909	0.3695	0.168145	5.947233
WINTER	1	-0.123596	0.064794	-1.908	0.0645	0.336669	2.970276
SPRING	1	0.025355	0.062081	0.408	0.6854	0.335351	2.981953
SUMMER	1	0.072171	0.058527	1.233	0.2255	0.327656	3.051986
SOUTH	1	-0.049654	0.082083	-0.605	0.5490	0.151739	6.590273
WEST	1	0.128001	0.070047	1.827	0.0759	0.226721	4.410708
NORTEAST	1	0.093636	0.054466	1.719	0.0942	0.451135	2.216629
LEAD_WT	1	-.0000013759	.00000651049	-0.211	0.8338	0.233470	4.283201
GCUR75	1	279.376	129.192	2.162	0.0373	0.313370	3.191113

OBS	ID	ACTUAL	PREDICT VALUE	STD ERR PREDICT	LOWER95% PREDICT	UPPER95% PREDICT	RESIDUAL	STD ERR RESIDUAL	STUDENT RESIDUAL	-2-1-0 1 2	COOK'S D
1	1	2.745	2.814	0.104626	2.491	3.136	-.068830	0.058508	-1.176	| **| |	0.177
2	3	2.778	2.798	0.100249	2.492	3.104	-.020444	0.051209	-0.399	| | |	0.024
3	4	2.603	2.592	0.056732	2.357	2.827	0.010761	0.083660	0.129	| | |	0.000
4	5	2.799	2.786	0.091402	2.480	3.091	0.013525	0.077527	0.174	| | |	0.002

TEH 0530209

DUP050031121

COMPLETE RECORDS FOR BLOOD_PB, VARIABLES 1-6, 22-30, DAYS_PB, LEAD_WT, & GCUR75

BETWEEN SITE REGRESSION ANALYSES (#31A: 6 ----- WEIGHT = 1 / LBSD2W ** 2

OBS	ID	ACTUAL	PREDICT VALUE	STD ERR PREDICT	LOWER95% PREDICT	UPPER95% PREDICT	RESIDUAL	STD ERR RESIDUAL	STUDENT RESIDUAL	-2-1-0 1 2	COOK'S D
5	6	2.716	2.631	0.063325	2.360	2.902	0.085668	0.099278	0.863	|*	0.012
6	7	2.771	2.676	0.061213	2.450	2.902	0.095119	0.070435	1.350	|**	0.055
7	8	2.463	2.515	0.064367	2.236	2.794	-.052062	0.103267	-0.504	*|	0.004
8	9	2.706	2.637	0.060772	2.335	2.938	0.069935	0.121251	0.577	|*	0.003
9	10	2.428	2.485	0.068647	2.207	2.764	-.057019	0.097191	-0.587	*|	0.007
10	11	2.540	2.648	0.072749	2.358	2.936	-.107798	0.099386	-1.085	**|	0.025
11	12	2.476	2.531	0.058855	2.271	2.792	-.055041	0.098013	-0.562	*|	0.005
12	13	2.975	2.936	0.091905	2.640	3.233	0.038236	0.066949	0.571	|*	0.025
13	14	2.182	2.438	0.056062	2.215	2.661	-.255566	0.076035	-3.361	******|	0.246
14	15	2.664	2.529	0.060385	2.303	2.755	0.134959	0.071573	1.886	|***	0.101
15	16	2.139	2.081	0.087705	1.772	2.390	0.057979	0.088600	0.654	|*	0.017
16	17	2.483	2.421	0.049163	2.184	2.659	0.061329	0.094310	0.650	|*	0.005
17	18	2.597	2.493	0.067052	2.223	2.763	0.104644	0.093236	1.122	|**	0.026
18	20	2.693	2.695	0.062784	2.422	2.967	-.001890	0.100749	-0.019	|	0.000
19	21	2.855	2.824	0.097135	2.484	3.163	0.031603	0.095472	0.331	|	0.005
20	22	2.690	2.621	0.067192	2.357	2.886	0.069169	0.089314	0.774	|*	0.014
21	23	2.746	2.732	0.064658	2.481	2.983	0.014149	0.083637	0.169	|	0.001
22	24	2.386	2.495	0.061041	2.252	2.738	-.108688	0.083015	-1.309	**|	0.037
23	25	2.689	2.535	0.058701	2.248	2.822	0.154287	0.114782	1.344	|**	0.019
24	26	2.709	2.606	0.066650	2.304	2.908	0.102961	0.115183	0.894	|*	0.011
25	27	2.588	2.556	0.061389	2.273	2.839	0.032354	0.109109	0.297	|	0.001
26	28	2.623	2.693	0.097983	2.381	3.006	-.069923	0.067362	-1.038	**|	0.091
27	29	2.593	2.663	0.079272	2.414	2.912	-.069961	0.049785	-1.405	**|	0.200
28	30	2.333	2.560	0.045752	2.314	2.806	-.226916	0.102428	-2.215	****|	0.039
29	31	2.622	2.643	0.065475	2.374	2.912	-.020960	0.095091	-0.220	|	0.001
30	32	2.440	2.412	0.057699	2.175	2.650	0.027827	0.084092	0.331	|	0.002
31	33	2.450	2.529	0.127023	2.150	2.908	-.078601	0.051614	-1.523	***|	0.562
32	34	2.720	2.669	0.083390	2.309	3.029	0.051031	0.132480	0.385	|	0.002
33	35	2.665	2.436	0.063964	2.149	2.722	0.229268	0.108431	2.114	|****	0.062
34	36	2.717	2.714	0.076035	2.478	2.950	0.003267	0.044366	0.074	|	0.001
35	37	2.687	2.727	0.097388	2.396	3.057	-.039189	0.087298	-0.449	|	0.010
36	38	2.877	2.747	0.054265	2.470	3.025	0.129348	0.113422	1.140	|**	0.012
37	39	2.544	2.488	0.058916	2.250	2.726	0.055848	0.082522	0.677	|*	0.009
38	40	2.782	2.685	0.063575	2.447	2.923	0.096721	0.075248	1.285	|**	0.047
39	41	2.846	2.800	0.112508	2.430	3.169	0.046539	0.088868	0.524	|*	0.018
40	42	2.786	2.810	0.091515	2.495	3.125	-.024446	0.086265	-0.283	|	0.004
41	43	2.615	2.589	0.050414	2.355	2.824	0.025666	0.090777	0.283	|	0.001
42	44	2.714	2.646	0.069631	2.375	2.917	0.067914	0.090361	0.752	|*	0.013
43	45	2.750	2.764	0.076025	2.523	3.005	-.013930	0.050424	-0.276	|	0.007
44	46	2.651	2.645	0.078584	2.387	2.904	0.005459	0.062353	0.088	|	0.000
45	47	2.390	2.401	0.065786	2.173	2.630	-.011292	0.063490	-0.178	|	0.001
46	48	2.549	2.571	0.070505	2.323	2.818	-.021254	0.070178	-0.303	|	0.004
47	49	2.250	2.182	0.069325	1.929	2.434	0.068796	0.076525	0.899	|*	0.027
48	50	2.316	2.413	0.042959	2.194	2.631	-.096272	0.088940	-1.082	**|	0.011
49	52	2.630	2.740	0.097947	2.380	3.100	-.110140	0.111219	-0.990	*|	0.030
50	53	2.789	2.653	0.097029	2.284	3.021	0.135863	0.119044	1.141	|**	0.035
51	54	2.589	2.670	0.102993	2.309	3.031	-.080903	0.101935	-0.794	*|	0.026
52	55	2.622	2.718	0.057441	2.464	2.973	-.096346	0.095852	-1.005	**|	0.015
53	56	2.432	2.465	0.066459	2.206	2.723	-.033033	0.086304	-0.383	|	0.003
54	57	2.618	2.671	0.092365	2.313	3.030	-.053744	0.119205	-0.451	|	0.005

#31A: 6 ----- ALL COMPLETE RECORDS EXCLUDING THE TWO NEW YORK SITES

13:31 SATURDAY, NOVEMBER 19, 1983

COMPLETE RECORDS FOR BLOOD_PB, VARIABLES 1-6, 22-30, DAYS_PB, LEAD_WT, & GCUR75

BETWEEN SITE REGRESSION ANALYSES (#31A: 6 ----- WEIGHT = 1 / LBSD2W ** 2

OBS	ID	ACTUAL	PREDICT VALUE	STD ERR PREDICT	LOWER95% PREDICT	UPPER95% PREDICT	RESIDUAL	STD ERR RESIDUAL	STUDENT RESIDUAL	-2-1-0 1 2	COOK'S D
55	58	2.581	2.544	0.070102	2.271	2.818	0.036358	0.091472	0.397	| | |	0.004
56	59	2.663	2.705	0.065925	2.418	2.992	-.041970	0.106539	-0.394	| | |	0.002
57	60	2.526	2.449	0.059534	2.158	2.740	0.076926	0.116323	0.661	| |* |	0.005
58	61	2.374	2.457	0.068888	2.223	2.691	-.083646	0.061833	-1.353	| **| |	0.091
59	62	2.577	2.570	0.058341	2.327	2.814	0.006498	0.087056	0.075	| | |	0.000
60	63	2.548	2.513	0.058320	2.252	2.773	0.035402	0.098416	0.360	| | |	0.002
61	64	2.414	2.480	0.069177	2.230	2.730	-.066162	0.074997	-0.882	| *| |	0.026

SUM OF RESIDUALS 0.0003176459
SUM OF SQUARED RESIDUALS 0.0003478665

TEH 0530211

DUP050031123

Between Site Model A
Transformed Gas. Lead Exp.
Dep. Var.: Adj. Set 2W

COMPLETE RECORDS FOR BLOOD_PB, VARIABLES 1-6, 22-30, DAYS_PB, LEAD_WT, & GCUR75

BETWEEN SITE REGRESSION ANALYSES (#31A: 6 ----- WEIGHT = 1 / LBSD2W ** 2

MODEL: EQ2WGS
DEP VARIABLE: LBPB2W

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F VALUE	PROB>F
MODEL	24	1916.895	79.870620	4.435	0.0001
ERROR	36	648.281	18.007800		
C TOTAL	60	2565.176			

ROOT MSE	4.243560	R-SQUARE	0.7473
DEP MEAN	2.588740	ADJ R-SQ	0.5788
C.V.	163.9237		

VARIABLE	DF	PARAMETER ESTIMATE	STANDARD ERROR	T FOR H0: PARAMETER=0	PROB > |T|	TOLERANCE	VARIANCE INFLATION
INTERCEP	1	2.589969	0.016529	156.697	0.0001	.	0.000000
BLACK	1	0.200763	0.173823	1.155	0.2557	0.283393	3.528664
MALE	1	0.520652	0.500874	1.039	0.3055	0.541923	1.845281
CHILD	1	0.242360	0.341817	0.709	0.4829	0.253911	3.938393
TEEN	1	1.346551	0.600250	2.243	0.0311	0.456222	2.191914
INCOME	1	0.518736	0.210199	2.468	0.0185	0.285152	3.506899
BL_MA	1	7.385168	3.991787	1.850	0.0725	0.534197	1.871970
BL_CH	1	0.155380	1.285447	0.121	0.9045	0.416153	2.402961
BL_TN	1	-0.618127	2.977387	-0.208	0.8367	0.492333	2.031147
BL_IN	1	1.731243	1.243663	1.392	0.1724	0.476171	2.100085
MA_CH	1	-9.861848	5.155562	-1.913	0.0637	0.622335	1.606852
MA_TN	1	4.773955	13.512468	0.353	0.7259	0.533594	1.874085
MA_IN	1	-0.464046	3.375398	-0.137	0.8914	0.591981	1.689242
CH_IN	1	-0.462040	2.300738	-0.201	0.8420	0.374193	2.672416
TN_IN	1	-0.908460	4.688149	-0.194	0.8474	0.368221	2.715758
URBAN	1	0.080565	0.106473	0.757	0.4542	0.099948	10.005163
CC	1	-0.135329	0.108299	-1.250	0.2195	0.179590	5.568229
WINTER	1	-0.143358	0.065608	-2.185	0.0355	0.330238	3.028122
SPRING	1	0.009585732	0.063519	0.151	0.8809	0.322167	3.103983
SUMMER	1	0.059537	0.058616	1.016	0.3165	0.328526	3.043897
SOUTH	1	-0.074617	0.080603	-0.926	0.3608	0.158259	6.318762
WEST	1	0.148261	0.073407	2.020	0.0509	0.207619	4.816516
NORTEAST	1	0.072177	0.055888	1.291	0.2048	0.430923	2.320601
LEAD_WT	1	-.0000027528	0.0000066755	-0.412	0.6825	0.223338	4.477517
L_GCUR75	1	0.116961	0.055473	2.108	0.0420	0.133200	7.507516

OBS	ID	ACTUAL	PREDICT VALUE	STD ERR PREDICT	LOWER95% PREDICT	UPPER95% PREDICT	RESIDUAL	STD ERR RESIDUAL	STUDENT RESIDUAL	-2-1-0 1 2	COOK'S D
1	1	2.745	2.768	0.106143	2.442	3.093	-.022887	0.056439	-0.406	| | |	0.023
2	3	2.778	2.824	0.099401	2.519	3.129	-.046528	0.053515	-0.869	| *| |	0.104
3	4	2.603	2.667	0.068387	2.419	2.915	-.063883	0.074827	-0.854	| *| |	0.024
4	5	2.799	2.741	0.088175	2.439	3.043	0.058280	0.081681	0.714	| |* |	0.024

TEH 0530212

DUP050031124

COMPLETE RECORDS FOR BLOOD_PB, VARIABLES 1-6, 22-30, DAYS_PB, LEAD_WT, & GCUR75

BETWEEN SITE REGRESSION ANALYSES (#31A: 6 ----- WEIGHT = 1 / LBSD2W ** 2

OBS	ID	ACTUAL	PREDICT VALUE	STD ERR PREDICT	LOWER95% PREDICT	UPPER95% PREDICT	RESIDUAL	STD ERR RESIDUAL	STUDENT RESIDUAL	-2-1-0 1 2	COOK'S D
5	6	2.716	2.654	0.064826	2.380	2.927	0.062847	0.098706	0.637	*	0.007
6	7	2.771	2.672	0.061504	2.445	2.899	0.098914	0.070535	1.402	**	0.060
7	8	2.463	2.499	0.064400	2.219	2.779	-.035800	0.103656	-0.345		0.002
8	9	2.706	2.655	0.062263	2.351	2.958	0.051626	0.120927	0.427		0.002
9	10	2.428	2.446	0.073566	2.162	2.731	-.018297	0.093954	-0.195		0.001
10	11	2.540	2.649	0.072889	2.359	2.940	-.109322	0.099718	-1.096	**	0.026
11	12	2.476	2.583	0.054913	2.325	2.841	-.106669	0.100647	-1.060	**	0.013
12	13	2.975	2.833	0.068623	2.563	3.103	0.141629	0.091069	1.555	***	0.055
13	14	2.182	2.430	0.055771	2.208	2.653	-.248065	0.076582	-3.239	******	0.223
14	15	2.664	2.523	0.060614	2.296	2.749	0.141178	0.071729	1.968	***	0.111
15	16	2.139	2.076	0.087999	1.766	2.386	0.063389	0.088809	0.714	*	0.020
16	17	2.483	2.418	0.049347	2.180	2.656	0.064731	0.094555	0.685	*	0.005
17	18	2.597	2.528	0.069180	2.256	2.801	0.069402	0.092078	0.754	*	0.013
18	20	2.693	2.738	0.057418	2.470	3.006	-.044941	0.104287	-0.431		0.002
19	21	2.855	2.770	0.095089	2.432	3.107	0.085726	0.098052	0.874	*	0.029
20	22	2.690	2.624	0.067394	2.359	2.889	0.066254	0.089560	0.740	*	0.012
21	23	2.746	2.796	0.079892	2.527	3.066	-.050081	0.069691	-0.719	*	0.027
22	24	2.386	2.502	0.061364	2.258	2.746	-.115622	0.083142	-1.391	**	0.042
23	25	2.689	2.555	0.059786	2.266	2.844	0.134060	0.114635	1.169	**	0.015
24	26	2.709	2.636	0.067925	2.332	2.940	0.073000	0.114877	0.635	*	0.006
25	27	2.588	2.583	0.064175	2.297	2.869	0.005040	0.107909	0.047		0.000
26	28	2.623	2.721	0.098512	2.408	3.035	-.098164	0.067191	-1.461	**	0.184
27	29	2.593	2.637	0.080752	2.385	2.888	-.043646	0.047874	-0.912	*	0.095
28	30	2.333	2.562	0.045719	2.315	2.808	-.228834	0.102792	-2.226	****	0.039
29	31	2.622	2.655	0.065473	2.385	2.925	-.032947	0.095491	-0.345		0.002
30	32	2.440	2.410	0.057918	2.172	2.649	0.030072	0.084294	0.357		0.002
31	33	2.450	2.487	0.125437	2.109	2.864	-.036307	0.056319	-0.645	*	0.082
32	34	2.720	2.659	0.083002	2.299	3.019	0.061369	0.133249	0.461		0.003
33	35	2.665	2.460	0.066802	2.170	2.749	0.205183	0.107129	1.915	***	0.057
34	36	2.717	2.708	0.076741	2.471	2.946	0.008726	0.043644	0.200		0.005
35	37	2.687	2.724	0.097751	2.392	3.056	-.036619	0.087451	-0.419		0.009
36	38	2.877	2.753	0.053720	2.475	3.031	0.123917	0.114077	1.086	**	0.010
37	39	2.544	2.448	0.062090	2.207	2.690	0.095996	0.080526	1.192	**	0.034
38	40	2.782	2.655	0.062566	2.418	2.892	0.126758	0.076452	1.658	***	0.074
39	41	2.846	2.841	0.115366	2.467	3.215	0.005210	0.085811	0.061		0.000
40	42	2.786	2.785	0.093061	2.467	3.103	2.1E-04	0.085127	0.003		0.000
41	43	2.615	2.617	0.048036	2.385	2.850	-.002035	0.092391	-0.022		0.000
42	44	2.714	2.653	0.070593	2.380	2.926	0.061161	0.090025	0.679	*	0.011
43	45	2.750	2.763	0.076259	2.521	3.004	-.012680	0.050541	-0.251		0.006
44	46	2.651	2.686	0.077344	2.428	2.943	-.034815	0.064333	-0.541	*	0.017
45	47	2.390	2.403	0.066068	2.174	2.632	-.013234	0.063572	-0.208		0.002
46	48	2.549	2.586	0.069983	2.339	2.833	-.036303	0.071097	-0.511	*	0.010
47	49	2.250	2.191	0.068450	1.939	2.443	0.059261	0.077701	0.763	*	0.018
48	50	2.316	2.393	0.042881	2.174	2.612	-.076877	0.089290	-0.861	*	0.007
49	52	2.630	2.660	0.087912	2.310	3.010	-.030402	0.119833	-0.254		0.001
50	53	2.789	2.661	0.096279	2.293	3.030	0.127317	0.120213	1.059	**	0.029
51	54	2.589	2.663	0.103462	2.301	3.025	-.073878	0.102048	-0.724	*	0.022
52	55	2.622	2.705	0.059027	2.448	2.962	-.082789	0.095258	-0.869	*	0.012
53	56	2.432	2.389	0.072504	2.123	2.655	0.042434	0.081707	0.519	*	0.008
54	57	2.618	2.677	0.092427	2.318	3.037	-.059835	0.119701	-0.500		0.006

COMPLETE RECORDS FOR BLOOD_PB, VARIABLES 1-6, 22-30, DAYS_PB, LEAD_WT, & GCUR75

BETWEEN SITE REGRESSION ANALYSES (#31A: 6 ----- WEIGHT = 1 / LBSD2W ** 2

OBS	ID	ACTUAL	PREDICT VALUE	STD ERR PREDICT	LOWER95% PREDICT	UPPER95% PREDICT	RESIDUAL	STD ERR RESIDUAL	STUDENT RESIDUAL	-2-1-0 1 2	COOK'S D
55	58	2.581	2.559	0.069323	2.286	2.832	0.021731	0.092474	0.235	| | |	0.001
56	59	2.663	2.725	0.067167	2.436	3.014	-.061659	0.106183	-0.581	| *| |	0.005
57	60	2.526	2.472	0.060354	2.180	2.765	0.053723	0.116320	0.462	| | |	0.002
58	61	2.374	2.431	0.068533	2.197	2.665	-.057671	0.062618	-0.921	| *| |	0.041
59	62	2.577	2.552	0.057231	2.309	2.794	0.025171	0.088146	0.286	| | |	0.001
60	63	2.548	2.540	0.058048	2.279	2.800	0.008313	0.098955	0.084	| | |	0.000
61	64	2.414	2.492	0.069372	2.241	2.742	-.078011	0.075213	-1.037	| **| |	0.037

SUM OF RESIDUALS 0.0003438189
SUM OF SQUARED RESIDUALS 0.0003260395

Between Site Model E
Untransformed Gas. Lead Exp.
Dep. Var.: Adj. Set 2W

#31A: 6 ----- ALL COMPLETE RECORDS EXCLUDING THE TWO NEW YORK SITES
13:31 SATURDAY, NOVEMBER 19, 1983

COMPLETE RECORDS FOR BLOOD_PB, VARIABLES 1-6, 22-30, DAYS_PB, LEAD_WT, & GCUR75

BETWEEN SITE REGRESSION ANALYSES (#31A: 6 ----- WEIGHT = 1 / LBSD2W ** 2

MODEL: EQ2WES
DEP VARIABLE: LBPB2W

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F VALUE	PROB>F
MODEL	25	1928.652	77.146098	4.242	0.0001
ERROR	35	636.523	18.186378		
C TOTAL	60	2565.176			

ROOT MSE	4.264549	R-SQUARE	0.7519
DEP MEAN	2.588740	ADJ R-SQ	0.5746
C.V.	164.7345		

VARIABLE	DF	PARAMETER ESTIMATE	STANDARD ERROR	T FOR H0: PARAMETER=0	PROB > |T|	TOLERANCE	VARIANCE INFLATION
INTERCEP	1	2.589730	0.016608	155.929	0.0001	.	0.000000
BLACK	1	0.171721	0.190888	0.900	0.3745	0.237319	4.213736
MALE	1	0.413383	0.543882	0.760	0.4523	0.464164	2.154413
CHILD	1	0.317696	0.328452	0.967	0.3401	0.277722	3.600720
TEEN	1	1.351243	0.602145	2.244	0.0313	0.457851	2.184115
INCOME	1	0.565827	0.224964	2.515	0.0166	0.251420	3.977416
BL_MA	1	6.363807	4.633614	1.373	0.1784	0.400389	2.497574
BL_CH	1	-0.497579	1.366162	-0.364	0.7179	0.372085	2.687557
BL_TN	1	-1.252764	3.210093	-0.390	0.6987	0.427740	2.337870
BL_IN	1	1.776307	1.257000	1.413	0.1664	0.470742	2.124305
MA_CH	1	-12.857338	5.161359	-2.491	0.0176	0.627095	1.594654
MA_TN	1	1.539072	13.698115	0.112	0.9112	0.524379	1.907018
MA_IN	1	0.353266	3.421486	0.103	0.9184	0.581854	1.718643
CH_IN	1	0.225800	2.337099	0.097	0.9236	0.366237	2.730475
TN_IN	1	-2.801620	4.693626	-0.597	0.5544	0.371005	2.695379
URBAN	1	0.120297	0.097190	1.238	0.2240	0.121144	8.254666
CC	1	-0.079414	0.117226	-0.677	0.5026	0.154799	6.460008
WINTER	1	-0.118524	0.065742	-1.803	0.0800	0.332158	3.010614
SPRING	1	0.006342282	0.068763	0.092	0.9270	0.277631	3.601909
SUMMER	1	0.061710	0.061037	1.011	0.3189	0.305989	3.268094
SOUTH	1	-0.073163	0.089931	-0.814	0.4214	0.128394	7.788532
WEST	1	0.125315	0.070709	1.772	0.0851	0.225984	4.425083
NORTEAST	1	0.086144	0.056031	1.537	0.1332	0.432976	2.309597
LEAD_WT	1	-4.33253E-07	.00000671206	-0.065	0.9489	0.223102	4.482251
GCUR75	1	2575.120	3447.113	0.747	0.4600	0.000447	2236.793792
GLAG75	1	-2279.617	3420.457	-0.666	0.5095	0.000444	2249.973614

COMPLETE RECORDS FOR BLOOD_PB, VARIABLES 1-6, 22-30, DAYS_PB, LEAD_WT, & GCUR75

BETWEEN SITE REGRESSION ANALYSES (#31A: 6 ----- WEIGHT = 1 / LBSD2W ** 2

OBS	ID	ACTUAL	PREDICT VALUE	STD ERR PREDICT	LOWER95% PREDICT	UPPER95% PREDICT	RESIDUAL	STD ERR RESIDUAL	STUDENT RESIDUAL	-2-1-0 1 2	COOK'S D
1	1	2.745	2.802	0.106907	2.474	3.129	-.057080	0.056268	-1.014	**	0.143
2	3	2.778	2.793	0.101290	2.484	3.102	-.015626	0.051100	-0.306		0.014
3	4	2.603	2.583	0.058819	2.344	2.822	0.019964	0.083175	0.240		0.001
4	5	2.799	2.814	0.101736	2.494	3.135	-.015257	0.065113	-0.234		0.005
5	6	2.716	2.633	0.063928	2.360	2.907	0.083179	0.099983	0.832	*	0.011
6	7	2.771	2.687	0.063983	2.456	2.918	0.083808	0.068926	1.216	**	0.049
7	8	2.463	2.510	0.065250	2.228	2.793	-.047376	0.103836	-0.456		0.003
8	9	2.706	2.649	0.064068	2.343	2.956	0.057403	0.120743	0.475		0.002
9	10	2.428	2.496	0.071074	2.213	2.779	-.067873	0.096587	-0.703	*	0.010
10	11	2.540	2.643	0.073726	2.350	2.936	-.102628	0.099861	-1.028	**	0.022
11	12	2.476	2.541	0.060880	2.276	2.805	-.064182	0.097822	-0.656	*	0.006
12	13	2.975	2.925	0.094095	2.624	3.226	0.049287	0.065404	0.754	*	0.045
13	14	2.182	2.435	0.056693	2.210	2.660	-.252445	0.076486	-3.301	******	0.230
14	15	2.664	2.532	0.061033	2.304	2.760	0.131862	0.071982	1.832	***	0.093
15	16	2.139	2.085	0.088567	1.773	2.397	0.054256	0.089117	0.609	*	0.014
16	17	2.483	2.416	0.050275	2.175	2.656	0.067012	0.094663	0.708	*	0.005
17	18	2.597	2.503	0.069219	2.229	2.777	0.094654	0.092760	1.020	**	0.022
18	20	2.693	2.715	0.070206	2.433	2.997	-.022162	0.096873	-0.229		0.001
19	21	2.855	2.835	0.099365	2.491	3.179	0.020252	0.094699	0.214		0.002
20	22	2.690	2.615	0.068294	2.348	2.883	0.075078	0.089574	0.838	*	0.016
21	23	2.746	2.719	0.068212	2.462	2.975	0.027590	0.081842	0.337		0.003
22	24	2.386	2.481	0.065164	2.232	2.729	-.094363	0.080855	-1.167	**	0.034
23	25	2.689	2.523	0.061931	2.231	2.815	0.166496	0.114219	1.458	**	0.024
24	26	2.709	2.617	0.069289	2.311	2.924	0.091630	0.114831	0.798	*	0.009
25	27	2.588	2.538	0.067373	2.248	2.828	0.050131	0.106677	0.470		0.003
26	28	2.623	2.688	0.099000	2.373	3.004	-.065225	0.067521	-0.966	*	0.077
27	29	2.593	2.655	0.080806	2.403	2.907	-.061880	0.048687	-1.271	**	0.171
28	30	2.333	2.563	0.046299	2.315	2.811	-.229709	0.103143	-2.227	****	0.038
29	31	2.622	2.633	0.067781	2.359	2.906	-.010635	0.094573	-0.112		0.000
30	32	2.440	2.404	0.059437	2.163	2.645	0.036025	0.083851	0.430		0.004
31	33	2.450	2.511	0.130706	2.125	2.897	-.061016	0.044829	-1.361	**	0.606
32	34	2.720	2.689	0.089253	2.321	3.057	0.031003	0.130089	0.238		0.001
33	35	2.665	2.438	0.064580	2.149	2.727	0.226685	0.109209	2.076	****	0.058
34	36	2.717	2.713	0.076633	2.475	2.951	0.003842	0.044705	0.086		0.001
35	37	2.687	2.712	0.100701	2.375	3.048	-.024175	0.085046	-0.284		0.004
36	38	2.877	2.741	0.055545	2.460	3.022	0.135824	0.113894	1.193	**	0.013
37	39	2.544	2.483	0.059877	2.243	2.724	0.060998	0.082807	0.737	*	0.011
38	40	2.782	2.686	0.064086	2.446	2.926	0.095808	0.075824	1.264	**	0.044
39	41	2.846	2.787	0.114993	2.412	3.162	0.059306	0.087489	0.678	*	0.031
40	42	2.786	2.820	0.093350	2.500	3.139	-.034055	0.085735	-0.397		0.007
41	43	2.615	2.584	0.051520	2.347	2.821	0.031356	0.091087	0.344		0.001
42	44	2.714	2.651	0.070497	2.377	2.925	0.063426	0.090818	0.698	*	0.011
43	45	2.750	2.766	0.076666	2.523	3.009	-.015735	0.050746	-0.310		0.008
44	46	2.651	2.656	0.080736	2.393	2.919	-.004995	0.060851	-0.082		0.000
45	47	2.390	2.402	0.066330	2.172	2.633	-.012634	0.063954	-0.198		0.002
46	48	2.549	2.559	0.073032	2.308	2.811	-.010008	0.068684	-0.146		0.001
47	49	2.250	2.181	0.069867	1.927	2.436	0.069035	0.077122	0.895	*	0.025
48	50	2.316	2.416	0.043525	2.195	2.636	-.099255	0.089523	-1.109	**	0.011
49	52	2.630	2.769	0.107874	2.395	3.143	-.139136	0.103299	-1.347	**	0.076
50	53	2.789	2.660	0.098336	2.287	3.032	0.128946	0.119524	1.079	**	0.030

TEH 0530216

DUP050031128

#31A: 6 ----- ALL COMPLETE RECORDS EXCLUDING THE TWO NEW YORK SITES
13:31 SATURDAY, NOVEMBER 19, 1983

COMPLETE RECORDS FOR BLOOD_PB, VARIABLES 1-6, 22-30, DAYS_PB, LEAD_WT, & GCUR75

BETWEEN SITE REGRESSION ANALYSES (#31A: 6 ----- WEIGHT = 1 / LBSD2W ** 2

OBS	ID	ACTUAL	PREDICT VALUE	STD ERR PREDICT	LOWER95% PREDICT	UPPER95% PREDICT	RESIDUAL	STD ERR RESIDUAL	STUDENT RESIDUAL	-2-1-0 1 2	COOK'S D
51	54	2.589	2.662	0.104450	2.298	3.027	-.073129	0.102067	-0.716	| *| |	0.021
52	55	2.622	2.716	0.058045	2.458	2.973	-.093520	0.096507	-0.969	| *| |	0.013
53	56	2.432	2.465	0.066987	2.204	2.726	-.033790	0.086971	-0.389	| | |	0.003
54	57	2.618	2.678	0.093585	2.315	3.040	-.060171	0.119749	-0.502	| *| |	0.006
55	58	2.581	2.540	0.070892	2.264	2.817	0.040264	0.092000	0.438	| | |	0.004
56	59	2.663	2.702	0.066624	2.412	2.992	-.038668	0.107257	-0.361	| | |	0.002
57	60	2.526	2.458	0.061495	2.163	2.753	0.067942	0.116454	0.583	| |* |	0.004
58	61	2.374	2.468	0.071436	2.230	2.707	-.094861	0.060001	-1.581	| ***| |	0.136
59	62	2.577	2.574	0.059068	2.328	2.820	0.002731	0.087554	0.031	| | |	0.000
60	63	2.548	2.524	0.061239	2.259	2.789	0.023943	0.097684	0.245	| | |	0.001
61	64	2.414	2.477	0.069848	2.225	2.729	-.063314	0.075462	-0.839	| *| |	0.023

SUM OF RESIDUALS 0.0002693244
SUM OF SQUARED RESIDUALS 0.0003457684

Between Site Model E
Transformed Gas. Lead Exp.
Dep. Var.: Adj. Set 2W

COMPLETE RECORDS FOR BLOOD_PB, VARIABLES 1-6, 22-30, DAYS_PB, LEAD_WT, & GCUR75

BETWEEN SITE REGRESSION ANALYSES (#31A: 6 ----- WEIGHT = 1 / LBSD2W ** 2

MODEL: EQ2WIS
DEP VARIABLE: LBPB2W

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F VALUE	PROB>F
MODEL	25	1986.029	79.441153	4.801	0.0001
ERROR	35	579.147	16.547053		
C TOTAL	60	2565.176			

ROOT MSE	4.067807	R-SQUARE	0.7742
DEP MEAN	2.588740	ADJ R-SQ	0.6130
C.V.	157.1346		

VARIABLE	DF	PARAMETER ESTIMATE	STANDARD ERROR	T FOR H0: PARAMETER=0	PROB > |T|	TOLERANCE	VARIANCE INFLATION
INTERCEP	1	2.589468	0.015846	163.416	0.0001	.	0.000000
BLACK	1	0.132712	0.169918	0.781	0.4400	0.272514	3.669539
MALE	1	0.391547	0.484267	0.809	0.4242	0.532704	1.877216
CHILD	1	0.211100	0.328017	0.644	0.5241	0.253359	3.946973
TEEN	1	1.052615	0.593087	1.775	0.0846	0.429401	2.328824
INCOME	1	0.468274	0.203000	2.307	0.0271	0.280935	3.559543
BL_MA	1	5.866753	3.897902	1.505	0.1413	0.514795	1.942523
BL_CH	1	0.520790	1.245109	0.418	0.6783	0.407574	2.453540
BL_TN	1	-1.171440	2.866883	-0.409	0.6853	0.487943	2.049419
BL_IN	1	1.767029	1.192283	1.482	0.1473	0.476069	2.100538
MA_CH	1	-6.805259	5.163322	-1.318	0.1961	0.570135	1.753970
MA_TN	1	7.537378	13.023213	0.579	0.5665	0.527843	1.894502
MA_IN	1	-0.577203	3.236075	-0.178	0.8595	0.591808	1.689737
CH_IN	1	-0.689132	2.208246	-0.312	0.7568	0.373246	2.679197
TN_IN	1	0.821571	4.572991	0.180	0.8585	0.355607	2.812089
URBAN	1	0.041185	0.103866	0.397	0.6941	0.096509	10.361678
CC	1	-0.086475	0.106529	-0.812	0.4224	0.170550	5.863379
WINTER	1	-0.152381	0.063046	-2.417	0.0210	0.328619	3.043040
SPRING	1	-0.082880	0.075854	-1.093	0.2820	0.207584	4.817319
SUMMER	1	-0.013393	0.066560	-0.201	0.8417	0.234123	4.271256
SOUTH	1	-0.081402	0.077336	-1.053	0.2997	0.157967	6.330428
WEST	1	0.097652	0.074595	1.309	0.1990	0.184746	5.412838
NORTEAST	1	0.042543	0.055500	0.767	0.4485	0.401518	2.490546
LEAD_WT	1	-.0000011719	0.0000064456	-0.182	0.8568	0.220122	4.542930
L_GCUR75	1	2.835896	1.331252	2.130	0.0403	0.000213	4705.386683
L_GLAG75	1	-2.719445	1.330439	-2.044	0.0485	0.000213	4696.076003

TEH 0530218

DUP050031130

COMPLETE RECORDS FOR BLOOD_PB, VARIABLES 1-6, 22-30, DAYS_PB, LEAD_WT, & GCUR75

BETWEEN SITE REGRESSION ANALYSES (#31A: 6 ----- WEIGHT = 1 / LBSD2W ** 2

OBS	ID	ACTUAL	PREDICT VALUE	STD ERR PREDICT	LOWER95% PREDICT	UPPER95% PREDICT	RESIDUAL	STD ERR RESIDUAL	STUDENT RESIDUAL	-2-1-0 1 2	COOK'S D
1	1	2.745	2.745	0.102351	2.432	3.058	-2.0E-04	0.052951	-0.004		0.000
2	3	2.778	2.819	0.095316	2.526	3.112	-.041494	0.051240	-0.810	*	0.087
3	4	2.603	2.646	0.066334	2.407	2.885	-.043158	0.071008	-0.608	*	0.012
4	5	2.799	2.749	0.084606	2.458	3.039	0.050667	0.078210	0.648	*	0.019
5	6	2.716	2.655	0.062143	2.392	2.917	0.061812	0.094616	0.653	*	0.007
6	7	2.771	2.668	0.058996	2.450	2.886	0.103325	0.067579	1.529	***	0.069
7	8	2.463	2.490	0.061904	2.221	2.758	-.026404	0.099256	-0.266		0.001
8	9	2.706	2.688	0.061891	2.395	2.981	0.018144	0.114755	0.158		0.000
9	10	2.428	2.434	0.070789	2.161	2.707	-.005680	0.089851	-0.063		0.000
10	11	2.540	2.650	0.069872	2.371	2.930	-.110326	0.095587	-1.154	**	0.027
11	12	2.476	2.592	0.052806	2.344	2.839	-.115242	0.096387	-1.196	**	0.017
12	13	2.975	2.870	0.068211	2.608	3.131	0.104743	0.085411	1.226	**	0.037
13	14	2.182	2.392	0.056652	2.175	2.609	-.209750	0.070976	-2.955	*****	0.214
14	15	2.664	2.510	0.058423	2.292	2.728	0.153652	0.068487	2.244	****	0.141
15	16	2.139	2.064	0.084547	1.766	2.362	0.075037	0.084940	0.883	*	0.030
16	17	2.483	2.481	0.056435	2.244	2.718	0.001821	0.085254	0.021		0.000
17	18	2.597	2.515	0.066633	2.253	2.777	0.082686	0.088025	0.939	*	0.019
18	20	2.693	2.772	0.057496	2.512	3.031	-.078927	0.098575	-0.801	*	0.008
19	21	2.855	2.755	0.091434	2.431	3.079	0.100442	0.093715	1.072	**	0.042
20	22	2.690	2.636	0.064851	2.381	2.891	0.054672	0.085664	0.638	*	0.009
21	23	2.746	2.735	0.082197	2.470	3.001	0.010940	0.059763	0.183		0.002
22	24	2.386	2.501	0.058824	2.267	2.735	-.114691	0.079697	-1.439	**	0.043
23	25	2.689	2.572	0.057890	2.294	2.850	0.117345	0.109583	1.071	**	0.012
24	26	2.709	2.684	0.069172	2.388	2.979	0.025273	0.107615	0.235		0.001
25	27	2.588	2.558	0.062728	2.283	2.834	0.030103	0.102710	0.293		0.001
26	28	2.623	2.720	0.094432	2.419	3.021	-.097353	0.064407	-1.512	***	0.189
27	29	2.593	2.612	0.078307	2.370	2.854	-.019446	0.044337	-0.439		0.023
28	30	2.333	2.512	0.050067	2.271	2.754	-.179353	0.095515	-1.878	***	0.037
29	31	2.622	2.646	0.062933	2.387	2.905	-.023471	0.091419	-0.257		0.001
30	32	2.440	2.413	0.055541	2.185	2.642	0.026902	0.080788	0.333		0.002
31	33	2.450	2.463	0.120781	2.100	2.826	-.012993	0.052768	-0.246		0.012
32	34	2.720	2.704	0.082635	2.356	3.053	0.015755	0.125766	0.125		0.000
33	35	2.665	2.487	0.065470	2.208	2.767	0.177323	0.101784	1.742	***	0.048
34	36	2.717	2.699	0.073693	2.472	2.927	0.017694	0.041606	0.425		0.022
35	37	2.687	2.723	0.093703	2.405	3.042	-.035960	0.083829	-0.429		0.009
36	38	2.877	2.747	0.051591	2.480	3.013	0.130312	0.109308	1.192	**	0.012
37	39	2.544	2.434	0.059936	2.201	2.666	0.110423	0.076868	1.437	**	0.048
38	40	2.782	2.690	0.062359	2.460	2.920	0.091852	0.071269	1.289	**	0.049
39	41	2.846	2.840	0.110590	2.481	3.198	0.006787	0.082253	0.083		0.000
40	42	2.786	2.853	0.095112	2.540	3.165	-.067218	0.074635	-0.901	*	0.051
41	43	2.615	2.643	0.047789	2.419	2.868	-.028172	0.087637	-0.321		0.001
42	44	2.714	2.672	0.068285	2.410	2.934	0.042460	0.085810	0.495		0.006
43	45	2.750	2.753	0.073246	2.521	2.985	-.003265	0.048228	-0.068		0.000
44	46	2.651	2.690	0.074166	2.443	2.937	-.038819	0.061637	-0.630	*	0.022
45	47	2.390	2.436	0.065389	2.214	2.659	-.046496	0.058726	-0.792	*	0.030
46	48	2.549	2.545	0.069999	2.304	2.785	0.004556	0.065155	0.070		0.000
47	49	2.250	2.154	0.068082	1.910	2.398	0.096387	0.072235	1.334	**	0.061
48	50	2.316	2.453	0.050403	2.235	2.671	-.136498	0.080468	-1.696	***	0.043
49	52	2.630	2.676	0.084640	2.340	3.013	-.046535	0.114599	-0.406		0.003
50	53	2.789	2.658	0.092305	2.305	3.012	0.130508	0.115223	1.133	**	0.032

TEH 0530219

DUP050031131

COMPLETE RECORDS FOR BLOOD_PB, VARIABLES 1-6, 22-30, DAYS_PB, LEAD_WT, & GCUR75

BETWEEN SITE REGRESSION ANALYSES (#31A: 6 ----- WEIGHT = 1 / LBSD2W ** 2

OBS	ID	ACTUAL	PREDICT VALUE	STD ERR PREDICT	LOWER95% PREDICT	UPPER95% PREDICT	RESIDUAL	STD ERR RESIDUAL	STUDENT RESIDUAL	-2-1-0 1 2	COOK'S D
51	54	2.589	2.655	0.099251	2.308	3.002	-.066012	0.097746	-0.675	| *| |	0.018
52	55	2.622	2.688	0.057161	2.441	2.935	-.066200	0.090952	-0.728	| *| |	0.008
53	56	2.432	2.356	0.071325	2.099	2.614	0.075195	0.076665	0.981	| |* |	0.032
54	57	2.618	2.701	0.089335	2.355	3.046	-.083236	0.114171	-0.729	| *| |	0.013
55	58	2.581	2.587	0.067888	2.324	2.851	-.006658	0.087550	-0.076	| | |	0.000
56	59	2.663	2.667	0.070314	2.384	2.950	-.003899	0.097784	-0.040	| | |	0.000
57	60	2.526	2.525	0.063231	2.239	2.810	0.001569	0.108543	0.014	| | |	0.000
58	61	2.374	2.434	0.065713	2.210	2.659	-.060781	0.060005	-1.013	| **| |	0.047
59	62	2.577	2.529	0.055963	2.295	2.763	0.047765	0.083770	0.570	| |* |	0.006
60	63	2.548	2.543	0.055669	2.293	2.793	0.004892	0.094842	0.052	| | |	0.000
61	64	2.414	2.492	0.066499	2.251	2.732	-.077962	0.072098	-1.081	| **| |	0.038

SUM OF RESIDUALS 0.0001939322
SUM OF SQUARED RESIDUALS 0.00028765

TEH 0530220

DUP050031132

Between Site Model F
Untransformed Gas. Lead Exp.
Dep. Var.: Adj. Set 2W

#31A: 6 ----- ALL COMPLETE RECORDS EXCLUDING THE TWO NEW YORK SITES
13:31 SATURDAY, NOVEMBER 19, 1983

COMPLETE RECORDS FOR BLOOD_PB, VARIABLES 1-6, 22-30, DAYS_PB, LEAD_WT, & GCUR75

BETWEEN SITE REGRESSION ANALYSES (#31A: 6 ----- WEIGHT = 1 / LBSD2W ** 2

MODEL: EQ2WLS
DEP VARIABLE: LBPB2W

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F VALUE	PROB>F
MODEL	25	1927.347	77.093886	4.230	0.0001
ERROR	35	637.829	18.223672		
C TOTAL	60	2565.176			

ROOT MSE	4.268919	R-SQUARE	0.7514
DEP MEAN	2.588740	ADJ R-SQ	0.5737
C.V.	164.9033		

VARIABLE	DF	PARAMETER ESTIMATE	STANDARD ERROR	T FOR H0: PARAMETER=0	PROB > |T|	TOLERANCE	VARIANCE INFLATION
INTERCEP	1	2.770099	0.296636	9.338	0.0001	.	0.000000
BLACK	1	0.173542	0.192820	0.900	0.3743	0.233064	4.290663
MALE	1	0.420294	0.547216	0.768	0.4476	0.459465	2.176445
CHILD	1	0.317148	0.329341	0.963	0.3422	0.276791	3.612828
TEEN	1	1.352924	0.603306	2.243	0.0314	0.457025	2.188065
INCOME	1	0.559267	0.223970	2.497	0.0174	0.254175	3.934295
BL_MA	1	6.508199	4.629017	1.406	0.1686	0.402007	2.487520
BL_CH	1	-0.396820	1.329117	-0.299	0.7670	0.393922	2.538574
BL_TN	1	-1.201838	3.221401	-0.373	0.7113	0.425613	2.349553
BL_IN	1	1.783311	1.258267	1.417	0.1652	0.470758	2.124231
MA_CH	1	-12.911995	5.175785	-2.495	0.0175	0.624883	1.600299
MA_TN	1	1.769070	13.685196	0.129	0.8979	0.526447	1.899527
MA_IN	1	0.458407	3.420938	0.134	0.8942	0.583234	1.714577
CH_IN	1	0.150592	2.324243	0.065	0.9487	0.371059	2.694992
TN_IN	1	-2.887989	4.690158	-0.616	0.5420	0.372316	2.685889
URBAN	1	0.123546	0.096559	1.279	0.2091	0.122984	8.131171
CC	1	-0.081602	0.117194	-0.696	0.4908	0.155200	6.443291
WINTER	1	-0.119159	0.065771	-1.812	0.0786	0.332545	3.007108
SPRING	1	0.007441736	0.069180	0.108	0.9150	0.274850	3.638345
SUMMER	1	0.061506	0.061582	0.999	0.3248	0.301214	3.319900
SOUTH	1	-0.070287	0.089459	-0.786	0.4373	0.130019	7.691212
WEST	1	0.127281	0.070676	1.801	0.0803	0.226658	4.411942
NORTEAST	1	0.087371	0.055901	1.563	0.1271	0.435887	2.294172
LEAD_WT	1	-6.26851E-07	.00000668201	-0.094	0.9258	0.225575	4.433113
GCUR75	1	1592.349	2157.682	0.738	0.4654	0.001143	874.581270
GLAG275	1	-1307.139	2144.173	-0.610	0.5460	0.001128	886.693689

TEH 0530221

DUP050031133

#31A: 6 ----- ALL COMPLETE RECORDS EXCLUDING THE TWO NEW YORK SITES

13:31 SATURDAY, NOVEMBER 19, 1983

COMPLETE RECORDS FOR BLOOD_PB, VARIABLES 1-6, 22-30, DAYS_PB, LEAD_WT, & GCUR75

BETWEEN SITE REGRESSION ANALYSES (#31A: 6 ----- WEIGHT = 1 / LBSD2W ** 2

OBS	ID	ACTUAL	PREDICT VALUE	STD ERR PREDICT	LOWER95% PREDICT	UPPER95% PREDICT	RESIDUAL	STD ERR RESIDUAL	STUDENT RESIDUAL	-2-1-0 1 2		COOK'S D
1	1	2.745	2.802	0.107130	2.475	3.130	-.057660	0.056109	-1.028	**		0.148
2	3	2.778	2.792	0.101614	2.483	3.101	-.014436	0.050713	-0.285			0.013
3	4	2.603	2.583	0.059075	2.344	2.822	0.019683	0.083122	0.237			0.001
4	5	2.799	2.812	0.101941	2.491	3.133	-.012972	0.065023	-0.200			0.004
5	6	2.716	2.636	0.064482	2.362	2.911	0.080327	0.099772	0.805		*	0.010
6	7	2.771	2.686	0.064068	2.455	2.918	0.084718	0.068979	1.228		**	0.050
7	8	2.463	2.511	0.065346	2.228	2.793	-.047607	0.103924	-0.458			0.003
8	9	2.706	2.648	0.064103	2.341	2.955	0.058523	0.120882	0.484			0.003
9	10	2.428	2.495	0.071214	2.212	2.779	-.067134	0.096637	-0.695	*		0.010
10	11	2.540	2.644	0.073725	2.350	2.937	-.103527	0.100020	-1.035	**		0.022
11	12	2.476	2.539	0.060740	2.275	2.804	-.062843	0.098048	-0.641	*		0.006
12	13	2.975	2.925	0.094642	2.623	3.227	0.049813	0.064818	0.769		*	0.048
13	14	2.182	2.434	0.056852	2.209	2.660	-.252045	0.076490	-3.295	******		0.231
14	15	2.664	2.531	0.060980	2.302	2.759	0.133294	0.072154	1.847		***	0.094
15	16	2.139	2.085	0.088660	1.772	2.397	0.054542	0.089206	0.611		*	0.014
16	17	2.483	2.415	0.050732	2.174	2.656	0.067833	0.094544	0.717		*	0.006
17	18	2.597	2.502	0.069163	2.228	2.776	0.095861	0.092950	1.031		**	0.023
18	20	2.693	2.714	0.070596	2.432	2.996	-.020896	0.096740	-0.216			0.001
19	21	2.855	2.834	0.099328	2.489	3.178	0.021713	0.094941	0.229			0.002
20	22	2.690	2.612	0.069387	2.344	2.881	0.078203	0.088877	0.880		*	0.018
21	23	2.746	2.724	0.066632	2.468	2.979	0.022438	0.083274	0.269			0.002
22	24	2.386	2.482	0.065048	2.233	2.731	-.095914	0.081086	-1.183	**		0.035
23	25	2.689	2.523	0.062220	2.231	2.816	0.165924	0.114213	1.453		**	0.024
24	26	2.709	2.616	0.069368	2.309	2.923	0.092566	0.114943	0.805		*	0.009
25	27	2.588	2.541	0.066612	2.251	2.831	0.047307	0.107306	0.441			0.003
26	28	2.623	2.688	0.099170	2.372	3.004	-.065070	0.067490	-0.964	*		0.077
27	29	2.593	2.656	0.080837	2.403	2.908	-.062779	0.048824	-1.286	**		0.174
28	30	2.333	2.563	0.046523	2.315	2.812	-.230472	0.103169	-2.234	****		0.039
29	31	2.622	2.635	0.067345	2.362	2.908	-.012960	0.095030	-0.136			0.000
30	32	2.440	2.405	0.059627	2.163	2.646	0.035705	0.083845	0.426			0.004
31	33	2.450	2.513	0.130745	2.127	2.899	-.062789	0.045151	-1.391	**		0.624
32	34	2.720	2.683	0.087287	2.317	3.050	0.036843	0.131609	0.280			0.001
33	35	2.665	2.438	0.064667	2.149	2.727	0.226708	0.109309	2.074		****	0.058
34	36	2.717	2.713	0.076714	2.475	2.951	0.003897	0.044747	0.087			0.001
35	37	2.687	2.716	0.099693	2.381	3.052	-.028885	0.086432	-0.334			0.006
36	38	2.877	2.742	0.055513	2.461	3.023	0.134960	0.114054	1.183		**	0.013
37	39	2.544	2.483	0.059968	2.243	2.724	0.060704	0.082870	0.733		*	0.011
38	40	2.782	2.685	0.064138	2.445	2.925	0.096927	0.075913	1.277		**	0.045
39	41	2.846	2.788	0.115210	2.412	3.163	0.058585	0.087449	0.670		*	0.030
40	42	2.786	2.818	0.093368	2.499	3.138	-.032933	0.085907	-0.383			0.007
41	43	2.615	2.584	0.051789	2.346	2.821	0.031620	0.091058	0.347			0.002
42	44	2.714	2.655	0.071699	2.380	2.930	0.059160	0.090022	0.657		*	0.011
43	45	2.750	2.764	0.076698	2.521	3.007	-.013679	0.050868	-0.269			0.006
44	46	2.651	2.657	0.081371	2.393	2.920	-.005717	0.060174	-0.095			0.001
45	47	2.390	2.402	0.066390	2.171	2.633	-.012345	0.064028	-0.193			0.002
46	48	2.549	2.562	0.072643	2.310	2.813	-.012259	0.069244	-0.177			0.001
47	49	2.250	2.182	0.069941	1.927	2.437	0.068403	0.077199	0.886		*	0.025
48	50	2.316	2.415	0.043478	2.194	2.635	-.098388	0.089660	-1.097	**		0.011
49	52	2.630	2.767	0.108502	2.392	3.142	-.137462	0.102863	-1.336	**		0.076
50	53	2.789	2.658	0.098275	2.286	3.030	0.130549	0.119780	1.090		**	0.031

TEH 0530222

DUP050031134

COMPLETE RECORDS FOR BLOOD_PB, VARIABLES 1-6, 22-30, DAYS_PB, LEAD_WT, & GCUR75

BETWEEN SITE REGRESSION ANALYSES (#31A: 6 ----- WEIGHT = 1 / LBSD2W ** 2

OBS	ID	ACTUAL	PREDICT VALUE	STD ERR PREDICT	LOWER95% PREDICT	UPPER95% PREDICT	RESIDUAL	STD ERR RESIDUAL	STUDENT RESIDUAL	-2-1-0 1 2	COOK'S D
51	54	2.589	2.661	0.104878	2.296	3.027	-.072206	0.101842	-0.709	| *| |	0.021
52	55	2.622	2.716	0.058042	2.459	2.974	-.094342	0.096643	-0.976	| *| |	0.013
53	56	2.432	2.466	0.067074	2.204	2.727	-.034214	0.087046	-0.393	| | |	0.004
54	57	2.618	2.677	0.093647	2.314	3.040	-.059422	0.119898	-0.496	| | |	0.006
55	58	2.581	2.540	0.071119	2.263	2.816	0.040934	0.091975	0.445	| | |	0.005
56	59	2.663	2.702	0.066676	2.412	2.992	-.039083	0.107377	-0.364	| | |	0.002
57	60	2.526	2.457	0.061524	2.162	2.753	0.068794	0.116591	0.590	| |* |	0.004
58	61	2.374	2.468	0.071653	2.229	2.707	-.094280	0.059891	-1.574	| ***| |	0.136
59	62	2.577	2.573	0.059066	2.328	2.819	0.003471	0.087686	0.040	| | |	0.000
60	63	2.548	2.523	0.061426	2.258	2.789	0.024642	0.097705	0.252	| | |	0.001
61	64	2.414	2.477	0.069964	2.224	2.730	-.063146	0.075499	-0.836	| *| |	0.023

SUM OF RESIDUALS 0.0002757459
SUM OF SQUARED RESIDUALS 0.0003465913

TEH 0530223

DUP050031135

Between Site Model F
Transformed Gas. Lead Exp.
Dep. Var.: Adj. Set 2W

COMPLETE RECORDS FOR BLOOD_PB, VARIABLES 1-6, 22-30, DAYS_PB, LEAD_WT, & GCUR75

BETWEEN SITE REGRESSION ANALYSES (#31A: 6 ----- WEIGHT = 1 / LBSD2W ** 2

MODEL: EQ2WRS
DEP VARIABLE: LBPB2W

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F VALUE	PROB>F
MODEL	25	1987.772	79.510869	4.820	0.0001
ERROR	35	577.404	16.497256		
C TOTAL	60	2565.176			

ROOT MSE	4.061681	R-SQUARE	0.7749
DEP MEAN	2.588740	ADJ R-SQ	0.6141
C.V.	156.898		

VARIABLE	DF	PARAMETER ESTIMATE	STANDARD ERROR	T FOR H0: PARAMETER=0	PROB > |T|	TOLERANCE	VARIANCE INFLATION
INTERCEP	1	-6.514876	4.392675	-1.483	0.1470	.	0.000000
BLACK	1	0.130382	0.169803	0.768	0.4477	0.272061	3.675645
MALE	1	0.361235	0.485537	0.744	0.4618	0.528325	1.892774
CHILD	1	0.178640	0.328608	0.544	0.5901	0.251688	3.973166
TEEN	1	1.044395	0.592729	1.762	0.0868	0.428627	2.333031
INCOME	1	0.456327	0.203431	2.243	0.0313	0.278906	3.585443
BL_MA	1	5.398161	3.939127	1.370	0.1793	0.502559	1.989817
BL_CH	1	0.706488	1.258754	0.561	0.5782	0.397586	2.515180
BL_TN	1	-1.481053	2.880026	-0.514	0.6103	0.482045	2.074496
BL_IN	1	1.782434	1.190616	1.497	0.1433	0.475966	2.100989
MA_CH	1	-6.536067	5.188905	-1.260	0.2161	0.562828	1.776742
MA_TN	1	7.771746	13.013959	0.597	0.5542	0.527003	1.897521
MA_IN	1	-0.412529	3.230825	-0.128	0.8991	0.591946	1.689342
CH_IN	1	-0.705802	2.205267	-0.320	0.7508	0.373129	2.680038
TN_IN	1	1.021831	4.582834	0.223	0.8249	0.353016	2.832733
URBAN	1	0.039185	0.103847	0.377	0.7082	0.096254	10.389133
CC	1	-0.084170	0.106555	-0.790	0.4349	0.169954	5.883937
WINTER	1	-0.142889	0.062797	-2.275	0.0291	0.330233	3.028161
SPRING	1	-0.093256	0.078473	-1.188	0.2427	0.193374	5.171319
SUMMER	1	-0.026025	0.069654	-0.374	0.7109	0.213140	4.691744
SOUTH	1	-0.077957	0.077166	-1.010	0.3193	0.158190	6.321520
WEST	1	0.092074	0.075309	1.223	0.2296	0.180719	5.533463
NORTEAST	1	0.036853	0.056142	0.656	0.5158	0.391214	2.556144
LEAD_WT	1	-.0000017021	.00000640947	-0.266	0.7921	0.221941	4.505702
L_GCUR75	1	2.208667	1.010542	2.186	0.0356	0.000368	2719.523288
LGLAG275	1	-2.093471	1.009998	-2.073	0.0456	0.000369	2709.267559

TEH 0530224

DUP050031136

COMPLETE RECORDS FOR BLOOD_PB, VARIABLES 1-6, 22-30, DAYS_PB, LEAD_WT, & GCUR75

BETWEEN SITE REGRESSION ANALYSES (#31A: 6 ----- WEIGHT = 1 / LBSD2W ** 2

OBS	ID	ACTUAL	PREDICT VALUE	STD ERR PREDICT	LOWER95% PREDICT	UPPER95% PREDICT	RESIDUAL	STD ERR RESIDUAL	STUDENT RESIDUAL	-2-1-0 1 2	COOK'S D
1	1	2.745	2.745	0.102194	2.432	3.057	3.2E-05	0.052877	0.001	|	0.000
2	3	2.778	2.814	0.095263	2.522	3.107	-.036531	0.050994	-0.716	*|	0.069
3	4	2.603	2.638	0.066893	2.399	2.877	-.035298	0.070280	-0.502	*|	0.009
4	5	2.799	2.754	0.084617	2.464	3.043	0.045619	0.077941	0.585	|*	0.016
5	6	2.716	2.674	0.062795	2.411	2.936	0.042821	0.093980	0.456	|	0.004
6	7	2.771	2.666	0.058946	2.446	2.884	0.105217	0.067443	1.560	|***	0.072
7	8	2.463	2.486	0.061965	2.217	2.754	-.022654	0.099010	-0.229	|	0.001
8	9	2.706	2.695	0.062651	2.402	2.988	0.011562	0.114118	0.101	|	0.000
9	10	2.428	2.433	0.070702	2.161	2.706	-.005057	0.089700	-0.056	|	0.000
10	11	2.540	2.657	0.069864	2.378	2.936	-.117017	0.095372	-1.227	**|	0.031
11	12	2.476	2.590	0.052679	2.343	2.838	-.114015	0.096268	-1.184	**|	0.016
12	13	2.975	2.871	0.068162	2.610	3.132	0.103862	0.085240	1.218	|**	0.037
13	14	2.182	2.387	0.057300	2.170	2.605	-.204898	0.070279	-2.916	*****|	0.217
14	15	2.664	2.508	0.058470	2.290	2.725	0.156255	0.068268	2.289	|****	0.148
15	16	2.139	2.069	0.084299	1.772	2.366	0.070569	0.084932	0.831	|*	0.026
16	17	2.483	2.472	0.053952	2.238	2.706	0.010685	0.086665	0.123	|	0.000
17	18	2.597	2.521	0.066311	2.260	2.782	0.076789	0.088059	0.872	|*	0.017
18	20	2.693	2.774	0.057613	2.514	3.033	-.080780	0.098308	-0.822	*|	0.009
19	21	2.855	2.754	0.091326	2.430	3.078	0.101388	0.093545	1.084	|**	0.043
20	22	2.690	2.623	0.064509	2.369	2.877	0.067466	0.085720	0.787	|*	0.013
21	23	2.746	2.737	0.081596	2.473	3.002	0.008928	0.060323	0.148	|	0.002
22	24	2.386	2.502	0.058734	2.268	2.735	-.115773	0.079578	-1.455	**|	0.044
23	25	2.689	2.571	0.057728	2.294	2.848	0.118268	0.109457	1.081	|**	0.012
24	26	2.709	2.686	0.069305	2.391	2.981	0.023236	0.107300	0.217	|	0.001
25	27	2.588	2.557	0.062702	2.282	2.832	0.031140	0.102513	0.304	|	0.001
26	28	2.623	2.717	0.094312	2.416	3.018	-.093874	0.064278	-1.460	**|	0.177
27	29	2.593	2.615	0.077989	2.373	2.856	-.022068	0.044624	-0.495	|	0.029
28	30	2.333	2.516	0.049030	2.276	2.756	-.182994	0.095869	-1.909	***|	0.037
29	31	2.622	2.645	0.062855	2.386	2.904	-.022875	0.091269	-0.251	|	0.001
30	32	2.440	2.417	0.055518	2.188	2.645	0.023808	0.080625	0.295	|	0.002
31	33	2.450	2.460	0.120753	2.097	2.822	-.009545	0.052336	-0.182	|	0.007
32	34	2.720	2.697	0.081579	2.350	3.044	0.022939	0.126183	0.182	|	0.001
33	35	2.665	2.498	0.066584	2.218	2.778	0.166670	0.100840	1.653	|***	0.046
34	36	2.717	2.696	0.073676	2.469	2.924	0.020637	0.041376	0.499	|	0.030
35	37	2.687	2.727	0.093576	2.410	3.045	-.040085	0.083686	-0.479	|	0.011
36	38	2.877	2.745	0.051560	2.479	3.011	0.131828	0.109121	1.208	|**	0.013
37	39	2.544	2.429	0.060149	2.197	2.661	0.115232	0.076514	1.506	|***	0.054
38	40	2.782	2.692	0.062483	2.462	2.922	0.089794	0.070969	1.265	|**	0.048
39	41	2.846	2.834	0.110480	2.475	3.192	0.012680	0.082054	0.155	|	0.002
40	42	2.786	2.857	0.095637	2.545	3.170	-.071958	0.073663	-0.977	*|	0.062
41	43	2.615	2.638	0.047066	2.414	2.862	-.022899	0.087857	-0.261	|	0.001
42	44	2.714	2.685	0.069327	2.422	2.948	0.028992	0.084757	0.342	|	0.003
43	45	2.750	2.749	0.073313	2.517	2.980	0.001545	0.047885	0.032	|	0.000
44	46	2.651	2.694	0.074148	2.448	2.941	-.043541	0.061432	-0.709	*|	0.028
45	47	2.390	2.435	0.065096	2.213	2.657	-.045256	0.058853	-0.769	*|	0.028
46	48	2.549	2.546	0.069693	2.306	2.786	0.003586	0.065272	0.055	|	0.000
47	49	2.250	2.158	0.067454	1.915	2.401	0.092533	0.072618	1.274	|**	0.054
48	50	2.316	2.447	0.048644	2.231	2.664	-.130993	0.081377	-1.610	***|	0.036
49	52	2.630	2.681	0.084750	2.345	3.017	-.051365	0.114250	-0.450	|	0.004
50	53	2.789	2.656	0.092193	2.303	3.009	0.132938	0.115029	1.156	|**	0.033

TEH 0530225

DUP050031137

COMPLETE RECORDS FOR BLOOD_PB, VARIABLES 1-6, 22-30, DAYS_PB, LEAD_WT, & GCUR75

BETWEEN SITE REGRESSION ANALYSES (#31A: 6 ----- WEIGHT = 1 / LBSD2W ** 2

OBS	ID	ACTUAL	PREDICT VALUE	STD ERR PREDICT	LOWER95% PREDICT	UPPER95% PREDICT	RESIDUAL	STD ERR RESIDUAL	STUDENT RESIDUAL	-2-1-0 1 2	COOK'S D
51	54	2.589	2.654	0.099117	2.308	3.001	-.065140	0.097583	-0.668	| *| |	0.018
52	55	2.622	2.700	0.056543	2.454	2.946	-.078092	0.091147	-0.857	| *| |	0.011
53	56	2.432	2.357	0.071160	2.100	2.613	0.075062	0.076604	0.980	| |* |	0.032
54	57	2.618	2.705	0.089428	2.359	3.050	-.086963	0.113821	-0.764	| *| |	0.014
55	58	2.581	2.579	0.067079	2.317	2.842	0.001320	0.087961	0.015	| | |	0.000
56	59	2.663	2.660	0.071456	2.376	2.944	0.002996	0.096727	0.031	| | |	0.000
57	60	2.526	2.513	0.060951	2.230	2.796	0.013427	0.109624	0.122	| | |	0.000
58	61	2.374	2.444	0.065875	2.219	2.668	-.070213	0.059628	-1.178	| **| |	0.065
59	62	2.577	2.521	0.056691	2.287	2.756	0.055441	0.083095	0.667	| |* |	0.008
60	63	2.548	2.548	0.055715	2.298	2.798	-2.8E-04	0.094623	-0.003	| | |	0.000
61	64	2.414	2.492	0.066399	2.251	2.732	-.077876	0.071989	-1.082	| **| |	0.038

SUM OF RESIDUALS 0.0001861707
SUM OF SQUARED RESIDUALS 0.0002876435

TEH 0530226

DUP050031138

COMPLETE RECORDS FOR BLOOD_PB, VARIABLES 1-6, 22-30, DAYS_PB, LEAD_WT, & GCUR75

BETWEEN SITE REGRESSION ANALYSES (#31A: 6 ----- WEIGHT = 1 / LBSD2W ** 2

Between Site Model G
Untransformed Gas. Lead Exp.
Dep. Var.: Adj. Set 2W

MODEL: EQ2WMS
DEP VARIABLE: LBPB2W

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F VALUE	PROB>F
MODEL	25	1926.970	77.078819	4.227	0.0001
ERROR	35	638.205	18.234434		
C TOTAL	60	2565.176			

ROOT MSE	4.270180	R-SQUARE	0.7512
DEP MEAN	2.588740	ADJ R-SQ	0.5735
C.V.	164.952		

VARIABLE	DF	PARAMETER ESTIMATE	STANDARD ERROR	T FOR H0: PARAMETER=0	PROB > |T|	TOLERANCE	VARIANCE INFLATION
INTERCEP	1	2.717576	0.216811	12.534	0.0001	.	0.000000
BLACK	1	0.178852	0.195894	0.913	0.3675	0.225940	4.425947
MALE	1	0.422645	0.548199	0.771	0.4459	0.458090	2.182979
CHILD	1	0.315245	0.330051	0.955	0.3461	0.275764	3.626283
TEEN	1	1.347555	0.602887	2.235	0.0319	0.457931	2.183736
INCOME	1	0.552726	0.221269	2.498	0.0173	0.260573	3.837690
BL_MA	1	6.526857	4.649223	1.404	0.1692	0.398755	2.507803
BL_CH	1	-0.360834	1.316394	-0.274	0.7856	0.401811	2.488735
BL_TN	1	-1.208914	3.239327	-0.373	0.7113	0.421164	2.374372
BL_IN	1	1.770810	1.261267	1.404	0.1691	0.468798	2.133116
MA_CH	1	-12.973521	5.188864	-2.500	0.0172	0.622104	1.607447
MA_TN	1	1.802229	13.689346	0.132	0.8960	0.526438	1.899558
MA_IN	1	0.473150	3.421966	0.138	0.8908	0.583228	1.714595
CH_IN	1	0.129248	2.320740	0.056	0.9559	0.372399	2.685289
TN_IN	1	-2.962487	4.684785	-0.632	0.5313	0.373391	2.678157
URBAN	1	0.127191	0.094908	1.340	0.1888	0.127376	7.850802
CC	1	-0.083805	0.116489	-0.719	0.4767	0.157177	6.362243
WINTER	1	-0.118666	0.065914	-1.800	0.0804	0.331300	3.018415
SPRING	1	0.009268071	0.068283	0.136	0.8928	0.282287	3.542500
SUMMER	1	0.063032	0.061045	1.033	0.3089	0.306720	3.260298
SOUTH	1	-0.067148	0.087943	-0.764	0.4503	0.134619	7.428351
WEST	1	0.129241	0.070718	1.828	0.0762	0.226522	4.414573
NORTEAST	1	0.089074	0.055501	1.605	0.1175	0.442447	2.260160
LEAD_WT	1	-7.70184E-07	.00000664913	-0.116	0.9084	0.227946	4.387006
GCUR75	1	1200.440	1560.638	0.769	0.4469	0.002187	457.270235
GLAG375	1	-927.870	1566.676	-0.592	0.5575	0.002124	470.867051

TEH 0530227

DUP050031139

COMPLETE RECORDS FOR BLOOD_PB, VARIABLES 1-6, 22-30, DAYS_PB, LEAD_WT, & GCUR75

BETWEEN SITE REGRESSION ANALYSES (#31A: 6 ----- WEIGHT = 1 / LBSD2W ** 2

OBS	ID	ACTUAL	PREDICT VALUE	STD ERR PREDICT	LOWER95% PREDICT	UPPER95% PREDICT	RESIDUAL	STD ERR RESIDUAL	STUDENT RESIDUAL	-2-1-0 1 2	COOK'S D
1	1	2.745	2.804	0.106957	2.476	3.131	-.058709	0.056516	-1.039	**|	0.149
2	3	2.778	2.791	0.101881	2.481	3.101	-.013301	0.050250	-0.265	|	0.011
3	4	2.603	2.582	0.059442	2.343	2.822	0.020232	0.082897	0.244	|	0.001
4	5	2.799	2.811	0.101449	2.490	3.131	-.011493	0.065853	-0.175	|	0.003
5	6	2.716	2.638	0.065132	2.363	2.913	0.078211	0.099391	0.787	|*	0.010
6	7	2.771	2.686	0.064044	2.455	2.917	0.085107	0.069039	1.233	|**	0.050
7	8	2.463	2.511	0.065314	2.229	2.793	-.048017	0.103987	-0.462	|	0.003
8	9	2.706	2.647	0.063768	2.340	2.953	0.059586	0.121105	0.492	|	0.003
9	10	2.428	2.496	0.071468	2.212	2.779	-.067424	0.096493	-0.699	*|	0.010
10	11	2.540	2.645	0.073570	2.352	2.938	-.104954	0.100179	-1.048	**|	0.023
11	12	2.476	2.540	0.060994	2.275	2.805	-.063261	0.097931	-0.646	*|	0.006
12	13	2.975	2.928	0.093777	2.627	3.229	0.046454	0.066122	0.703	|*	0.038
13	14	2.182	2.434	0.057014	2.208	2.659	-.251378	0.076404	-3.290	******|	0.232
14	15	2.664	2.530	0.060948	2.301	2.758	0.134264	0.072218	1.859	|***	0.095
15	16	2.139	2.084	0.088634	1.772	2.396	0.055175	0.089285	0.618	|*	0.014
16	17	2.483	2.415	0.050804	2.174	2.656	0.067809	0.094541	0.717	|*	0.006
17	18	2.597	2.501	0.068908	2.227	2.774	0.096930	0.093182	1.040	|**	0.023
18	20	2.693	2.713	0.070705	2.431	2.996	-.020478	0.096705	-0.212	|	0.001
19	21	2.855	2.832	0.098939	2.488	3.175	0.023649	0.095404	0.248	|	0.003
20	22	2.690	2.612	0.069640	2.343	2.881	0.078573	0.088721	0.886	|*	0.019
21	23	2.746	2.725	0.066305	2.470	2.980	0.021131	0.083574	0.253	|	0.002
22	24	2.386	2.483	0.064764	2.234	2.732	-.096844	0.081352	-1.190	**|	0.035
23	25	2.689	2.523	0.062810	2.229	2.816	0.166653	0.113933	1.463	|**	0.025
24	26	2.709	2.616	0.069210	2.309	2.922	0.093299	0.115085	0.811	|*	0.009
25	27	2.588	2.541	0.066731	2.251	2.831	0.047044	0.107276	0.439	|	0.003
26	28	2.623	2.686	0.099514	2.370	3.003	-.063274	0.067044	-0.944	*|	0.075
27	29	2.593	2.656	0.080757	2.404	2.909	-.063415	0.049010	-1.294	**|	0.175
28	30	2.333	2.564	0.046625	2.315	2.812	-.230765	0.103159	-2.237	****|	0.039
29	31	2.622	2.636	0.067141	2.363	2.909	-.013896	0.095216	-0.146	|	0.000
30	32	2.440	2.404	0.059808	2.163	2.646	0.035918	0.083754	0.429	|	0.004
31	33	2.450	2.513	0.131037	2.126	2.900	-.062496	0.044425	-1.407	**|	0.662
32	34	2.720	2.681	0.086365	2.315	3.046	0.039526	0.132272	0.299	|	0.001
33	35	2.665	2.438	0.064658	2.148	2.727	0.227042	0.109357	2.076	|****	0.058
34	36	2.717	2.713	0.076735	2.475	2.952	0.003823	0.044762	0.085	|	0.001
35	37	2.687	2.717	0.099460	2.382	3.053	-.030136	0.086759	-0.347	|	0.006
36	38	2.877	2.743	0.055196	2.462	3.024	0.133444	0.114250	1.168	|**	0.012
37	39	2.544	2.483	0.060227	2.242	2.724	0.061543	0.082720	0.744	|*	0.011
38	40	2.782	2.685	0.064157	2.444	2.925	0.096892	0.075936	1.276	|**	0.045
39	41	2.846	2.787	0.115600	2.411	3.163	0.059420	0.087003	0.683	|*	0.032
40	42	2.786	2.819	0.093498	2.499	3.139	-.033090	0.085821	-0.386	|	0.007
41	43	2.615	2.584	0.051669	2.347	2.821	0.031012	0.091161	0.340	|	0.001
42	44	2.714	2.656	0.072044	2.380	2.931	0.058497	0.089790	0.651	|*	0.011
43	45	2.750	2.762	0.076828	2.518	3.005	-.011516	0.050722	-0.227	|	0.005
44	46	2.651	2.657	0.081695	2.393	2.921	-.006167	0.059783	-0.103	|	0.001
45	47	2.390	2.403	0.066443	2.172	2.633	-.012902	0.064012	-0.202	|	0.002
46	48	2.549	2.563	0.072445	2.311	2.814	-.013175	0.069494	-0.190	|	0.002
47	49	2.250	2.184	0.070072	1.929	2.439	0.066438	0.077122	0.861	|*	0.024
48	50	2.316	2.415	0.043499	2.194	2.636	-.098387	0.089682	-1.097	**|	0.011
49	52	2.630	2.766	0.108449	2.391	3.141	-.136569	0.102983	-1.326	**|	0.075
50	53	2.789	2.659	0.098548	2.286	3.032	0.129267	0.119615	1.081	|**	0.030

TEH 0530228

DUP050031140

#31A: 6 ----- ALL COMPLETE RECORDS EXCLUDING THE TWO NEW YORK SITES 228
13:31 SATURDAY, NOVEMBER 19, 1983

COMPLETE RECORDS FOR BLOOD_PB, VARIABLES 1-6, 22-30, DAYS_PB, LEAD_WT, & GCUR75

BETWEEN SITE REGRESSION ANALYSES (#31A: 6 ----- WEIGHT = 1 / LBSD2W ** 2

OBS	ID	ACTUAL	PREDICT VALUE	STD ERR PREDICT	LOWER95% PREDICT	UPPER95% PREDICT	RESIDUAL	STD ERR RESIDUAL	STUDENT RESIDUAL	-2-1-0 1 2	COOK'S D
51	54	2.589	2.661	0.104995	2.296	3.027	-.072085	0.101784	-0.708	| *| |	0.021
52	55	2.622	2.718	0.057979	2.460	2.975	-.095637	0.096720	-0.989	| *| |	0.014
53	56	2.432	2.466	0.067110	2.205	2.728	-.034462	0.087059	-0.396	| | |	0.004
54	57	2.618	2.677	0.093636	2.314	3.039	-.059028	0.119964	-0.492	| | |	0.006
55	58	2.581	2.539	0.071353	2.262	2.816	0.041874	0.091837	0.456	| | |	0.005
56	59	2.663	2.701	0.066877	2.411	2.992	-.037929	0.107296	-0.353	| | |	0.002
57	60	2.526	2.457	0.061443	2.162	2.752	0.069300	0.116678	0.594	| |* |	0.004
58	61	2.374	2.468	0.071742	2.229	2.707	-.094145	0.059827	-1.574	| ***| |	0.137
59	62	2.577	2.573	0.059038	2.327	2.819	0.003898	0.087742	0.044	| | |	0.000
60	63	2.548	2.523	0.061602	2.258	2.789	0.024625	0.097635	0.252	| | |	0.001
61	64	2.414	2.476	0.070056	2.224	2.729	-.062689	0.075455	-0.831	| *| |	0.023

SUM OF RESIDUALS 0.0002799136
SUM OF SQUARED RESIDUALS 0.0003467388

COMPLETE RECORDS FOR BLOOD_PB, VARIABLES 1-6, 22-30, DAYS_PB, LEAD_WT, & GCUR75

BETWEEN SITE REGRESSION ANALYSES (#31A: 6 ----- WEIGHT = 1 / LBSD2W ** 2

MODEL: EQ2WSS
DEP VARIABLE: LBPB2W

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F VALUE	PROB>F
MODEL	25	1990.200	79.608000	4.846	0.0001
ERROR	35	574.976	16.427877		
C TOTAL	60	2565.176			

ROOT MSE	4.053132	R-SQUARE	0.7759
DEP MEAN	2.588740	ADJ R-SQ	0.6157
C.V.	156.5677		

VARIABLE	DF	PARAMETER ESTIMATE	STANDARD ERROR	T FOR H0: PARAMETER=0	PROB > |T|	TOLERANCE	VARIANCE INFLATION
INTERCEP	1	-4.823040	3.509316	-1.374	0.1781	.	0.000000
BLACK	1	0.124060	0.169947	0.730	0.4703	0.270456	3.697454
MALE	1	0.354711	0.484804	0.732	0.4692	0.527694	1.895036
CHILD	1	0.135796	0.330353	0.411	0.6835	0.247990	4.032427
TEEN	1	1.057854	0.589378	1.795	0.0813	0.431691	2.316472
INCOME	1	0.449950	0.203390	2.212	0.0336	0.277843	3.599153
BL_MA	1	4.967508	3.980735	1.248	0.2204	0.490038	2.040656
BL_CH	1	0.852628	1.271357	0.671	0.5068	0.388103	2.576637
BL_TN	1	-1.726601	2.891787	-0.597	0.5543	0.476121	2.100306
BL_IN	1	1.776806	1.188050	1.496	0.1437	0.476014	2.100777
MA_CH	1	-6.388533	5.191472	-1.231	0.2267	0.559907	1.786011
MA_TN	1	7.909390	12.991192	0.609	0.5466	0.526628	1.898873
MA_IN	1	-0.298945	3.224876	-0.093	0.9267	0.591634	1.690235
CH_IN	1	-0.685150	2.200030	-0.311	0.7573	0.373331	2.678589
TN_IN	1	1.341211	4.602674	0.291	0.7725	0.348507	2.869380
URBAN	1	0.033650	0.104092	0.323	0.7484	0.095398	10.482356
CC	1	-0.083096	0.106353	-0.781	0.4399	0.169882	5.886426
WINTER	1	-0.134503	0.062804	-2.142	0.0393	0.328766	3.041673
SPRING	1	-0.094012	0.078012	-1.205	0.2362	0.194844	5.132323
SUMMER	1	-0.030534	0.070374	-0.434	0.6670	0.207922	4.809491
SOUTH	1	-0.069506	0.077024	-0.902	0.3730	0.158103	6.325003
WEST	1	0.094554	0.074580	1.268	0.2132	0.183491	5.449858
NORTEAST	1	0.034308	0.056310	0.609	0.5463	0.387247	2.582331
LEAD_WT	1	-.0000024157	.00000637794	-0.379	0.7072	0.223198	4.480323
L_GCUR75	1	1.824318	0.809989	2.252	0.0307	0.000570	1754.575874
LGLAG375	1	-1.704645	0.806970	-2.112	0.0419	0.000577	1734.042739

Between Site Model G
Transformed Gas. Lead Exp.
Dep. Var.: Adj. Set 2W

TEH 0530230

DUP050031142

COMPLETE RECORDS FOR BLOOD_PB, VARIABLES 1-6, 22-30, DAYS_PB, LEAD_WT, & GCUR75

BETWEEN SITE REGRESSION ANALYSES (#31A: 6 ----- WEIGHT = 1 / LBSD2W ** 2

OBS	ID	ACTUAL	PREDICT VALUE	STD ERR PREDICT	LOWER95% PREDICT	UPPER95% PREDICT	RESIDUAL	STD ERR RESIDUAL	STUDENT RESIDUAL	-2-1-0 1 2	COOK'S D
1	1	2.745	2.745	0.101956	2.433	3.057	-3.0E-05	0.052810	-0.001	|	0.000
2	3	2.778	2.808	0.095262	2.516	3.100	-.030003	0.050512	-0.594	*|	0.048
3	4	2.603	2.629	0.067673	2.389	2.869	-.026501	0.069244	-0.383	|	0.005
4	5	2.799	2.762	0.084797	2.472	3.052	0.037395	0.077387	0.483	|	0.011
5	6	2.716	2.692	0.064468	2.428	2.955	0.024912	0.092550	0.269	|	0.001
6	7	2.771	2.667	0.058805	2.449	2.884	0.104579	0.067316	1.554	|***	0.071
7	8	2.463	2.479	0.062215	2.211	2.747	-.016073	0.098563	-0.163	|	0.000
8	9	2.706	2.698	0.062836	2.405	2.991	0.008759	0.113704	0.077	|	0.000
9	10	2.428	2.431	0.070659	2.158	2.703	-.002552	0.089428	-0.029	|	0.000
10	11	2.540	2.670	0.070276	2.391	2.949	-.129586	0.094759	-1.368	**|	0.040
11	12	2.476	2.588	0.052498	2.341	2.834	-.111461	0.096103	-1.160	**|	0.015
12	13	2.975	2.875	0.068533	2.614	3.137	0.099339	0.084647	1.174	|**	0.035
13	14	2.182	2.385	0.057427	2.168	2.603	-.202744	0.069928	-2.899	*****|	0.218
14	15	2.664	2.506	0.058408	2.289	2.724	0.157514	0.068072	2.314	|****	0.152
15	16	2.139	2.073	0.084064	1.776	2.369	0.066599	0.084810	0.785	|*	0.023
16	17	2.483	2.458	0.050789	2.227	2.689	0.024762	0.088308	0.280	|	0.001
17	18	2.597	2.526	0.066084	2.265	2.786	0.071552	0.087940	0.814	|*	0.014
18	20	2.693	2.770	0.056970	2.512	3.029	-.077530	0.098405	-0.788	*|	0.008
19	21	2.855	2.754	0.091102	2.431	3.078	0.100813	0.093380	1.080	|**	0.043
20	22	2.690	2.614	0.064543	2.360	2.868	0.076240	0.085411	0.893	|*	0.018
21	23	2.746	2.743	0.080398	2.480	3.005	0.003399	0.061561	0.055	|	0.000
22	24	2.386	2.502	0.058611	2.269	2.735	-.115900	0.079411	-1.459	**|	0.045
23	25	2.689	2.570	0.057505	2.293	2.846	0.119729	0.109280	1.096	|**	0.013
24	26	2.709	2.685	0.068851	2.390	2.979	0.024302	0.107272	0.227	|	0.001
25	27	2.588	2.557	0.062508	2.283	2.832	0.030921	0.102336	0.302	|	0.001
26	28	2.623	2.713	0.094167	2.413	3.013	-.090166	0.064064	-1.407	**|	0.165
27	29	2.593	2.619	0.077590	2.378	2.859	-.025786	0.044937	-0.574	*|	0.038
28	30	2.333	2.521	0.047812	2.282	2.759	-.187701	0.096229	-1.951	***|	0.036
29	31	2.622	2.646	0.062691	2.388	2.904	-.023633	0.091099	-0.259	|	0.001
30	32	2.440	2.420	0.055497	2.192	2.648	0.020684	0.080389	0.257	|	0.001
31	33	2.450	2.460	0.120469	2.098	2.822	-.009687	0.052295	-0.185	|	0.007
32	34	2.720	2.690	0.080654	2.344	3.036	0.030030	0.126402	0.238	|	0.001
33	35	2.665	2.508	0.067809	2.227	2.789	0.156688	0.099713	1.571	|***	0.044
34	36	2.717	2.693	0.073661	2.466	2.920	0.024183	0.041038	0.589	|*	0.043
35	37	2.687	2.729	0.093391	2.411	3.046	-.041314	0.083497	-0.495	|	0.012
36	38	2.877	2.746	0.051426	2.480	3.011	0.131202	0.108903	1.205	|**	0.012
37	39	2.544	2.422	0.060579	2.190	2.654	0.122113	0.075912	1.609	|***	0.063
38	40	2.782	2.698	0.063155	2.467	2.928	0.083596	0.070105	1.192	|**	0.044
39	41	2.846	2.825	0.110465	2.467	3.182	0.021719	0.081587	0.266	|	0.005
40	42	2.786	2.860	0.095701	2.548	3.173	-.074710	0.073162	-1.021	**|	0.069
41	43	2.615	2.630	0.046299	2.408	2.853	-.015155	0.088026	-0.172	|	0.000
42	44	2.714	2.694	0.070086	2.430	2.957	0.020752	0.083830	0.248	|	0.002
43	45	2.750	2.743	0.073418	2.512	2.975	0.006795	0.047384	0.143	|	0.002
44	46	2.651	2.696	0.074047	2.450	2.943	-.045529	0.061236	-0.743	*|	0.031
45	47	2.390	2.432	0.064540	2.211	2.652	-.041835	0.059190	-0.707	*|	0.023
46	48	2.549	2.550	0.068907	2.312	2.789	-9.4E-04	0.065811	-0.014	|	0.000
47	49	2.250	2.162	0.066811	1.920	2.404	0.088330	0.072928	1.211	|**	0.047
48	50	2.316	2.443	0.047278	2.228	2.658	-.126763	0.081948	-1.547	***|	0.031
49	52	2.630	2.692	0.085315	2.356	3.028	-.062313	0.113455	-0.549	*|	0.007
50	53	2.789	2.650	0.092117	2.297	3.002	0.138711	0.114692	1.209	|**	0.036

COMPLETE RECORDS FOR BLOOD_PB, VARIABLES 1-6, 22-30, DAYS_PB, LEAD_WT, & GCUR75

BETWEEN SITE REGRESSION ANALYSES (#31A: 6 ----- WEIGHT = 1 / LBSD2W ** 2

OBS	ID	ACTUAL	PREDICT VALUE	STD ERR PREDICT	LOWER95% PREDICT	UPPER95% PREDICT	RESIDUAL	STD ERR RESIDUAL	STUDENT RESIDUAL	-2-1-0 1 2	COOK'S D
51	54	2.589	2.654	0.098918	2.308	3.000	-.064542	0.097368	-0.663	| *| |	0.017
52	55	2.622	2.706	0.056380	2.460	2.951	-.083783	0.090982	-0.921	| *| |	0.013
53	56	2.432	2.365	0.070159	2.110	2.621	0.066210	0.077224	0.857	| |* |	0.023
54	57	2.618	2.704	0.089198	2.360	3.049	-.086812	0.113614	-0.764	| *| |	0.014
55	58	2.561	2.568	0.066342	2.306	2.829	0.012967	0.088227	0.147	| | |	0.000
56	59	2.663	2.657	0.071797	2.373	2.941	0.006436	0.096156	0.067	| | |	0.000
57	60	2.526	2.504	0.059502	2.222	2.785	0.022571	0.110117	0.205	| | |	0.000
58	61	2.374	2.449	0.066025	2.225	2.674	-.075902	0.059182	-1.283	| **| |	0.079
59	62	2.577	2.515	0.057380	2.280	2.750	0.062032	0.082363	0.753	| |* |	0.011
60	63	2.548	2.554	0.055849	2.304	2.804	-.005893	0.094275	-0.063	| | |	0.000
61	64	2.414	2.492	0.066260	2.253	2.732	-.078466	0.071838	-1.092	| **| |	0.039

SUM OF RESIDUALS 0.000183402
SUM OF SQUARED RESIDUALS 0.0002890667

APPENDIX 6

Regression Summaries of Corrected Site
Blood Lead Means on Time

From Between Site Models A, E, F, and G
Based on Adjustment Set 2W

#31A: 6 ----- ALL COMPLETE RECORDS EXCLUDING THE TWO NEW YORK SITES 383

13:31 SATURDAY, NOVEMBER 19, 1983

COMPLETE RECORDS FOR BLOOD_PB, VARIABLES 1-6, 22-30, DAYS_PB, LEAD_WT, & GCUR75

BETWEEN SITE REGRESSION ANALYSES (#31A: 7 ----- CORRECTED RESPONSES

Corrected Site Mean Blood Lead
Between Site Model A
Untransformed Gas. Lead Exp.
Based on Adj. Set 2W

DEP VARIABLE: A_EQ2WCS

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F VALUE	PROB>F
MODEL	1	0.048963	0.048963	7.160	0.0096
ERROR	59	0.403469	0.006838456		
C TOTAL	60	0.452432			

ROOT MSE	0.082695	R-SQUARE	0.1082
DEP MEAN	2.590494	ADJ R-SQ	0.0931
C.V.	3.192246		

VARIABLE	DF	PARAMETER ESTIMATE	STANDARD ERROR	T FOR H0: PARAMETER=0	PROB > |T|	TOLERANCE	VARIANCE INFLATION
INTERCEP	1	2.636702	0.020256	130.168	0.0001	.	0.000000
DAYS_PB	1	-.0000662419	.00002475583	-2.676	0.0096	1.000000	1.000000

OBS	ACTUAL	PREDICT VALUE	STD ERR PREDICT	LOWER95% PREDICT	UPPER95% PREDICT	RESIDUAL	STD ERR RESIDUAL	STUDENT RESIDUAL	-2-1-0 1 2	COOK'S D
1	2.518	2.636	0.019920	2.465	2.806	-.117411	0.080260	-1.463	**	0.066
2	2.567	2.633	0.018995	2.463	2.802	-.066074	0.080484	-0.821	*	0.019
3	2.598	2.585	0.010806	2.418	2.752	0.013109	0.081986	0.160		0.000
4	2.601	2.630	0.018166	2.461	2.799	-.029405	0.080675	-0.364		0.003
5	2.673	2.582	0.011096	2.415	2.749	0.091118	0.081947	1.112	**	0.011
6	2.682	2.627	0.017259	2.458	2.796	0.055218	0.080874	0.683	*	0.011
7	2.535	2.584	0.010824	2.418	2.751	-.049481	0.081984	-0.604	*	0.003
8	2.657	2.624	0.016486	2.456	2.793	0.032691	0.081035	0.403		0.003
9	2.530	2.562	0.014946	2.394	2.730	-.032226	0.081333	-0.396		0.003
10	2.479	2.622	0.015901	2.454	2.791	-.142973	0.081152	-1.762	***	0.060
11	2.532	2.553	0.017711	2.383	2.722	-.020484	0.080776	-0.254		0.002
12	2.625	2.621	0.015614	2.453	2.790	0.004099	0.081208	0.050		0.000
13	2.331	2.546	0.019568	2.376	2.717	-.214965	0.080346	-2.675	*****	0.212
14	2.722	2.618	0.014718	2.450	2.786	0.104172	0.081375	1.280	**	0.027
15	2.645	2.540	0.021490	2.369	2.711	0.104584	0.079854	1.310	**	0.062
16	2.648	2.610	0.012924	2.443	2.778	0.038065	0.081679	0.466		0.003
17	2.692	2.593	0.010645	2.427	2.760	0.098258	0.082007	1.198	**	0.012
18	2.585	2.570	0.013138	2.402	2.737	0.015489	0.081645	0.190		0.000
19	2.619	2.605	0.011980	2.438	2.773	0.013172	0.081823	0.161		0.000
20	2.656	2.603	0.011501	2.435	2.770	0.053722	0.081891	0.656	*	0.004
21	2.601	2.599	0.011096	2.432	2.766	0.001834	0.081947	0.022		0.000
22	2.478	2.552	0.017805	2.383	2.721	-.073816	0.080755	-0.914	*	0.020
23	2.741	2.596	0.010786	2.429	2.763	0.145356	0.081989	1.773	***	0.027
24	2.690	2.572	0.012669	2.404	2.739	0.118142	0.081719	1.446	**	0.025
25	2.619	2.589	0.010595	2.423	2.756	0.029929	0.082013	0.365		0.001
26	2.517	2.565	0.014145	2.398	2.733	-.048258	0.081476	-0.592	*	0.005
27	2.517	2.581	0.011146	2.414	2.748	-.064079	0.081940	-0.782	*	0.006
28	2.360	2.550	0.018513	2.380	2.719	-.189712	0.080596	-2.354	****	0.146

TEH 0530234

DUP050031146

#31A: 6 ----- ALL COMPLETE RECORDS EXCLUDING THE TWO NEW YORK SITES 384
13:31 SATURDAY, NOVEMBER 19, 1983

COMPLETE RECORDS FOR BLOOD_PB, VARIABLES 1-6, 22-30, DAYS_PB, LEAD_WT, & 6CUR75

BETWEEN SITE REGRESSION ANALYSES (#31A: 7 ----- CORRECTED RESPONSES

OBS	ACTUAL	PREDICT VALUE	STD ERR PREDICT	LOWER95% PREDICT	UPPER95% PREDICT	RESIDUAL	STD ERR RESIDUAL	STUDENT RESIDUAL	-2-1-0 1 2	COOK'S D
29	2.566	2.556	0.016540	2.388	2.725	0.009610	0.081024	0.119	|	0.000
30	2.615	2.560	0.015678	2.391	2.728	0.055335	0.081195	0.682	|*	0.009
31	2.508	2.546	0.019746	2.376	2.716	-.037436	0.080303	-0.466	|	0.007
32	2.638	2.635	0.019780	2.465	2.805	0.002893	0.080295	0.036	|	0.000
33	2.816	2.614	0.013738	2.446	2.782	0.202412	0.081546	2.482	|****	0.087
34	2.590	2.633	0.019108	2.463	2.803	-.042726	0.080457	-0.531	*|	0.008
35	2.548	2.593	0.010637	2.426	2.760	-.045343	0.082008	-0.553	*|	0.003
36	2.716	2.631	0.018328	2.461	2.800	0.085884	0.080638	1.065	|**	0.029
37	2.643	2.578	0.011500	2.411	2.746	0.064422	0.081891	0.787	|*	0.006
38	2.684	2.628	0.017516	2.459	2.797	0.055950	0.080819	0.692	|*	0.011
39	2.634	2.620	0.015355	2.452	2.789	0.013351	0.081257	0.164	|	0.000
40	2.563	2.626	0.016971	2.457	2.795	-.063368	0.080935	-0.783	*|	0.013
41	2.613	2.578	0.011546	2.411	2.745	0.034555	0.081885	0.422	|	0.002
42	2.655	2.624	0.016345	2.455	2.792	0.031163	0.081064	0.384	|	0.003
43	2.573	2.576	0.011962	2.408	2.743	-.002469	0.081825	-0.030	|	0.000
44	2.593	2.618	0.014697	2.450	2.786	-.025247	0.081379	-0.310	|	0.002
45	2.576	2.562	0.014952	2.394	2.730	0.013524	0.081332	0.166	|	0.000
46	2.566	2.613	0.013573	2.446	2.781	-.047412	0.081573	-0.581	*|	0.005
47	2.656	2.541	0.021256	2.370	2.712	0.114684	0.079916	1.435	|**	0.073
48	2.491	2.611	0.013102	2.444	2.779	-.120355	0.081650	-1.474	**|	0.028
49	2.477	2.605	0.011828	2.437	2.772	-.127683	0.081845	-1.560	***|	0.025
50	2.723	2.572	0.012637	2.405	2.739	0.150890	0.081724	1.846	|***	0.041
51	2.506	2.602	0.011405	2.435	2.769	-.095681	0.081905	-1.168	**|	0.013
52	2.491	2.600	0.011162	2.433	2.767	-.109233	0.081938	-1.333	**|	0.016
53	2.554	2.549	0.018696	2.380	2.719	0.004767	0.080554	0.059	|	0.000
54	2.533	2.570	0.013161	2.402	2.737	-.036258	0.081641	-0.444	|	0.003
55	2.623	2.596	0.010791	2.429	2.763	0.027347	0.081988	0.334	|	0.001
56	2.545	2.589	0.010596	2.423	2.756	-.044305	0.082013	-0.540	*|	0.002
57	2.664	2.587	0.010669	2.420	2.754	0.077005	0.082004	0.939	|*	0.007
58	2.503	2.565	0.014226	2.397	2.733	-.061657	0.081462	-0.757	*|	0.009
59	2.594	2.576	0.011931	2.409	2.743	0.017779	0.081830	0.217	|	0.001
60	2.622	2.556	0.016551	2.388	2.725	0.066009	0.081022	0.815	|*	0.014
61	2.521	2.559	0.015726	2.391	2.728	-.038482	0.081186	-0.474	|	0.004
62	.	2.636	0.019910	2.465	2.806	.	.	.		.
63	.	2.540	0.021489	2.369	2.711	.	.	.		.

SUM OF RESIDUALS 1.21014E-13
SUM OF SQUARED RESIDUALS 0.4034689

TEH 0530235

DUP050031147

Corrected Site Mean Blood Lead
Between Site Model A
Transformed Gas. Lead Exp.
Based on Adj. Set 2W

COMPLETE RECORDS FOR BLOOD_PB, VARIABLES 1-6, 22-30, DAYS_PB, LEAD_WT, & GCUR75

BETWEEN SITE REGRESSION ANALYSES (#31A: 7 ----- CORRECTED RESPONSES

DEP VARIABLE: A_EQ2WGS

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F VALUE	PROB>F
MODEL	1	0.061319	0.061319	9.514	0.0031
ERROR	59	0.380252	0.006444954		
C TOTAL	60	0.441572			

ROOT MSE	0.080280	R-SQUARE	0.1389
DEP MEAN	2.590567	ADJ R-SQ	0.1243
C.V.	3.098953		

VARIABLE	DF	PARAMETER ESTIMATE	STANDARD ERROR	T FOR H0: PARAMETER=0	PROB > |T|	TOLERANCE	VARIANCE INFLATION
INTERCEP	1	2.642278	0.019665	134.366	0.0001	.	0.000000
DAYS_PB	1	-.0000741306	.00002403302	-3.085	0.0031	1.000000	1.000000

OBS	ACTUAL	PREDICT VALUE	STD ERR PREDICT	LOWER95% PREDICT	UPPER95% PREDICT	RESIDUAL	STD ERR RESIDUAL	STUDENT RESIDUAL	-2-1-0 1 2	COOK'S D
1	2.564	2.641	0.019338	2.476	2.806	-.076917	0.077917	-0.987	*	0.030
2	2.541	2.638	0.018440	2.473	2.803	-.097256	0.078134	-1.245	**	0.043
3	2.523	2.584	0.010491	2.422	2.746	-.060920	0.079592	-0.765	*	0.005
4	2.645	2.635	0.017635	2.470	2.799	0.010574	0.078320	0.135		0.000
5	2.650	2.581	0.010772	2.419	2.743	0.069282	0.079554	0.871	*	0.007
6	2.686	2.631	0.016755	2.467	2.795	0.054597	0.078513	0.695	*	0.011
7	2.551	2.584	0.010508	2.422	2.746	-.032576	0.079590	-0.409		0.001
8	2.639	2.628	0.016004	2.465	2.792	0.010282	0.078669	0.131		0.000
9	2.569	2.559	0.014509	2.396	2.722	0.009784	0.078958	0.124		0.000
10	2.478	2.626	0.015436	2.463	2.790	-.148350	0.078782	-1.883	***	0.068
11	2.480	2.548	0.017193	2.384	2.712	-.067662	0.078418	-0.863	*	0.018
12	2.729	2.625	0.015158	2.461	2.788	0.103761	0.078836	1.316	**	0.032
13	2.339	2.541	0.018997	2.376	2.706	-.202294	0.078000	-2.593	*****	0.199
14	2.728	2.621	0.014288	2.458	2.784	0.107060	0.078999	1.355	**	0.030
15	2.650	2.535	0.020862	2.369	2.701	0.115881	0.077522	1.495	**	0.081
16	2.652	2.613	0.012547	2.450	2.775	0.039033	0.079294	0.492		0.003
17	2.656	2.594	0.010335	2.432	2.756	0.062591	0.079612	0.786	*	0.005
18	2.542	2.567	0.012754	2.405	2.730	-.025156	0.079261	-0.317		0.001
19	2.673	2.607	0.011630	2.445	2.770	0.065436	0.079434	0.824	*	0.007
20	2.653	2.604	0.011165	2.442	2.766	0.049304	0.079500	0.620	*	0.004
21	2.537	2.601	0.010772	2.438	2.763	-.063527	0.079554	-0.799	*	0.006
22	2.471	2.548	0.017285	2.383	2.712	-.076261	0.078398	-0.973	*	0.023
23	2.721	2.597	0.010471	2.435	2.759	0.124401	0.079595	1.563	***	0.021
24	2.660	2.570	0.012299	2.407	2.732	0.090325	0.079333	1.139	**	0.016
25	2.592	2.589	0.010285	2.427	2.751	0.002662	0.079619	0.033		0.000
26	2.489	2.562	0.013732	2.400	2.725	-.073584	0.079097	-0.930	*	0.013
27	2.543	2.580	0.010820	2.418	2.742	-.036728	0.079546	-0.462		0.002
28	2.358	2.545	0.017973	2.380	2.710	-.186864	0.078243	-2.388	****	0.150

TEH 0530236

DUP050031148

COMPLETE RECORDS FOR BLOOD_PB, VARIABLES 1-6, 22-30, DAYS_PB, LEAD_WT, & GCUR75

BETWEEN SITE REGRESSION ANALYSES (#31A: 7 ----- CORRECTED RESPONSES

OBS	ACTUAL	PREDICT VALUE	STD ERR PREDICT	LOWER95% PREDICT	UPPER95% PREDICT	RESIDUAL	STD ERR RESIDUAL	STUDENT RESIDUAL	-2-1-0 1 2	COOK'S D
29	2.554	2.553	0.016057	2.389	2.716	0.001599	0.078658	0.020	|	0.000
30	2.617	2.556	0.015220	2.392	2.719	0.061191	0.078824	0.776	|*	0.011
31	2.551	2.541	0.019169	2.376	2.706	0.010097	0.077958	0.130	|	0.001
32	2.648	2.641	0.019202	2.475	2.806	0.007834	0.077950	0.101	|	0.000
33	2.792	2.617	0.013337	2.454	2.780	0.175464	0.079165	2.216	|****	0.070
34	2.596	2.638	0.018550	2.473	2.803	-.042409	0.078108	-0.543	*|	0.008
35	2.550	2.594	0.010326	2.432	2.756	-.043170	0.079614	-0.542	*|	0.002
36	2.711	2.635	0.017793	2.471	2.800	0.075612	0.078284	0.966	|*	0.024
37	2.683	2.577	0.011164	2.415	2.739	0.105927	0.079500	1.332	|**	0.018
38	2.714	2.632	0.017005	2.468	2.797	0.081468	0.078459	1.038	|**	0.025
39	2.592	2.624	0.014907	2.460	2.787	-.031595	0.078884	-0.401	|	0.003
40	2.587	2.630	0.016476	2.466	2.794	-.043008	0.078572	-0.547	*|	0.007
41	2.585	2.577	0.011209	2.415	2.739	0.008249	0.079494	0.104	|	0.000
42	2.648	2.628	0.015867	2.464	2.792	0.020370	0.078697	0.259	|	0.001
43	2.574	2.574	0.011613	2.412	2.736	4.8E-04	0.079436	0.006	|	0.000
44	2.552	2.621	0.014268	2.458	2.784	-.068842	0.079002	-0.871	*|	0.012
45	2.574	2.559	0.014515	2.396	2.722	0.014872	0.078957	0.188	|	0.001
46	2.551	2.616	0.013177	2.453	2.779	-.065240	0.079192	-0.824	*|	0.009
47	2.646	2.535	0.020636	2.370	2.701	0.110949	0.077583	1.430	|**	0.072
48	2.510	2.614	0.012719	2.451	2.776	-.103491	0.079266	-1.306	**|	0.022
49	2.557	2.606	0.011483	2.444	2.769	-.049698	0.079455	-0.625	*|	0.004
50	2.714	2.570	0.012268	2.407	2.732	0.144470	0.079338	1.821	|***	0.040
51	2.513	2.603	0.011072	2.441	2.765	-.090080	0.079513	-1.133	**|	0.012
52	2.504	2.601	0.010836	2.439	2.763	-.096875	0.079546	-1.218	**|	0.014
53	2.629	2.544	0.018150	2.380	2.709	0.085072	0.078202	1.088	|**	0.032
54	2.527	2.567	0.012777	2.404	2.730	-.039931	0.079257	-0.504	*|	0.003
55	2.609	2.597	0.010476	2.435	2.759	0.011983	0.079594	0.151	|	0.000
56	2.525	2.589	0.010287	2.427	2.751	-.063936	0.079619	-0.803	*|	0.005
57	2.641	2.587	0.010358	2.425	2.749	0.054148	0.079610	0.680	|*	0.004
58	2.529	2.562	0.013810	2.399	2.725	-.032727	0.079084	-0.414	|	0.003
59	2.612	2.574	0.011582	2.412	2.736	0.038132	0.079441	0.480	|	0.002
60	2.595	2.552	0.016068	2.389	2.716	0.042901	0.078656	0.545	|*	0.006
61	2.509	2.556	0.015267	2.392	2.719	-.046698	0.078815	-0.592	*|	0.007
62	.	2.641	0.019329	2.476	2.806	.	.	.		.
63	.	2.535	0.020862	2.369	2.701	.	.	.		.

SUM OF RESIDUALS 1.04583E-13
SUM OF SQUARED RESIDUALS 0.3802523

TEH 0530237

DUP050031149

Corrected Site Mean Blood Lead
Between Site Model E
Untransformed Gas. Lead Exp.
Based on Adj. Set 2W

COMPLETE RECORDS FOR BLOOD_PB, VARIABLES 1-6, 22-30, DAYS_PB, LEAD_WT, & GCUR75

BETWEEN SITE REGRESSION ANALYSES (#31A: 7 ----- CORRECTED RESPONSES

DEP VARIABLE: A_EQ2WES

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F VALUE	PROB>F
MODEL	1	0.045690	0.045690	6.695	0.0122
ERROR	59	0.402671	0.006824931		
C TOTAL	60	0.448361			

ROOT MSE	0.082613	R-SQUARE	0.1019
DEP MEAN	2.590092	ADJ R-SQ	0.0867
C.V.	3.189584		

VARIABLE	DF	PARAMETER ESTIMATE	STANDARD ERROR	T FOR H0: PARAMETER=0	PROB > |T|	TOLERANCE	VARIANCE INFLATION
INTERCEP	1	2.634729	0.020236	130.199	0.0001	.	0.000000
DAYS_PB	1	-.0000639899	.00002473134	-2.587	0.0122	1.000000	1.000000

OBS	ACTUAL	PREDICT VALUE	STD ERR PREDICT	LOWER95% PREDICT	UPPER95% PREDICT	RESIDUAL	STD ERR RESIDUAL	STUDENT RESIDUAL	-2-1-0 1 2	COOK'S D
1	2.530	2.634	0.019900	2.464	2.804	-.103723	0.080181	-1.294	| **| |	0.052
2	2.571	2.631	0.018976	2.461	2.800	-.059419	0.080404	-0.739	| *| |	0.015
3	2.607	2.585	0.010795	2.418	2.751	0.022518	0.081905	0.275	| | |	0.001
4	2.572	2.628	0.018148	2.459	2.797	-.056441	0.080595	-0.700	| *| |	0.012
5	2.670	2.582	0.011085	2.415	2.748	0.088730	0.081866	1.084	| |** |	0.011
6	2.671	2.625	0.017241	2.456	2.794	0.045549	0.080794	0.564	| |* |	0.007
7	2.540	2.584	0.010813	2.418	2.751	-.044598	0.081902	-0.545	| *| |	0.003
8	2.644	2.623	0.016469	2.454	2.791	0.021711	0.080955	0.268	| | |	0.001
9	2.519	2.563	0.014931	2.395	2.731	-.043637	0.081253	-0.537	| *| |	0.005
10	2.484	2.621	0.015885	2.452	2.789	-.136321	0.081072	-1.681	| ***| |	0.054
11	2.523	2.553	0.017693	2.384	2.722	-.030514	0.080696	-0.378	| | |	0.003
12	2.636	2.620	0.015598	2.452	2.788	0.016595	0.081127	0.205	| | |	0.001
13	2.335	2.548	0.019549	2.378	2.717	-.212939	0.080267	-2.653	| *****| |	0.209
14	2.719	2.617	0.014703	2.449	2.784	0.102407	0.081294	1.260	| |** |	0.026
15	2.641	2.542	0.021468	2.371	2.713	0.099563	0.079775	1.248	| |** |	0.056
16	2.654	2.609	0.012911	2.442	2.777	0.044825	0.081598	0.549	| |* |	0.004
17	2.682	2.593	0.010635	2.426	2.760	0.088771	0.081926	1.084	| |** |	0.010
18	2.565	2.570	0.013125	2.403	2.737	-.005087	0.081564	-0.062	| | |	0.000
19	2.607	2.605	0.011968	2.438	2.772	0.002733	0.081742	0.033	| | |	0.000
20	2.662	2.602	0.011489	2.435	2.769	0.060443	0.081810	0.739	| |* |	0.005
21	2.615	2.599	0.011085	2.432	2.765	0.015979	0.081866	0.195	| | |	0.000
22	2.493	2.553	0.017788	2.384	2.722	-.060391	0.080675	-0.749	| *| |	0.014
23	2.754	2.595	0.010775	2.429	2.762	0.158154	0.081907	1.931	| |*** |	0.032
24	2.679	2.572	0.012656	2.405	2.739	0.106581	0.081638	1.306	| |** |	0.020
25	2.637	2.589	0.010584	2.422	2.756	0.048074	0.081932	0.587	| |* |	0.003
26	2.522	2.566	0.014131	2.398	2.734	-.044011	0.081396	-0.541	| *| |	0.004
27	2.525	2.581	0.011135	2.414	2.748	-.055912	0.081859	-0.683	| *| |	0.004
28	2.357	2.551	0.018495	2.381	2.720	-.193484	0.080516	-2.403	| ****| |	0.152

COMPLETE RECORDS FOR BLOOD_PB, VARIABLES 1-6, 22-30, DAYS_PB, LEAD_WT, & GCUR75

BETWEEN SITE REGRESSION ANALYSES (#31A: 7 ----- CORRECTED RESPONSES

OBS	ACTUAL	PREDICT VALUE	STD ERR PREDICT	LOWER95% PREDICT	UPPER95% PREDICT	RESIDUAL	STD ERR RESIDUAL	STUDENT RESIDUAL	-2-1-0 1 2	COOK'S D
29	2.576	2.557	0.016524	2.389	2.726	0.019181	0.080944	0.237		0.001
30	2.623	2.560	0.015663	2.392	2.728	0.062884	0.081115	0.775	*	0.011
31	2.526	2.547	0.019726	2.377	2.717	-.020965	0.080224	-0.261		0.002
32	2.618	2.633	0.019760	2.463	2.803	-.015213	0.080215	-0.190		0.001
33	2.814	2.613	0.013725	2.445	2.780	0.201027	0.081465	2.468	****	0.086
34	2.591	2.631	0.019089	2.462	2.801	-.040302	0.080378	-0.501	*	0.007
35	2.563	2.593	0.010626	2.426	2.759	-.029834	0.081927	-0.364		0.001
36	2.723	2.629	0.018310	2.459	2.798	0.094124	0.080559	1.168	**	0.035
37	2.648	2.578	0.011488	2.412	2.745	0.069566	0.081810	0.850	*	0.007
38	2.683	2.626	0.017499	2.457	2.795	0.056709	0.080739	0.702	*	0.012
39	2.646	2.619	0.015340	2.451	2.787	0.027531	0.081177	0.339		0.002
40	2.553	2.624	0.016954	2.456	2.793	-.071368	0.080855	-0.883	*	0.017
41	2.618	2.578	0.011535	2.411	2.745	0.040229	0.081804	0.492		0.002
42	2.650	2.622	0.016328	2.454	2.791	0.028211	0.080983	0.348		0.002
43	2.571	2.576	0.011950	2.409	2.743	-.004377	0.081744	-0.054		0.000
44	2.582	2.616	0.014682	2.449	2.784	-.034371	0.081298	-0.423		0.003
45	2.574	2.563	0.014937	2.395	2.731	0.011623	0.081252	0.143		0.000
46	2.577	2.612	0.013560	2.445	2.780	-.034991	0.081493	-0.429		0.003
47	2.656	2.542	0.021235	2.372	2.713	0.113649	0.079837	1.424	**	0.072
48	2.488	2.610	0.013089	2.443	2.777	-.122233	0.081570	-1.499	**	0.029
49	2.448	2.604	0.011817	2.437	2.771	-.155797	0.081764	-1.905	***	0.038
50	2.716	2.572	0.012625	2.405	2.739	0.143749	0.081643	1.761	***	0.037
51	2.514	2.601	0.011394	2.434	2.768	-.087119	0.081824	-1.065	**	0.011
52	2.494	2.599	0.011151	2.432	2.766	-.105683	0.081857	-1.291	**	0.015
53	2.553	2.550	0.018678	2.381	2.720	0.003011	0.080474	0.037		0.000
54	2.527	2.570	0.013148	2.402	2.737	-.042994	0.081560	-0.527	*	0.004
55	2.627	2.595	0.010781	2.429	2.762	0.031846	0.081907	0.389		0.001
56	2.548	2.589	0.010585	2.422	2.756	-.040638	0.081932	-0.496		0.002
57	2.655	2.587	0.010658	2.420	2.753	0.068304	0.081923	0.834	*	0.006
58	2.492	2.566	0.014212	2.398	2.733	-.073334	0.081382	-0.901	*	0.012
59	2.590	2.576	0.011919	2.409	2.743	0.013915	0.081749	0.170		0.000
60	2.611	2.557	0.016535	2.389	2.726	0.053796	0.080942	0.665	*	0.009
61	2.524	2.560	0.015710	2.392	2.728	-.036289	0.081106	-0.447		0.004
62	.	2.634	0.019890	2.464	2.804	.	.	.		.
63	.	2.542	0.021468	2.371	2.713	.	.	.		.

SUM OF RESIDUALS 1.19016E-13
SUM OF SQUARED RESIDUALS 0.4026709

TEH 0530239

DUP050031151

Corrected Site Mean Blood Lead
Between Site Model E
Transformed Gas. Lead Exp.
Based on Adj. Set 2W

COMPLETE RECORDS FOR BLOOD_PB, VARIABLES 1-6, 22-30, DAYS_PB, LEAD_WT, & GCUR75

BETWEEN SITE REGRESSION ANALYSES (#31A: 7 ----- CORRECTED RESPONSES

DEP VARIABLE: A_EQ2WIS

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F VALUE	PROB>F
MODEL	1	0.032853	0.032853	5.402	0.0236
ERROR	59	0.358812	0.006081557		
C TOTAL	60	0.391665			

ROOT MSE	0.077984	R-SQUARE	0.0839
DEP MEAN	2.589108	ADJ R-SQ	0.0684
C.V.	3.012015		

VARIABLE	DF	PARAMETER ESTIMATE	STANDARD ERROR	T FOR H0: PARAMETER=0	PROB > |T|	TOLERANCE	VARIANCE INFLATION
INTERCEP	1	2.626958	0.019102	137.520	0.0001	.	0.000000
DAYS_PB	1	-.0000542607	.00002334565	-2.324	0.0236	1.000000	1.000000

OBS	ACTUAL	PREDICT VALUE	STD ERR PREDICT	LOWER95% PREDICT	UPPER95% PREDICT	RESIDUAL	STD ERR RESIDUAL	STUDENT RESIDUAL	-2-1-0 1 2	COOK'S D
1	2.587	2.626	0.018785	2.466	2.787	-.039231	0.075688	-0.518	*|	0.008
2	2.546	2.624	0.017913	2.464	2.784	-.078106	0.075899	-1.029	**|	0.029
3	2.544	2.584	0.010191	2.427	2.742	-.040470	0.077316	-0.523	*|	0.002
4	2.638	2.621	0.017131	2.462	2.781	0.016267	0.076080	0.214	|	0.001
5	2.649	2.582	0.010464	2.424	2.739	0.067041	0.077279	0.868	|*	0.007
6	2.690	2.619	0.016275	2.460	2.778	0.071406	0.076267	0.936	|*	0.020
7	2.561	2.584	0.010207	2.427	2.742	-.023526	0.077313	-0.304	|	0.001
8	2.605	2.617	0.015547	2.458	2.776	-.011598	0.076419	-0.152	|	0.000
9	2.581	2.566	0.014094	2.407	2.725	0.015394	0.076700	0.201	|	0.001
10	2.477	2.615	0.014995	2.456	2.774	-.138374	0.076529	-1.808	***|	0.063
11	2.472	2.558	0.016702	2.398	2.718	-.086171	0.076175	-1.131	**|	0.031
12	2.692	2.614	0.014724	2.455	2.773	0.077544	0.076582	1.013	|**	0.019
13	2.377	2.553	0.018453	2.393	2.713	-.175727	0.075770	-2.319	****|	0.160
14	2.741	2.612	0.013879	2.453	2.770	0.129198	0.076739	1.684	|***	0.046
15	2.662	2.548	0.020265	2.387	2.709	0.113978	0.075305	1.514	|***	0.083
16	2.589	2.605	0.012188	2.447	2.763	-.016470	0.077026	-0.214	|	0.001
17	2.670	2.592	0.010039	2.434	2.749	0.078220	0.077335	1.011	|**	0.009
18	2.508	2.572	0.012389	2.414	2.730	-.063925	0.076994	-0.830	*|	0.009
19	2.688	2.601	0.011298	2.444	2.759	0.086110	0.077162	1.116	|**	0.013
20	2.642	2.599	0.010846	2.441	2.756	0.042785	0.077227	0.554	|*	0.003
21	2.598	2.596	0.010464	2.439	2.754	0.001618	0.077279	0.021	|	0.000
22	2.472	2.558	0.016791	2.398	2.717	-.085361	0.076155	-1.121	**|	0.031
23	2.704	2.594	0.010171	2.436	2.751	0.110795	0.077318	1.433	|**	0.018
24	2.612	2.574	0.011947	2.416	2.732	0.038474	0.077064	0.499	|	0.003
25	2.617	2.588	0.009991	2.431	2.746	0.028882	0.077342	0.373	|	0.001
26	2.490	2.569	0.013339	2.410	2.727	-.078842	0.076835	-1.026	**|	0.016
27	2.568	2.581	0.010511	2.424	2.739	-.013863	0.077273	-0.179	|	0.000
28	2.408	2.556	0.017459	2.396	2.716	-.148113	0.076005	-1.949	***|	0.100

COMPLETE RECORDS FOR BLOOD_PB, VARIABLES 1-6, 22-30, DAYS_PB, LEAD_WT, & GCUR75

BETWEEN SITE REGRESSION ANALYSES (#31A: 7 ----- CORRECTED RESPONSES

OBS	ACTUAL	PREDICT VALUE	STD ERR PREDICT	LOWER95% PREDICT	UPPER95% PREDICT	RESIDUAL	STD ERR RESIDUAL	STUDENT RESIDUAL	-2-1-0 1 2	COOK'S D
29	2.564	2.561	0.015598	2.402	2.720	0.002334	0.076409	0.031	| | |	0.000
30	2.614	2.564	0.014785	2.405	2.723	0.050199	0.076570	0.656	| |* |	0.008
31	2.574	2.553	0.018621	2.392	2.713	0.021492	0.075729	0.284	| | |	0.002
32	2.603	2.626	0.018653	2.465	2.786	-.022911	0.075721	-0.303	| | |	0.003
33	2.764	2.608	0.012956	2.450	2.766	0.156090	0.076901	2.030	| |**** |	0.058
34	2.605	2.624	0.018019	2.464	2.784	-.019215	0.075874	-0.253	| | |	0.002
35	2.551	2.591	0.010031	2.434	2.749	-.040236	0.077337	-0.520	| *| |	0.002
36	2.717	2.622	0.017284	2.462	2.782	0.095475	0.076045	1.256	| |** |	0.041
37	2.697	2.579	0.010845	2.422	2.737	0.118211	0.077227	1.531	| |*** |	0.023
38	2.679	2.620	0.016519	2.460	2.779	0.059221	0.076215	0.777	| |* |	0.014
39	2.594	2.613	0.014480	2.455	2.772	-.019634	0.076628	-0.256	| | |	0.001
40	2.520	2.618	0.016004	2.459	2.777	-.098336	0.076324	-1.288	| **| |	0.036
41	2.559	2.579	0.010888	2.421	2.737	-.020125	0.077220	-0.261	| | |	0.001
42	2.630	2.616	0.015414	2.457	2.775	0.013121	0.076446	0.172	| | |	0.001
43	2.584	2.577	0.011280	2.419	2.735	0.006888	0.077164	0.089	| | |	0.000
44	2.548	2.611	0.013860	2.453	2.770	-.063206	0.076743	-0.824	| *| |	0.011
45	2.541	2.566	0.014100	2.407	2.725	-.025403	0.076699	-0.331	| | |	0.002
46	2.592	2.608	0.012800	2.450	2.766	-.016105	0.076927	-0.209	| | |	0.001
47	2.683	2.549	0.020046	2.388	2.710	0.134740	0.075364	1.788	| |*** |	0.113
48	2.451	2.606	0.012356	2.448	2.764	-.155460	0.076999	-2.019	| ****| |	0.052
49	2.541	2.601	0.011155	2.443	2.758	-.060139	0.077182	-0.779	| *| |	0.006
50	2.718	2.574	0.011917	2.416	2.732	0.143582	0.077068	1.863	| |*** |	0.041
51	2.521	2.598	0.010756	2.441	2.756	-.077352	0.077239	-1.001	| **| |	0.010
52	2.521	2.597	0.010526	2.439	2.754	-.075991	0.077271	-0.983	| *| |	0.009
53	2.662	2.555	0.017631	2.395	2.715	0.106923	0.075965	1.408	| |** |	0.053
54	2.504	2.572	0.012412	2.414	2.730	-.068148	0.076990	-0.885	| *| |	0.010
55	2.580	2.594	0.010177	2.436	2.751	-.013274	0.077317	-0.172	| | |	0.000
56	2.583	2.588	0.009992	2.431	2.746	-.005046	0.077342	-0.065	| | |	0.000
57	2.589	2.586	0.010061	2.429	2.744	0.002399	0.077333	0.031	| | |	0.000
58	2.526	2.568	0.013415	2.410	2.727	-.042004	0.076822	-0.547	| *| |	0.005
59	2.635	2.577	0.011251	2.419	2.735	0.057771	0.077168	0.749	| |* |	0.006
60	2.592	2.561	0.015608	2.402	2.720	0.030728	0.076406	0.402	| | |	0.003
61	2.509	2.564	0.014830	2.405	2.722	-.054523	0.076561	-0.712	| *| |	0.010
62	.	2.626	0.018776	2.466	2.787	.	.	.		.
63	.	2.548	0.020265	2.387	2.709	.	.	.		.

SUM OF RESIDUALS 1.08580E-13
SUM OF SQUARED RESIDUALS 0.3588119

TEH 0530241

DUP050031153

COMPLETE RECORDS FOR BLOOD_PB, VARIABLES 1-6, 22-30, DAYS_PB, LEAD_WT, & GCUR75

BETWEEN SITE REGRESSION ANALYSES (#31A: 7 ----- CORRECTED RESPONSES

Corrected Site Mean Blood Lead
Between Site Model F
Untransformed Gas. Lead Exp.
Based on Adj. Set 2W

DEP VARIABLE: A_EQ2WLS

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F VALUE	PROB>F
MODEL	1	0.046483	0.046483	6.809	0.0115
ERROR	59	0.402790	0.00682695		
C TOTAL	60	0.449273			

ROOT MSE	0.082625	R-SQUARE	0.1035
DEP MEAN	2.590130	ADJ R-SQ	0.0883
C.V.	3.190008		

VARIABLE	DF	PARAMETER ESTIMATE	STANDARD ERROR	T FOR H0: PARAMETER=0	PROB > |T|	TOLERANCE	VARIANCE INFLATION
INTERCEP	1	2.635153	0.020239	130.201	0.0001	.	0.000000
DAYS_PB	1	-.0000645426	0.000024735	-2.609	0.0115	1.000000	1.000000

OBS	ACTUAL	PREDICT VALUE	STD ERR PREDICT	LOWER95% PREDICT	UPPER95% PREDICT	RESIDUAL	STD ERR RESIDUAL	STUDENT RESIDUAL	-2-1-0	0 1 2	COOK'S D
1	2.529	2.634	0.019903	2.464	2.804	-.104718	0.080192	-1.306	**		0.053
2	2.573	2.631	0.018979	2.462	2.801	-.058619	0.080416	-0.729	*		0.015
3	2.607	2.584	0.010797	2.418	2.751	0.022247	0.081917	0.272			0.001
4	2.574	2.629	0.018150	2.459	2.798	-.054525	0.080607	-0.676	*		0.012
5	2.667	2.581	0.011087	2.415	2.748	0.085913	0.081878	1.049		**	0.010
6	2.672	2.626	0.017244	2.457	2.795	0.046116	0.080806	0.571		*	0.007
7	2.539	2.584	0.010815	2.418	2.751	-.044817	0.081915	-0.547	*		0.003
8	2.646	2.623	0.016472	2.454	2.792	0.022510	0.080967	0.278			0.002
9	2.520	2.563	0.014933	2.395	2.731	-.042701	0.081265	-0.525	*		0.005
10	2.484	2.621	0.015887	2.453	2.789	-.137524	0.081084	-1.696	***		0.055
11	2.524	2.553	0.017696	2.384	2.722	-.028897	0.080708	-0.358			0.003
12	2.637	2.620	0.015601	2.452	2.788	0.016826	0.081139	0.207			0.001
13	2.335	2.547	0.019552	2.377	2.717	-.212210	0.080279	-2.643	*****		0.207
14	2.720	2.617	0.014705	2.449	2.785	0.103572	0.081306	1.274		**	0.027
15	2.642	2.541	0.021471	2.371	2.712	0.100228	0.079787	1.256		**	0.057
16	2.655	2.609	0.012913	2.442	2.777	0.045441	0.081610	0.557		*	0.004
17	2.683	2.593	0.010636	2.426	2.760	0.089914	0.081938	1.097		**	0.010
18	2.566	2.570	0.013127	2.402	2.737	-.003686	0.081576	-0.045			0.000
19	2.609	2.605	0.011970	2.438	2.772	0.004031	0.081754	0.049			0.000
20	2.665	2.602	0.011491	2.435	2.769	0.063429	0.081822	0.775		*	0.006
21	2.609	2.599	0.011087	2.432	2.766	0.010715	0.081878	0.131			0.000
22	2.491	2.553	0.017790	2.384	2.722	-.061661	0.080687	-0.764	*		0.014
23	2.753	2.595	0.010776	2.429	2.762	0.157498	0.081920	1.923		***	0.032
24	2.680	2.572	0.012658	2.405	2.739	0.107634	0.081650	1.318		**	0.021
25	2.634	2.589	0.010586	2.422	2.756	0.045220	0.081944	0.552		*	0.003
26	2.522	2.566	0.014133	2.398	2.733	-.043685	0.081408	-0.537	*		0.004
27	2.524	2.581	0.011136	2.414	2.748	-.056772	0.081871	-0.693	*		0.004
28	2.357	2.551	0.018498	2.381	2.720	-.193946	0.080528	-2.408	****		0.153

COMPLETE RECORDS FOR BLOOD_PB, VARIABLES 1-6, 22-30, DAYS_PB, LEAD_WT, & GCUR75

BETWEEN SITE REGRESSION ANALYSES (#31A: 7 ----- CORRECTED RESPONSES

OBS	ACTUAL	PREDICT VALUE	STD ERR PREDICT	LOWER95% PREDICT	UPPER95% PREDICT	RESIDUAL	STD ERR RESIDUAL	STUDENT RESIDUAL	-2-1-0 1 2	COOK'S D
29	2.574	2.557	0.016526	2.388	2.726	0.017101	0.080956	0.211	|	0.001
30	2.623	2.560	0.015665	2.392	2.728	0.062783	0.081127	0.774	|*	0.011
31	2.524	2.547	0.019729	2.377	2.717	-.022404	0.080235	-0.279	|	0.002
32	2.624	2.634	0.019763	2.464	2.804	-.009785	0.080227	-0.122	|	0.000
33	2.814	2.613	0.013727	2.445	2.781	0.200816	0.081477	2.465	|****	0.086
34	2.591	2.632	0.019091	2.462	2.801	-.040640	0.080389	-0.506	*|	0.007
35	2.558	2.593	0.010628	2.426	2.759	-.034605	0.081939	-0.422	|	0.002
36	2.722	2.629	0.018313	2.460	2.798	0.092887	0.080570	1.153	|**	0.034
37	2.648	2.578	0.011490	2.412	2.745	0.069334	0.081823	0.847	|*	0.007
38	2.684	2.627	0.017502	2.458	2.796	0.057478	0.080751	0.712	|*	0.012
39	2.646	2.619	0.015342	2.451	2.787	0.026524	0.081189	0.327	|	0.002
40	2.554	2.625	0.016957	2.456	2.793	-.070581	0.080867	-0.873	*|	0.017
41	2.619	2.578	0.011536	2.411	2.745	0.040557	0.081816	0.496	|	0.002
42	2.646	2.623	0.016331	2.454	2.791	0.023628	0.080995	0.292	|	0.002
43	2.573	2.576	0.011952	2.409	2.743	-.002236	0.081756	-0.027	|	0.000
44	2.581	2.617	0.014684	2.449	2.785	-.035360	0.081310	-0.435	|	0.003
45	2.575	2.563	0.014939	2.395	2.731	0.012110	0.081264	0.149	|	0.000
46	2.575	2.612	0.013562	2.445	2.780	-.037470	0.081505	-0.460	|	0.003
47	2.655	2.542	0.021239	2.371	2.713	0.113389	0.079849	1.420	|**	0.071
48	2.489	2.610	0.013091	2.443	2.778	-.121577	0.081582	-1.490	**|	0.029
49	2.450	2.604	0.011819	2.437	2.771	-.154279	0.081776	-1.887	***|	0.037
50	2.718	2.572	0.012627	2.405	2.739	0.145467	0.081655	1.781	|***	0.038
51	2.515	2.601	0.011396	2.434	2.768	-.086329	0.081836	-1.055	**|	0.011
52	2.493	2.599	0.011153	2.433	2.766	-.106623	0.081869	-1.302	**|	0.016
53	2.553	2.550	0.018681	2.380	2.719	0.002892	0.080486	0.036	|	0.000
54	2.528	2.570	0.013150	2.402	2.737	-.042109	0.081572	-0.516	*|	0.003
55	2.628	2.596	0.010782	2.429	2.762	0.032431	0.081919	0.396	|	0.001
56	2.548	2.589	0.010587	2.422	2.756	-.041082	0.081944	-0.501	*|	0.002
57	2.656	2.587	0.010660	2.420	2.753	0.069147	0.081935	0.844	|*	0.006
58	2.493	2.565	0.014214	2.398	2.733	-.072578	0.081394	-0.892	*|	0.012
59	2.591	2.576	0.011921	2.409	2.743	0.014739	0.081761	0.180	|	0.000
60	2.612	2.557	0.016537	2.388	2.726	0.054740	0.080954	0.676	|*	0.010
61	2.524	2.560	0.015713	2.392	2.728	-.035900	0.081118	-0.443	|	0.004
62	.	2.634	0.019893	2.464	2.804	.	.	.		.
63	.	2.541	0.021471	2.371	2.712	.	.	.		.

SUM OF RESIDUALS 1.03473E-13
SUM OF SQUARED RESIDUALS 0.4027901

TEH 0530243

DUP050031155

Corrected Site Mean Blood Lead
Between Site Model F
Transformed Gas. Lead Exp.
Based on Adj. Set 2W

COMPLETE RECORDS FOR BLOOD_PB, VARIABLES 1-6, 22-30, DAYS_PB, LEAD_WT, & GCUR75

BETWEEN SITE REGRESSION ANALYSES (#31A: 7 ----- CORRECTED RESPONSES

DEP VARIABLE: A_EQ2WRS

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F VALUE	PROB>F
MODEL	1	0.032849	0.032849	5.415	0.0234
ERROR	59	0.357888	0.006065899		
C TOTAL	60	0.390737			

ROOT MSE	0.077884	R-SQUARE	0.0841
DEP MEAN	2.588983	ADJ R-SQ	0.0685
C.V.	3.00828		

VARIABLE	DF	PARAMETER ESTIMATE	STANDARD ERROR	T FOR H0: PARAMETER=0	PROB > |T|	TOLERANCE	VARIANCE INFLATION
INTERCEP	1	2.626831	0.019078	137.691	0.0001	.	0.000000
DAYS_PB	1	-.0000542574	.00002331557	-2.327	0.0234	1.000000	1.000000

OBS	ACTUAL	PREDICT VALUE	STD ERR PREDICT	LOWER95% PREDICT	UPPER95% PREDICT	RESIDUAL	STD ERR RESIDUAL	STUDENT RESIDUAL	-2-1-0 1 2	COOK'S D
1	2.587	2.626	0.018761	2.466	2.786	-.038869	0.075591	-0.514	| *| |	0.008
2	2.551	2.624	0.017890	2.464	2.783	-.073015	0.075801	-0.963	| *| |	0.026
3	2.552	2.584	0.010177	2.427	2.741	-.032485	0.077216	-0.421	| | |	0.002
4	2.633	2.621	0.017109	2.462	2.781	0.011346	0.075982	0.149	| | |	0.001
5	2.630	2.582	0.010451	2.424	2.739	0.048174	0.077180	0.624	| |* |	0.004
6	2.692	2.619	0.016254	2.460	2.778	0.073425	0.076169	0.964	| |* |	0.021
7	2.564	2.584	0.010194	2.427	2.741	-.019650	0.077214	-0.254	| | |	0.001
8	2.599	2.617	0.015526	2.458	2.776	-.018054	0.076321	-0.237	| | |	0.001
9	2.582	2.566	0.014076	2.407	2.724	0.016140	0.076601	0.211	| | |	0.001
10	2.470	2.615	0.014976	2.456	2.774	-.144938	0.076431	-1.896	| ***| |	0.069
11	2.473	2.558	0.016680	2.398	2.717	-.084821	0.076077	-1.115	| **| |	0.030
12	2.691	2.614	0.014705	2.456	2.773	0.076790	0.076483	1.004	| |** |	0.019
13	2.382	2.553	0.018430	2.393	2.713	-.170753	0.075672	-2.256	| ****| |	0.151
14	2.743	2.611	0.013862	2.453	2.770	0.131928	0.076640	1.721	| |*** |	0.048
15	2.658	2.548	0.020239	2.387	2.709	0.109632	0.075208	1.458	| |** |	0.077
16	2.598	2.605	0.012172	2.447	2.763	-.007481	0.076927	-0.097	| | |	0.000
17	2.664	2.591	0.010026	2.434	2.749	0.072448	0.077236	0.938	| |* |	0.007
18	2.506	2.572	0.012373	2.414	2.730	-.065655	0.076895	-0.854	| *| |	0.009
19	2.688	2.601	0.011283	2.444	2.759	0.087181	0.077062	1.131	| |** |	0.014
20	2.655	2.599	0.010832	2.441	2.756	0.055704	0.077127	0.722	| |* |	0.005
21	2.596	2.596	0.010451	2.439	2.754	-2.7E-04	0.077180	-0.003	| | |	0.000
22	2.471	2.558	0.016769	2.398	2.717	-.086320	0.076057	-1.135	| **| |	0.031
23	2.705	2.593	0.010158	2.436	2.751	0.111843	0.077219	1.448	| |** |	0.018
24	2.610	2.574	0.011932	2.416	2.731	0.036560	0.076965	0.475	| | |	0.003
25	2.618	2.588	0.009978	2.431	2.745	0.030044	0.077242	0.389	| | |	0.001
26	2.493	2.568	0.013322	2.410	2.727	-.075239	0.076736	-0.980	| *| |	0.014
27	2.565	2.581	0.010497	2.424	2.739	-.016361	0.077173	-0.212	| | |	0.000
28	2.404	2.556	0.017436	2.396	2.715	-.151631	0.075907	-1.998	| ***| |	0.105

COMPLETE RECORDS FOR BLOOD_PB, VARIABLES 1-6, 22-30, DAYS_PB, LEAD_WT, & GCUR75

BETWEEN SITE REGRESSION ANALYSES (#31A: 7 ----- CORRECTED RESPONSES

OBS	ACTUAL	PREDICT VALUE	STD ERR PREDICT	LOWER95% PREDICT	UPPER95% PREDICT	RESIDUAL	STD ERR RESIDUAL	STUDENT RESIDUAL	-2-1-0 1 2	COOK'S D
29	2.564	2.561	0.015578	2.402	2.720	0.003054	0.076310	0.040	|	0.000
30	2.611	2.564	0.014766	2.405	2.722	0.047229	0.076471	0.618	|*	0.007
31	2.578	2.552	0.018597	2.392	2.713	0.025062	0.075631	0.331	|	0.003
32	2.610	2.626	0.018629	2.465	2.786	-.015600	0.075623	-0.206	|	0.001
33	2.754	2.608	0.012939	2.450	2.766	0.145562	0.076802	1.895	|***	0.051
34	2.608	2.624	0.017996	2.464	2.784	-.016146	0.075776	-0.213	|	0.001
35	2.547	2.591	0.010018	2.434	2.748	-.044236	0.077237	-0.573	*|	0.003
36	2.719	2.622	0.017262	2.462	2.781	0.097118	0.075947	1.279	|**	0.042
37	2.702	2.579	0.010831	2.422	2.736	0.123145	0.077127	1.597	|***	0.025
38	2.677	2.620	0.016497	2.460	2.779	0.057290	0.076117	0.753	|*	0.013
39	2.600	2.613	0.014462	2.455	2.772	-.013615	0.076529	-0.178	|	0.001
40	2.515	2.618	0.015984	2.459	2.777	-.102949	0.076226	-1.351	**|	0.040
41	2.564	2.579	0.010874	2.422	2.736	-.014728	0.077121	-0.191	|	0.000
42	2.616	2.616	0.015394	2.457	2.775	-2.2E-04	0.076347	-0.003	|	0.000
43	2.589	2.577	0.011266	2.419	2.734	0.011823	0.077065	0.153	|	0.000
44	2.544	2.611	0.013842	2.453	2.770	-.067801	0.076644	-0.885	*|	0.013
45	2.542	2.566	0.014082	2.407	2.724	-.024040	0.076600	-0.314	|	0.002
46	2.591	2.608	0.012784	2.450	2.766	-.016950	0.076828	-0.221	|	0.001
47	2.680	2.549	0.020020	2.388	2.709	0.131008	0.075267	1.741	|***	0.107
48	2.456	2.606	0.012340	2.448	2.764	-.149828	0.076900	-1.948	***|	0.049
49	2.536	2.601	0.011140	2.443	2.758	-.064844	0.077083	-0.841	*|	0.007
50	2.720	2.574	0.011902	2.416	2.732	0.146136	0.076969	1.899	|***	0.043
51	2.522	2.598	0.010742	2.441	2.756	-.076354	0.077140	-0.990	*|	0.009
52	2.509	2.597	0.010513	2.439	2.754	-.087758	0.077171	-1.137	**|	0.012
53	2.662	2.555	0.017609	2.395	2.715	0.106913	0.075867	1.409	|**	0.053
54	2.500	2.572	0.012396	2.414	2.730	-.071751	0.076891	-0.933	*|	0.011
55	2.588	2.594	0.010163	2.436	2.751	-.005170	0.077218	-0.067	|	0.000
56	2.590	2.588	0.009979	2.431	2.745	0.001974	0.077242	0.026	|	0.000
57	2.600	2.586	0.010048	2.429	2.743	0.014382	0.077233	0.186	|	0.000
58	2.517	2.568	0.013398	2.410	2.726	-.051311	0.076723	-0.669	*|	0.007
59	2.643	2.577	0.011237	2.419	2.734	0.065571	0.077069	0.851	|*	0.008
60	2.587	2.561	0.015588	2.402	2.720	0.025675	0.076308	0.336	|	0.002
61	2.509	2.563	0.014811	2.405	2.722	-.054313	0.076463	-0.710	*|	0.009
62	.	2.626	0.018752	2.466	2.786	.	.	.		.
63	.	2.548	0.020239	2.387	2.709	.	.	.		.

SUM OF RESIDUALS 1.22569E-13
SUM OF SQUARED RESIDUALS 0.357888

TEH 0530245

DUP050031157

Corrected Site Mean Blood Lead
Between Site Model G
Untransformed Gas. Lead Exp.
Based on Adj. Set 2W

COMPLETE RECORDS FOR BLOOD_PB, VARIABLES 1-6, 22-30, DAYS_PB, LEAD_WT, & GCUR75

BETWEEN SITE REGRESSION ANALYSES (#31A: 7 ----- CORRECTED RESPONSES

DEP VARIABLE: A_EQ2WMS

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F VALUE	PROB>F
MODEL	1	0.046684	0.046684	6.837	0.0113
ERROR	59	0.402839	0.006827773		
C TOTAL	60	0.449522			

ROOT MSE	0.082630	R-SQUARE	0.1039
DEP MEAN	2.590160	ADJ R-SQ	0.0887
C.V.	3.190163		

VARIABLE	DF	PARAMETER ESTIMATE	STANDARD ERROR	T FOR H0: PARAMETER=0	PROB > |T|	TOLERANCE	VARIANCE INFLATION
INTERCEP	1	2.635280	0.020240	130.199	0.0001	.	0.000000
DAYS_PB	1	-.0000646816	.00002473649	-2.615	0.0113	1.000000	1.000000

OBS	ACTUAL	PREDICT VALUE	STD ERR PREDICT	LOWER95% PREDICT	UPPER95% PREDICT	RESIDUAL	STD ERR RESIDUAL	STUDENT RESIDUAL	-2-1-0 1 2	COOK'S D
1	2.528	2.634	0.019904	2.464	2.804	-.105892	0.080197	-1.320	**|	0.054
2	2.574	2.631	0.018980	2.462	2.801	-.057603	0.080421	-0.716	*|	0.014
3	2.607	2.585	0.010798	2.418	2.751	0.022778	0.081922	0.278	|	0.001
4	2.576	2.629	0.018151	2.459	2.798	-.053158	0.080612	-0.659	*|	0.011
5	2.665	2.581	0.011088	2.415	2.748	0.083785	0.081883	1.023	|**	0.010
6	2.672	2.626	0.017245	2.457	2.795	0.046398	0.080811	0.574	|*	0.008
7	2.539	2.584	0.010815	2.418	2.751	-.045245	0.081919	-0.552	*|	0.003
8	2.647	2.623	0.016473	2.455	2.792	0.023472	0.080972	0.290	|	0.002
9	2.520	2.563	0.014934	2.395	2.731	-.042962	0.081270	-0.529	*|	0.005
10	2.482	2.621	0.015888	2.453	2.790	-.139047	0.081088	-1.715	***|	0.056
11	2.524	2.553	0.017697	2.384	2.722	-.029265	0.080713	-0.363	|	0.003
12	2.634	2.620	0.015602	2.452	2.788	0.013372	0.081144	0.165	|	0.001
13	2.336	2.547	0.019553	2.377	2.717	-.211480	0.080284	-2.634	*****|	0.206
14	2.721	2.617	0.014706	2.449	2.785	0.104455	0.081311	1.285	|**	0.027
15	2.642	2.541	0.021473	2.370	2.712	0.100936	0.079792	1.265	|**	0.058
16	2.655	2.610	0.012914	2.442	2.777	0.045346	0.081615	0.556	|*	0.004
17	2.684	2.593	0.010637	2.426	2.760	0.090947	0.081943	1.110	|**	0.010
18	2.567	2.570	0.013128	2.402	2.737	-.003254	0.081581	-0.040	|	0.000
19	2.611	2.605	0.011971	2.438	2.772	0.005905	0.081759	0.072	|	0.000
20	2.666	2.602	0.011492	2.435	2.769	0.063743	0.081827	0.779	|*	0.006
21	2.608	2.599	0.011088	2.432	2.766	0.009359	0.081883	0.114	|	0.000
22	2.490	2.553	0.017791	2.384	2.722	-.062541	0.080692	-0.775	*|	0.015
23	2.754	2.596	0.010777	2.429	2.762	0.158186	0.081925	1.931	|***	0.032
24	2.680	2.572	0.012659	2.405	2.739	0.108376	0.081655	1.327	|**	0.021
25	2.634	2.589	0.010586	2.422	2.756	0.044929	0.081949	0.548	|*	0.003
26	2.524	2.566	0.014134	2.398	2.733	-.041866	0.081413	-0.514	*|	0.004
27	2.524	2.581	0.011137	2.414	2.748	-.057419	0.081876	-0.701	*|	0.005
28	2.356	2.550	0.018499	2.381	2.720	-.194184	0.080533	-2.411	****|	0.153

COMPLETE RECORDS FOR BLOOD_PB, VARIABLES 1-6, 22-30, DAYS_PB, LEAD_WT, & GCUR75

BETWEEN SITE REGRESSION ANALYSES (#31A: 7 ----- CORRECTED RESPONSES

<table>
<tr><th>OBS</th><th>ACTUAL</th><th>PREDICT VALUE</th><th>STD ERR PREDICT</th><th>LOWER95% PREDICT</th><th>UPPER95% PREDICT</th><th>RESIDUAL</th><th>STD ERR RESIDUAL</th><th>STUDENT RESIDUAL</th><th>-2-1-0 1 2</th><th>COOK'S D</th></tr>
<tr><td>29</td><td>2.573</td><td>2.557</td><td>0.016527</td><td>2.388</td><td>2.726</td><td>0.016206</td><td>0.080961</td><td>0.200</td><td>| | |</td><td>0.001</td></tr>
<tr><td>30</td><td>2.623</td><td>2.560</td><td>0.015666</td><td>2.392</td><td>2.728</td><td>0.063031</td><td>0.081132</td><td>0.777</td><td>| |* |</td><td>0.011</td></tr>
<tr><td>31</td><td>2.525</td><td>2.547</td><td>0.019730</td><td>2.377</td><td>2.717</td><td>-.022048</td><td>0.080240</td><td>-0.275</td><td>| | |</td><td>0.002</td></tr>
<tr><td>32</td><td>2.627</td><td>2.634</td><td>0.019764</td><td>2.464</td><td>2.804</td><td>-.007225</td><td>0.080232</td><td>-0.090</td><td>| | |</td><td>0.000</td></tr>
<tr><td>33</td><td>2.814</td><td>2.613</td><td>0.013727</td><td>2.445</td><td>2.781</td><td>0.201071</td><td>0.081482</td><td>2.468</td><td>| |**** |</td><td>0.086</td></tr>
<tr><td>34</td><td>2.591</td><td>2.632</td><td>0.019093</td><td>2.462</td><td>2.801</td><td>-.040833</td><td>0.080394</td><td>-0.508</td><td>| *| |</td><td>0.007</td></tr>
<tr><td>35</td><td>2.557</td><td>2.593</td><td>0.010628</td><td>2.426</td><td>2.760</td><td>-.035892</td><td>0.081944</td><td>-0.438</td><td>| | |</td><td>0.002</td></tr>
<tr><td>36</td><td>2.721</td><td>2.629</td><td>0.018314</td><td>2.460</td><td>2.799</td><td>0.091257</td><td>0.080575</td><td>1.133</td><td>| |** |</td><td>0.033</td></tr>
<tr><td>37</td><td>2.649</td><td>2.578</td><td>0.011491</td><td>2.412</td><td>2.745</td><td>0.070168</td><td>0.081827</td><td>0.858</td><td>| |* |</td><td>0.007</td></tr>
<tr><td>38</td><td>2.684</td><td>2.627</td><td>0.017503</td><td>2.458</td><td>2.796</td><td>0.057334</td><td>0.080755</td><td>0.710</td><td>| |* |</td><td>0.012</td></tr>
<tr><td>39</td><td>2.646</td><td>2.619</td><td>0.015343</td><td>2.451</td><td>2.787</td><td>0.027266</td><td>0.081193</td><td>0.336</td><td>| | |</td><td>0.002</td></tr>
<tr><td>40</td><td>2.554</td><td>2.625</td><td>0.016958</td><td>2.456</td><td>2.794</td><td>-.070842</td><td>0.080872</td><td>-0.876</td><td>| *| |</td><td>0.017</td></tr>
<tr><td>41</td><td>2.618</td><td>2.578</td><td>0.011537</td><td>2.411</td><td>2.745</td><td>0.039945</td><td>0.081821</td><td>0.488</td><td>| | |</td><td>0.002</td></tr>
<tr><td>42</td><td>2.646</td><td>2.623</td><td>0.016332</td><td>2.454</td><td>2.791</td><td>0.022865</td><td>0.081000</td><td>0.282</td><td>| | |</td><td>0.002</td></tr>
<tr><td>43</td><td>2.576</td><td>2.576</td><td>0.011953</td><td>2.409</td><td>2.743</td><td>-7.1E-05</td><td>0.081761</td><td>-0.001</td><td>| | |</td><td>0.000</td></tr>
<tr><td>44</td><td>2.581</td><td>2.617</td><td>0.014685</td><td>2.449</td><td>2.785</td><td>-.035897</td><td>0.081315</td><td>-0.441</td><td>| | |</td><td>0.003</td></tr>
<tr><td>45</td><td>2.574</td><td>2.563</td><td>0.014940</td><td>2.395</td><td>2.731</td><td>0.011582</td><td>0.081269</td><td>0.143</td><td>| | |</td><td>0.000</td></tr>
<tr><td>46</td><td>2.574</td><td>2.612</td><td>0.013563</td><td>2.445</td><td>2.780</td><td>-.038464</td><td>0.081510</td><td>-0.472</td><td>| | |</td><td>0.003</td></tr>
<tr><td>47</td><td>2.653</td><td>2.542</td><td>0.021240</td><td>2.371</td><td>2.713</td><td>0.111498</td><td>0.079854</td><td>1.396</td><td>| |** |</td><td>0.069</td></tr>
<tr><td>48</td><td>2.489</td><td>2.610</td><td>0.013092</td><td>2.443</td><td>2.778</td><td>-.121648</td><td>0.081587</td><td>-1.491</td><td>| **| |</td><td>0.029</td></tr>
<tr><td>49</td><td>2.450</td><td>2.604</td><td>0.011819</td><td>2.437</td><td>2.771</td><td>-.153446</td><td>0.081781</td><td>-1.876</td><td>| ***| |</td><td>0.037</td></tr>
<tr><td>50</td><td>2.716</td><td>2.572</td><td>0.012627</td><td>2.405</td><td>2.739</td><td>0.144194</td><td>0.081660</td><td>1.766</td><td>| |*** |</td><td>0.037</td></tr>
<tr><td>51</td><td>2.515</td><td>2.601</td><td>0.011397</td><td>2.434</td><td>2.768</td><td>-.086262</td><td>0.081841</td><td>-1.054</td><td>| **| |</td><td>0.011</td></tr>
<tr><td>52</td><td>2.491</td><td>2.599</td><td>0.011153</td><td>2.433</td><td>2.766</td><td>-.107968</td><td>0.081874</td><td>-1.319</td><td>| **| |</td><td>0.016</td></tr>
<tr><td>53</td><td>2.553</td><td>2.550</td><td>0.018682</td><td>2.380</td><td>2.719</td><td>0.002701</td><td>0.080491</td><td>0.034</td><td>| | |</td><td>0.000</td></tr>
<tr><td>54</td><td>2.528</td><td>2.570</td><td>0.013151</td><td>2.402</td><td>2.737</td><td>-.041701</td><td>0.081577</td><td>-0.511</td><td>| *| |</td><td>0.003</td></tr>
<tr><td>55</td><td>2.629</td><td>2.596</td><td>0.010783</td><td>2.429</td><td>2.762</td><td>0.033329</td><td>0.081924</td><td>0.407</td><td>| | |</td><td>0.001</td></tr>
<tr><td>56</td><td>2.549</td><td>2.589</td><td>0.010588</td><td>2.422</td><td>2.756</td><td>-.039956</td><td>0.081949</td><td>-0.488</td><td>| | |</td><td>0.002</td></tr>
<tr><td>57</td><td>2.656</td><td>2.587</td><td>0.010661</td><td>2.420</td><td>2.753</td><td>0.069630</td><td>0.081940</td><td>0.850</td><td>| |* |</td><td>0.006</td></tr>
<tr><td>58</td><td>2.493</td><td>2.565</td><td>0.014215</td><td>2.398</td><td>2.733</td><td>-.072421</td><td>0.081399</td><td>-0.890</td><td>| *| |</td><td>0.012</td></tr>
<tr><td>59</td><td>2.591</td><td>2.576</td><td>0.011921</td><td>2.409</td><td>2.743</td><td>0.015167</td><td>0.081766</td><td>0.185</td><td>| | |</td><td>0.000</td></tr>
<tr><td>60</td><td>2.612</td><td>2.557</td><td>0.016538</td><td>2.388</td><td>2.726</td><td>0.054765</td><td>0.080958</td><td>0.676</td><td>| |* |</td><td>0.010</td></tr>
<tr><td>61</td><td>2.524</td><td>2.560</td><td>0.015714</td><td>2.391</td><td>2.728</td><td>-.035407</td><td>0.081122</td><td>-0.436</td><td>| | |</td><td>0.004</td></tr>
<tr><td>62</td><td>.</td><td>2.634</td><td>0.019894</td><td>2.464</td><td>2.804</td><td>.</td><td>.</td><td>.</td><td></td><td>.</td></tr>
<tr><td>63</td><td>.</td><td>2.541</td><td>0.021472</td><td>2.370</td><td>2.712</td><td>.</td><td>.</td><td>.</td><td></td><td>.</td></tr>
</table>

SUM OF RESIDUALS 1.07914E-13
SUM OF SQUARED RESIDUALS 0.4028386

TEH 0530247

DUP050031159

Corrected Site Mean Blood Lead
Between Site Model G
Transformed Gas. Lead Exp.
Based on Adj. Set 2W

COMPLETE RECORDS FOR BLOOD_PB, VARIABLES 1-6, 22-30, DAYS_PB, LEAD_WT, & GCUR75

BETWEEN SITE REGRESSION ANALYSES (#31A: 7 ----- CORRECTED RESPONSES

DEP VARIABLE: A_EQ2WSS

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F VALUE	PROB>F
MODEL	1	0.032563	0.032563	5.370	0.0240
ERROR	59	0.357779	0.006064043		
C TOTAL	60	0.390342			

ROOT MSE	0.077872	R-SQUARE	0.0834
DEP MEAN	2.588906	ADJ R-SQ	0.0679
C.V.	3.00791		

VARIABLE	DF	PARAMETER ESTIMATE	STANDARD ERROR	T FOR H0: PARAMETER=0	PROB > |T|	TOLERANCE	VARIANCE INFLATION
INTERCEP	1	2.626589	0.019075	137.699	0.0001	.	0.000000
DAYS_PB	1	-.0000540209	0.000023312	-2.317	0.0240	1.000000	1.000000

OBS	ACTUAL	PREDICT VALUE	STD ERR PREDICT	LOWER95% PREDICT	UPPER95% PREDICT	RESIDUAL	STD ERR RESIDUAL	STUDENT RESIDUAL	-2-1-0 1 2	COOK'S D
1	2.587	2.626	0.018758	2.465	2.786	-.038693	0.075579	-0.512	*|	0.008
2	2.557	2.623	0.017887	2.463	2.783	-.066260	0.075790	-0.874	*|	0.021
3	2.561	2.584	0.010176	2.427	2.741	-.023631	0.077204	-0.306	|	0.001
4	2.624	2.621	0.017106	2.462	2.781	0.003340	0.075970	0.044	|	0.000
5	2.612	2.582	0.010449	2.424	2.739	0.030311	0.077168	0.393	|	0.001
6	2.692	2.619	0.016252	2.459	2.778	0.072994	0.076157	0.958	|*	0.021
7	2.571	2.584	0.010193	2.427	2.741	-.013014	0.077202	-0.169	|	0.000
8	2.596	2.616	0.015524	2.458	2.775	-.020659	0.076309	-0.271	|	0.002
9	2.585	2.566	0.014074	2.408	2.724	0.018622	0.076590	0.243	|	0.001
10	2.457	2.615	0.014973	2.456	2.773	-.157317	0.076419	-2.059	****|	0.081
11	2.476	2.558	0.016678	2.399	2.717	-.082326	0.076065	-1.082	**|	0.028
12	2.686	2.614	0.014703	2.455	2.773	0.072453	0.076471	0.947	|*	0.017
13	2.384	2.553	0.018427	2.393	2.713	-.168679	0.075660	-2.229	****|	0.147
14	2.745	2.611	0.013859	2.453	2.769	0.133362	0.076629	1.740	|***	0.050
15	2.654	2.548	0.020236	2.387	2.709	0.105560	0.075197	1.404	|**	0.071
16	2.612	2.605	0.012170	2.447	2.763	0.006744	0.076915	0.088	|	0.000
17	2.659	2.591	0.010025	2.434	2.748	0.067298	0.077224	0.871	|*	0.006
18	2.510	2.572	0.012372	2.414	2.730	-.062402	0.076883	-0.812	*|	0.009
19	2.688	2.601	0.011282	2.444	2.759	0.086737	0.077050	1.126	|**	0.014
20	2.663	2.599	0.010830	2.441	2.756	0.064598	0.077115	0.838	|*	0.007
21	2.590	2.596	0.010449	2.439	2.753	-.005689	0.077168	-0.074	|	0.000
22	2.471	2.558	0.016767	2.398	2.717	-.086507	0.076045	-1.138	**|	0.031
23	2.707	2.593	0.010157	2.436	2.751	0.113400	0.077207	1.469	|**	0.019
24	2.611	2.574	0.011930	2.416	2.731	0.037637	0.076953	0.489	|	0.003
25	2.618	2.588	0.009977	2.431	2.745	0.029898	0.077230	0.387	|	0.001
26	2.497	2.568	0.013320	2.410	2.727	-.071543	0.076724	-0.932	*|	0.013
27	2.561	2.581	0.010496	2.424	2.739	-.020035	0.077161	-0.260	|	0.001
28	2.399	2.556	0.017434	2.396	2.715	-.156406	0.075895	-2.061	****|	0.112

TEH 0530248

DUP050031160

COMPLETE RECORDS FOR BLOOD_PB, VARIABLES 1-6, 22-30, DAYS_PB, LEAD_WT, & GCUR75

BETWEEN SITE REGRESSION ANALYSES (#31A: 7 ----- CORRECTED RESPONSES

OBS	ACTUAL	PREDICT VALUE	STD ERR PREDICT	LOWER95% PREDICT	UPPER95% PREDICT	RESIDUAL	STD ERR RESIDUAL	STUDENT RESIDUAL	-2-1-0 1 2	COOK'S D
29	2.563	2.561	0.015576	2.402	2.720	0.002252	0.076298	0.030	|	0.000
30	2.608	2.564	0.014764	2.405	2.722	0.044071	0.076460	0.576	|*	0.006
31	2.577	2.553	0.018594	2.392	2.713	0.024838	0.075619	0.328	|	0.003
32	2.617	2.625	0.018626	2.465	2.786	-.008272	0.075612	-0.109	|	0.000
33	2.744	2.608	0.012937	2.450	2.766	0.135741	0.076790	1.768	|***	0.044
34	2.611	2.624	0.017993	2.464	2.784	-.012371	0.075765	-0.163	|	0.001
35	2.546	2.591	0.010016	2.434	2.748	-.045378	0.077225	-0.588	*|	0.003
36	2.718	2.622	0.017259	2.462	2.781	0.096711	0.075935	1.274	|**	0.042
37	2.709	2.579	0.010829	2.422	2.736	0.130060	0.077115	1.687	|***	0.028
38	2.671	2.619	0.016495	2.460	2.779	0.051301	0.076105	0.674	|*	0.011
39	2.609	2.613	0.014459	2.455	2.772	-.004392	0.076518	-0.057	|	0.000
40	2.512	2.618	0.015981	2.459	2.777	-.105497	0.076214	-1.384	**|	0.042
41	2.572	2.579	0.010873	2.422	2.736	-.006951	0.077109	-0.090	|	0.000
42	2.608	2.616	0.015391	2.457	2.775	-.008264	0.076336	-0.108	|	0.000
43	2.594	2.577	0.011264	2.419	2.734	0.017096	0.077053	0.222	|	0.001
44	2.542	2.611	0.013840	2.453	2.769	-.069615	0.076632	-0.908	*|	0.013
45	2.545	2.566	0.014080	2.408	2.724	-.020643	0.076589	-0.270	|	0.001
46	2.586	2.607	0.012782	2.450	2.765	-.021315	0.076816	-0.277	|	0.001
47	2.675	2.549	0.020017	2.388	2.710	0.126706	0.075255	1.684	|***	0.100
48	2.460	2.606	0.012338	2.448	2.764	-.145448	0.076888	-1.892	***|	0.046
49	2.525	2.600	0.011139	2.443	2.758	-.075665	0.077071	-0.982	*|	0.010
50	2.726	2.574	0.011900	2.416	2.731	0.151920	0.076957	1.974	|***	0.047
51	2.523	2.598	0.010740	2.441	2.755	-.075640	0.077128	-0.981	*|	0.009
52	2.503	2.597	0.010511	2.439	2.754	-.093338	0.077159	-1.210	**|	0.014
53	2.653	2.555	0.017606	2.396	2.715	0.097991	0.075856	1.292	|**	0.045
54	2.500	2.572	0.012394	2.414	2.730	-.071598	0.076879	-0.931	*|	0.011
55	2.600	2.593	0.010162	2.436	2.751	0.006573	0.077206	0.085	|	0.000
56	2.593	2.588	0.009978	2.431	2.745	0.005487	0.077230	0.071	|	0.000
57	2.610	2.586	0.010047	2.429	2.743	0.023590	0.077221	0.305	|	0.001
58	2.511	2.568	0.013396	2.410	2.726	-.057015	0.076711	-0.743	*|	0.008
59	2.649	2.577	0.011235	2.419	2.734	0.072187	0.077057	0.937	|*	0.009
60	2.581	2.561	0.015586	2.402	2.720	0.020022	0.076296	0.262	|	0.001
61	2.509	2.564	0.014809	2.405	2.722	-.054937	0.076451	-0.719	*|	0.010
62	.	2.626	0.018749	2.465	2.786	.	.	.		.
63	.	2.548	0.020236	2.387	2.709	.	.	.		.

SUM OF RESIDUALS 1.13465E-13
SUM OF SQUARED RESIDUALS 0.3577786

Table IV-2

Site Specific Gasoline Lead
Exposure Data

BLOOD LEAD AND GASOLINE LEAD SUMMARIES FOR NHANES II SITES

SITE ID	STRATA	PSU	SITE LOCATION	MEAN EXAM DATE	BLOOD LEAD SITE MEAN	N	GAS CUR, 75	STATE POP 1975	COUNTY POP 1975	COUNTY AREA
1	01	1	MIAMI, FL	03/06/76	16.5672	134	0.000185586	8283074	1439481	2042
2	02	1	HONOLULU, HI	03/08/78	16.6379	116	.	868396	705381	596
3	03	1	SHREVEPORT, LA	04/20/76	17.2026	153	0.000062760	3803937	239078	899
4	04	1	WOODLAND, CA	04/14/78	14.1016	187	0.000096106	21202559	687888	975
5	05	1	NEWPORT NEWS, VA	05/30/76	17.6194	134	0.000466976	4980570	263773	124
6	06	1	WICHITA, KS	05/31/78	15.9565	138	0.000096786	2279899	345224	1007
7	07	1	DEXTER, MO	07/15/76	17.6955	220	0.000009076	4769816	52051	1520
8	08	1	ALBANY, OR	04/17/78	12.4419	129	0.000005511	2284335	81000	2283
9	09	1	DES MOINES, IA	08/24/76	15.5481	104	0.000152171	2860686	296881	578
10	10	1	AMARILLO, TX	03/19/79	11.9259	135	0.000027852	12244678	157004	1812
11	11	1	FARMINGTON, MN	09/24/76	14.0476	126	0.000056900	3916105	166754	576
12	12	1	DAYTON, OH	08/13/79	13.1224	147	0.000167200	10735280	587507	459
13	13	1	CHICAGO, IL	10/10/76	21.0728	151	0.001009336	11206393	5369328	954
14	14	1	SAYLERSVILLE, KY	11/12/79	9.6822	214	0.000012856	3387860	73033	966
15	15	1	ATHENS, TN	11/30/76	15.4541	218	0.000013987	4174100	73829	1339
16	16	1	HARRISONBURG, VA	02/11/80	9.1626	123	0.000008428	4980570	78890	1024
17	17	1	GAINESVILLE, GA	03/23/77	12.8225	169	0.000020654	4931083	86932	1018
18	18	1	ELIZABETHTOWN, KY	12/03/77	14.5241	145	0.000016088	3387860	111265	1313
19	19	1	NEW YORK, NY	05/05/77	15.7704	135	0.003570288	18075487	1355482	41
20	20	1	TRENTON, NJ	11/27/78	15.7737	137	0.000199776	7332965	318374	228
21	21	1	PATTERSON, NJ	06/04/77	18.5146	103	0.000609924	7332965	879845	234
22	22	1	NEW BRITAIN, CT	07/19/77	15.7516	153	0.000183728	3100188	1581322	1343
23	23	1	TAUTON, MA	09/04/77	16.5205	171	0.000192687	5812489	1083807	948
24	24	1	WILLIAMSPORT, PA	08/18/79	11.6833	180	0.000012329	11863710	114897	1216
25	25	1	MCKEES ROCK, PA	10/26/77	15.5130	115	0.000327400	11863710	1517996	728
26	26	1	MIDDLETOWN, NY	10/25/78	15.8519	108	0.000025936	18075487	241811	833
27	27	1	LOS ANGELES, CA	02/01/78	14.3361	122	0.000226089	21202559	6986898	4069
28	28	1	HOUSTON, TX	01/30/79	14.7353	136	0.000381602	12244678	1944431	1723
29	29	1	OSCEOLA, MO	06/06/78	14.1743	218	0.000002597	4769816	14916	1074
30	30	1	MANSFIELD, OH	09/22/79	10.8684	152	0.000031663	10735280	130915	496
31	31	1	INDIANAPOLIS, IN	06/14/79	14.5417	144	0.000315505	5309197	782139	392
32	32	1	MATTOON, IL	04/29/79	12.2337	184	0.000008282	11206393	60454	853

Table IV-2 (Pg. 2 of 2)

Site Specific Gasoline Lead
Exposure Data

BLOOD LEAD AND GASOLINE LEAD SUMMARIES FOR NHANES II SITES

SITE ID	STRATA	PSU	SITE LOCATION	MEAN EXAM DATE	BLOOD LEAD SITE MEAN	N	GAS CUR, 75	STATE POP 1975	COUNTY POP 1975	COUNTY AREA
33	01	2	WASHINGTON, DC	11/21/79	12.2157	102	0.000661512	711518	711518	61
34	02	2	SAN JOSE, CA	03/13/76	15.8333	78	0.000171962	21202599	1174171	1300
35	03	2	COCOA, FL	01/28/77	16.2645	121	0.000058473	8283074	231918	1011
36	04	2	FRESNO, CA	04/14/76	16.4737	247	0.000014885	21202599	445727	5966
37	05	2	ATLANTA, GA	12/06/77	15.6283	113	0.000408114	4931083	450599	269
38	06	2	TACOMA, WA	05/22/76	18.7025	121	0.000051064	3553231	415707	1676
39	07	2	CHEBOYGEN, MI	07/17/78	13.2312	186	0.000004213	9116699	40630	1182
40	08	2	BLACKFOOT, ID	07/02/76	16.7614	197	0.000003797	913765	32698	2084
41	09	2	WAUKEGAN, IL	10/24/76	18.5269	93	0.000158300	11206393	407373	457
42	10	2	CHEYENNE, WY	07/30/76	16.7521	121	0.000009183	376309	63212	2703
43	11	2	RACINE, WI	07/22/78	14.7022	178	0.000081231	4577343	175781	337
44	12	2	MINNEAPOLIS, MN	09/01/76	16.2177	147	0.000324178	3916105	915603	567
45	13	2	DETROIT, MI	08/29/78	17.1545	233	0.000493799	9116699	2517726	605
46	14	2	GREENVILLE, NC	12/01/76	15.3177	192	0.000025538	5441366	145804	1354
47	15	2	MARKED TREE, AR	03/19/79	11.6900	229	0.000008488	2106793	27826	760
48	16	2	LAFAYETTE, LA	02/07/77	13.8923	195	0.000084052	3803937	125233	283
49	17	2	ROCK HILL, SC	01/31/80	10.3833	180	0.000017603	2815762	132727	1078
50	18	2	ONEONTA, AL	03/11/77	11.2041	196	0.000010755	3615907	65245	1279
51	19	2	NEW YORK, NY	04/25/77	14.0403	124	0.006626714	18075487	1429033	23
52	20	2	PLAINSFIELD, NJ	06/18/77	14.9885	87	0.000828313	7332965	520823	103
53	21	2	MT. KOSCO, NY	10/22/78	17.2593	81	0.000177229	18075487	879241	443
54	22	2	BRAINTREE, MA	07/29/77	14.3626	91	0.000273407	5812489	619994	394
55	23	2	PORTLAND, ME	08/27/77	14.8562	153	0.000066555	1057955	202183	879
56	24	2	ONEONTA, NY	10/01/79	12.0932	161	0.000002465	18075487	47071	1443
57	25	2	NORRISTOWN, PA	11/28/78	14.3571	84	0.000180559	11863710	634001	496
58	26	2	ERIE, PA	10/24/77	13.8819	144	0.000052877	11863710	273396	813
59	27	2	LOS ANGELES, CA	02/02/78	15.4098	122	0.000225668	21202559	6986898	4069
60	28	2	SAN DIEGO, CA	03/11/78	13.0804	112	0.000048960	21202559	1584583	4261
61	29	2	BOVENA, TX	02/04/79	11.6278	223	0.000004043	12244678	10302	859
62	30	2	GREENVILLE, MI	08/27/78	14.0172	174	0.000008438	9116699	91486	1287
63	31	2	CINCINNATI, OH	06/14/79	13.6507	146	0.000284623	10735280	900284	414
64	32	2	BLOOMINGTON, IN	05/01/79	12.0109	184	0.000019669	5309197	117081	935

assumed that the association between gasoline sales and population holds at the county level as well. Accordingly, county gasoline lead use was estimated (refer to Eq. 1) as the product of state gasoline lead use and the ratio of 1975 county populations to 1975 state population. To account for differences in the areas of the sites, and the consequent different exposures even if the same mass of gasoline lead were used, the county lead use value was divided by the land area of each site.

Inspection of Table IV-2 reveals that the two largest gasoline lead exposure values were associated with New York City sampling sites (Sites ID's 19 and 51). This is not unexpected because New York State represents an exception to the strong relationship between gasoline sales and population. Because of the influence of the New York City area, New York State has much lower gasoline consumption than its population would imply. The nine county New York Standard Metropolitan Statistical Area (NYSMSA) had 1970 population of 11,571,883 persons and gasoline consumption of 1,964,179 thousand gallons [19]. For the same year, New York State population was 18,236,951, and gasoline consumption was 5,506,910 thousand gallons. Thus, 1970 per capita gasoline consumption in the NYSMSA (170 gallons/year) was only 32 percent of that in the non-SMSA portion of the state (532 gallons/year). This pattern is ascribed to congestion and the availability of common carrier commuter facilities in the NYSMSA.

As a result of this exception, these two New York City sites were excluded from all analyses reported in Section V. Further, no gasoline lead data were available from Hawaii and, consequently, Honolulu (Site ID 2) was also excluded from these analyses. In order to achieve fair comparisons between results given in Section III which did not consider exposure to gasoline lead, and those in Section V which did, these three sites were excluded from analyses in Section III as well.

IV.B Comparing National and Site-Specific Measures of Gasoline Lead Exposure

Figure IV-1 is a time plot of quarterly national gasoline lead exposure during the survey period. Here quarterly national lead use (billions of grams) has been divided by U.S. square miles (3,540,023) to express exposure in the same units as the site-specific measure. The plot shows a dramatic, nearly linear, decline in gasoline lead use during the NHANES II survey period. The correlation coefficient, based on 17 quarterly values starting with 1Q76, is -.79.

Quarterly values of site gasoline lead exposure using (1) were computed for each site throughout the survey period. This was done to determine if the relationship between site gasoline lead exposure and time conformed to the pattern exhibited by the national lead use. These data are provided for each site and quarter in Table IV-3, along with the national values. Correlation coefficients and plots, similar to Figure IV-1, were developed for each site (although the plots are not shown here). Figure IV-2 summarizes these relationships in a histogram of the 61 correlation coefficients corresponding to all sites except New York City and Honolulu. These coefficients are large and negative, and range between -.97 and -.47. Uniformly, the individual site time trends conform to that observed nationally (r=-.79).

Each NHANES II site was sampled once during a short time frame within the survey period, roughly about six weeks. A time plot of the site specific measure is shown in Figure IV-3 where site average GCUR75 is plotted against site average examination date (Days_Pb). The plot reveals only a slight downward trend (r=-.10). By taking logarithms, the highly skewed nature of the GCUR75 values is symmetrized. Figure IV-4 is a plot of these logarithms (base 10) versus time. Again, a slight downward trend is present (r=-.17). These figures and correlation coefficients suggest that exposure to gasoline lead, as encountered by the survey site itinerary, is not nearly as strongly declining as the four year lead exposure trends based on either national or individual site lead use.

Figure IV-1

Quarterly National Gasoline Lead Use

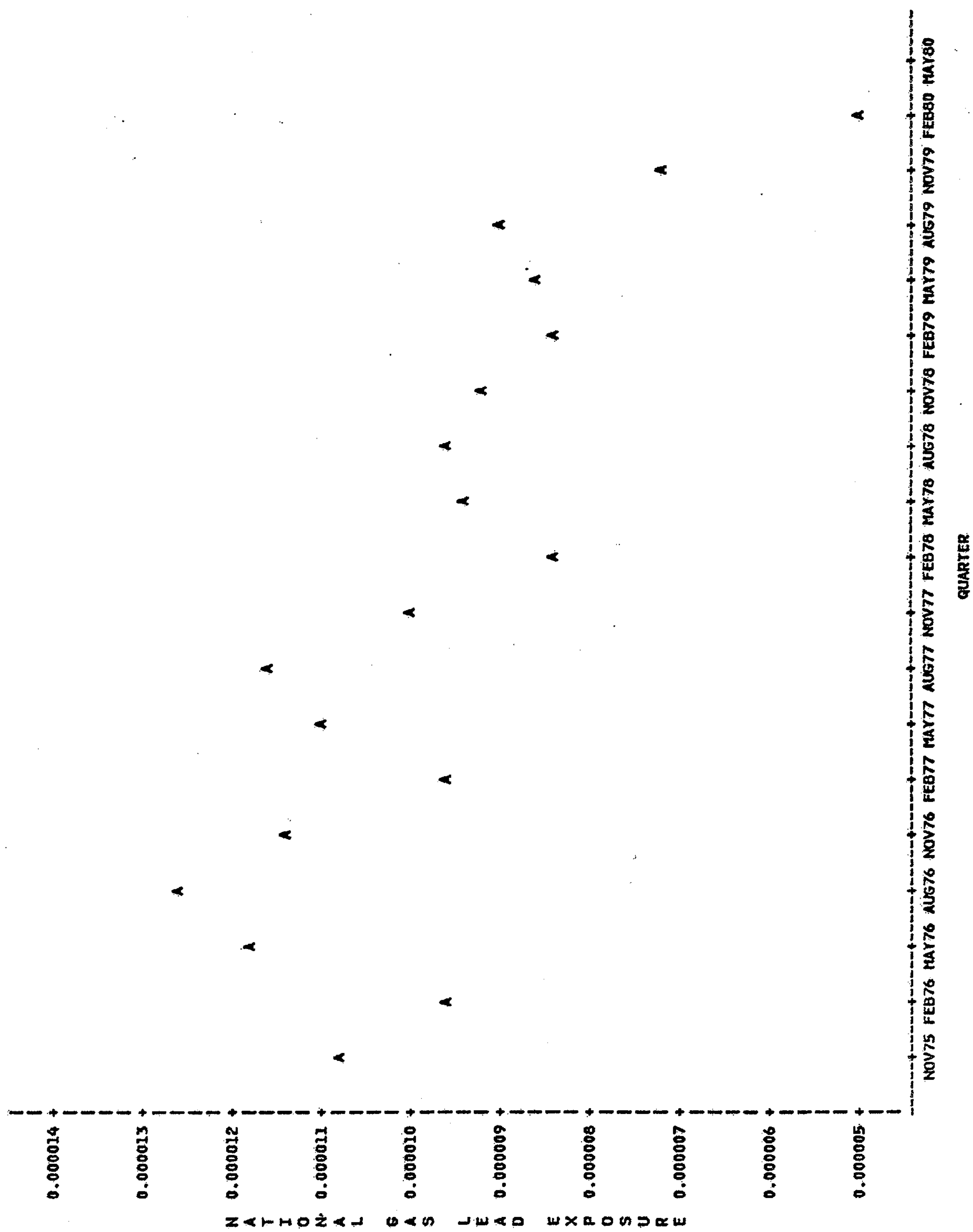


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Table IV-3

Quarterly Site and
National Gasoline Lead Use

SITE GAS LEAD EXPOSURE (X 10,000)

QTR.	SITE 1	SITE 3	SITE 4	SITE 5	SITE 6	SITE 7	SITE 8	SITE 9	SITE 10	SITE 11	SITE 12
4Q75	1.5202	0.5901	1.2255	3.7320	0.9682	0.0787	0.0618	1.1920	0.2554	0.4692	2.1192
1Q76	1.5045	0.5436	1.2157	3.3433	0.8833	0.0689	0.0548	0.9489	0.2401	0.3324	1.7399
2Q76	1.5796	0.6231	1.3799	4.2778	1.0858	0.0866	0.0690	1.3430	0.2791	0.4756	2.1706
3Q76	1.6158	0.6574	1.4275	4.7750	1.0893	0.0902	0.0807	1.5183	0.2690	0.5732	2.4203
4Q76	1.5373	0.5845	1.3000	4.2706	0.9568	0.0750	0.0653	1.3657	0.2390	0.5271	2.2207
1Q77	1.4626	0.4687	1.1835	3.6321	0.8305	0.0600	0.0530	1.0459	0.2173	0.4569	1.8422
2Q77	1.4962	0.5905	1.1728	4.4226	0.9619	0.0729	0.0678	1.2919	0.2435	0.5543	2.2986
3Q77	1.5033	0.5987	1.1447	4.7575	0.8732	0.0776	0.0832	1.2748	0.2341	0.6128	2.5015
4Q77	1.4450	0.5656	0.9875	4.1638	0.8242	0.0653	0.0640	1.1423	0.2079	0.4635	1.9549
1Q78	1.4756	0.5223	0.8535	3.4616	0.7324	0.0507	0.0488	0.8735	0.1905	0.3046	1.2963
2Q78	1.4362	0.5479	0.9322	3.9870	0.9586	0.0621	0.0513	1.0850	0.2402	0.4176	1.5721
3Q78	1.3716	0.5266	0.9131	4.1698	0.9305	0.0650	0.0505	1.0962	0.2621	0.4977	1.6550
4Q78	1.3936	0.5177	0.8354	4.0737	0.8994	0.0701	0.0464	1.0947	0.2773	0.4005	1.6807
1Q79	1.4623	0.4925	0.7699	3.7209	0.7798	0.0616	0.0423	0.9381	0.2660	0.5048	1.5811
2Q79	1.3999	0.4788	0.7131	3.7833	0.8279	0.0684	0.0468	1.0308	0.2340	0.3656	1.6587
3Q79	1.3802	0.4503	0.6921	3.8448	0.7666	0.0693	0.0516	1.0066	0.2228	0.4545	1.6697
4Q79	1.1138	0.3613	0.5995	3.0162	0.5558	0.0550	0.0382	0.8394	0.1730	0.3347	1.3162
1Q80	0.8799	0.2514	0.5052	2.1120	0.3652	0.0367	0.0264	0.4990	0.1420	0.1912	0.9121

SITE GAS LEAD EXPOSURE (X 10,000)

QTR.	SITE 13	SITE 14	SITE 15	SITE 16	SITE 17	SITE 18	SITE 19	SITE 20	SITE 21	SITE 22	SITE 23
4Q75	8.2632	0.1567	0.1418	0.1352	0.2065	0.1757	36.0885	1.9878	5.3527	1.6673	1.5517
1Q76	6.5140	0.1367	0.1295	0.1211	0.1861	0.1533	31.4300	1.8132	4.8825	1.4979	1.3402
2Q76	9.0548	0.1663	0.1471	0.1549	0.2190	0.1864	37.9505	2.1967	5.9152	1.8591	1.6870
3Q76	10.3902	0.1803	0.1565	0.1729	0.2323	0.2021	43.0315	2.4294	6.5417	2.0365	1.8365
4Q76	9.7619	0.1564	0.1351	0.1547	0.2060	0.1753	38.0657	2.1960	5.9131	1.8937	1.8910
1Q77	7.8384	0.1249	0.1121	0.1315	0.1825	0.1400	32.6042	1.8408	4.9568	1.6540	1.6490
2Q77	8.9629	0.1540	0.1373	0.1602	0.2069	0.1726	36.4397	2.1830	5.8782	1.7630	1.8569
3Q77	9.4731	0.1646	0.1453	0.1723	0.2085	0.1845	40.8696	2.3298	6.2736	1.8113	1.9637
4Q77	8.1643	0.1431	0.1295	0.1508	0.1971	0.1604	33.7126	2.1170	5.7003	1.7030	1.6142
1Q78	6.4497	0.1087	0.1063	0.1254	0.1833	0.1218	26.6453	1.9054	5.1306	1.5648	1.3072
2Q78	6.8053	0.1378	0.1261	0.1444	0.1951	0.1545	28.6206	1.9014	5.1199	1.5560	1.4815
3Q78	6.6566	0.1399	0.1285	0.1510	0.2001	0.1568	29.3065	1.9202	6.2987	1.5522	1.5153
4Q78	7.1709	0.1418	0.1254	0.1475	0.1904	0.1589	29.9521	1.9625	5.2845	1.6457	1.4311
1Q79	6.5305	0.1276	0.1092	0.1348	0.1858	0.1430	28.6828	1.8094	5.0876	1.6031	1.3499
2Q79	6.5185	0.1486	0.1166	0.1370	0.1974	0.1666	27.9859	1.7491	4.7097	1.4607	1.3859
3Q79	6.4236	0.1568	0.1183	0.1392	0.1978	0.1757	28.1707	1.7660	4.7553	1.4641	1.5308
4Q79	5.3568	0.1216	0.0954	0.1093	0.1595	0.1362	22.3708	1.4095	3.7954	1.2028	1.2122
1Q80	3.6919	0.0781	0.0666	0.0765	0.1143	0.0875	15.7772	1.0283	2.7689	0.8546	0.9536

Table IV-3 (Pg. 2 of 3)

Quarterly Site and
National Gasoline Lead Use

SITE GAS LEAD EXPOSURE (X 10,000)

QTR.	SITE 24	SITE 25	SITE 26	SITE 27	SITE 28	SITE 29	SITE 30	SITE 31	SITE 32	SITE 33	SITE 34
4Q75	0.1415	3.1232	0.3169	2.9825	3.3258	0.0319	0.4370	3.6149	0.1041	12.4426	1.5688
1Q76	0.1213	2.6831	0.2760	2.9588	3.1277	0.0279	0.3588	2.9200	0.0820	10.7705	1.5564
2Q76	0.1517	3.3475	0.3332	3.3584	3.6345	0.0351	0.4476	4.1027	0.1140	12.0492	1.7665
3Q76	0.1689	3.7268	0.3778	3.4742	3.5031	0.0366	0.4991	4.7431	0.1308	12.8361	1.8275
4Q76	0.1525	3.3663	0.3342	3.1640	3.1124	0.0304	0.4579	4.2748	0.1229	12.4590	1.6643
1Q77	0.1239	2.7348	0.2863	2.8804	2.8298	0.0243	0.3799	3.4466	0.0987	10.4426	1.5151
2Q77	0.1477	3.2591	0.3200	2.8544	3.1717	0.0296	0.4740	4.1185	0.1129	11.4754	1.5014
3Q77	0.1601	3.5324	0.3589	2.7860	3.0486	0.0315	0.5158	4.3831	0.1193	11.5410	1.4654
4Q77	0.1439	3.1756	0.2960	2.4034	2.7081	0.0265	0.4031	3.7352	0.1028	10.4262	1.2642
1Q78	0.1183	2.6113	0.2340	2.0772	2.4814	0.0206	0.2673	2.8359	0.0812	8.7705	1.0926
2Q78	0.1309	2.8883	0.2513	2.2688	3.1289	0.0252	0.3242	3.2560	0.0857	9.0984	1.1934
3Q78	0.1340	2.9573	0.2573	2.2224	3.4143	0.0264	0.3413	3.1794	0.0838	8.7213	1.1690
4Q78	0.1339	2.9543	0.2630	2.0331	3.6113	0.0284	0.3466	3.2282	0.0903	9.2787	1.0694
1Q79	0.1257	2.7735	0.2519	1.8737	3.4649	0.0250	0.3260	2.9148	0.0822	9.2459	0.9856
2Q79	0.1244	2.7461	0.2457	1.7354	3.0483	0.0277	0.3420	3.0944	0.0821	9.2623	0.9129
3Q79	0.1240	2.7369	0.2474	1.6843	2.9021	0.0281	0.3443	3.0711	0.0809	8.7049	0.8860
4Q79	0.0992	2.1898	0.1964	1.4590	2.2529	0.0223	0.2714	2.4837	0.0675	7.1803	0.7674
1Q80	0.0675	1.4885	0.1337	1.2296	1.8493	0.0149	0.1881	1.6908	0.0465	5.0656	0.6468

SITE GAS LEAD EXPOSURE (X 10,000)

QTR.	SITE 35	SITE 36	SITE 37	SITE 38	SITE 39	SITE 40	SITE 41	SITE 42	SITE 43	SITE 44	SITE 45
4Q75	0.4947	0.1298	4.0516	0.4193	0.0514	0.0231	1.3087	0.0508	0.8111	2.6172	6.2181
1Q76	0.4896	0.1287	3.6508	0.3982	0.0400	0.0195	1.5090	0.0405	0.6524	1.8544	4.8487
2Q76	0.5140	0.1461	4.2958	0.4861	0.0512	0.0268	1.4341	0.0595	0.9264	2.6531	6.1998
3Q76	0.5258	0.1512	4.4643	0.5375	0.0582	0.0324	1.6456	0.0858	1.0926	3.1974	7.0470
4Q76	0.5003	0.1377	4.0411	0.4398	0.0550	0.0244	1.5461	0.0568	0.9353	2.9401	6.6577
1Q77	0.4760	0.1253	3.5791	0.3703	0.0473	0.0194	1.2415	0.0404	0.7512	2.5483	5.7278
2Q77	0.4869	0.1242	4.0584	0.4648	0.0544	0.0240	1.4196	0.0539	0.9109	3.0918	6.5878
3Q77	0.4892	0.1212	4.0903	0.5252	0.0570	0.0279	1.5004	0.0779	1.0239	3.4180	6.8973
4Q77	0.4702	0.1046	3.8665	0.4102	0.0524	0.0208	1.2931	0.0487	0.8299	2.5855	6.3427
1Q78	0.4802	0.0904	3.5954	0.3223	0.0443	0.0182	1.0215	0.0396	0.6746	1.6989	5.3576
2Q78	0.4673	0.0987	3.8267	0.3398	0.0437	0.0211	1.0778	0.0474	0.7545	2.3294	5.2905
3Q78	0.4463	0.0967	3.8128	0.3440	0.0398	0.0222	1.0543	0.0578	0.7951	2.7764	4.8140
4Q78	0.4535	0.0885	3.7347	0.3074	0.0394	0.0176	1.1357	0.0403	0.7849	2.2337	4.7660
1Q79	0.4758	0.0815	3.6446	0.2893	0.0364	0.0148	1.0343	0.0346	0.7396	1.5789	4.4091
2Q79	0.4555	0.0755	3.8716	0.3101	0.0404	0.0163	1.0324	0.0365	0.7390	2.0391	4.8870
3Q79	0.4491	0.0733	3.8804	0.3326	0.0443	0.0177	1.0174	0.0443	0.7806	2.5352	5.3672
4Q79	0.3624	0.0635	3.1293	0.2580	0.0347	0.0130	0.8484	0.0326	0.5940	1.8667	4.2041
1Q80	0.2863	0.0535	2.2413	0.1791	0.0239	0.0094	0.5847	0.0224	0.4010	1.0663	2.8995

Table IV-3 (Pg. 3 of 3)

Quarterly Site and National Gasoline Lead Use

SITE GAS LEAD EXPOSURE (X 10,000)

QTR.	SITE 46	SITE 47	SITE 48	SITE 49	SITE 50	SITE 51	SITE 52	SITE 53	SITE 54	SITE 55	SITE 56
4Q75	0.2405	0.0985	0.9818	0.2797	0.1117	67.8225	7.1983	2.1665	2.1358	0.4353	0.0356
1Q76	0.2172	0.0882	0.9046	0.2559	0.1004	59.0675	6.5660	1.8869	1.8447	0.3642	0.0310
2Q76	0.2628	0.1093	1.0369	0.2990	0.1161	71.3217	7.9548	2.2783	2.3220	0.4883	0.0374
3Q76	0.2691	0.1178	1.0939	0.3164	0.1230	80.8707	8.7974	2.5833	2.5278	0.6301	0.0425
4Q76	0.2437	0.0946	0.9727	0.2820	0.1122	71.5382	7.9520	2.2852	2.6028	0.5105	0.0376
1Q77	0.2137	0.0709	0.7799	0.2473	0.0988	61.2743	6.6660	1.9573	2.2698	0.4511	0.0322
2Q77	0.2401	0.0953	0.9827	0.2869	0.1127	68.4824	7.9051	2.1876	2.5559	0.5322	0.0360
3Q77	0.2509	0.1135	0.9963	0.2901	0.1158	76.8077	8.4368	2.4535	2.7029	0.6455	0.0403
4Q77	0.2331	0.0991	0.9411	0.2649	0.1091	63.3573	7.6659	2.0239	2.2218	0.4959	0.0333
1Q78	0.2167	0.0844	0.8691	0.2476	0.0997	50.0754	6.8998	1.5996	1.7992	0.3746	0.0263
2Q78	0.2393	0.0982	0.9117	0.2698	0.1079	53.7877	6.8853	1.7182	2.0391	0.3998	0.0282
3Q78	0.2409	0.1013	0.8762	0.2677	0.1078	55.0767	6.9535	1.7594	2.0857	0.5031	0.0289
4Q78	0.2359	0.0897	0.8614	0.2576	0.1063	56.2901	7.1066	1.7981	1.9698	0.4220	0.0296
1Q79	0.2284	0.0758	0.8194	0.2484	0.1012	53.9046	6.8418	1.7219	1.8580	0.3587	0.0283
2Q79	0.2374	0.0805	0.7966	0.2687	0.1070	52.5950	6.3336	1.6801	1.9075	0.3883	0.0276
3Q79	0.2457	0.0835	0.7493	0.2729	0.1113	52.9421	6.3950	1.6912	2.1071	0.5146	0.0278
4Q79	0.1909	0.0658	0.6012	0.2119	0.0887	42.0423	5.1041	1.3430	1.6685	0.3859	0.0221
1Q80	0.1372	0.0447	0.4183	0.1519	0.0632	29.6506	3.7236	0.9472	1.3125	0.2952	0.0156

QTR.	SITE GAS LEAD EXPOSURE (X 10,000) SITE 57	SITE 58	SITE 59	SITE 60	SITE 61	SITE 62	SITE 63	SITE 64	NATIONAL GAS LEAD EXPOSURE (X 10,000)
4Q75	1.9146	0.5037	2.9825	0.6459	0.0353	0.1062	3.6004	0.2269	0.1083
1Q76	1.6412	0.4318	2.9588	0.6408	0.0332	0.0828	2.9560	0.1833	0.0968
2Q76	2.0521	0.5399	3.3584	0.7273	0.0386	0.1059	3.6877	0.2575	0.1170
3Q76	2.2846	0.6010	3.4742	0.7524	0.0372	0.1204	4.1119	0.2977	0.1262
4Q76	2.0636	0.5429	3.1640	0.6852	0.0331	0.1137	3.7728	0.2684	0.1130
1Q77	1.6765	0.4411	2.8804	0.6238	0.0301	0.0978	3.1298	0.2163	0.0965
2Q77	1.9979	0.5256	2.8544	0.6182	0.0337	0.1125	3.9053	0.2585	0.1107
3Q77	2.1654	0.5697	2.7860	0.6034	0.0324	0.1178	4.2498	0.2751	0.1159
4Q77	1.9467	0.5121	2.4034	0.5205	0.0288	0.1083	3.3213	0.2344	0.0997
1Q78	1.6007	0.4211	2.0772	0.4499	0.0264	0.0915	2.2023	0.1780	0.0830
2Q78	1.7705	0.4658	2.2688	0.4914	0.0333	0.0904	2.6708	0.2043	0.0940
3Q78	1.8129	0.4769	2.2224	0.4813	0.0363	0.0822	2.8118	0.1995	0.0962
4Q78	1.8110	0.4765	2.0331	0.4403	0.0384	0.0814	2.8554	0.2026	0.0921
1Q79	1.7002	0.4473	1.8737	0.4058	0.0368	0.0753	2.6862	0.1829	0.0839
2Q79	1.6834	0.4429	1.7354	0.3759	0.0324	0.0835	2.8181	0.1942	0.0867
3Q79	1.6778	0.4414	1.6843	0.3648	0.0308	0.0917	2.8367	0.1927	0.0899
4Q79	1.3424	0.3532	1.4590	0.3160	0.0239	0.0718	2.2361	0.1559	0.0710
1Q80	0.9125	0.2401	1.2296	0.2663	0.0197	0.0495	1.5496	0.1061	0.0504

Figure IV-2

Summary of Correlation Coefficients
of Four Year Quarterly
Gasoline Lead Exposure at the
NHANES II Survey Sites

MOMENTS

N	61	SUM WGTS	61
MEAN	-0.704966	SUM	-43.003
STD DEV	0.131912	VARIANCE	0.0174007
SKEWNESS	-0.248062	KURTOSIS	-0.186288
USS	31.3597	CSS	1.04404
CV	-18.7118	STD MEAN	0.0168896
T:MEAN=0	-41.7398	PROB>|T|	0.0001
SGN RANK	-945.5	PROB>|S|	0.0001
NUM ^= 0	61		
D:NORMAL	0.0922192	PROB>D	>0.15

QUANTILES(DEF=4)

100% MAX	-0.471557	99%	-0.471557
75% Q3	-0.628038	95%	-0.480585
50% MED	-0.719949	90%	-0.528274
25% Q1	-0.770091	10%	-0.952929
0% MIN	-0.965578	5%	-0.965577
		1%	-0.965577
RANGE	0.49402		
Q3-Q1	0.142052		
MODE	-0.965577		

EXTREMES

LOWEST	HIGHEST
-0.965577	-0.480611
-0.965577	-0.480611
-0.965577	-0.480583
-0.965577	-0.477315
-0.965577	-0.471557

```
STEM LEAF                  #     BOXPLOT
 -46 72                    2        |
 -48 111                   3        |
 -50                                |
 -52 776                   3        |
 -54 466                   3        |
 -56 6                     1        |
 -58                                |
 -60 49                    2        |
 -62 706                   3     +-----+
 -64 7003                  4     |     |
 -66 99900                 5     |     |
 -68 00                    2     |     |
 -70 77                    2     *--+--*
 -72 9622222200           10     |     |
 -74 10                    2     |     |
 -76 00000                 5     +-----+
 -78 88733                 5        |
 -80                                |
 -82 5                     1        |
 -84                                |
 -86 7                     1        |
 -88                                |
 -90 2                     1        |
 -92                                |
 -94                                |
 -96 666666                6        |
     ----+----+----+----+
 MULTIPLY STEM.LEAF BY 10**-02
```

```
                        NORMAL PROBABILITY PLOT
-0.47+                                            *   *
     |                                       ****
     |                                        +
     |                                     **+
     |                                  ****+
-0.57+                                  **+
     |                                 ++
     |                                +*
     |                              +**
     |                            ****
-0.67+                          **+
     |                         **
     |                        +**
     |                     ****
     |                   ***+
-0.77+                  **+
     |               ****++
     |                 +
     |              *++
     |              +
-0.87+            +*
     |           +
     |         ++  *
     |        +
     |      ++
-0.97+  **********
      +----+----+----+----+----+----+----+----+----+----+
          -2        -1        +0        +1        +2
```

TEH 0530088

DUP050031001

Figure IV-3

Site Specific Gasoline Lead
Exposure Trend

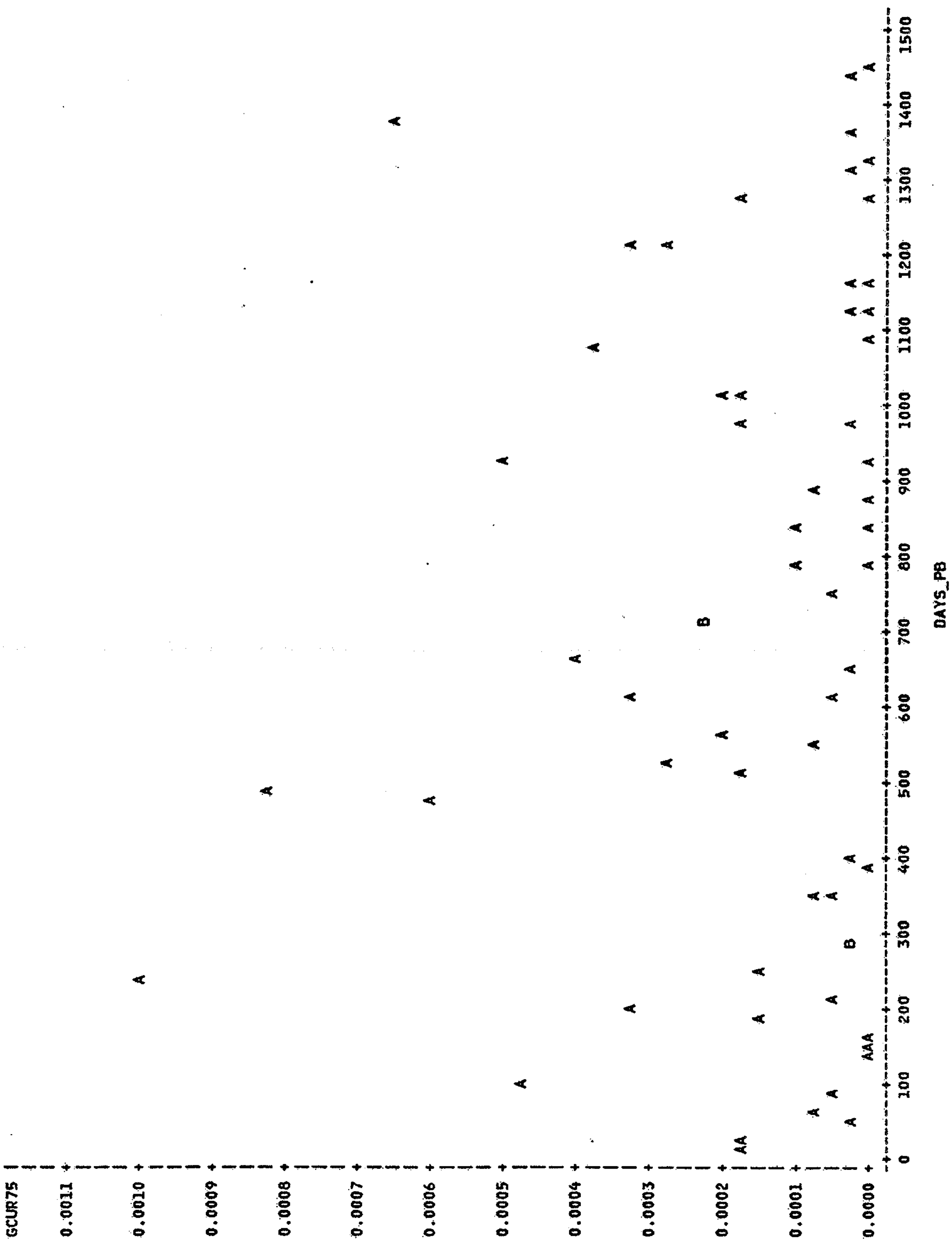
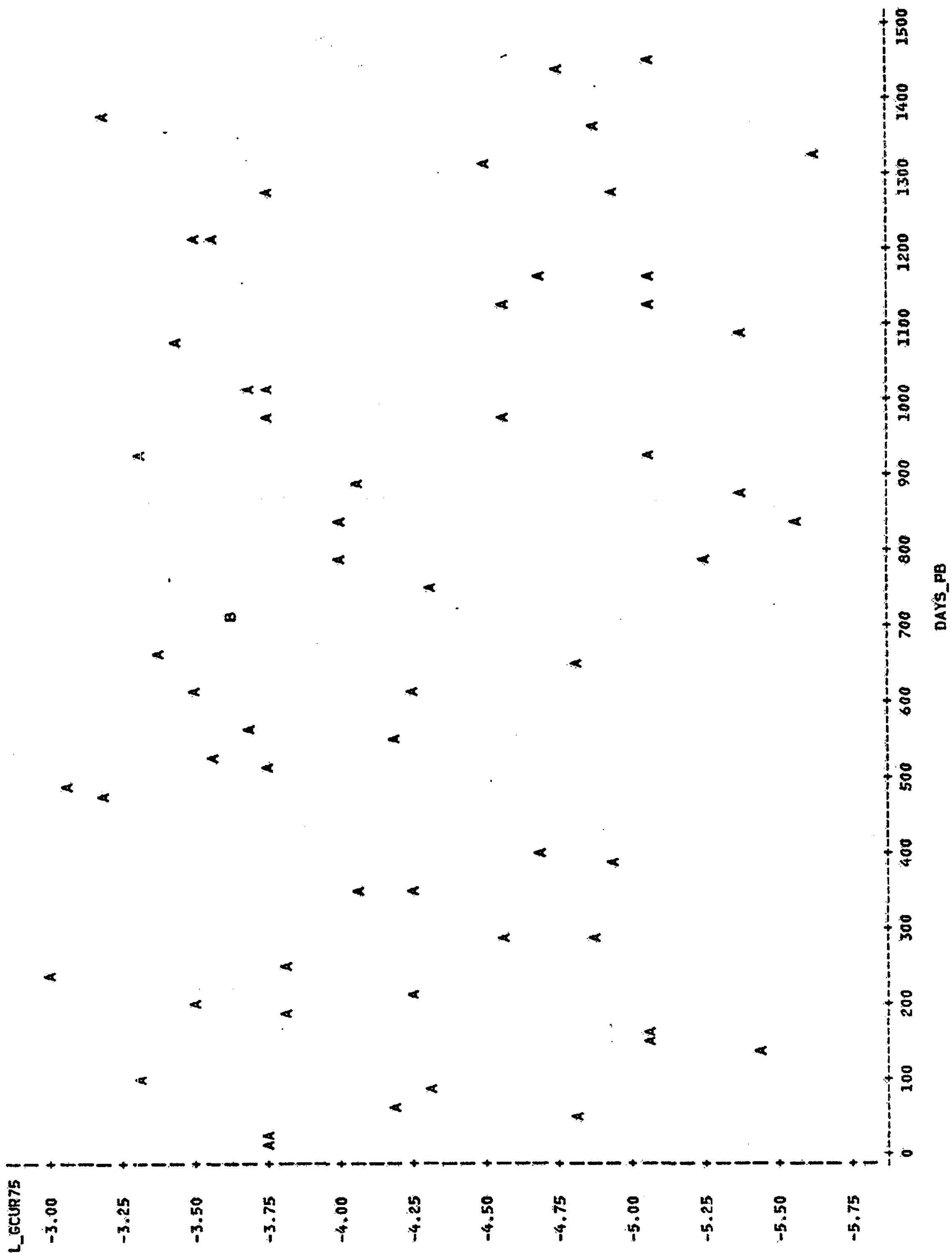


Figure IV-4

Trend of Logarithm of
Site Specific Gasoline Exposure



TEH 0530090

DUP050031003

This observation on the influence of site itinerary is conceptually illustrated in Figure IV-5. The solid lines indicate the strong downward trend in gasoline lead use at the sites during the survey period. The points on these lines show the exposure at the time the site was sampled. The collection of such points, summarized by the dotted line, portrays the exposure encountered by the site itinerary.

The slight trend in site specific gasoline lead exposure raises suspicion that this variable is not well correlated with blood lead, since blood lead levels dramatically declined during the survey period (see Figure II-1). However, a plot of site mean blood lead versus log site gasoline lead exposure (Figure IV-6) demonstrates a fairly strong relationship ($r=.49$). Thus, the site specific exposure appears to be sensitive enough to detect an expected relationship between blood lead and gasoline lead. In fact, in the analyses reported in Section V, this variable was flagged as significant ($p \leq .05$) when adjusting for demographic effects.

Values of GCUR75 vary by a factor of 400. Little reliable data is available on the range of exposures to be expected. In the study by Azar, et al [20] where individuals studied for blood lead wore personal air monitors, air lead concentrations varied by a factor of 46. Thus, it may be expected that variation in exposures in a sample as diverse as NHANES II would be even greater. It is common to represent a density measure in regression models by its logarithm due to the typical skewed nature of such data. As the analyses in Section V confirm, there is little difference in the estimated contributions of gasoline lead exposure to the reported blood lead decline when using GCUR75 or $\log_{10}$GCUR75.

Figure IV-5

Conceptual Illustration of Exposure at Individual Sites Versus Exposure Encountered by Survey Itinerary

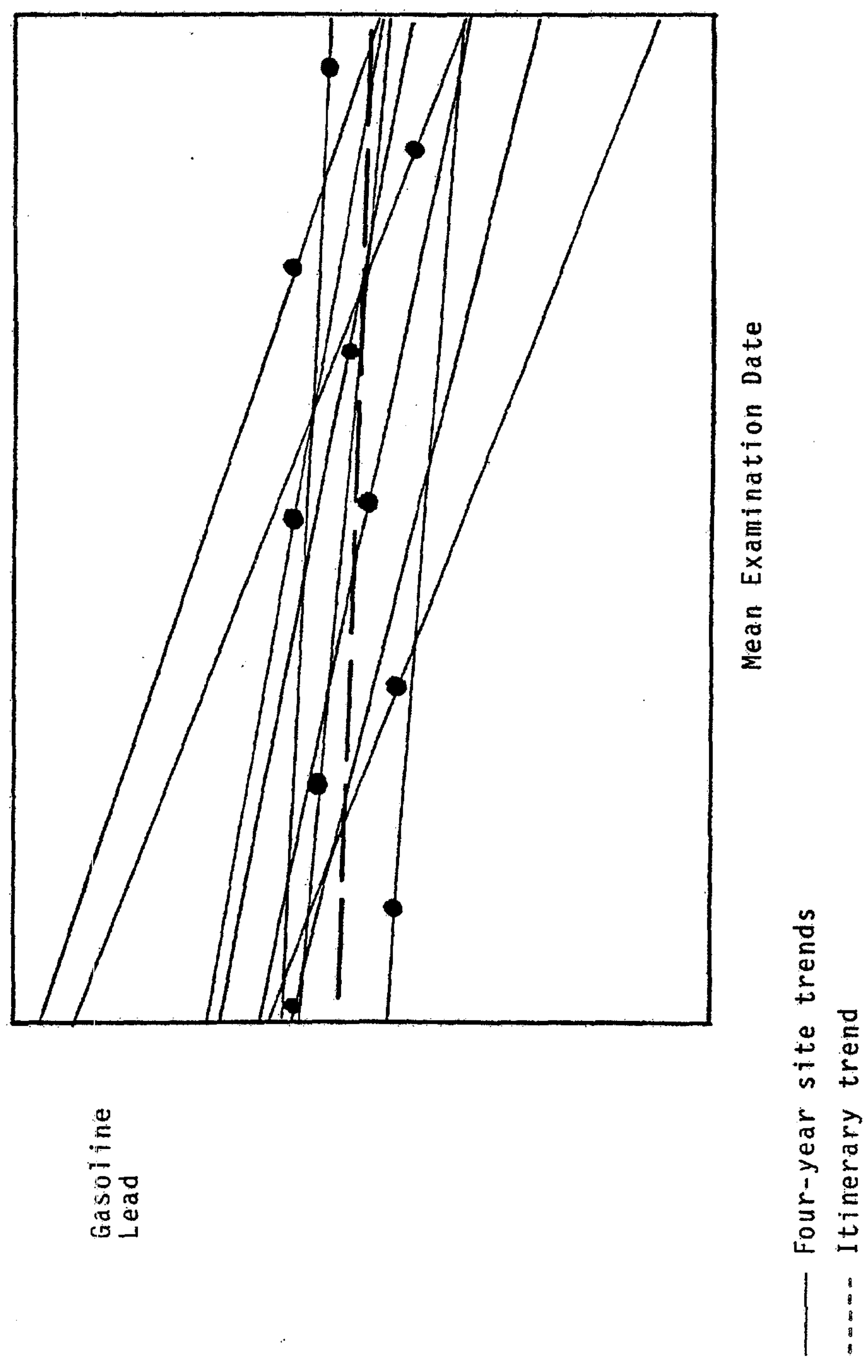
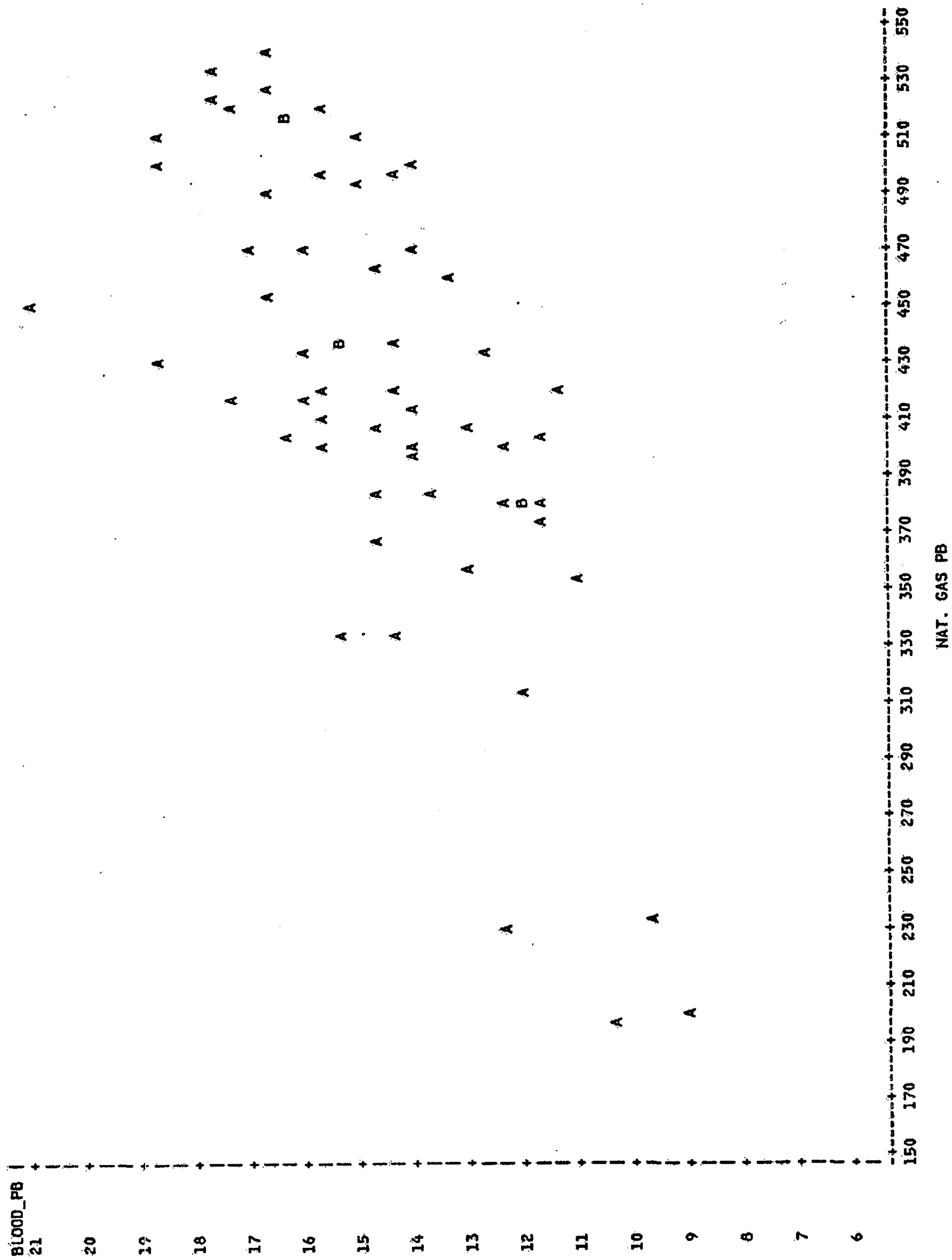


Figure IV-6

Site Mean Blood Lead Vs. Site Specific
Gasoline Lead Exposure



TEH 0530093

DUP050031006

An aspect of the site-specific measure that could result in a time-related bias is the between-site variation in site area (square miles). Counties or groups of counties are defined by political boundaries rather than natural boundaries. Consequently, if these areas tended to decrease in size according to site itinerary, there would be a tendency to dampen the true site-specific exposure time trend. Figure IV-7 is a plot of site areas versus site average examination date. No strong trend is apparent. The correlation coefficient is -.20 and this is exaggerated negatively by the influential site near the beginning of the survey.

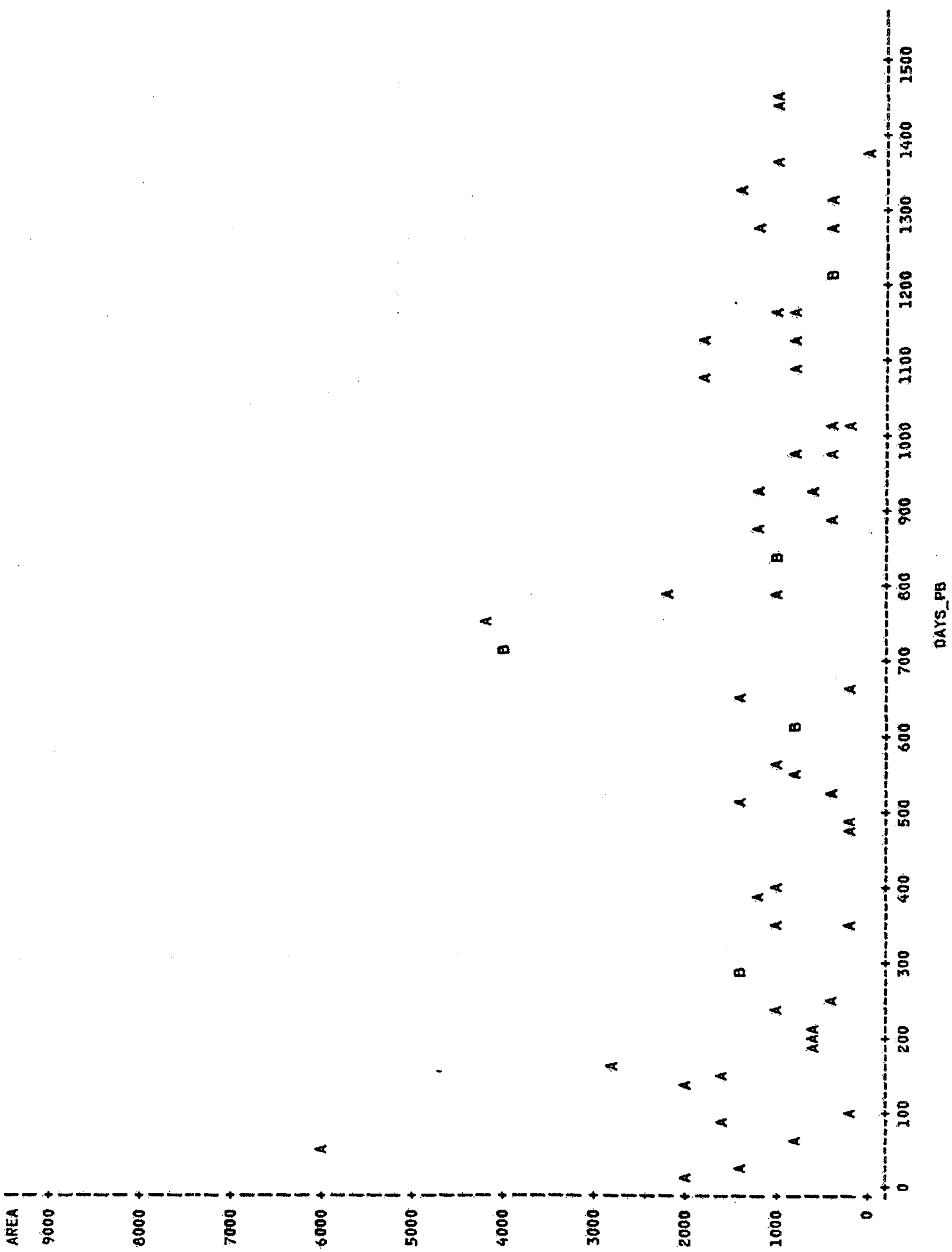
Another way to investigate a potential time bias in the site-specific exposure is to relate county lead use versus site average examination date. County lead use is state lead use proportioned by the fraction of the state's population living in counties representing a survey site (see Eq. 1). County lead use divided by county size gives the site specific measure. The time correlation coefficient for county lead use is -.13. Consequently, variation in county size appears to have little impact on the exposure-time trend relationship.

Inherent in the site specific measure of gasoline lead exposure is specification error due to a nonuniform distribution of gasoline lead within a sampling site. A measure of gasoline lead exposure that accounts for variation within sites would help to alleviate this limitation. Unfortunately, on the basis of available data, it is impossible to derive an exposure measure to account variation between individuals within sites. At best, one might investigate an exposure measure accounting for variation between subsites within sites.

It is expected, though, that the specification error associated with the site specific exposure measure is of much less severity than that resulting from use of national gasoline lead exposure, where all individuals in the U.S., regardless of location, are assumed to have the same exposure to gasoline lead in a calendar quarter.

Figure IV-7

Site County Areas Versus
Examination Date



V. Effect of Exposure to Gasoline Lead on Reported Blood Lead Decline

In this section the results of analyses accounting for exposure to gasoline lead are presented. The modelling approach is that described in Section III.A where a between-site analysis is performed on the set of adjusted site blood lead means obtained from the within-site analysis. The only difference is that the between-site models incorporate, in addition to survey demographics, one or more terms (Z-type covariates) for gasoline lead exposure.

Based on the regression results three methods are investigated for estimating the amount of the blood lead decline ascribable to exposure to gasoline lead. The first compares the residual blood lead trend before and after removing the effects of gasoline lead exposure. The second uses the estimated blood lead/gasoline lead coefficients to estimate the decline for the survey sites over the four year period, and the third uses the blood lead-time coefficient.

The collective results of these analyses suggest that site specific exposure to gasoline lead accounts for less than 1.0 μg/dl of the blood lead decline. The key results are presented in Tables 5, 6, 12, 13, 15 and 19.

V.A Results of the Between-Site Analyses

The four sets of adjusted site mean blood leads, based on results of within-site analyses on models 1, 1W, 2 and 2W (see Appendix 1), are used as the dependent variables in the between-site analyses that follow. The only change from the between-site models shown in Table III-6 is the inclusion of one or more Z-type covariates reflecting current or lagged exposure to gasoline lead at each survey site.

The key feature of the measure of gasoline lead exposure used is that it attempts to reflect the exposure of the sampled individuals at each site at the time the site was visited during NHANES II. This is essential since it was shown in Section IV that the gasoline lead exposure time trend, reflecting site itinerary during NHANES II, corresponds neither to the national gasoline lead use trend nor the lead use trend at any single site over the entire survey period.

The four gasoline lead exposure variables considered were current site exposure (GCUR75), thirty day lagged exposure (GLAG75), forty-five day lagged exposure (GLAG275), and sixty day lagged exposure (GLAG375). The lagged measures were constructed analogous to that described in Section IV for GCUR75. The values for each record correspond to the date preceding the examination date according to the lag interval (ie, 30, 45 or 60 days). The individual measures were averaged within sites and the site averages used in the between-site analyses. Table V-1 presents a listing of these site averages.

A variety of between-site models were investigated for Adjustments Sets 1, 1W, 2 and 2W. These between-site models, involving gasoline lead exposure terms, will be referred to by letters A-K. Table V-2 indicates the gasoline lead exposure terms included in each model. Two variations of each between-site model were investigated - one where the gasoline lead exposure measures are considered in untransformed form and one where each was transformed to $\log_{10}$ units.

Table V-1

Site Averages of Current and Lagged
Site Specific Gasoline Lead Exposure

GASOLINE LEAD EXPOSURE SUMMARIES BY SURVEY LOCATION

SITE ID	STRATA	PSU	SITE LOCATION	N	BLOOD LEAD	EXAM DATE	GCUR75	GLAG75	GLAG275	GLAG375
1	01	1	MIAMI, FL	134	16.57	03/06/76	1.856	1.839	1.842	1.845
2	02	1	HONOLULU, HI	116	16.64	03/08/78	.	.	.	.
3	03	1	SHREVEPORT, LA	153	17.20	04/20/76	0.628	0.600	0.586	0.578
4	04	1	WOODLAND, CA	187	14.10	04/14/78	0.961	0.933	0.919	0.918
5	05	1	NEWPORT NEWS, VA	134	17.62	05/30/76	4.670	4.417	4.251	4.084
6	06	1	WICHITA, KS	138	15.96	05/31/78	0.968	0.935	0.897	0.858
7	07	1	DEXTER, MO	220	17.70	07/15/76	0.091	0.090	0.089	0.088
8	08	1	ALBANY, OR	129	12.44	04/17/78	0.055	0.054	0.054	0.054
9	09	1	DES MOINES, IA	104	15.55	08/24/76	1.522	1.498	1.469	1.440
10	10	1	AMARILLO, TX	135	11.93	03/19/79	0.279	0.290	0.293	0.295
11	11	1	FARMINGTON, MN	126	14.05	09/24/76	0.569	0.584	0.583	0.568
12	12	1	DAYTON, OH	147	13.12	08/13/79	1.672	1.679	1.677	1.675
13	13	1	CHICAGO, IL	151	21.07	10/10/76	10.093	10.300	10.389	10.346
14	14	1	SAYLERSVILLE, KY	214	9.68	11/12/79	0.129	0.141	0.147	0.153
15	15	1	ATHENS, TN	218	15.45	11/30/76	0.140	0.148	0.151	0.155
16	16	1	HARRISONBURG, VA	123	9.16	02/11/80	0.084	0.095	0.101	0.106
17	17	1	GAINESVILLE, GA	169	12.82	03/23/77	0.207	0.198	0.199	0.202
18	18	1	ELIZABETHTOWN, KY	145	14.52	12/03/77	0.161	0.172	0.176	0.180
19	19	1	NEW YORK, NY	135	15.77	05/05/77	35.703	34.412	33.771	33.130
20	20	1	TRENTON, NJ	137	15.77	11/27/78	1.998	1.999	1.992	1.985
21	21	1	PATTERSON, NJ	103	18.51	06/04/77	6.099	5.905	5.748	5.589
22	22	1	NEW BRITAIN, CT	153	15.75	07/19/77	1.837	1.821	1.813	1.804
23	23	1	TAUTON, MA	171	16.52	09/04/77	1.927	1.991	1.977	1.959
24	24	1	WILLIAMSPORT, PA	180	11.68	08/18/79	0.123	0.125	0.125	0.125
25	25	1	MCKEES ROCK, PA	115	15.51	10/26/77	3.274	3.391	3.450	3.508
26	26	1	MIDDLETOWN, NY	108	15.85	10/25/78	0.259	0.258	0.257	0.256
27	27	1	LOS ANGELES, CA	122	14.34	02/01/78	2.261	2.372	2.429	2.485
28	28	1	HOUSTON, TX	136	14.74	01/30/79	3.816	3.869	3.895	3.921
29	29	1	OSCEOLA, MO	218	14.17	06/06/78	0.026	0.025	0.024	0.024
30	30	1	MANSFIELD, OH	152	10.87	09/22/79	0.317	0.340	0.345	0.346
31	31	1	INDIANAPOLIS, IN	144	14.54	06/14/79	3.155	3.154	3.131	3.101
32	32	1	MATTOON, IL	184	12.23	04/29/79	0.083	0.083	0.083	0.083

Table V-1 (Pg. 2 of 2)

Site Averages of Current and Lagged
Site Specific Gasoline Lead Exposure

GASOLINE LEAD EXPOSURE SUMMARIES BY SURVEY LOCATION

SITE ID	STRATA	PSU	SITE LOCATION	N	BLOOD LEAD	EXAM DATE	GCUR75	GLAG75	GLAG275	GLAG375
33	01	2	WASHINGTON, DC	102	12.22	11/21/79	6.615	7.130	7.364	7.598
34	02	2	SAN JOSE, CA	78	15.83	03/13/76	1.720	1.655	1.657	1.661
35	03	2	COCOA, FL	121	16.26	01/28/77	0.585	0.594	0.599	0.604
36	04	2	FRESNO, CA	247	16.47	04/14/76	0.149	0.143	0.140	0.138
37	05	2	ATLANTA, GA	113	15.63	12/06/77	4.081	4.171	4.210	4.250
38	06	2	TACOMA, WA	121	18.70	05/22/76	0.511	0.483	0.468	0.453
39	07	2	CHEBOYGEN, MI	186	13.23	07/17/78	0.042	0.043	0.044	0.045
40	08	2	BLACKFOOT, ID	197	16.76	07/02/76	0.038	0.036	0.034	0.033
41	09	2	WAUKEGAN, IL	93	18.53	10/24/76	1.583	1.616	1.632	1.648
42	10	2	CHEYENNE, WY	121	16.75	07/30/76	0.092	0.082	0.077	0.072
43	11	2	RACINE, WI	178	14.70	07/22/78	0.812	0.799	0.792	0.785
44	12	2	MINNEAPOLIS, MN	147	16.22	09/01/76	3.242	3.207	3.117	3.025
45	13	2	DETROIT, MI	233	17.15	08/29/78	4.938	5.030	5.107	5.187
46	14	2	GREENVILLE, NC	192	15.32	12/01/76	0.255	0.265	0.270	0.274
47	15	2	MARKED TREE, AR	229	11.69	03/19/79	0.085	0.084	0.085	0.088
48	16	2	LAFAYETTE, LA	195	13.89	02/07/77	0.841	0.897	0.929	0.962
49	17	2	ROCK HILL, SC	180	10.38	01/31/80	0.176	0.197	0.208	0.218
50	18	2	ONEONTA, AL	196	11.20	03/11/77	0.108	0.105	0.107	0.109
51	19	2	NEW YORK, NY	124	14.04	04/25/77	66.267	63.856	62.652	61.809
52	20	2	PLAINSFIELD, NJ	87	14.99	06/18/77	8.283	8.097	7.921	7.708
53	21	2	MT. KOSCO, NY	81	17.26	10/22/78	1.772	1.760	1.753	1.747
54	22	2	BRAINTREE, MA	91	14.36	07/29/77	2.734	2.685	2.661	2.636
55	23	2	PORTLAND, ME	153	14.86	08/27/77	0.666	0.663	0.644	0.624
56	24	2	ONEONTA, NY	161	12.09	10/01/79	0.025	0.027	0.027	0.027
57	25	2	NORRISTOWN, PA	84	14.36	11/28/78	1.806	1.822	1.822	1.823
58	26	2	ERIE, PA	144	13.88	10/24/77	0.529	0.548	0.557	0.566
59	27	2	LOS ANGELES, CA	122	15.41	02/02/78	2.257	2.368	2.425	2.481
60	28	2	SAN DIEGO, CA	112	13.08	03/11/78	0.490	0.485	0.495	0.508
61	29	2	BOVENA, TX	223	11.63	02/04/79	0.040	0.041	0.041	0.042
62	30	2	GREENVILLE, MI	174	14.02	08/27/78	0.084	0.086	0.087	0.089
63	31	2	CINCINNATI, OH	146	13.65	06/14/79	2.846	2.836	2.818	2.796
64	32	2	BLOOMINGTON, IN	184	12.01	05/01/79	0.197	0.193	0.191	0.189

Table V-2

Gasoline Lead Exposure Terms Included in Between-Site Models

Between Site Model	Term			
	No Lag GCUR75	30 Day Lag GLAG75	45 Day Lag GLAG275	60 Day Lag GLAG375
A	X			
B		X		
C			X	
D				X
E	X	X		
F	X		X	
G	X			X
H		X	X	
I		X		X
J	X	X	X	
K	X	X	X	X

Table V-3 presents highlights of the weighted least squares regression summaries on between-site models A-K, where the weights were the reciprocals of the adjusted blood lead site mean variances. For reference, the results of between-site analyses based only on personal, residence, and itinerary survey demographics are included. Inclusion of one or more terms for gasoline lead exposure increased the adjusted R^2-value from .01 to .07.

Although in most analysis categories it is difficult to justify a best model based on adjusted R^2-values, model A was marginally the best in all cases when gasoline lead exposure was untransformed and model G was marginally the best in all cases when gasoline lead exposure was transformed. The overall best predictive models on the basis of the maximum R^2-adjusted criterion were models G, F, E based on Adjustment Sets 2 and 2W. These models include GCUR75 with each of the other lagged gasoline lead terms. Appendix 5 provides

Table V-3 (Pg 1 of 2)

Regression Summaries of Between-Site Analyses
Including Gasoline Lead Exposure Terms
Weighted Least Squares

Based on Adjustment Set	Log Gas Pb Terms		Between-Site Model A	B	C	D	E	F	G	H	I	J	K	No Gas Pb Terms
1		R^2-adjusted	.590	.588	.587	.586	.586	.585	.585	.582	.583	.576	.567	.527
		Root MSE	3.57	3.58	3.58	3.59	3.58	3.59	3.59	3.60	3.60	3.63	3.67	3.83
		Max VIF	6.09	6.01	5.96	5.93	2150	856	460	5610	1431	91788	206478	5.40
		Max Cook's D	.87	.93	.97	1.01	.94	.97	1.00	1.00	1.05	.88	.92	.31
1	X	R^2-adjusted	.569	.565	.564	.562	.600	.602	.607	.590	.592	.590	.602	
		Root MSE	3.66	3.68	3.68	3.69	3.53	3.52	3.50	3.57	3.56	3.56	3.52	
		Max VIF	9.58	9.48	9.44	9.37	4649	2708	1754	30137	6846	107319	1148606	
		Max Cook's D	.18	.18	.18	.18	.17	.17	.16	.15	.16	.16	.15	
1W		R^2-adjusted	.579	.577	.576	.574	.575	.574	.574	.570	.572	.565	.554	.517
		Root MSE	3.62	3.63	3.63	3.64	3.63	3.64	3.64	3.65	3.65	3.68	3.72	3.88
		Max VIF	7.14	7.06	7.01	6.99	2250	887	471	5700	1448	95333	208230	6.28
		Max Cook's D	.82	.87	.91	.95	.87	.90	.93	.93	.97	.80	.86	.29
1W	X	R^2-adjusted	.557	.552	.551	.550	.588	.591	.595	.578	.581	.579	.590	
		Root MSE	3.71	3.73	3.73	3.74	3.58	3.57	3.55	3.62	3.61	3.62	3.57	
		Max VIF	10.01	9.90	9.86	9.81	4705	2720	1755	30224	6983	112072	1157833	
		Max Cook's D	.19	.18	.18	.18	.19	.18	.17	.15	.15	.17	.16	

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Table V-3 (Pg 2 of 2)

Regression Summaries of Between-Site Analyses
Including Gasoline Lead Exposure Terms
Weighted Least Squares

Based on Adjustment Set	Log Gas Pb Terms		Between-Site Model A	B	C	D	E	F	G	H	I	J	K	No Gas Pb Terms
2		R^2-adjusted	.592	.591	.590	.589	.587	.586	.585	.584	.584	.576	.564	.552
		Root MSE	4.17	4.18	4.18	4.18	4.20	4.20	4.21	4.22	4.21	4.25	4.31	4.37
		Max VIF	6.09	6.01	5.96	5.93	2150	857	460	5610	1431	91789	206479	5.39
		Max Cook's D	.61	.65	.68	.71	.63	.66	.70	.68	.74	.59	.74	.22
2	X	R^2-adjusted	.588	.585	.584	.582	.624	.624	.625	.607	.605	.614	.614	
		Root MSE	4.19	4.21	4.22	4.22	4.01	4.00	4.00	4.10	4.11	4.06	4.06	
		Max VIF	9.58	9.48	9.44	9.37	4649	2708	1754	30137	6896	107319	1148606	
		Max Cook's D	.23	.23	.23	.23	.22	.22	.22	.23	.23	.22	.22	
2W		R^2-adjusted	.581	.580	.579	.578	.575	.574	.574	.572	.572	.563	.550	.540
		Root MSE	4.23	4.24	4.24	4.25	4.26	4.27	4.27	4.28	4.28	4.32	4.38	4.43
		Max VIF	7.14	7.06	7.01	6.99	2250	887	471	5700	1448	95333	208230	6.28
		Max Cook's D	.56	.60	.63	.66	.61	.62	.66	.64	.70	.56	.70	.21
2W	X	R^2-adjusted	.579	.575	.574	.572	.613	.614	.616	.598	.598	.603	.604	
		Root MSE	4.24	4.26	4.27	4.28	4.07	4.06	4.05	4.15	4.15	4.12	4.12	
		Max VIF	10.01	9.90	9.86	9.81	4705	2720	1755	30224	6983	112072	1157833	
		Max Cook's D	.22	.22	.23	.23	.21	.22	.22	.23	.22	.22	.22	

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the detailed regression summaries for models A, E, F and G based on all adjustment sets and transformed and untransformed gasoline lead exposure terms. For Models A-D where a single gasoline lead exposure term (centered about overall mean) is included, the maximum variance inflation factor (VIF) is 10 or less and usually associated with the urban term. For the other models with more than one gasoline lead exposure term, the VIF's are considerably higher and, as expected, always associated with the exposure terms. The VIF's among the gasoline lead exposure terms in Models H, I, J and K are exceedingly large and generally have marginally poorer predictive ability than models E, F and G. The VIF's associated with survey demographic terms remain relatively small (ie, less than 11) for all models.

For models using untransformed gasoline lead exposure, one site data record (Washington, D.C.) suggested marginal influence (according to Cook's D criterion) on the estimated model coefficients at the fifth-percentile F-distribution value of .60. However, in the case of the models using the transformed gasoline lead exposure, no influential site records were noted.

Table V-4 presents a summary of the regression coefficients for models A and G based on Adjustment Set 2W. The corresponding coefficients from the analysis without gasoline lead exposure terms (see Table VII-6) are included in order to assess the impact of gasoline lead exposure on survey demographic effects.

From Table V-4 it is seen that the terms reflecting exposure to gasoline lead were flagged as significant ($p \leq .05$) in the presence of between-site survey demographic factors. In general, for models A-K the gasoline lead exposure terms were significant at or near the .05 level in all models where one exposure term (log transformed or not) was present or where $\log_{10}$ GCUR75 and one other log transformed lag term were present. It should be noted, however, that when two or more highly correlated gasoline lead exposure terms are present (refer to maximum VIF's in Table V-3) the coefficients will be driven away from zero in opposite directions. For example, for model G the lagged coefficient is -1.70 suggesting, by itself, that the higher the lagged gasoline lead exposure, the lower the expected blood lead level. This

Table V-4

Coefficients Compared in Analyses of Adjustment Set
With and Without Gasoline Lead Exposure

Model Terms	Without Gas Pb Exposure Coeff.	Without Gas Pb Exposure t-value	With Gas Pb Exposure Model A Coeff.	With Gas Pb Exposure Model A t-value	With Gas Pb Exposure Model G Coeff.	With Gas Pb Exposure Model G t-value
Black	.34*	2.00	.20	1.16	.12	.73
Male	.41	.78	.52	1.04	.35	.73
Child	.54	1.65	.24	.71	.14	.41
Teen	1.09	1.78	1.34*	2.24	1.06	1.80
Income	.53*	2.43	.52*	2.47	.45	2.21*
BL_MA	8.59*	2.08	7.39	1.85	4.97	1.25
BL_CH	-.30	-.23	.16	.12	.85	.67
BL_TN	-1.26	-.41	-.62	-.21	-1.73	-.60
BL_IN	1.74*	1.34	1.73	1.39	1.78	1.50
MA_CH	-11.49	-2.16	-9.86	-1.91	-6.39	-1.23
MA_TN	2.28	.16	4.77	.35	7.91	.61
MA_IN	-.43	-.12	-.46	-.14	-.30	-.09
CH_IN	.50	.21	-.46	-.20	-.69	-.31
TN_IN	-2.35	-.49	-.91	-.19	1.34	.29
Urban	.22*	2.61	.08	.76	.03	.32
CC	-.17	-1.59	-.14	-1.25	-.08	-.78
Winter	-.12	-1.83	-.14*	-2.19	-.13	-2.14*
Spring	.04	.61	.01	.15	-.09	-1.21
Summer	.06	1.05	.06	1.02	-.03	-.43
South	-.09	-1.05	-.07	-.93	-.07	-.90
West	.09	1.27	.15	2.02	.09	1.27
Northeast	.10	1.71	.07	1.29	.03	.61
Lead Wt	$9.7(\times 10^{-7})$	.14	$27.5(\times 10^{-7})$	-.41	$24.2(\times 10^{-7})$	-.38
$\log_{10}$ GCUR75			.12*	2.11	1.82	2.25*
$\log_{10}$ GLAG375					-1.70	-2.11*

*Flagged as significant at $p \leq .05$

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interpretation is clearly implausible. It is well known that the individual coefficients among highly correlated terms provide little useful information. At best, the impact of the fitted exposure coefficients may be evaluated as a set.

The other aspect of the results in Table V-4 to be noted is the comparison of survey demographic coefficients. Following the analysis presented in Section III, inclusion of the single gasoline lead exposure term changed the t-value by more than one unit only for Urban; inclusion of two exposure terms resulted in a one unit t-value change for Black, Child, Urban, Spring and Northeast. Comparing coefficients between Models A and G, t-values for Spring and Summer changed by more than one unit.

The VIF for $\log_{10}$GCUR75 is 7.50 in Model A which implies 86.7 percent of the variation in $\log_{10}$GCUR75 can be explained by variation in survey demographics. For Model G, the VIF for $\log_{10}$GLAG375 is 1734 which implies over 99.9 percent of its variation can be explained by survey demographics and $\log_{10}$GCUR75. From this perspective it is doubtful that additional information can be gained by including, in general, more than one term for gasoline lead exposure.

V.B Estimation of Blood Lead Decline Attributable to Site Specific Gasoline Lead Exposure

In this section, three approaches to estimating the contribution of exposure to gasoline lead are examined. The first compares residual trends from between-site models with and without gasoline lead exposure terms. The second employs the regression coefficient of gasoline lead. The third uses a time coefficient adjusted for survey demographics and gasoline lead exposure.

V.B.1 Comparison of Residual Blood Lead Time Trends

Following the same basic approach as described in Section III.D, residuals from between-site Models A-K (based on adjusted site blood lead means from within-site analyses and transformed and untransformed terms for gasoline lead exposure) were regressed on site mean examination date. This residual blood lead time trend is the trend that remains after the effects of survey demographics (P, R, and I terms) and gasoline lead exposure have been removed. Comparing this time trend to the one obtained when only effects of survey demographics were removed provides a way to isolate the contribution of gasoline lead exposure to the reported blood lead decline.

Table V-5 provides a summary of these results for all models and situations evaluated. The residual decline (μg/dl) is estimated by computing the difference between the predicted residual blood lead at the mean examination date of all venous blood lead examinees at the first site sampled (Day 16.46 after survey began) and the last site sampled (Day 1452.93) in NHANES II. The contribution of exposure to gasoline lead is then estimated by comparing residual blood lead declines from Models A-K with that associated with a model only accounting for survey demographics. Of the 88 analyses performed, estimates of the contribution of gasoline lead exposure ranged from .11 to .67 μg/dl. Models G, F and E, based on Adjustment Sets 2 and 2W, were identified in the previous section as giving the highest adjusted R^2-values. The contribution estimates from these analyses were all .52 μg/dl, which reflects approximately 10 percent of the reported blood lead decline.

Table V-5

Contribution (μg/dl) to Reported Blood Lead Decline Attributable to Gasoline Lead Exposure

Between-Site Model	Between-Site Analyses* Based on Adjustment Set: 1 — Residual Blood Pb Decline	1 — Attributable to Gas Pb Exp	1W — Residual Blood Pb Decline	1W — Attributable to Gas Pb Exp	2 — Residual Blood Pb Decline	2 — Attributable to Gas Pb Exp	2W — Residual Blood Pb Decline	2W — Attributable to Gas Pb Exp
Survey Demographics Only (P,R and I terms)	1.62	-	1.62	-	1.56	-	1.56	-
Gas Lead Exposure Term Untransformed								
A	1.27	.35	1.27	.35	1.28	.28	1.28	.28
B	1.28	.34	1.28	.34	1.28	.28	1.28	.28
C	1.28	.34	1.29	.33	1.28	.28	1.28	.28
D	1.29	.33	1.29	.33	1.29	.27	1.28	.28
E	1.21	.41	1.22	.40	1.22	.34	1.22	.34
F	1.23	.39	1.23	.39	1.24	.32	1.24	.32
G	1.23	.39	1.23	.39	1.24	.32	1.24	.32
H	1.25	.37	1.25	.37	1.26	.30	1.25	.31
I	1.25	.37	1.25	.37	1.25	.31	1.25	.31
J	1.19	.43	1.19	.43	1.20	.36	1.20	.36
K	1.18	.44	1.18	.44	1.20	.36	1.20	.36
Gas Lead Exposure Term Transformed								
A	1.48	.14	1.48	.14	1.42	.14	1.41	.15
B	1.50	.12	1.50	.12	1.45	.11	1.44	.12
C	1.51	.11	1.50	.12	1.45	.11	1.44	.12
D	1.51	.11	1.51	.11	1.45	.11	1.45	.11
E	1.10	.52	1.10	.52	1.04	.52	1.04	.52
F	1.09	.53	1.09	.53	1.04	.52	1.04	.52
G	1.07	.55	1.07	.55	1.04	.52	1.04	.52
H	1.23	.39	1.23	.39	1.18	.38	1.17	.39
I	1.23	.39	1.22	.40	1.21	.35	1.20	.36
J	1.09	.53	1.09	.53	1.04	.52	1.04	.52
K	.96	.66	.95	.67	.94	.62	.93	.63

*Weighted least squares - weighted by reciprocol of the variances of the adjusted site means.

The analyses of Models A-K are not conditional analyses where terms for gasoline lead exposure were fit after the survey demographic terms. Rather, residual blood lead time trends were evaluated from two separate least squares analyses where all terms were simultaneously fitted each time. Because of this, it is felt that this is a viable and fair approach to isolating the contribution of gasoline lead exposure to the reported blood lead decline. All of the residual blood lead declines (.93-1.51 μg/dl) from Models A-K were significantly ($p \leq .05$) greater than zero. Therefore, the individual coefficients of model terms will be biased to the extent that they are correlated with unaccounted for causes of the remaining trend. However, it is felt that the approach here, which computes the gasoline lead contribution by differencing, diminishes the impact of biasing in the individual regression coefficients.

A single term for time (Days_Pb) was included in the residual regressions from Models A-K. Although this may not be the best model to estimate the blood lead decline in all analyses performed, for purposes here and in view of the data limitations, this seems to be more than adequate. Figures V-1 and V-2 are plots of the corrected (residuals plus overall mean) site means versus site mean examination date for Model G based on Adjustment Sets 1W and 2W, respectively. These plots typify the general linear behavior present in all analyses. The details of the regressions of corrected site mean blood leads on time are presented in Appendix 6 from Models A, E, F and G based on Adjustment Set 2W. According to Cook's D criterion, no sites were identified as influential in these analyses.

Figure V-1

Corrected Site Blood Lead Means
from Between Site Model A
Based on Adjustment Set 1W

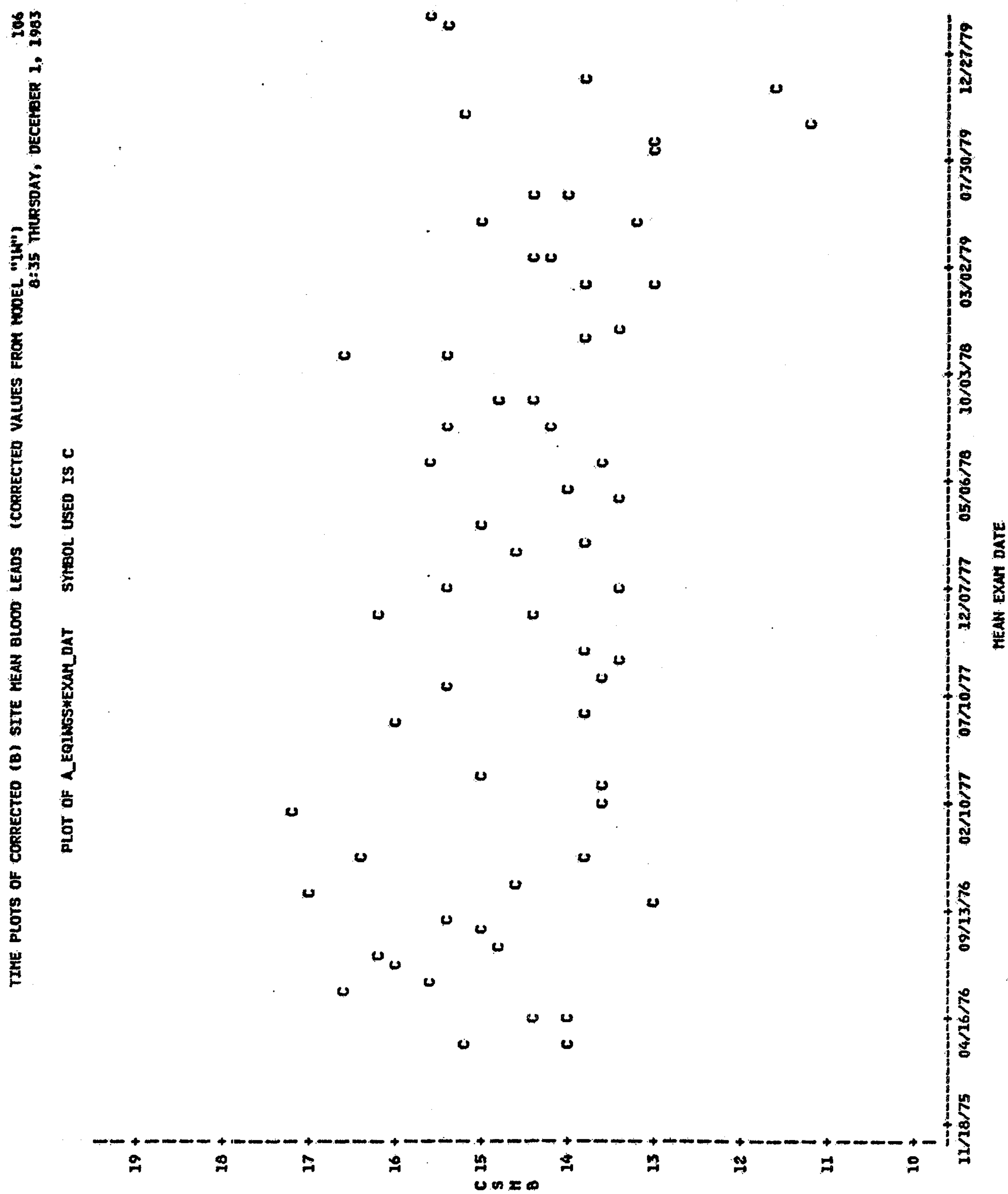

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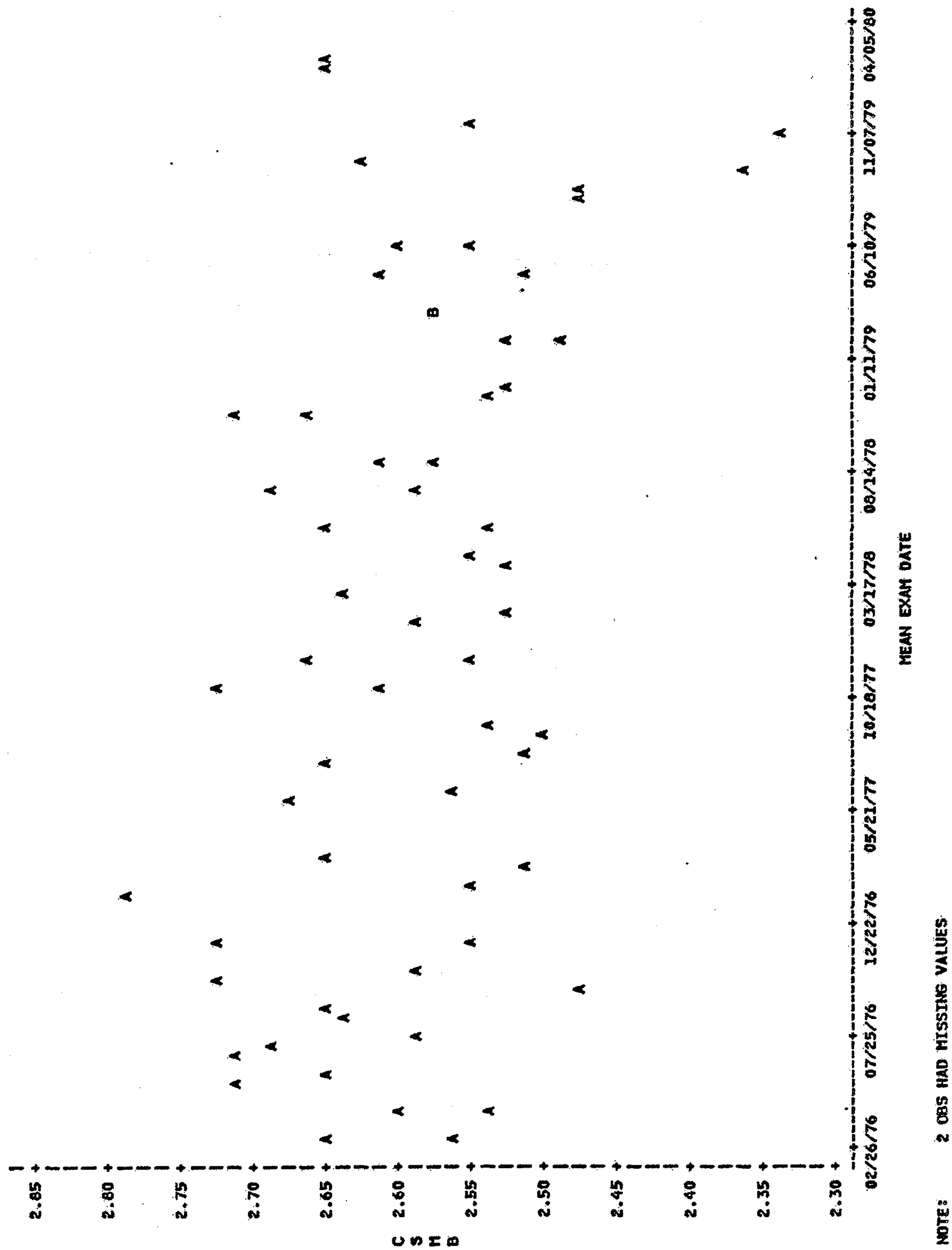
Figure V-2

Corrected Site Blood Lead Means
from Between Site Model A
Based on Adjustment Set 2W



One last set of between-site analyses were performed to evaluate the contribution to the blood lead decline of gasoline lead exposure by comparing the trend present in the adjusted site mean blood leads with the residual trend based on a model accounting for effects of current exposure to gasoline lead (and lead weight) but not in the presence of survey demographics. These analyses are summarized in Table V-6 and follow the format and interpretation of the entries in Table V-5. The estimated contributions range between .27 and .75 µg/dl. Interestingly, even when ignoring effects of survey demographics, the single term for exposure to gasoline lead is estimated to contribute only slightly more to the blood lead decline than when survey demographics are accounted for.

V.B.2 Use of Blood Lead/Gasoline Lead Regression Coefficients

In each of the analyses with Models A-K, regression coefficients associated with gasoline lead exposure terms were estimated. In this section these coefficients are used to estimate the blood lead decline during NHANES II attributable to gasoline lead exposure. In order to do this a reliable measure of gasoline lead exposure at the beginning and end of NHANES II is needed. Since the blood lead-gasoline lead coefficients were based on 61 of the 64 survey sites, the contribution of gasoline lead exposure should be evaluated based on the change in gasoline lead exposure during the survey that collectively occurred for these 61 survey sites.

V.B.2.a. Description of Computations

Three computational methods were investigated to evaluate the collective change in exposure to gasoline lead at the survey sites. Basic to the computations was either a state or national gasoline lead use value associated with the beginning and ending quarters of NHANES II. These lead use values were then converted to gasoline lead exposure measures analogous to GCUR75, GLAG75, GLAG275 and GLAG375.

Table V-6

Contribution (μg/dl) to Reported Blood Lead Decline
of Gasoline Lead Exposure Ignoring Effects of Survey Demographics

	Adjustment Set							
	1		1W		2		2W	
	BPb Decline	Attrib to Gas Pb	BPb Decline	Attrib to Gas Pb	BPb Decline	Attrib to Gas Pb	BPb Decline	Attrib to Gas Pb
Adjusted Site Blood Pb Means	5.66	–	5.44	–	5.40	–	5.17	–
Residuals from Model with GCUR75	5.17	.49	5.17	.27	4.92	.48	4.90	.27
Residuals from Model with $\log_{10}$GCUR75	4.93	.73	4.93	.51	4.65	.75	4.66	.51

Gasoline lead use values were linearly interpolated from quarterly values (associated with midpoint of the quarter) to arrive at a lead use figure associated with no lag, 30-day lag, 45-day lag and 60-day lag. The quarterly values are given by site in Table IV-3. Table V-7 provides a summary of these times in terms of NHANES II study day and date. As before the blood lead decline attributable to gasoline lead exposure will be evaluated between the mean examination dates of the first (Day 16) and last (Day 1453) sites sampled in the survey.

Table V-7

Summary of Reference Dates for Evaluating Changes in Gasoline Lead Exposure for the Survey Sites

	Start of NHANES II		End of NHANES II	
	Day	Date	Day	Date
No Lag	16	3/7/76	1453	2/11/80
30-Day Lag	-14	2/6/76	1423	1/12/80
45-Day Lag	-29	1/22/76	1408	12/28/79
60-Day Lag	-44	1/7/76	1393	12/13/79

A gasoline lead use value was computed for each of the 61 survey sites associated with each of the eight dates above. These values are given in Table V-8 using the notation GS, GF, GSL30, GFL30, GSL45, GFL45, GSL60, GFL60, where "S" refers to start and "F" to final, with the lag time appended. Additional information by site on county population, state population, and county area that is used in the gasoline lead exposure calculations is contained in Table IV-2.

Table V-8

Current and Lagged Gasoline Lead Use At Each Survey Site At Beginning and End of Survey

BLOOD LEAD AND GASOLINE LEAD SUMMARIES FOR NHANES II SITES

WEIGHTED STATE GASOLINE LEAD VALUES FOR NHANES II SITES

SITE ID	STRATA	PSU	GS	GF	GSL30	GFL30	GSL45	GFL45	GSL60	GFL60
1	01	1	1.78840	1.04598	1.76962	1.13657	1.77265	1.18187	1.77569	1.22717
2	02	1	.	.	.	.	.	.	.	.
3	03	1	0.80413	0.36651	0.78417	0.41833	0.79511	0.44425	0.80606	0.47016
4	04	1	3.76863	1.53075	3.65640	1.62411	3.66123	1.67079	3.66606	1.71747
5	05	1	0.83385	0.50381	0.79180	0.57360	0.80680	0.60849	0.82180	0.64339
6	06	1	0.61883	0.24847	0.59299	0.29024	0.60230	0.31112	0.61161	0.33201
7	07	1	1.01732	0.52230	0.97332	0.60634	0.99569	0.64835	1.01806	0.69037
8	08	1	0.37423	0.17306	0.35747	0.19828	0.36492	0.21089	0.37237	0.22350
9	09	1	0.57972	0.28623	0.54189	0.34874	0.56421	0.37999	0.58653	0.41125
10	10	1	3.52191	2.02575	3.41486	2.17015	3.45030	2.24235	3.48574	2.31454
11	11	1	0.49490	0.26713	0.46800	0.33112	0.49849	0.36312	0.52899	0.39511
12	12	1	1.54358	0.77990	1.49076	0.89162	1.54319	0.94748	1.59563	1.00335
13	13	1	1.41504	0.74967	1.33145	0.85896	1.38886	0.91360	1.44627	0.96824
14	14	1	0.64366	0.35856	0.62157	0.42275	0.63636	0.45484	0.65114	0.48693
15	15	1	1.01169	0.51348	0.98990	0.58535	1.00523	0.62128	1.02056	0.65722
16	16	1	0.83385	0.50382	0.79180	0.57371	0.80680	0.60865	0.82180	0.64360
17	17	1	1.11901	0.67129	1.08637	0.75747	1.10582	0.80055	1.12527	0.84364
18	18	1	0.64366	0.35856	0.62157	0.42275	0.63636	0.45484	0.65114	0.48693
19	19	1	1.80158	0.87845	1.74359	0.99729	1.78557	1.05672	1.82756	1.11614
20	20	1	0.99919	0.54880	0.96127	0.61480	0.97638	0.64780	0.99150	0.68080
21	21	1	0.99919	0.54880	0.96127	0.61480	0.97638	0.64780	0.99150	0.68080
22	22	1	0.41659	0.22903	0.39881	0.25926	0.40616	0.27438	0.41351	0.28949
23	23	1	0.72254	0.49058	0.69203	0.53393	0.70975	0.55561	0.72747	0.57728
24	24	1	1.61227	0.86444	1.54839	0.99598	1.59021	1.06175	1.63203	1.12752
25	25	1	1.61480	0.86444	1.55136	0.99598	1.59264	1.06175	1.63391	1.12752
26	26	1	1.80158	0.84976	1.74359	0.97850	1.78557	1.04287	1.82756	1.10724
27	27	1	3.76863	1.53075	3.65640	1.62411	3.66123	1.67079	3.66606	1.71747
28	28	1	3.52191	2.02575	3.41486	2.17015	3.45030	2.24235	3.48574	2.31454
29	29	1	1.01732	0.52230	0.97332	0.60634	0.99569	0.64835	1.01806	0.69037
30	30	1	1.54358	0.77990	1.49076	0.89162	1.54319	0.94748	1.59563	1.00335
31	31	1	0.85043	0.45917	0.79529	0.52874	0.82576	0.56352	0.85624	0.59830
32	32	1	1.41504	0.74967	1.33145	0.85896	1.38886	0.91360	1.44627	0.96824

Table V-8 (Pg. 2 of 2)

Current and Lagged Gasoline Lead Use at Each Survey Site at Beginning and End of Survey

BLOOD LEAD AND GASOLINE LEAD SUMMARIES FOR NHANES II SITES

WEIGHTED STATE GASOLINE LEAD VALUES FOR NHANES II SITES

SITE ID	STRATA	PSU	GS	GF	GSL30	GFL30	GSL45	GFL45	GSL60	GFL60
33	01	2	0.06752	0.03147	0.06671	0.03572	0.06839	0.03785	0.07007	0.03997
34	02	2	3.76863	1.53075	3.65640	1.62411	3.66123	1.67079	3.66606	1.71747
35	03	2	1.78840	1.04598	1.76962	1.13657	1.77265	1.18187	1.77569	1.22717
36	04	2	3.76863	1.53075	3.65640	1.62411	3.66123	1.67079	3.66606	1.71747
37	05	2	1.11901	0.67129	1.08637	0.75747	1.10582	0.80055	1.12527	0.84364
38	06	2	0.59980	0.26147	0.57340	0.29876	0.57839	0.31740	0.58339	0.33604
39	07	2	1.13127	0.64776	1.09187	0.74198	1.14132	0.78909	1.19077	0.83620
40	08	2	0.12329	0.05592	0.11547	0.06285	0.11891	0.06631	0.12236	0.06977
41	09	2	1.87504	0.74967	1.87211	0.85896	1.83062	0.91360	1.78913	0.96824
42	10	2	0.07234	0.03673	0.06683	0.04216	0.06955	0.04488	0.07227	0.04760
43	11	2	0.62862	0.35935	0.58628	0.41519	0.60924	0.44312	0.63220	0.47104
44	12	2	0.49490	0.26713	0.46800	0.33112	0.49849	0.36312	0.52899	0.39511
45	13	2	1.13127	0.64776	1.09187	0.74198	1.14132	0.78909	1.19077	0.83620
46	14	2	1.15146	0.70514	1.10933	0.79468	1.12872	0.83945	1.14810	0.88422
47	15	2	0.53583	0.26264	0.51337	0.30270	0.52317	0.32272	0.53296	0.34275
48	16	2	0.80413	0.36651	0.78417	0.41833	0.79511	0.44425	0.80606	0.47016
49	17	2	0.60826	0.35334	0.59067	0.39864	0.59962	0.42128	0.60857	0.44393
50	18	2	0.73735	0.45623	0.71936	0.51566	0.73263	0.54538	0.74590	0.57510
51	19	2	1.80158	0.87845	1.74359	0.99729	1.78557	1.05672	1.82756	1.11614
52	20	2	0.99919	0.54880	0.96127	0.61480	0.97638	0.64780	0.99150	0.68080
53	21	2	1.80158	0.87845	1.74359	0.99729	1.78557	1.05672	1.82756	1.11614
54	22	2	0.72254	0.49058	0.69203	0.53393	0.70975	0.55561	0.72747	0.57728
55	23	2	0.18082	0.13763	0.17073	0.15138	0.17612	0.15825	0.18151	0.16513
56	24	2	1.80158	0.87845	1.74359	0.99729	1.78557	1.05672	1.82756	1.11614
57	25	2	1.61227	0.86444	1.54839	0.99598	1.59021	1.06175	1.63203	1.12752
58	26	2	1.61227	0.86444	1.54839	0.99598	1.59021	1.06175	1.63203	1.12752
59	27	2	3.76863	1.53075	3.65640	1.62411	3.66123	1.67079	3.66606	1.71747
60	28	2	3.76863	1.53075	3.65640	1.62411	3.66123	1.67079	3.66606	1.71747
61	29	2	3.52191	2.02575	3.41486	2.17015	3.45030	2.24235	3.48574	2.31454
62	30	2	1.13127	0.64776	1.09187	0.74198	1.14132	0.78909	1.19077	0.83620
63	31	2	1.54358	0.77990	1.49076	0.89162	1.54319	0.94748	1.59563	1.00335
64	32	2	0.85043	0.45917	0.79529	0.52874	0.82576	0.56352	0.85624	0.59830

The first computational method, referred to as Method 1, evaluates gasoline lead exposure analogous to the method of evaluating GCUR75 for an individual except the individual components are replaced by averages based on the 61 survey sites. The simplified formula, where the summations extend over the 61 sites used, follows:

$$\frac{\Sigma(\text{State Gas Pb Use at time t})_i \ \Sigma(\text{County Pop. 75})_i}{\Sigma(\text{State Pop. 75})_i \ \Sigma(\text{County Areas})_i}$$

This formula was evaluated using a state gasoline lead use at each time t shown in Table V-7. See Table V-9 for a summary of these evaluations.

The second computational method, referred to as Method 2, evaluates a gasoline lead exposure by averaging the exposure densities of the individual sites. The formula is

$$\sum_{i=1}^{61} \frac{(\text{State Gas Pb Use at time t})_i \ (\text{County Pop. 75})_i}{(\text{State Pop. 75})_i \ (\text{County Areas})_i} \ /61$$

This formula was also evaluated for each of the eight times and these values are given in Table V-9.

The third computational method, referred to as Method 3, evaluates NHANES II survey site exposure to gasoline lead by proportioning national gasoline lead use at time t on the basis of the fraction of the U.S. population represented by the population of the sampled counties. The formula is

$$\frac{(\text{Nat. Gas Pb Use at time t}) \ \Sigma(\text{County Pop. 75})_i}{(\text{U.S. Pop. 75}) \ \Sigma \ (\text{County Areas})_i}$$

National gasoline lead use was evaluated by linear interpolation between quarterly values that included each of the eight dates (Table V-7). The relevant national quarterly values and associated dates are listed below.

Date	Nat. Gas. Pb Use (gr)
11/15/75	38,332,862,660
2/15/75	34,270,161,240
5/15/76	41,421,017,370
11/15/76	25,147,533,040
2/15/76	17,842,296,150

The other values used in Method 3 are 213,030,000 for 1975 U.S. population, 46,714,564 for 1975 total county population of 61 sites, and 72394 mi^2 for total county area of 61 sites. The evaluations for the eight dates are shown in Table V-9.

Table V-9

Total Gasoline Lead Exposure Values for 61 Survey Sites
For Three Computational Methods

	Method 1	Method 2	Method 3
Start			
No Lag	.000107344	.000150624	.000108860
30-Day Lag	.000103705	.000145220	.000105024
45-Day Lag	.000105391	.000148588	.000107052
60-Day Lag	.000107077	.000151956	.000109081
End			
No Lag	.0000542747	.0000789113	.000055018
30-Day Lag	.0000604188	.0000890318	.000062313
45-Day Lag	.0000634909	.0000940920	.000065961
60-Day Lag	.0000665630	.0000991523	.000069608

The values presented in Table V-9 may be used to compute the change in exposure at 61 sites during the four-year NHANES II survey. This change then is multiplied by the respective regression coefficients, from models where gasoline lead exposure was untransformed, to get a blood lead contribution from each exposure term. The contributions of each exposure term then are summed to evaluate the total blood lead decline attributable to the gasoline lead exposure terms used in that particular model.

For models where the gasoline lead exposure terms appear in $\log_{10}$ form, the values appearing in Table V-9 need to be appropriately altered. For Methods 1 and 3, the logarithm of the values in Table V-9 was computed from which the difference between log exposures was applied to the regression coefficients. For Method 2, however, the computational formula was altered by averaging the logarithm of the quantity in braces. These values at the eight exposure times are given below in Table V-10.

Table V-10

Total Log Gasoline Lead Exposure Values for 61 Survey Sites
Method 2

	Start	End
No Lag	-4.2670	-4.5493
30-Day Lag	-4.2840	-4.4958
45-Day Lag	-4.2743	-4.4714
60-Day Lag	-4.2649	-4.4484

For Adjustment Sets 2 and 2W, the dependent variable is on a natural log scale. The exposure regression coefficients, therefore, signify change in ln(blood lead) per change in exposure. Multiplying the regression coefficients by the change in exposure provides an estimated change in ln(blood lead). However, what is desired is the change in blood lead and this cannot be obtained by exponentiation of the change in ln(blood lead). The change in blood lead (ΔBlood Pb) is easily shown to be given by the expression

$$\Delta \text{Blood Pb} = B_s(1-\exp(-b\Delta(\text{Exposure}))$$

where B_s is the predicted site mean blood lead value at the first mean examination date (Day 16.46 of survey) from a regression of Adjustment Set 2 or 2W on site mean examination date. Further, b is the gasoline lead exposure regression coefficient and ΔExposure reflects the change in exposure to gasoline lead. The values used for B_s are 16.184 μg/dl for Adjustment Set 2 and 16.087 μg/dl for Adjustment Set 2W.

V.B.2.b. <u>Discussion of Results</u>

It was noted in Section V.B.1 that between-site Model A provided the highest adjusted R^2-values among models where the gasoline lead exposure terms were untransformed and Models G, F, and E were best among models where the gasoline lead exposure terms were log-transformed. Gasoline lead exposure contributions to the reported blood lead decline based on regression coefficients for Models A, E, F and G and each of the computational methods were evaluated. The gasoline lead exposure regression coefficients are given in Table V-11 for these models, based on Adjusted Sets 1, 1W, 2 and 2W.

The estimated contributions by gasoline lead exposure to the reported blood lead decline during NHANES II are summarized in Table V-12. The results associated with Adjustment Sets 2 and 2W were exponentiated so all contribution estimates are in terms of μg/dl.

Table V-11

Coefficients of Gasoline Lead Exposure Terms

Based on Adj BPb Set	Between-Site Model	No Transform of Exposure Terms				Log Transform of Exposure Terms			
		GCUR75	GLAG75	GLAG275	GLAG375	GCUR75	GLAG75	GLAG275	GLAG375
1	A	4513.4				1.6044			
	E	41177.5	-36357.2			37.6143	-35.9707		
	F	25599.0		-20952.3		29.9069		-28.2951	
	G	20076.6			-15644.2	25.4725			-23.8199
1W	A	4479.5				1.6124			
	E	43853.8	-39097.8			38.0173	-36.4118		
	F	26833.9		-22255.1		30.0256		-28.4372	
	G	20724.4			-16364.9	25.4850			-23.8347
2	A	274.9				.1109			
	E	2627.0	-2332.4			2.8617	-2.7478		
	F	1631.2		-1347.7		2.2253		-2.1138	
	G	1228.3			-958.4	1.8257			-1.7113
2W	A	279.4				.1170			
	E	2575.1	-2279.6			2.8359	-2.7195		
	F	1592.4		-1307.1		2.2087		-2.0935	
	G	1200.4			-927.9	1.8243			-1.7047

Table V-12

Estimated Contributions to Reported Blood Lead Decline By Gasoline Lead Exposure(1)

Based on Adj BPb Set	Between-Site Model	Method 1		Method 2		Method 3	
		No Transform	Log Transform	No Transform	Log Transform	No Transform	Log Transform
1	A	.24	.48	.32	.45	.24	.48
	E	.61	2.70	.91	3.00	.66	2.99
	F	.48	2.63	.69	2.45	.52	2.91
	G	.43	2.63	.61	2.15	.46	2.90
1W	A	.24	.48	.32	.46	.24	.48
	E	.63	2.72	.95	3.02	.69	3.01
	F	.49	2.63	.71	2.87	.53	2.92
	G	.44	2.63	.62	2.82	.47	2.90
2	A	.23	.52	.32	.50	.24	.52
	E	.61	2.97	.90	2.92	.66	3.26
	F	.48	2.85	.69	2.81	.52	3.13
	G	.42	2.77	.60	2.73	.45	3.03
2W	A	.24	.55	.32	.52	.24	.55
	E	.60	2.94	.88	2.89	.65	3.23
	F	.47	2.83	.67	2.79	.51	3.10
	G	.41	2.73	.59	2.72	.44	3.02

(1)Estimates on Models E, F and G are incorrect because they are based on negative lagged gasoline lead exposure regression coefficients; see discussion in text and Table V-13

The results displayed in Table V-11, which are based on regression coefficients of gasoline lead exposure terms, lack the consistency of the results reported in Table V-5, which are based on a comparison of residual trends. The estimated contribution to the reported blood lead drop for Model A ranges between .24 and .52 µg/dl, somewhat comparable to the Model A results in Table V-5 where the drop was from .14 to .35 µg/dl. However, the results for Models E, F and G are substantially different from those in Table V-5.

A closer inspection of the results in Table V-12 for Models E, F and G reveals why these values are erroneous. In computing the estimated blood lead decline, contributions from each gasoline lead exposure term are evaluated separately and summed. For example, the change in blood lead associated with changes in each exposure term may be written

$$\Delta\text{Blood Pb} = a\ \Delta(\text{Exposure}) + b\ \Delta(\text{Lag Exposure})$$

where a and b are the estimated regression coefficients associated with the respective exposure terms. For the situation here the b-coefficient is negative (see Table V-11) for Models E, F and G because of the high correlation between the two exposure terms (see VIF's in Table V-3 for these models). Further, both coefficients are driven away from zero although their sum is close to the regression coefficient based on a model with a single exposure term. The result of this is an expression for evaluating ΔBlood Pb which is inadmissible since the true coefficient for the lagged exposure must be nonnegative; otherwise, an increase in Δ(Lag Exposure) serves to reduce ΔBlood Pb.

To show this anomaly another way, note that the change in current exposure (GCUR75) is greater than the change in any of the lagged exposures (to see this compute exposure changes based on the data in Tables V-9 and V-10). This is true for untransformed or transformed exposures regardless of exposure calculation method. This results in an upper bound on ΔBlood Pb as follows:

$$\Delta\text{Blood Pb} < (a+b)\ \Delta(\text{Exposure}).$$

Thus, applying the change in current exposure to the sum of the coefficients provides an upper bound to the contribution to the reported blood lead decline due to exposure to gasoline lead. For comparison purposes, these results are shown in Table V-13. Note these conservative estimates are all well below the corresponding values for Models E, F and G in Table V-12. The range of upper bound estimates is .23 to .56 μg/dl. The corresponding range based on the comparison of residual trend results in Table V-5 for the models is .32 to .55 μg/dl. The agreement is now remarkably similar.

Table V-13

Upper Bounds to Estimated Contributions to Reported Blood Lead Decline by Gasoline Lead Exposure

Based on Adj BPb Set	Between-Site Model	Method 1 No Transform	Method 1 Log Transform	Method 2 No Transform	Method 2 Log Transform	Method 3 No Transform	Method 3 Log Transform
1	E	.26	.47	.35	.45	.26	.49
	F	.25	.48	.33	.44	.25	.48
	G	.24	.49	.32	.45	.24	.49
1W	E	.25	.48	.34	.44	.26	.48
	F	.24	.47	.33	.43	.25	.47
	G	.23	.49	.31	.45	.23	.49
2	E	.25	.54	.34	.50	.25	.54
	F	.24	.53	.33	.49	.25	.53
	G	.23	.54	.31	.50	.23	.54
2W	E	.25	.55	.34	.51	.25	.55
	F	.24	.54	.33	.50	.25	.54
	G	.23	.56	.31	.52	.23	.56

Results based on ridge regression estimates for Model G are discussed in Section VI.B.2. The estimated contributions due to gasoline lead exposure are smaller than those presented in Table V-13.

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One further set of analyses was done using the regression coefficient of GCUR75 from models which excluded the between-site effects of survey demographics. These coefficients, along with those previously reported for Model A (Table V-13), are summarized in Table V-14. Note that the gasoline lead exposure (GCUR75) coefficients, with one exception, are larger when between-site survey demographics are not accounted for. This is not surprising since certain demographic factors and gasoline lead exposures have been shown to be related to time and blood lead. Consequently, the gasoline lead exposure coefficient attempts to account for all time related changes due to survey demographics, gasoline lead exposure, and other time-related causes.

The estimated contributions to the blood lead decline are given in Table V-15 based on the blood lead/gasoline lead exposure slope for models not accounting for between-site survey effects. These values which are conservative show a range of contribution estimates from .29 to .59 µg/dl.

Table V-14

Coefficients of Gasoline Lead Exposure Terms From
Between-Site Models Not Accounting for Survey Demographics

Based on Adj BPb Set	Between-Site Model	Gasoline Lead Expose: Not Transformed	Gasoline Lead Expose: Log Transformed
1	Model A	4513.4	1.6044
	No Survey Dem	5486.0	1.5523
1W	Model A	4479.5	1.6124
	No Survey Dem*	5463.5	1.7422
2	Model A	274.9	.1109
	No Survey Dem	383.1	.1143
2W	Model A	279.4	.1170
	No Survey Dem*	375.4	.1270

*Except Lead_Wt

Table V-15

Estimated Contributions to Reported Blood Lead Decline
by Gasoline Lead Exposure
Effects of Between-Site Survey Demographics Excluded

Computational Method	Based on Adj BPb Set	Form of Exposure Term	
		No Transform	Log Transform
Method 1	1	.29	.46
	1W	.29	.52
	2	.32	.54
	2W	.32	.59
Method 2	1	.39	.44
	1W	.39	.49
	2	.44	.51
	2W	.43	.57
Method 3	1	.30	.46
	1W	.29	.52
	2	.33	.54
	2W	.32	.59

V.B.3 Use of "Time" Coefficient

Analyses were performed on Between-Site Models A and G with a time term (Days__Pb) added to estimate the time coefficient adjusted for survey demographics and gasoline lead exposure. These analyses are similar to the ones discussed in Section III.E.2 except that now terms for gasoline lead exposure are included.

Ostensibly, such a time coefficient could be used to quantify the contribution to the reported blood lead decline not due to survey demographics and gasoline lead exposure. However, it was noted in Sections I.B and III.E.2 that this does not occur. This time coefficient will capture all the linear time components associated with all other model terms not themselves corrected for time.

The results of the analyses with time are included for completeness. They illustrate the above fact on the interpretation of the time coefficient as well as present additional insight into the relationships among survey demographics, gasoline lead exposure and time.

Table V-16 presents the regression summaries from these analyses for Model A (results for Model G were similar). As was noted in reference to the analogous

Table V-16

Between-Site Regression Results of Model A with Time Term

	Based on Adjustment Set			
No Transform	1	1W	2	2W
Root MSE	2.57	2.61	2.91	2.93
R_A^2	.79	.78	.80	.80
N	61	61	61	61
Error Degrees of Freedom	36	35	36	35
Max VIF	6.91	7.87	6.91	7.87
Max Cook's D	.75	.70	.44	.40
GCUR75 Coefficient	2192.7	2227.4	99.59	108.5
Time Coefficient	-.00373*	-.00373*	-.000281*	-.000283*
Time VIF	3.74	3.75	3.74	3.75
Log_{10} Transform				
Root MSE	2.51	2.54	2.78	2.78
R_A^2	.80	.79	.82	.82
N	61	61	61	61
Error Degrees of Freedom	36	35	36	35
Max VIF	10.45	10.80	10.45	10.80
Max Cook's D	.21	.19	.19	.15
Log_{10}GCUR75 Coefficient	1.118*	1.188*	.0752*	.0856*
Time Coefficient	-.00386*	-.00388*	-.000283*	-.000287*
Time VIF	3.47	3.49	3.47	3.49

*Flagged as significant at $p \leq .05$

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summaries in Table III-10, inclusion of a time term greatly improved the prediction precision. Residual regressions against time from these analyses demonstrated no time-related effects remained. The variance inflation factors (VIF) associated with time indicate over 70 percent of the variation in time is explainable by survey demographics and gasoline lead exposure.

Table V-17 summarizes these estimated blood lead declines for the variations of Model A analyses, using the time coefficient adjusted for survey demographics and gasoline lead exposure. It is seen that these declines are comparable to the declines associated with the adjusted site mean blood leads (see Table III-8). Consequently, these results illustrate that the time coefficient, even though adjusted for survey demographics and gasoline lead exposure, accounts for time-related effects of both survey demographics and gasoline lead exposure.

Table V-17

Estimated Blood Lead Decline (μg/dl) Based on Time Regression Coefficient

Exposure Term for Gasoline Lead	Model A Results Based on Adjustment Set			
	1	1W	2	2W
Untransformed	5.36	5.36	5.38	5.37
Transformed	5.54	5.57	5.41	5.44

The impact on the regression coefficients of Model A results before and after, including a time term, is shown in Table V-18. As was concluded from a similar comparison shown in Table III-12, the addition of a time term changes many (10 to be exact) of the t-values of the survey demographic effects by at least one. The corresponding impact on the gasoline lead coefficient is more clearly identified by comparing these values in Table V-16 with those in Table V-11 for Model A. Here it is seen that the gasoline lead coefficient is substantially reduced after inclusion of a time term - by a factor of more than two in most cases. Refer to Section V.D for further discussion on the relevance of this observation.

Table V-18

Coefficients Compared from Between-Site Model A Results
With and Without Time Using Adjustment Set 2W

	Without "Time" Coefficient	Without "Time" t-value	With "Time" Coefficient	With "Time" t-value	t-values differing by at least 1
Black	.20	1.16	.41*	3.48	x
Male	.52	1.04	.06	.17	
Child	.24	.71	-.27	-1.15	x
Teen	1.34*	2.24	.76	1.90	
Income	.52*	2.47	-.11	-.67	x
BL_MA	7.39	1.85	3.16	1.18	
BL_CH	.16	.12	.98	1.15	x
BL_TN	-.62	-.21	-1.12	-.57	
BL_IN	1.73	1.39	-1.10	-1.21	x
MA_CH	-9.86	-1.91	-6.76	-1.99	
MA_TN	4.77	.35	-8.81	-.97	x
MA_IN	-.46	-.14	-2.52	-1.13	
CH_IN	-.46	-.20	-1.70	-1.12	
TN_IN	-.91	-.19	1.58	.51	
Urban	.08	.76	-.06	-.78	x
CC	-.14	-1.25	-.03	-.44	
Winter	-.14*	-2.19	-.11*	-.25	
Spring	.01	.15	-.02	-.47	
Summer	.06	1.02	-.02	-.47	x
South	-.07	-.93	-.12*	-2.31	x
West	.15	2.02	.10*	2.06	
Northeast	.07	1.29	.06	1.56	
Lead_Wt GCUR75	27.5($x10^{-7}$)	-.41	49.1($x10^{-7}$)	-1.12	
$\log_{10}$GCUR75	.12*	2.11	.086*	2.34	
Days_Pb			-.000287*	-7.00	

*Flagged as significant at $p \leq .05$

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V.C Estimation of Blood Lead Decline Attributable to National Gasoline Lead Use

The unsuitability of national gasoline lead use as an exposure correlate to NHANES II blood lead data was demonstrated in Section IV. There it was shown that the gasoline lead exposure trend, as encountered by the survey site itinerary, is considerably different from the trend in national gasoline lead use during the survey period. Consequently, the fact that national gasoline lead use does not account for site-to-site variation in exposure limits the suitability of this exposure correlate.

It may be argued that some global measure exposure needs to be incorporated in order to account for such factors as import of lead contaminated food inside, or personal travelling outside, a geographic location. To this extent, incorporation of national gasoline lead use in between-site models with survey demographics should provide upper bound estimates of the real contribution of gasoline lead exposure.

Between-site analyses were performed based on survey demographic terms and national gasoline lead use. The national gasoline lead use values were taken from [3]. Table V-19 presents a summary of the residual blood lead time declines and portions of reported blood lead declines attributable to national gasoline lead use. These summaries were obtained in the same manner as those in Table V-5. The results show that national gasoline lead use contributes between .78 and 1.12 μg/dl to the reported blood lead decline. The upper bound estimates are approximately twice those when using the site specific gasoline lead exposure correlate.

Table V-19

Contribution (μg/dl) to Reported Blood Lead Decline
Attributable to National Gasoline Lead Use

	Based on Adjustment Set							
	1		1W		2		2W	
Between-Site Model	Residual Blood Pb Decline	Attributable to Nat. Gas. Lead Use	Residual Blood Pb Decline	Attributable to Nat. Gas. Lead Use	Residual Blood Pb Decline	Attributable to Nat. Gas. Lead Use	Residual Blood Pb Decline	Attributable to Nat. Gas. Lead Use
Survey Dem. Only	1.62	-	1.62	-	1.56	-	1.56	-
Survey Dem. + Nat. Gas. Pb Use	.55	1.07	.54	1.08	.44	1.12	.44	1.12
Survey Dem. + Log Nat. Gas. Pb Use	.84	.78	.81	.81	.69	.87	.68	.88

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V.D Summary

A variety of analyses and approaches are reported herein which address the contribution of gasoline lead exposure to the reported 5-6 μg/dl blood lead decline during NHANES II. Collectively and consistently, these analyses suggest that, while gasoline lead exposure is significantly associated with blood lead levels, its contribution to the decline is only between .25 and .75 μg/dl. The results based on the best explanatory models, where the natural logarithm of blood lead was used as the dependent variable and site specific gasoline lead exposure (ie, densities) were expressed in terms of base 10 logarithms, was about .50 μg/dl. This value is remarkably consistent with that obtained by multiplying the (crudely) estimated air lead decline during NHANES II of .32 $\mu g/m^3$ [8] with the widely agreed blood-lead/air-lead slope range of 1-2 m^3/dl [9].

The measure of exposure to gasoline lead used in these analyses (except for Section V.C) reflects exposure at each survey site at the time that site was sampled. This aspect is of considerable importance since it was determined that the gasoline lead exposure time trend corresponding to survey itinerary differs considerably from the four-year trends seen nationally or, for that matter, at any of the individual survey sites. Naturally, no index based on state or local lead use, population and area can be expected to accurately reflect individual exposures. To do this, personal monitoring data would be required which clearly is unavailable. Consequently, some specification error in exposure will be present which would have the effect of underestimating these regression coefficients.

Summarizing in more detail, three approaches were investigated for estimating the contribution of gasoline lead exposure. In the first, the difference between residual time declines was made based on models with and without gasoline lead exposure terms. Effects of four exposure terms were investigated - one reflecting current exposure and the others reflecting 30, 45 and 60-day lagged exposures - in eleven between-site models. Each model was analyzed using adjusted site mean blood lead sets from within-site analyses 1, 1W, 2 and 2W. Exposure terms were expressed in untransformed and log transformed form in each analysis variation. The best predictive models were those containing just the current exposure term or the current with one other lagged term. The estimated contribution due to gasoline lead exposure ranged from .11 to .67 μg/dl, with .52 μg/dl being the value associated with the preferred models. A further between-site analysis was performed where survey demographic effects were excluded. By comparing the residual decline with the decline of the adjusted blood lead site means, the contribution of gasoline lead exposure was found to be between .27 and .75 μg/dl depending on analysis variation. These results may be considered conservative in that survey demographics were not addressed.

The second approach used the gasoline lead exposure regression coefficients to evaluate the blood lead decline by multiplying them by the change in exposure. The exposure change was computed to reflect the four-year change that occurred at <u>all</u> survey sites, regardless of when each was visited by the survey caravans. Three different computational methods were used to reflect collective survey site exposure changes and all gave comparable results. Based on a model which incorporated current gasoline lead exposure, the estimated contributions ranged from .24 to .55 μg/dl. The estimated contributions based on models which included more than one term for exposure proved to give inadmissible results, resulting from negative coefficients due to high correlations among exposure terms. Admissible upper bounds for contributions based on these models ranged from .23 to .56 μg/dl. A contribution was also estimated based on the coefficient from the between-site analysis where no survey demographics were included. These values ranged between .29 and .59 μg/dl.

It was noted in Section V.B.3 that inclusion of a time term in models with a term for gasoline lead exposure reduced the gasoline lead exposure coefficient by a factor of two. This smaller coefficient is the correct least squares estimate because it is adjusted for all other terms in the model (see, for example [11]), including time. However, the second approach used the larger (biased) coefficient to estimate the gasoline lead contribution to the reported blood lead decline. The conservative value used would, in some sense, compensate for the effect of specification error on the regression coefficient noted above.

The third approach was based on use of the regression coefficient for "time" in models with terms for survey demographics and gasoline lead exposure. It has been noted that this approach is incorrect for estimating the portion of the reported blood lead trend not due to either survey demographics or exposure to gasoline lead.

Based on the results in Table V-5, it appears highly likely that causes other than survey demographics and gasoline lead exposure were responsible for some of the reported decline. This unexplained decline was significantly different from zero and ranged between .96 and 1.51 µg/dl depending on model and analysis. Likely candidates accounting for the unexplained decline include improved sample handling and collection during the survey, improved quality control, and other sources of lead exposure. Unfortunately, even marginally satisfactory data are not available on any of these candidates except improved quality control. Blind control sample results, available only after the first eleven months of the survey, provided a hint of a downward bias - at best, explaining only a portion of the unexplained decline.

Although it was concluded in Section III that national gasoline lead use is an unsuitable correlate to NHANES II blood lead data, its contribution to the reported blood lead decline was estimated between .78 and 1.12 µg/dl. These estimates are approximately twice that obtained when using the site specific measure of gasoline lead exposure and probably reflect an upper bound to the true effect of gasoline lead use.

Accurately and precisely estimating the true blood lead decline due to exposure to gasoline lead is not possible from these data due to inherent confounding among factor effects. It may be argued that a portion of the time related survey effects such as black, urban and income representation, actually incorporate some component of gasoline lead exposure, as well as