(1) Discredit other analyses
5.5 not due to gas leak

(2) Further analysis is needed
Reconvene the panel

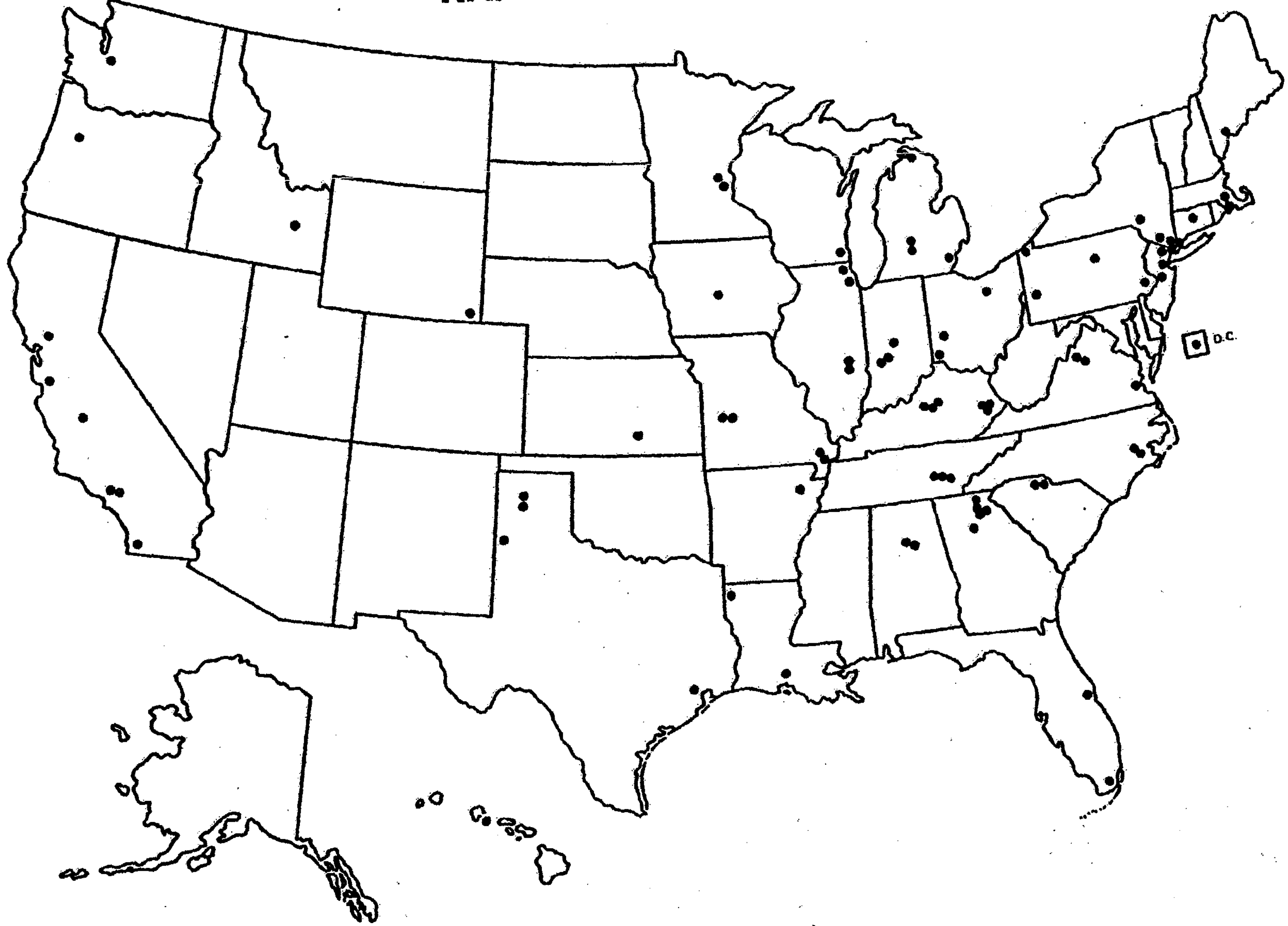
TEH 0532620.001

N33832

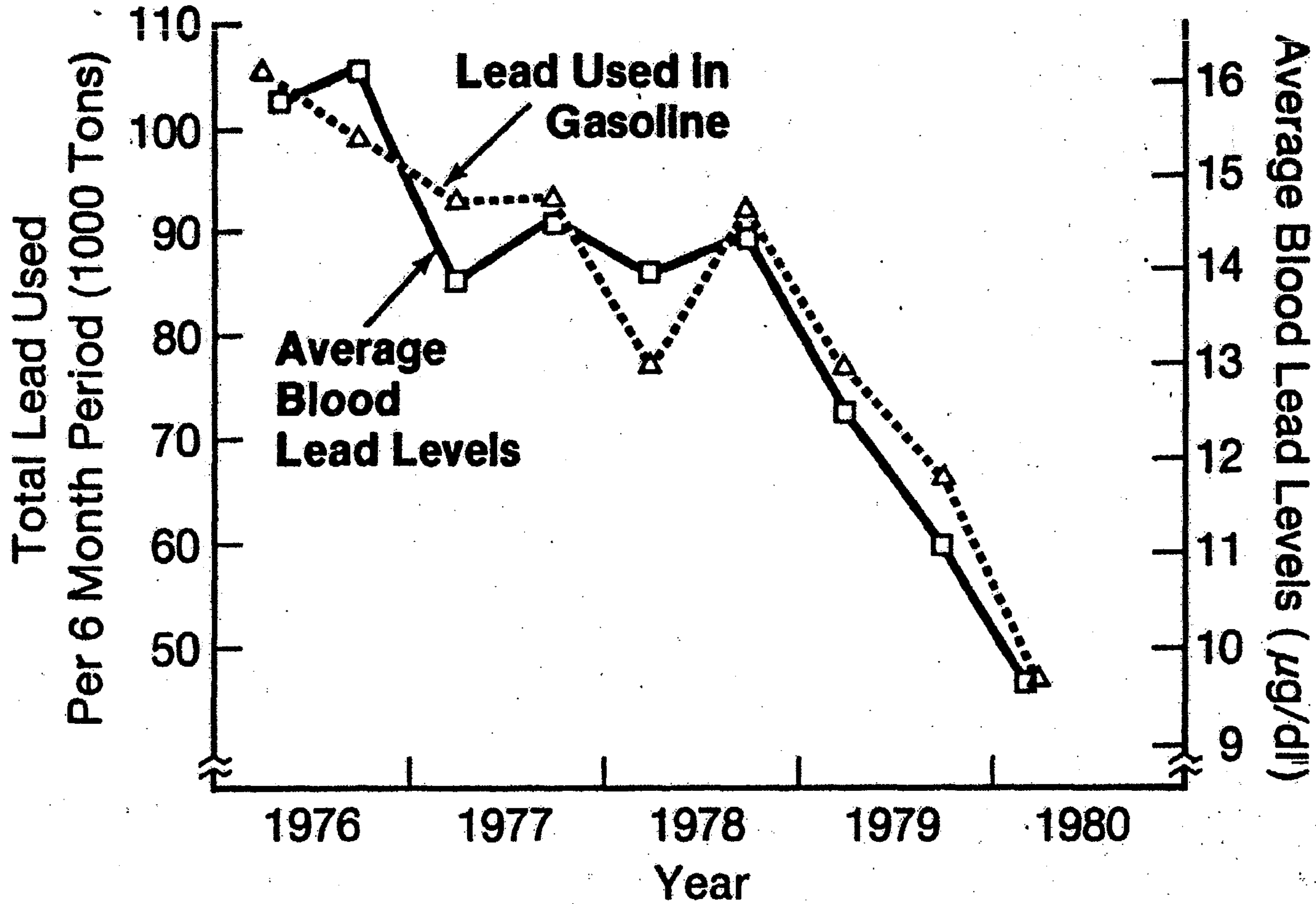
NHANES II

- Assessment of National Health Status
- February 1976 to February 1980
- 64 Sampling Sites
- 6 Months to 74 Years of Age
- 27,801 Persons Selected — 20,322 Examined
- 9,936 Venous Blood Lead Levels Determined
- Not Designed for Chronological Trend Analysis
- Apparent 37 Percent Reduction in Blood Lead

HANES II sample areas



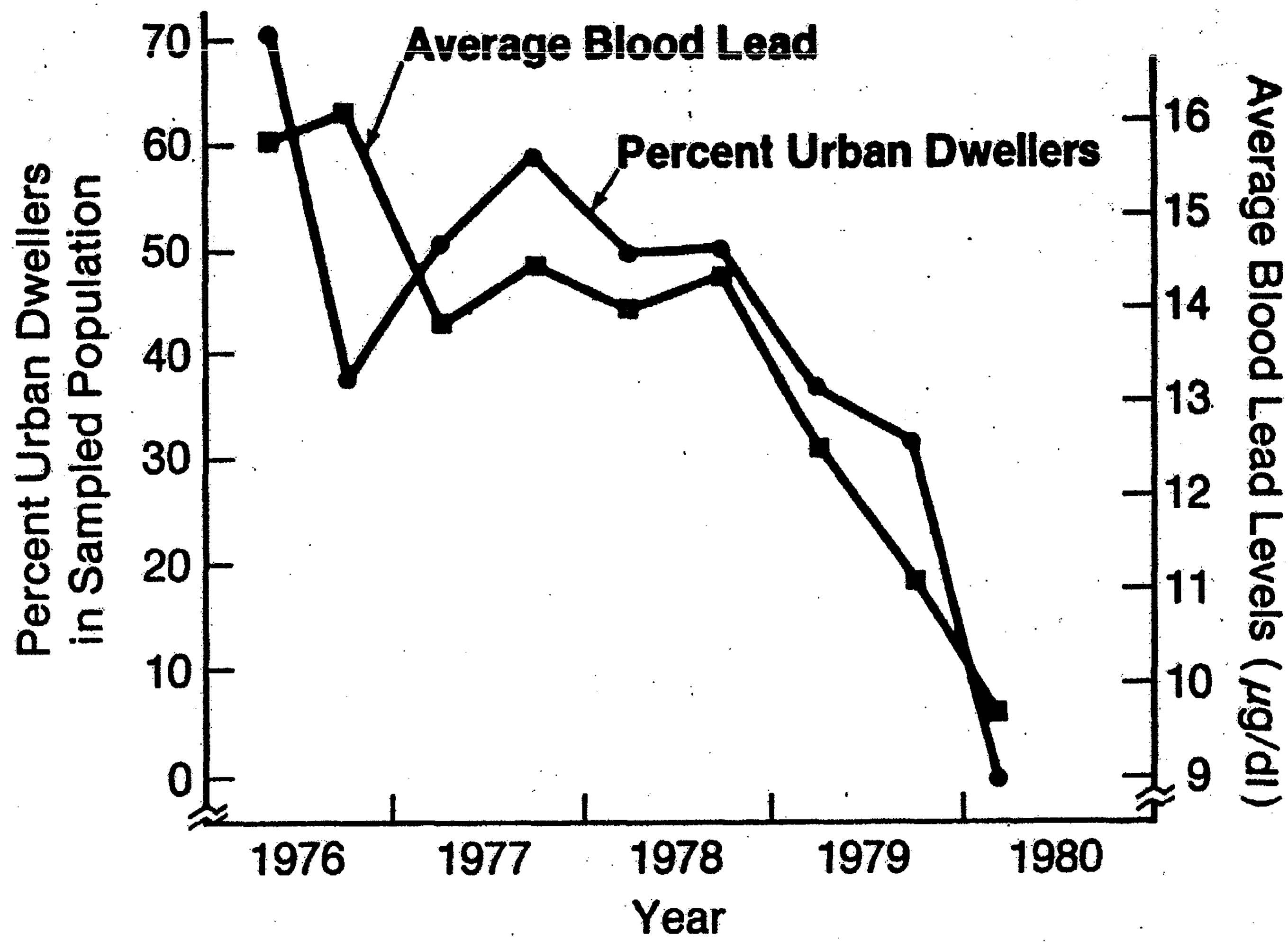
Gasoline Lead and NHANES II Blood Lead Levels (Feb. 1976 — Feb. 1980)



TEH 0532623

DUP050033892

Urban Dwellers Sampled and NHANES II Blood Lead Levels (Feb. 1976 — Feb. 1980)



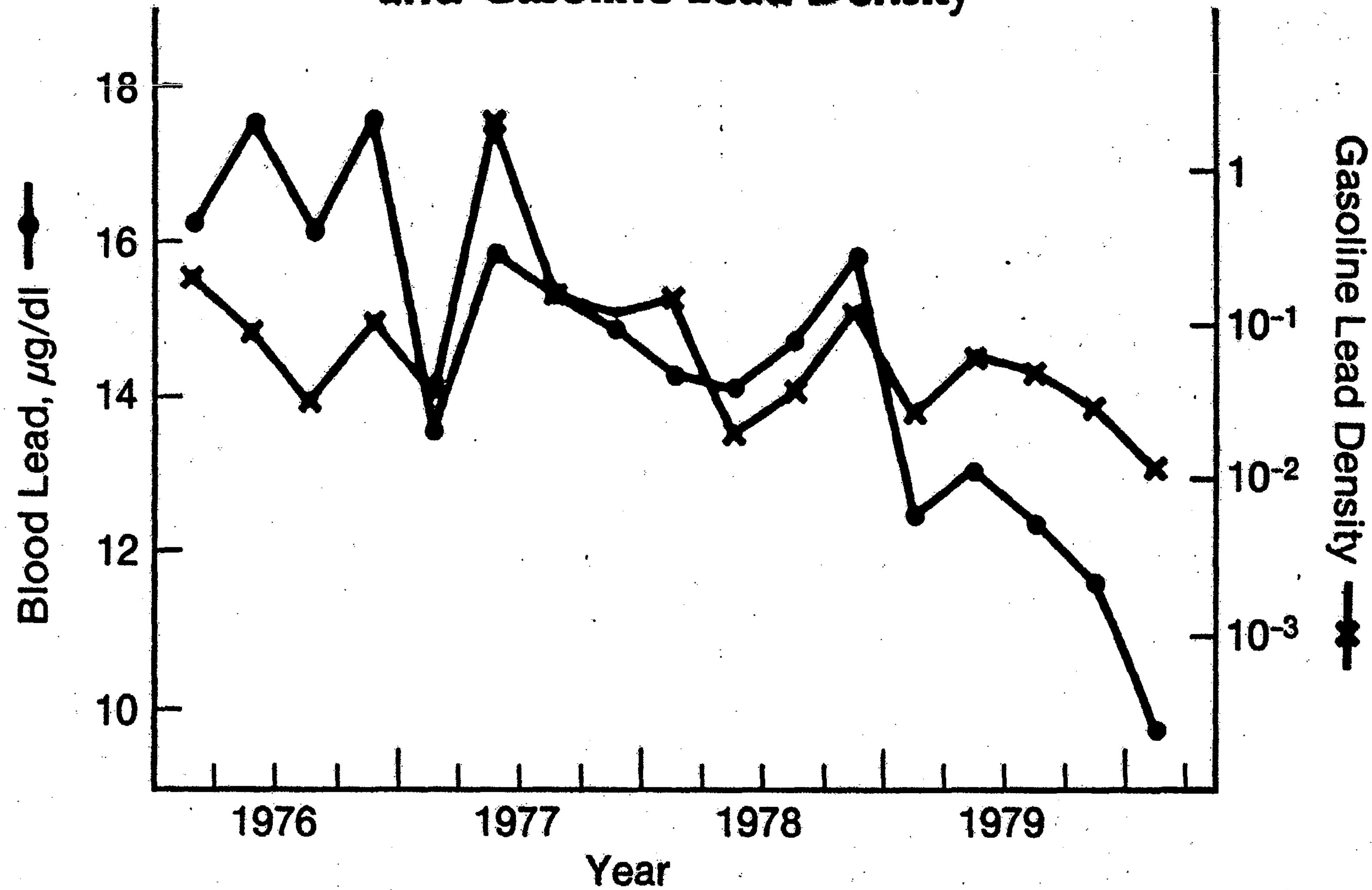
Identifiable Factors Potentially Influencing Blood Lead Trend

Exposure
- Air Lead from Gasoline
- Food and Beverages
- Water
- Paint
- Dust

Study Design
- Caravan Itinerary
- Personal Variables
- Residence Characteristics

Study Execution
- Laboratory Analysis
- Sample Handling

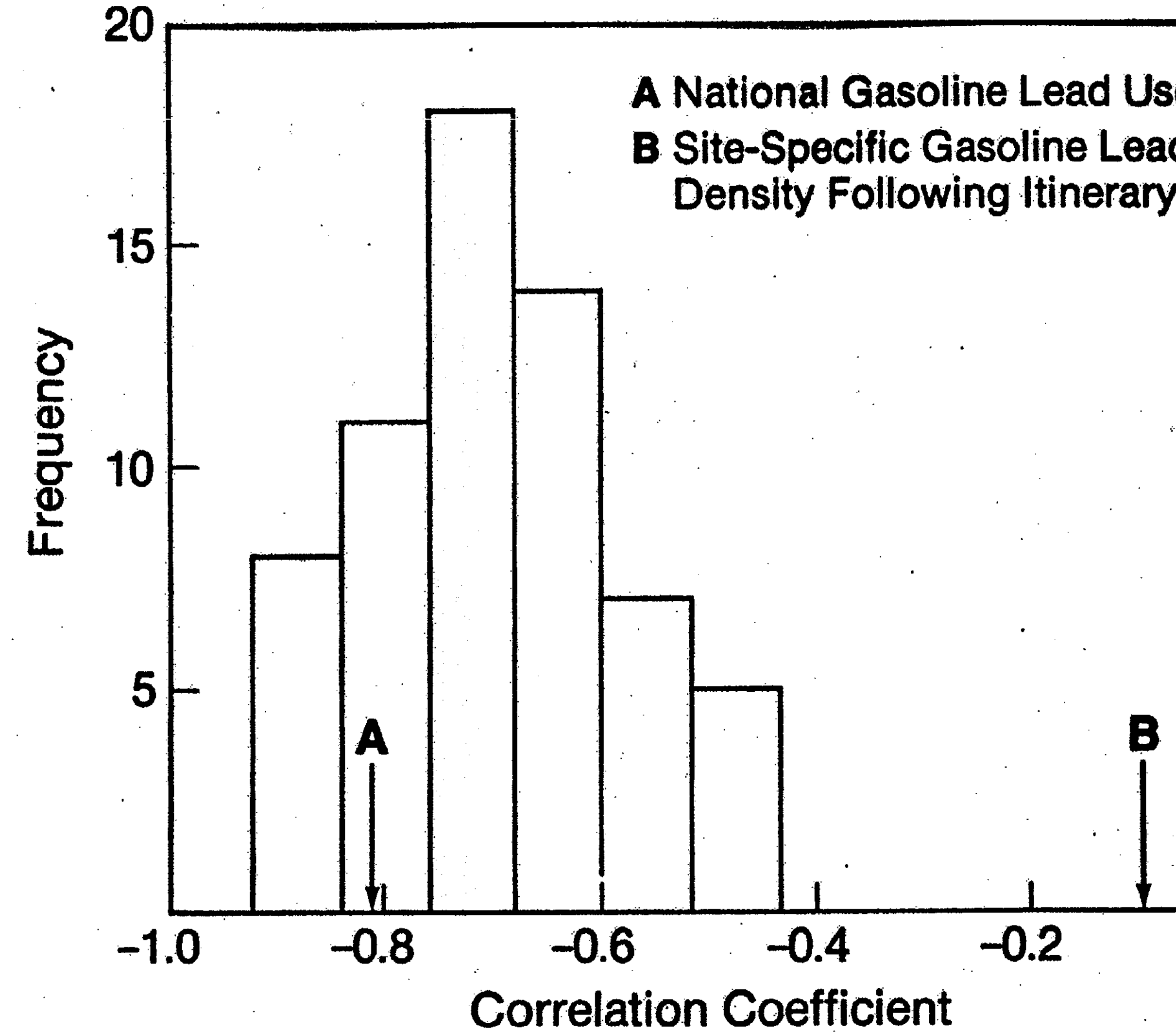
Quarterly Mean Blood Lead and Gasoline Lead Density



TEH 0532626

DUP050033895

Correlation of Gasoline Lead Density and Time



Analysis Approach Addresses Two Sources of Variation

- **Within Site** — Evaluates effects of demographics that vary within a site

  Exs: Age, Race, Sex, etc.

- **Between Site** — Evaluates effects of demographics that are constant within a site but vary between sites

  Exs: Region, Gas Pb Exposure, Race Site Mean

Steps in Blood Lead Trend Analysis

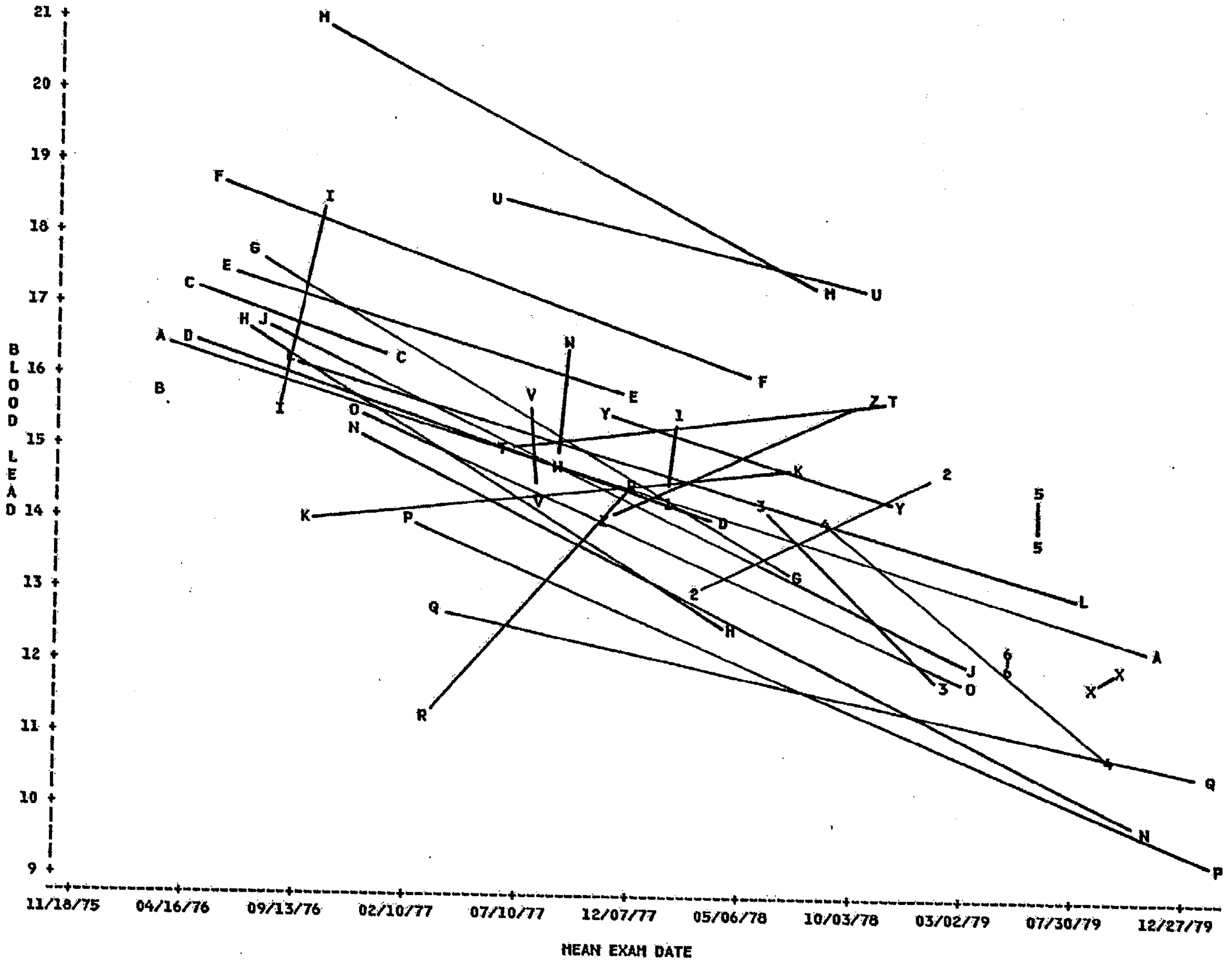
Within-Site Analysis	Adjust for Differing Characteristics of Individual Subjects
Between-Site Analysis	Further Adjust for Differing Site Characteristics — With and Without Gasoline Lead
Residual Time Analysis	Quantify Unexplained Time Trend
Gasoline Lead Contribution Analysis	Compare Unexplained Time Trend With and Without Gasoline Lead Exposure

Conclusions

- National gasoline lead use is not a valid index of exposure at NHANES II sites
- Over 50% of the apparent blood lead decrease is attributable to demographics
- 5 to 10% of the apparent blood lead decrease is attributable to gasoline lead exposure
- The blood lead decrease of 0.3 to 0.6 μg/dl attributable to gasoline lead is consistent with the observed air lead decrease
- A significant blood lead time trend remains after accounting for demographics and gasoline lead exposure

OBSERVED SITE MEAN BLOOD LEAD LABELED BY STRATA (A=1, B=2, ETC.)

PLOT OF BLOOD_PB*EXAM_DAT SYMBOL IS VALUE OF SYMBOL



2/6/84

Dick Anderson Comments

① Tell me about the lead cut ••• what is it?
How is it used?

Differential representation in the population
may be related to time

② Doesn't understand how SURREG works
w r t cuts, zero term, etc

③ Anderson Simulation of split plot ANCOV
Ran into a lot of collinearity

CBP approach

CBP claims this isn't a problem
one pass Results $\equiv$ 2 pass Results

within Site --- RLA adjusts to $X_{\cdot\cdot}$
rather than
$X_{i\cdot}$

In effect he assumes
$\beta_W = \beta_B$

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DUP050033901

RLA Says to handle time by SAS Type I which adj time for other effects but doesn't adj other variables for the time effect

This is the [illegible] [illegible] procedure --- (RDS old [illegible] build up procedure)

RLA Procedure
All other variable SAS Type II
Time effect last using SAS Type I

RLA — Putting time into model ala CDC/EPA is Dead wrong .... He feels strong about this

Key Point

(3)

RDS to RDS

We need to run CGP's ANCOV model for urban & rural separately to see if decline is larger in URBAN than in Rural

This will show CDC analysis is deficient

---

why is time trend the same in all demo groups

Total	5.5		
Survey	4.0		
Residual	1.5	Time	~~1.3~~ 1.7
		Residual	-.2

Time series problem --- Wants to hear Durbin's opinion on this

what about Box's analysis of Kendall's data

TEH 0532634

DUP050033903

Mordai Ezekiel did our kind of analysis

~~adj~~ Partial Residuals plot

ANCOV Model

$$y_{ij} = \mu + \beta_i + T_j + \theta(x_{ij} - x_{\bullet\bullet})$$

$$\theta = \left(\frac{\Delta \hat{X}_{ij} = \mu_x + \hat{\beta}_{xi} + \hat{T}_{jx}}{\Delta \hat{y}_{ij} = \hat{\mu}_y + \hat{\beta}_{yi} + \hat{\tau}_{jy}} \right)^{-1}$$

$$y = b_0 + b_1 X_1 + t X_t$$

$$\Delta y = b_1 \Delta X_1 + t \Delta X_t$$

when ΔX_i changes

ΔX_1 changes

$\therefore$ Slope changes from $-.001$ to $-.004$

TEH 0532635

DUP050033904

X_3 = % of Blacks

% B = f (time)

or is

time = f (B)

RAA — Says we have to adj time as well as response for covariates

---

−.004	Blood Pb adj for Demo time adj for Demo	How do these
−.001	Blood Pb adj for Demo time unadjusted	~~time~~ Combine ~~into~~ the ~~diff~~

TEH 0532636

DUP050033905

Review Ezekiel & Draper & Smith on this
also See Anderson & Bancroft
on this

$$y = b_0 + b_1 X_1 + b_2 X_2$$

$$b_2 = \frac{\Delta y \,(\text{adj for } X_1)}{\Delta X_2 \,(\text{adj for } X_2)}$$

$$\hat{y} = a_0 + a_1 X_1$$

$$y - \hat{y} = k_0 + k_2 X_2$$

$$= (k_0 + k_2 X_2) - (a_0 + a_1 X_1)$$

$$= (k_0 - a_0) + (-a_1) X_1 + k_2 X_2$$

objective: Want effect of time with
covariate fixed

If some individuals were tested at successive time periods what effect would time have

Time Series Response

~~y~~ ~~time~~ X_1 X_2 ---

Wayne Fuller
Ron Gallant

$\frac{\Delta y}{\Delta t}$ if ~~other~~ X's are fixed at some value

How do you estimate this?

$$\Delta y = b_0 + b_1 X(t) + b_2 t$$

$$\frac{\Delta y}{\Delta t} = b_1 \frac{d X(t)}{d(t)} + b_2 \quad \approx -.004 \, ?$$

$$b_2 \approx -.001 \, ?$$

TEH 0532638

$$X(t) = a + bT$$

$$y = \beta_0 + \beta_1 (a + bT) + \beta_2 T$$

$$\frac{\partial y}{\partial T} = (b + \beta_2) T$$

<u>Report</u>

* RLA concerned that ady correlation not taken into acct

* CGP found that one pass & 2 pass models give essentially the same results

Dummy Design -- Theory says use it
Practice says its not that helpful

EPA should have no objection to our use of ANCOV model since more terms gives a better description

---

what about putting Natl Gas Pb and Site Specific Pb

GLOBAL ?

LOCAL ?

---

new approach

approach to our letter

time series problem
∴ add someone to the panel

new gas Pb data

∴ need to convene the panel to consider these new developments

TEH 0532640

DUP050033909

Time is not a causative factor

∴ need to find other variables that were causing the trends

time is a surrogate for other factors

Lets get WHF to look into this

TEH 0532641

DUP050033910