MEMORANDUM

SUBJECT: Updated statistical information on air quality data from epidemiologic studies

FROM: Mary Ross and John Langstaff

TO: PM NAAQS Review Docket (OAR-2001-0017)

DATE: January 28, 2005

This memorandum provides information on the distribution of air quality data from epidemiologic studies, specifically for U.S. and Canadian studies of short-term exposures to $PM_{2.5}$ and $PM_{10-2.5}$. As described in a previous memorandum, study authors were contacted by email to request information on descriptive statistics on the distribution of air quality data used in their studies, beyond what was reported in the published studies (Ross, 2003; Attachment C). Numerous study authors responded by providing either the descriptive statistics or the air quality data set to allow staff to calculate descriptive statistics.

Tables A-1 and A-2 summarize some of the statistics for $PM_{2.5}$ and $PM_{10-2.5}$ data, respectively, including the mean, minimum and maximum values measured during the study period, as well as the 95th to 99th percentile values. The studies are arranged in order of increasing mean $PM_{2.5}$ and $PM_{10-2.5}$ concentrations. Average concentrations of $PM_{10-2.5}$ ranged from 6.3 to 33.2 $\mu g/m^3$. $PM_{2.5}$ concentrations ranged from 8.5 to 42.1 $\mu g/m^3$; in Table A-1, data are presented for thos studies with mean $PM_{2.5}$ up to 18 $\mu g/m^3$.

This memorandum also discusses a specific staff evaluation of $PM_{10-2.5}$ concentrations in the Detroit area that was done in conjunction with the risk assessment described in the second draft Staff Paper (chapter 4). In evaluating ambient air quality data from cities used in the health risk assessment, staff observed substantial differences between concentrations from recent years in Detroit with those reported from the study period. As described in Attachment B, this prompted further assessment to compare $PM_{10-2.5}$ measurements obtained for recent years from monitoring stations in and around Detroit, including those in nearby Windsor, Ontario, where the $PM_{10-2.5}$ concentrations used in the study were measured. The monitoring stations in the Detroit area are indicated on Figure B-1, and the $PM_{10-2.5}$ data from several recent years are summarized in Table B-1.

Attachments

ATTACHMENT A

Air Quality Statistics from U.S. and Canadian Health Studies of Short-term Exposure to Fine and Coarse Fraction Particles

A-1. Statistics for 24-hour $PM_{2.5}$ Concentrations from Health Studies (up to means of 18 µg/m^3)

Study Location	Air Quality Distribution Statistics *Italics = not year-round data*						
	mean	95%	96%	97%	98%	99%	max
Stieb, et al., 2000 St. John	8.5	20.5	22	23.4	27.3	30.9	53.2
Yu et al., 2000 Seattle (PM_{10})	*10.4*						*61.7*
Schwartz 2003a Portage	11.2	26.2	29	31	34.3	39.7	63
Schwartz 2003a Topeka	12.2	26	27	29.4	32	37	56
Delfino, et al., 1997 Montreal (summer 1993)	*12.1**	*29.9*	*30.7*	*30.8*	*31.2*	*31.4*	*31.4*
Peters et al., 2001 Boston	12.1	24.3					
Peters et al., 2000 Boston	12.7	26.6					53.2
Burnett and Goldberg, 2003 8 Canadian Cities	13.3	32**	31.1**	34.3**	38.9**	45.4**	86
Mar, et al., 2003 Phoenix	13.5*	27.8	28.5	30.2	32.2	34.1	41
Fairley, 2003 Santa Clara County	13.6*	43	46.2	49	59	69.2	105.4
Gold et al., 2000 Boston	*15.5*						*45.1*
Schwartz 2003a Boston	15.7	34.5	35.4	37.2	42	45	70.8
Ostro, et al., 2003 Coachella Valley	15.8*	28.6	29.8	30.5	33.8	37.0	48.3
Thurston, et al., 1994 Toronto	*15.8-22.3*				*51*		*66*
Liao et al., 1999 Baltimore	*16.1*						*32.2*
Sheppard, et al., 2003 Seattle	16.7	37.3**	40.2**	41.7**	46.6**	54.7**	96h
Burnett, et al., 1997 Toronto	*16.8*	*39.8*	*40.5*	*43.5*	*47.4*	*54.9*	*66.4*
Lipfert et al., 2000 Philadelphia	17.3	35.7	37.4	40.9	44.2	49.1	72.6

Study Location	Air Quality Distribution Statistics *Italics = not year-round data*						
	mean	95%	96%	97%	98%	99%	max
Goldberg and Burnett, 2003 Montreal	17.4*	39.5	44.4	46.6	53.1	59	72
Ito, 2003 Detroit	18	42.6	47.4	50.3	55.2	59.2	86

A-2. Statistics for 24-hour $PM_{10-2.5}$ Concentrations from Health Studies

Study Location	Air Quality Distribution Statistics *Italics = not year-round data*						
	mean	95%	96%	97%	98%	99%	max
Zhang et al., 1999 Naeher et al., 1999 SW Virginia	*6.3**						*19.8*
Schwartz, 2003a Portage	6.6	19	20.1	22	25	30.7	121
Lipfert et al., 2000 Philadelphia	6.9*	14.9	15.4	16.7	18.3	19.3	28.3
Peters et al., 2001 Boston	7.4	15.2					
Neas et al., 1999 Philadelphia	*8.3*						
Schwartz, 2003a Boston	8.8	21.6	23.1	25.4	28.6	33.5	69.3
Klemm and Mason, 2000 Atlanta	10.1						39.5
Schwartz, 2003a Kingston/Harriman	11.2	23.5	24.2	26.9	29.1	34.7	121
Burnett, et al., 1997 Toronto	*11.5**	*22.9*	*24.2*	*26.5*	*29.5*	*35.8*	*56.1*
Fairley, 2003 Santa Clara County	11.7*	22	24	26	29.2	39.2	55.2
Schwartz, Neas, 2000 6 US cities	11.7*	25	26	28	30	34	52
Schwartz, 2003a St. Louis	11.9	28	29.1	30.7	32.9	38.9	102.6
Thurston, et al., 1994 Toronto	*12.7-16.5*						*33*
Burnett and Goldberg, 2003 8 Canadian cities	12.9	30	29.6**	32.9**	34.0**	42.5**	99
Ito, 2003 Detroit	13.3*	27.6	31	34	36.2	40.2	50
Schwartz, 2003a Topeka	14.5	38.2	41.1	44	49	58.9	95.4

Study Location	**Air Quality Distribution Statistics** ***Italics = not year-round data***						
	mean	95%	96%	97%	98%	99%	max
Schwartz, 2003a Steubenville	16.1	39.1	42.4	47	53.2	61.4	167.5
Sheppard, et al., 2003 Seattle	16.2	27.2**	27.8**	31.4**	32.3**	38.7**	88
Moolgavkar, 2003 LA	22***						80
Chock et al., 2000 Pittsburgh	21.6	63.0	66.9	71.3	80.1	99.3	208
Ostro, et al., 2003 Coachella Valley	30.5	65.1	74.2	87.2	106.8	134.0	418
Mar, et al., 2003 Phoenix	33.2*	60.5	62.3	66.3	70.6	75.4	158.6

* Values for descriptive data vary slightly from those reported in the published study; statistical information shown here was either provided by study authors or calculated from data provided by authors.
** averaged annual values for years in study provided by investigators
*** median

ATTACHMENT B

$PM_{10-2.5}$ Concentrations From Monitoring Sites in Detroit Area

In developing the PM health risk assessment, air quality data were obtained for several recent years for each of the cities included in the assessment. One component of the health risk assessment was evaluation of the air quality data available for recent years and comparison of these data with levels reported in the studies (see Chapter 4 in Staff Paper). One such epidemiologic study used ambient measurements from two dichotomous samplers located in Windsor, Canada, for the time period 1992 through 1994 in a study of hospital admissions in Detroit (Lippmann et al., 2000; Ito, 2003). In looking at $PM_{10-2.5}$ data from Detroit, staff observed that the $PM_{10-2.5}$ concentrations at the two central city monitoring stations (Dearborn and West Fort) in recent years were substantially higher than those from the Windsor monitors in 1992-1994. The average concentration for the two Detroit monitors in 2003 was 21.7 $\mu g/m^3$, while the mean concentration at the Windsor monitors in 1992-1994 was 13.3 $\mu g/m^3$. This observation prompted further exploration of $PM_{10-2.5}$ concentrations reported from the Windsor and Detroit area monitors.

The Windsor monitors are located directly across from the Detroit central city area, as shown in the map below (Figure B-1). The authors did extensive evaluation of the available air quality data, as described in the initial study report. PM_{10} concentrations from eight monitoring sites in the area were found to be highly correlated, with a median correlation coefficient of 0.78 (Lippmann et al., 2000, p. 14). More detailed analyses used data from the numerous TSP monitors located across the Detroit area, including the Windsor monitoring stations. The authors found that the concentrations were highly correlated, and concluded that "the Windsor site was as good as any other sites in the are in terms of representing the population TSP exposure for the Detroit metropolitan area" (Lippmann et al., 2000, p. 20). The authors observed, in addition, that the magnitude of the TSP concentrations varied, with mean concentrations varied by a factor of two; concentrations were generally higher at the central city sites than in "upwind" areas west of the city (Lippmann et al., 2000, p. 20).

Figure B-1 also includes locations of all air pollution monitoring stations in the Wayne County area (which includes Detroit). Particulate matter concentrations have been measured at 4 of these sites – Allen Park, Dearborn, West Fort, and Livonia – and these monitoring stations are marked by arrows. At each of these stations, the $PM_{10-2.5}$ concentrations are determined by subtraction of PM_{10} and $PM_{2.5}$ concentrations.

$PM_{10-2.5}$ data are not available from Wayne County during the epidemiologic study time period. However, $PM_{10-2.5}$ data are available from the Windsor monitors for recent years, and thus can be used for comparison with $PM_{10-2.5}$ concentrations from Wayne County monitoring stations. Table B-1 shows annual mean $PM_{10-2.5}$ concentrations from Wayne County and Windsor stations for 1999 through 2003. It can be seen that concentrations from the two central Detroit sites (Dearborn and West Fort) are appreciably higher, by about two- to three-fold, than those at the Windsor monitors. $PM_{10-2.5}$ concentrations range around 20 $\mu g/m^3$ in 1999-2002 at

the two Detroit central sites (with more variable means of 11 and 30 $\mu g/m^3$ in 2003), and from 4.5 to 11.1 $\mu g/m^3$ at the Windsor monitor during the same time period. However, there are not such great differences between $PM_{10-2.5}$ measurements made in Windsor from measurements at the two Wayne County monitoring stations located outside the city. In 1999-2002, mean $PM_{10-2.5}$ concentrations at Allen Park (southwest of the city) range from 5.7 to 11.7 $\mu g/m^3$ and at Livonia (northwest of the city) range from 6.8 to 8.7 $\mu g/m^3$ (compared with 4.5 to 11.1 $\mu g/m^3$ at the Windsor monitor).

Correlations have also been determined for daily concentrations of $PM_{10-2.5}$ the same set of monitors. Appendix 3A of the CD reports correlation coefficients for the 1999-2001 time period for $PM_{10-2.5}$ from the Dearborn, West Fort and Livonia sites that range from about 0.4 to 0.6, with the lowest correlation reported between the sites the greatest distance apart, West Fort and Livonia (CD, p. 3A-36). Using data from 1999-2000, staff found correlation coefficients of similar magnitude for paired comparisons of $PM_{10-2.5}$ concentrations from the four Detroit and the Windsor sites, ranging from 0.4 to 0.75. Correlation coefficients for $PM_{10-2.5}$ data from the Windsor with each of the Detroit area sites were in the range of 0.44 to 0.76. Correlation coefficients for comparisons between Detroit monitoring stations ranged from 0.4 to nearly 0.6; again, the lowest correlation coefficients were for the central Detroit sites with the northwest monitoring station at Livonia.

Table B-1. Annual mean $PM_{10-2.5}$ concentrations from monitors in Wayne County, Michigan and Windsor, Ontario (in $\mu g/m^3$)

Site code	Site name	1999	2000	2001	2002	2003
60211	Windsor (RDG dichot)	9.7	11.1	8.6	4.5	7.1
0025	Livonia	8.7	6.8	8.5	no data	no data
0001	Allen Park	15.3	11.0	11.7	5.7	8.2
0015	West Fort	21.6	18.6	23.5	18.0	11.6
0033	Dearborn	21.8	19.8	18.0	20.0	30.4

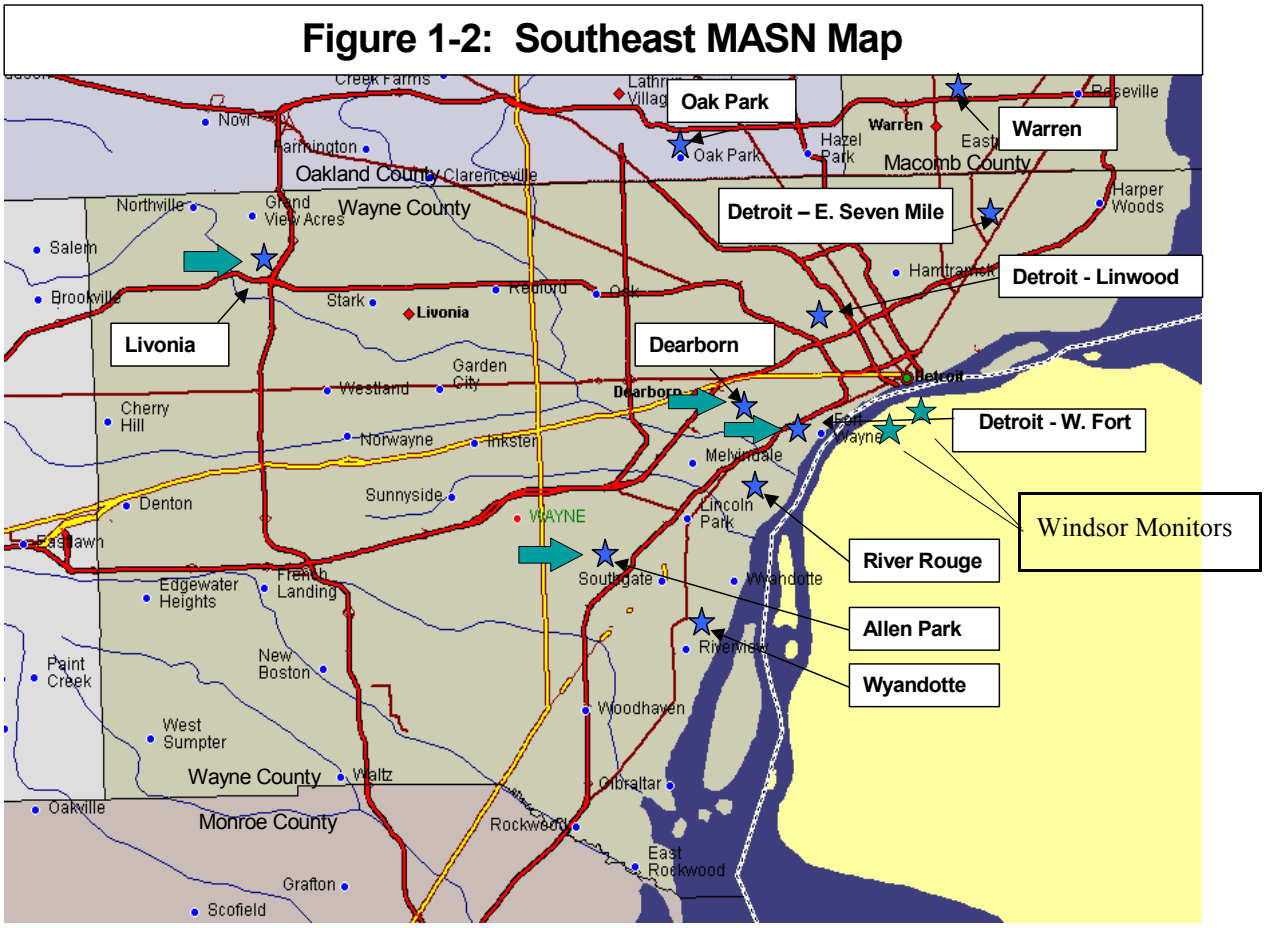

Figure B-1. Ambient air monitoring stations in the southeast region of the Michigan Air Sampling Network (MASN). The MASN monitoring stations that have included PM measurements are marked with arrows. In addition, the general locations of two monitoring stations in Windsor, Ontario, that have included PM measurements are marked "Windsor Monitors". Source: Michigan's 2003 Air Quality Report, Michigan Department of Environmental Quality, October 2004. [available at: http://www.michigan.gov/deq/0,1607,7-135-3310_4195-79055--,00.html]

ATTACHMENT C

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
RESEARCH TRIANGLE PARK, NC 27711

AUG 29 2003

OFFICE OF
AIR QUALITY PLANNING
AND STANDARDS

MEMORANDUM

SUBJECT: Statistical information on air quality data from epidemiologic studies

FROM: Mary Ross, Health Scientist

TO: PM NAAQS Review Docket (OAR-2001-0017)

This memorandum supplements the reported $PM_{2.5}$ and $PM_{10-2.5}$ air quality data from the short-term PM exposure studies, summarized in Appendix A of Chapter 3 of the draft Staff Paper, with information provided by the study authors (Attachment A). In preparing the draft Staff Paper, staff used information on the distribution of air quality data from health studies that used daily $PM_{2.5}$ and $PM_{10-2.5}$ data, including general distribution statistics such as the mean, minimum and maximum values measured during the study period, as well as the 95^{th} to 99^{th} percentile values. Staff observed that most studies provide some data on the distribution of concentration data for PM and gaseous co-pollutants, but the information provided was sometimes limited and the descriptive statistics provided vary from one study to another.

Authors of U.S. and Canadian epidemiologic studies were contacted by email (Attachment B), and asked for descriptive statistics for the air quality data used in their studies. We specifically requested information on the upper percentile values (95^{th}, 96^{th}, 97^{th}, 98^{th}, 99^{th} percentile concentrations), as well as the mean, median, minimum and maximum values. We noted that the authors could send the air quality data set for us to calculate the statistics, if they wished.

In response to our request:

- descriptive statistics were directly provided by authors of several studies (Lippmann et al., 2000; Ostro et al., 2000; Stieb et al., 2000; Tolbert et al., 2000)
- air quality data sets were provided for a number of studies (Burnett et al., 2000, 1999, 1998, 1997; Delfino et al., 1997, 1998; Fairley, 1999; Lipfert et al., 2000)
- annual average values for the years 1988 to 1996 were provided for the Seattle area and these values were averaged across the study periods for several studies (Moolgavkar et al., 2000; Norris et al., 1999; Sheppard et al., 1999)

Data were already available within EPA for a study conducted in Phoenix, AZ (Mar et al., 2000) since the data were collected as part of a monitoring study conducted by EPA's National Exposure Research Laboratory. In addition, air quality measurements made for the Harvard Six Cities study (e.g., Schwartz et al., 1996) had been provided to EPA previously.

The descriptive statistics for the health studies are summarized in the attached table (Attachment A); also attached are copies of the responses received from investigators (Attachment C) and a compact disc containing the data files provided (Attachment D). Where no additional data were obtained from researchers, the attached table includes the data available from the study publication. We note that, in comparing descriptive statistics calculated from data sets provided by researchers with results from the published papers, in a few cases these statistics varied slightly from those included in the original publication; however, in no case was there a substantial difference between the values.

In the attached table, data from U.S. and Canadian studies are arranged in order of increasing mean $PM_{2.5}$ and $PM_{10-2.5}$ concentrations. The study time periods varied from several months to approximately 10 years. Average $PM_{2.5}$ concentrations varied from 8.6 to 42.1 $\mu g/m^3$ across the studies and average $PM_{10-2.5}$ concentrations varied from 6.3 to 33.2 $\mu g/m^3$ For the purpose of this memorandum, data are presented for those studies with mean $PM_{2.5}$ concentrations from the low end of the range up to 18 $\mu g/m^3$.

Attachments

ATTACHMENT A

Air Quality Statistics from U.S. and Canadian Health Studies of Short-term Exposure to Fine and Coarse Fraction Particles

A. Statistics for 24-hour $PM_{2.5}$ Concentrations from Health Studies (up to means of 18 $\mu g/m^3$)

Study Location	Air Quality Distribution Statistics *Italics = not year-round data*						
	mean	95%	96%	97%	98%	99%	max
Stieb, et al., 2000 St. John	8.5	20.5	22	23.4	27.3	30.9	53.2
Yu et al., 2000 Seattle	*10.4*						*61.7*
Schwartz 2003a Portage	11.2	26.2	29	31	34.3	39.7	63
Norris, et al., 1999 Seattle	12	28.3**	31.3**	33.1**	35.9**	40.5**	81
Schwartz 2003a Topeka	12.2	26	27	29.4	32	37	56
Burnett and Goldberg, 2003 8 Canadian Cities	13.3	32**	31.1**	34.3**	38.9**	45.4**	86
Mar, et al., 2003 Phoenix	13.5	27.8	28.5	30.2	32.2	34.1	41
Fairley, 2003 Santa Clara County	13.6	43	46.2	49	59	69.2	105.4
Delfino, et al., 1997 Montreal	*14.7*	*31.4*	*44.4*	*47.2*	*50.2*	*60.2*	*69.6*
Schwartz 2003a Boston	15.7	34.5	35.4	37.2	42	45	70.8
Ostro, et al., 2003 Coachella Valley	15.8	28.6	29.8	30.5	33.8	37.0	48.3
Thurston, et al., 1994 Toronto	*15.8-22.3*				*51*		*66*
Burnett et al., 1999 Toronto	16.4	36	38	40.1	41.9	60	71
Burnett, et al., 1998 Toronto	16.4	36	38	40.1	41.9	60	71
Sheppard, et al., 2003 Seattle	16.7	37.3**	40.2**	41.7**	46.6**	54.7**	96h
Burnett, et al., 1997 Toronto	*16.8*	*39.8*	*40.5*	*43.5*	*47.4*	*54.9*	*66.4*
Lipfert et al., 2000 Philadelphia	17.3	35.7	37.4	40.9	44.2	49.1	72.6
Goldberg and Burnett, 2003 Montreal	17.4	39.5	44.4	46.6	53.1	59	72
Ito, 2003 Detroit	18	42.6	47.4	50.3	55.2	59.2	86

B. Statistics for 24-hour $PM_{10-2.5}$ Concentrations from Health Studies

Study Location	Air Quality Distribution Statistics *Italics = not year-round data*						
	mean	95%	96%	97%	98%	99%	max
Zhang et al., 1999 Naeher et al., 1999 SW Virginia	*6.3*						*19.8*
Schwartz, 2003a Portage	6.6	19	20.1	22	25	30.7	121
Lipfert et al., 2000 Philadelphia	6.9	14.9	15.4	16.7	18.3	19.3	28.3
Neas et al., 1999 Philadelphia	*8.3*						
Schwartz, 2003a Boston	8.8	21.6	23.1	25.4	28.6	33.5	69.3
Tolbert, et al., 2000 Atlanta	9.4	17.5	18.2	19.6	21	21.8	28.6
Klemm and Mason, 2000 Atlanta	10						39.5
Schwartz, 2003a Kingston/Harriman	11.2	23.5	24.2	26.9	29.1	34.7	121
Burnett et al., 1999 Toronto	11.3	24	25	26	30	33.7	68
Burnett, et al., 1997 Toronto	*11.5*	*22.9*	*24.2*	*26.5*	*29.5*	*35.8*	*56.1*
Fairley, 2003 Santa Clara County	11.7	22	24	26	29.2	39.2	55.2
Schwartz, 2003a St. Louis	11.9	28	29.1	30.7	32.9	38.9	102.6
Thurston, et al., 1994 Toronto	*12.7-16.5*						*33*
Burnett and Goldberg, 2003 8 Canadian cities	12.9	30	29.6**	32.9**	34.0**	42.5**	99
Ito, 2003 Detroit	13.3	27.6	31	34	36.2	40.2	50
Schwartz, 2003a Topeka	14.5	38.2	41.1	44	49	58.9	95.4
Schwartz, 2003a Steubenville	16.1	39.1	42.4	47	53.2	61.4	167.5
Sheppard, et al., 2003 Seattle	16.2	27.2**	27.8**	31.4**	32.3**	38.7**	88
Schwartz, Neas, 2000 6 US cities	*22**						*31*
Moolgavkar, 2003 LA	22*						80
Ostro, et al., 2003 Coachella Valley	30.5	65.1	74.2	87.2	106.8	134.0	418

Study Location	Air Quality Distribution Statistics *Italics = not year-round data*						
	mean	95%	96%	97%	98%	99%	max
Mar, et al., 2003 Phoenix	33.2	60.5	62.3	66.3	70.6	75.4	158.6

* median
** averaged annual values for years in study provided by investigators

ATTACHMENT B

Mary Ross

05/07/02 04:12 PM

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cc: Karen Martin/RTP/USEPA/US@EPA, Johnd Bachmann/RTP/USEPA/US@EPA, John Langstaff/RTP/USEPA/US@EPA, Scott Mathias/RTP/USEPA/US@EPA

Subject: request for air quality data from PM-health studies

To: Authors of recent U.S. and Canadian fine and coarse fraction PM epidemiology studies

You are probably aware that the EPA is now in the process of reviewing the national ambient air quality standards (NAAQS) for particulate matter (PM). An important part of this review is the preparation of the "Staff Paper" by the EPA's Office of Air Quality Planning and Standards. In the Staff Paper, we offer staff conclusions and recommendations to the EPA Administrator on a range of alternatives that may include retaining or revising the PM NAAQS. We are currently preparing the first external review draft of the PM Staff Paper, and plan to release this document for review around the end of June, 2002.

In preparing the draft Staff Paper, it is helpful to consider air quality distributions from areas where health studies were conducted to investigate associations between PM and health effects. Most studies provide some information on the distribution of concentration data for PM and gaseous co-pollutants, but the information is generally limited in scope and the descriptive statistics provided vary from one study to another.

Thus, I am contacting you now to ask you to provide information on the distribution of the air quality data for PM2.5 and PM10-2.5 (where measured) used in your studies. It is important to emphasize that I am **not** requesting health data. In addition, I am not requesting raw air quality data, but rather information on the distribution of the data. However, if you would prefer to send the entire air quality data set for us to compute the descriptive statistics, that would also be acceptable. Please be aware that your responses, together with whatever data you provide, will be placed in our public docket.

- Specifically, the descriptive statistics on the air quality data for the time period of the study that we are interested in are: mean and median values, 95th, 96th, 97th, 98th, and 99th percentile values, and the minimum and maximum values.
- In addition, we would ask that you identify the air quality monitors used, unless these monitors are identified already in the study publications.

References for U.S. and Canadian studies that have used fine and coarse fraction PM data are listed below. In most cases the first author is also listed as the contact for correspondence; however, where another author is indicated as corresponding author, I have listed that name at the end of the reference and will follow up with that author. I will follow this email message with a telephone call in the next day or so to try to address any additional questions you might have about this request. If you have already provided air quality data to us in response to earlier requests, we thank you, and I will verify that we have received the requested data when I call. Thank you in advance for your time.

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Burnett, R. T.; Cakmak, S.; Brook, J. R.; Krewski, D. (1997) The role of particulate size and chemistry in the association between summertime ambient air pollution and hospitalization for cardiorespiratory diseases. Environ. Health Perspect. 105:614-620.

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ATTACHMENT C

Paige Tolbert <ptolber@sph.emory.edu>

05/15/02 04:23 PM

To: Mary Ross/RTP/USEPA/US@EPA
cc: Kristina Busico Metzger <kmetzge@sph.emory.edu>
Subject: Fw: request for air quality data from PM-health studies

Here are the descriptive statistics regarding PM2.5 and coarse particles (PM 10-2.5) you requested, attached as an excel file. For the paper you cited ("Interim results..." JEAEE, 2000;10:446-460), the study period for which these data were available was 8/98-7/99. That paper also presented epidemiologic results for the preceding five-year period during which PM10 was the only particulate measure -- let us know if you would like distributional information on PM10 for that period. Please feel free to contact me or the study coordinator, Dr. Kristi Metzger (copied above), if you have further questions.

Best wishes,
Paige

****
Paige Tolbert, Ph.D.
Associate Professor
Rollins School of Public Health
Emory University
****

var	mean	median	p95	p96	p97	p98	p99	min	max
PM25	19.41883	17.54322	38.71547	41.10628	41.97559	44.68363	45.67969	3.194361	53.239
CP	9.385624	8.945186	17.52332	18.24671	19.59848	21.01257	21.79711	0.502787	28.56517

Kaz Ito
<kaz@env.med.nyu.edu>

05/09/02 12:17 PM

To: Mary Ross/RTP/USEPA/US@EPA
cc: lippmann@env.med.nyu.edu
Subject: Detroit PM distribution

Hi Mary,

The requested distributional characteristics for PM2.5 and PM10-2.5 measured at the monitor at the intersection of College and Park Streets in Windsor are:

	minimum, median, mean, 95%, 96%, 97%, 98%, 99%, and maximum
PM2.5:	4.0,15.0, 18.0, 42.6, 47.4, 50.3, 55.2, 59.2, and 86.0
PM10-2.5:	1.0, 12.0, 13.3, 27.6, 31.0, 34.0, 36.2, 40.2, and 50.0

Please let me know if there are more questions. Good luck!

Kaz

>Mary:

> In response to your telephone message this afternoon, I forwarded
> your e-mail message to Kaz Ito, who has the air quality data files
> you seek for our HEI sponsored study of Mortality and hospital
> admissions in Detroit. The Windsor air quality data that we used were
>provided by Jeff Brook. You should be hearing from Kaz about getting
> the data files ypu seek.

>Mort Lippmann

Bart Ostro
<BOSTRO@oehha.ca.gov>

To: Mary Ross/RTP/USEPA/US@EPA
cc:
Subject: precentiles in the Valley

07/24/03 05:50 PM

Mary: Per your request, I've attached a file with the distribution of our FP and CP data used in our mortality study. Let me know if you need any more information. Best, Bart

Dr. Bart Ostro, Ph.D., Chief
Air Pollution Epidemiology Unit
California Office of Environmental Health Hazard Assessment (OEHHA)
1515 Clay St., 16th Floor
Oakland, CA 94612
(510) 622-3157
FAX: (510) 622-3210

Bostro@oehha.ca.gov percentiles.xls

Distributions for Fine and Coarse Data used in Mortality Analysis of Coachella Valley

fine particles indio - dates Jan 01, 1989 thru Dec 10, 1998

mean	median	p95	p96	p97	p98	p99	min	max
15.8	14.8	28.6	29.8	30.5	33.4	37.0	4.8	48.3

predicted coarse particles indio - dates Jan 01, 1989 thru Dec 10, 1998

mean	median	p95	p96	p97	p98	p99	min	max
30.5	26.2	65.1	74.2	87.2	106.8	134.0	0.0	418.3

Chuck Morgan
<cjmorgan@u.washington.edu>
06/03/02 07:34 PM

To: Mary Ross/RTP/USEPA/US@EPA
cc: Jane Koenig <jkoenig@u.washington.edu>, 'Lianne' Elizabeth Sheppard <sheppard@u.washington.edu>
Subject: reply to data request

To: Ross.Mary@epamail.epa.gov

Re: request for air quality data from PM-health studies, dated 7 May 2002
Addressed to Jane Q Koenig, PhD, University of Washington and Lianne Sheppard, PhD, University of Washington.

<?xml:namespace prefix = o ns = "urn:schemas-microsoft-com:office:office" />

Monday, June 03, 2002

Thank you for the opportunity to provide some supplementary analysis of the data used in Norris *et al.* (1), Sheppard *et al.* (2), and Yu *et al.* (3).

All three studies used data from three monitoring sites in the Seattle area: the Duwamish (coded "SDUW"), Kent ("KENT"), and Lake Forest Park ("LFPA"). The time periods of the studies differ. Norris *et al.* used data from September 95 through December 96; Sheppard *et al.* used data from January 87 through December 96, and Yu *et al.* used data from November 93 through August 95. In an effort to standardize the reporting of this data, we are providing data on an annual basis for each of the three monitoring sites. These data are attached as SAS data files.

Note that the larger file (SeattleA) contains measurements of average daily PM10 and PM2.5 collected by the Federal Reference Method. The smaller (SeattleB) file contains estimated PM2.5 for the Lake Forest Park site, extrapolated from nephlometer data (4).

Charles J. Morgan, PhD
Research Scientist
UW / EPA Northwest Particulate Matter
and Health Research Center

voice: 206 616 6524

Notes

1. Norris, G.; Youngpong, S. N.; Koenig, J. Q.; Larson, T. V.; Sheppard, L.; Stout, J. W. (1999) An association between fine particles and asthma emergency department visits for children in Seattle. Environ. Health Perspect. 107:489-493. (Dr. Koenig)

2. Sheppard, L.; Levy, D.; Norris, G.; Larson, T. V.; Koenig, J. Q. (1999) Effects of ambient air pollution on nonelderly asthma hospital admissions in Seattle, Washington, 1987-1994. Epidemiology 10: 23-30.

3. Yu, O.; Sheppard, L.; Lumley, T.; Koenig, J.; Shapiro, G. G. (2000) Effects of ambient air pollution on symptoms of asthma in Seattle-area children enrolled in the CAMP study. Environ. Health Perspect. 108:1209-1214. (Dr. Sheppard)

4. The formula used is PM2.5est = 0.641 + 25.565*neph.  SeattleA.sd  SeattleB.sd

David Fairley
<DFairley@baaqmd.gov>

05/07/02 05:50 PM

To: Mary Ross/RTP/USEPA/US@EPA
cc:
Subject: RE: request for air quality data from PM-health studies

I did use just 1 monitoring site: San Jose - 4th St. (120B N 4th St, San Jose, CA 95112) The info I have says the AIRS id is 850004. Please contact me if you need more info.

Fred Lipfert
<flipfert@suffolk.lib.ny
.us>

05/07/02 10:22 PM

To: Mary Ross/RTP/USEPA/US@EPA
cc:
Subject: Fw: philadelphia pm data

Mary - here are the original data that were used in the paper. Table 2 of the paper gives some of the statistics you wanted.

-----Original Message-----
From: George Allen <gallen@sparc6b.harvard.edu>
To: flipfert@suffolk.lib.ny.us <flipfert@suffolk.lib.ny.us>
Cc: Douglas W. Dockery <ddockery@hsph.harvard.edu>
Date: Saturday, January 23, 1999 1:51 PM
Subject: philadelphia pm data

>
>Hi Fred; the Philadelphia PM data you requested is in the attached zip
>file. There are two files within that zip file, both flat ASCII
>comma-delimited format: pby.csv [the data and a long header with
>supplemental info] and pby-colo.csv [the collocated data from the same
>site].
>
>I did do a preliminary screening for gross problems using only
>these pm2.5 and pm10 data, but checks for external consistency [eg, with
>sulfate data or mass reconstruction from the XRF data] have not been done;
>that would resolve some of the data that look odd here but are not
>impossible values.
>
>Please contact me if you have any questions.
> George
>
>George A. Allen
>Harvard School of Public Health
>665 Huntington Ave., Room I-G10
>Boston, MA 02115
>Tel: 617-432-1946
>Fax: 432-0497 (or 33449)
>Email: gallen@hsph.harvard.edu
>
>

phil-pby.zi

Therese Mar
<therese@u.washington.edu>

05/08/02 01:19 PM

To: Mary Ross/RTP/USEPA/US@EPA
cc:
Subject: Re: request for air quality data from PM-health studies

Hi Mary,

The data that I used was from EPA NERL. I used PM2.5 and PM10 from 1/1/95 to 12/31/97. The coarse fraction was calculated as the difference PM10-PM2.5. Let me know if you need any additional information.

Therese

Tom Dann
<dann.tom@etc.ec.gc.ca>

05/14/02 02:50 PM

To: Mary Ross/RTP/USEPA/US@EPA
cc: Rick Burnett <rick_burnett@hc-sc.gc.ca>
Subject: Dichot Data Base

Hi Mary

At the request of Rick Burnett I'm sending you all the mass data (< 2.5 μm and 2.5-10 μm) collected in our dichotomous sampler network between 1984 and 2002. I've also included station details for all sites that appear in the data archive. If you have any questions please give me a call.

Tom

Tom Dann
Head Air Toxics
Analysis and Air Quality Division
Environment Canada
ETC, 335 River Road
Ottawa, Ontario K1A 0H3

Phone: 613-991-9459
Fax: 613-998-4032
E-mail: tom.dann@ec.gc.ca


DICHALL.csv


dich_sites.xls

"Delfino, Ralph"
<rdelfino@uci.edu>

05/14/02 05:36 PM

To: Mary Ross/RTP/USEPA/US@EPA, Tom Dann <dann.tom@etc.ec.gc.ca>, rick_burnett@hc-sc.gc.ca, mark@polair.epi.mcgill.ca, dave_stieb@hc-sc.gc.ca
cc:
Subject: Re: Dichot Data Base

For
Delfino, R. J.; Murphy-Moulton, A. M.; Burnett, R. T.; Brook, J. R.; Becklake, M. R. (1997) Effects of air pollution on emergency room visits for respiratory illnesses in Montreal, Quebec. Am. J. Respir. Crit. Care Med. 155: 568-576.

Only one station had daily data for use in the time series analysis of June-Sept 1992 and 1993: looks like station #50104

I will have to find time later to answer the question for the Alpine, CA study.

Ralph

Dave_Stieb@hc-sc.gc.ca

05/14/02 04:10 PM

To: Mary Ross/RTP/USEPA/US@EPA
cc:
Subject: Re: Dichot Data Base

Hello,

We used some special purpose monitors in the last study in the list.

Please see descriptive information attached.

Note that the minimum value for PM2.5 is non-zero while for the other PM metrics
it's zero. I'm not sure why that's the case, but it may be a result of averaging over multiple sites, where there were perhaps differences in availability of data for the various metrics.

I hope the information is helpful.

Regards,

Dave Stieb

(See attached file: pm_epa.wpd)

Ross.Mary@epamail.epa.gov on 05/14/2002 03:30:28 PM

To: Tom Dann <dann.tom@etc.ec.gc.ca>, Rick Burnett/HC-SC/GC/CA@HWC, mark@polair.epi.mcgill.ca, Dave Stieb/HC-SC/GC/CA@HWC, rdelfino@uci.edu
cc:

Subject: Re: Dichot Data Base

Thanks! Just one follow-up question, for Drs. Burnett, Goldberg, Delfino and Stieb: It looks like this data set (1984-2002) would cover the study periods for all of the following studies. Is that correct? My reading of the studies indicates that they used existing monitoring stations, not special purpose monitors established just for the studies.

Burnett, R. T.; Cakmak, S.; Brook, J. R.; Krewski, D. (1997) The role of particulate size and chemistry in the association between summertime ambient air pollution and hospitalization for cardiorespiratory diseases. Environ. Health Perspect. 105:614-620.

Burnett, R. T.; Cakmak, S.; Raizenne, M. E.; Stieb, D.; Vincent, R.; Krewski, D.; Brook, J. R.; Philips, O.; Ozkaynak, H. (1998) The association between ambient carbon monoxide levels and daily mortality in Toronto, Canada. J. Air Waste Manage. Assoc. 48:689-700.

Burnett, R. T.; Smith-Doiron, M.; Stieb, D.; Cakmak, S.; Brook, J. R. (1999) Effects of particulate and gaseous air pollution on cardiorespiratory hospitalizations. Arch. Environ. Health 54:130-139.

Burnett, R. T.; Brook, J.; Dann, T.; Delocla, C.; Philips, O.; Cakmak, S.; Vincent, R.; Goldberg, M. S.; Krewski, D. (2000) Association between particulate- and gas-phase components of urban air pollution and daily mortality in eight Canadian cities. Inhalation Toxicol. 12(suppl. 4): 15-39.

Burnett, R. T.; Smith-Doiron, M.; Stieb, D.; Raizenne, M. E.; Brook, J. R.; Dales, R. E.; Leech, J. A.; Cakmak, S.; Krewski, D. (2001) Association between ozone and hospitalization for acute respiratory diseases in children less than 2 years of age. Am. J. Epidemiol. 153:444-452.

Delfino, R. J.; Murphy-Moulton, A. M.; Burnett, R. T.; Brook, J. R.; Becklake, M. R. (1997) Effects of air pollution on emergency room visits for respiratory illnesses in Montreal, Quebec. Am. J. Respir. Crit. Care Med. 155: 568-576.

Goldberg, M. S.; Bailar, J. C., III; Burnett, R. T.; Brook, J. R.; Tamblyn, R.; Bonvalot, Y.; Ernst, P.; Flegel, K. M.; Singh, R. K.; Valois, M.-F. (2000) Identifying subgroups of the general population that may be susceptible to short-term increases in particulate air pollution: a time-series studi in Montreal, Quebec. Cambridge, MA: Health Effects Institute; research report 97.

Stieb, D. M.; Beveridge, R. C.; Brook, J. R.; Smith-Doiron, M.; Burnett, R. T.; Dales, R. E.; Beaulieu, S.; Judek, S.; Mamedov, A. (2000) Air pollution, aeroallergens and cardiorespiratory emergency department visits in Saint John, Canada. J. Exposure Anal. Environ. Epidemiol.: 10: 461-477.

Tom Dann
<dann.tom@etc.ec.gc.ca>
05/14/02 02:50 PM

To: Mary Ross/RTP/USEPA/US@EPA
cc: Rick Burnett <rick_burnett@hc-sc.gc.ca>
Subject: Dichot Data Base

Hi Mary

At the request of Rick Burnett I'm sending you all the mass data (< 2.5 μm and 2.5-10 μm) collected in our dichotomous sampler network between 1984 and 2002. I've also included station details for all sites that appear in the data archive. If you have any questions please give me a call.

Tom

Tom Dann
Head Air Toxics
Analysis and Air Quality Division
Environment Canada
ETC, 335 River Road
Ottawa, Ontario K1A 0H3

Phone: 613-991-9459
Fax: 613-998-4032
E-mail: tom.dann@ec.gc.ca

(See attached file: DICHALL.csv)(See attached file: dich_sites.xls)


DICHALL.csv

dich_sites.xls

pm_epa.wpd

PM values for Saint John, NB Study 1992-1996

	MEAN	MIN	MEDIAN	95%	96%	97%	98%	99%	MAX
PM_{10}	14.0	0	12.0	31.3	33.6	36.2	39.0	43.4	70.3
$PM_{2.5}$	8.5	0.6	7.0	20.5	22.0	23.4	27.3	30.9	53.2
$PM_{10\text{-}2.5}$	6.5	0	5.1	15.4	16.2	18.0	20.2	24.5	56.1

Marie-France Valois
<mary@polair.epi.mcgill.ca>

05/30/02 05:45 PM

To: Mary Ross/RTP/USEPA/US@EPA
cc:
Subject: PM data from Mark Goldberg's Montreal Study

Hello !!

About a month ago you asked us for some distributions from our Montreal Air Pollution study. I am sending you a PDF file with the overall distributions and the yearly distributions for TSP, PM10, PM2.5, Sulfates from TSP, Sulfates from PM10 and Sulfates from PM2.5.

I hope this is what you were looking for. If you have questions or other requests, please do not hesitate to communicate with me.

Have a nice evening,
Marie-France

Marie-France Valois
mary@polair.epi.mcgill.ca
marie-france.valois@mcgill.ca

tel : 514-398-2419
fax : 514-398-4503

table_pm_distribution

Goldberg Table 1. Particulate Pollutant Data[a] used in the Statistical Analyses, Montreal, 1984 to 1993.

Pollutant	Start year	No. of sites	Duration	Frequency	Samplers used	Analytic methods
TSP	1984	19	24 hour	every 6th day	High-volume samplers (flow rate of 1.5 m^3 per minute); midnight to midnight sampling	Washed glass filters, mass measured on Sartorius AC121S digital electronic balance
Sulfate from TSP	1984	13	24 hour	every 6th day	High-volume samplers (1.5 m^3 per minute); midnight to midnight sampling	Soluble sulfates on filters extracted by hot water and analysed by ionic chromatography
PM_{10}	1984	2	24 hour	every 6^{h} day	Sierra-Anderson dichotomous; (flow rate of 16.7 liters per minute); midnight to midnight	Electronic microbalance at constant temperature and relative humidity;
Sulfate from PM_{10}	1984	2	24 hour	every 6th day	High-volume samplers	Dionex ion chromatography
$PM_{2.5}$	1984	2	24 hour	every 6th day	Sierra-Anderson dichotomous; (flow rate of 16.7 liters per minute)	Electronic microbalance at constant temperature and relative humidity
Sulfate from $PM_{2.5}$	1984	2	24 hour	every 6th day	same as $PM_{2.5}$	Dionex ion chromatography

[a] PM was measured by Environment Canada as part of the National Air Pollution Surveillance Program. All other pollutants measured by the Montreal Urban Community. The number of sites changed during the study period.
Abbreviations: $PM_{2.5}$, PM_{10}, particulate matter with an aerodynamic diameter of 2.5 and 10 microns (μ); TSP, total suspended particles.

Goldberg Table 2. Distribution of Mean Daily Environmental Pollutants ($\mu g/m^3$) Averaged over all Monitoring Stations, Montreal, 1986-1993

Predicted particle measure	Mean	Median	Minimum	Maximum	Percentiles: 95th	96th	97th	98th	99th
TSP	53.14	48.71	14.63	211.06	94.53	97.67	105.61	109.22	121.64
PM_{10}	32.23	28.50	6.50	120.50	66.04	70.90	73.00	77.87	88.50
$PM_{2.5}$	17.38	14.67	2.18	72.00	39.50	44.40	46.57	53.07	59.00
Sulfate from TSP	4.25	3.57	0.26	19.21	10.53	11.13	12.22	13.00	14.73
Sulfate from PM_{10}	4.74	3.56	0.32	30.71	14.10	15.93	16.53	19.18	24.34
Sulfate from $PM_{2.5}$	4.28	3.14	0.22	29.15	12.56	14.43	15.70	17.71	23.45

Goldberg Table 3. Distribution of Mean Daily TSP ($\mu g/m^3$) Averaged over all Monitoring Stations by Year, Montreal, 1986-1993

					Percentiles:				
Year	Mean	Median	Minimum	Maximum	95th	96th	97th	98th	99th
84	63.41	57.76	26.75	211.06	121.53	123.35	130.38	130.38	211.06
85	55.37	53.59	22.75	111.87	89.07	104.06	105.64	105.64	111.87
86	53.32	51.19	14.63	104.21	85.38	95.13	99.67	99.67	104.21
87	63.81	65.50	20.71	147.69	97.56	106.06	106.73	106.73	147.69
88	55.79	50.53	23.11	125.47	106.37	106.82	112.58	112.58	125.47
89	57.29	54.67	17.73	110.75	92.41	96.71	97.67	97.67	110.75
90	47.81	46.33	20.59	87.39	83.89	83.89	84.07	84.07	87.39
91	45.32	40.15	19.36	120.87	79.87	82.44	86.14	86.14	120.87
92	46.42	42.35	17.38	121.64	80.36	86.07	86.24	86.24	121.64
93	42.34	37.13	17.83	156.88	74.31	77.17	90.31	90.31	156.88

Goldberg Table 4. Distribution of Mean Daily PM_{10} ($\mu g/m^3$) Averaged over all Monitoring Stations by Year, Montreal, 1986-1993

					Percentiles:				
Year	Mean	Median	Minimum	Maximum	95th	96th	97th	98th	99th
84	39.48	38.00	13.00	99.00	69.50	73.00	73.00	99.00	99.00
85	40.49	36.50	14.00	92.00	82.00	82.00	83.50	83.50	92.00
86	35.97	33.00	12.50	95.50	61.00	61.00	88.50	88.50	95.50
87	44.59	42.75	12.00	120.50	73.00	86.00	86.00	120.50	120.50
88	35.23	30.00	13.00	76.00	73.00	73.00	73.00	73.00	76.00
89	36.96	33.14	7.90	87.65	70.90	70.90	75.73	75.73	87.65
90	31.88	30.01	12.72	70.88	64.21	67.54	70.88	70.88	70.88
91	NA	NA	NA	NA	NA	NA	NA	NA	NA
92	29.69	25.00	9.28	98.61	60.09	63.07	63.42	64.37	72.66
93	23.11	20.99	6.50	118.00	45.12	46.02	50.71	57.49	86.56

Goldberg Table 5. Distribution of Mean Daily $PM_{2.5}$ ($\mu g/m^3$) Averaged over all Monitoring Stations by Year, Montreal, 1986-1993

					Percentiles:				
Year	Mean	Median	Minimum	Maximum	95th	96th	97th	98th	99th
84	21.01	19.50	6.00	65.50	43.00	46.00	46.00	65.50	65.50
85	19.36	15.50	5.00	68.50	38.50	38.50	45.00	45.00	68.50
86	19.34	18.25	3.50	64.00	33.50	33.50	54.50	54.50	64.00
87	23.57	20.00	7.00	72.00	51.00	59.00	59.00	72.00	72.00
88	18.40	16.00	5.00	52.00	39.50	39.50	46.50	46.50	52.00
89	20.19	18.50	4.72	55.84	45.93	45.93	53.07	53.07	55.84
90	18.05	15.72	4.81	58.95	48.70	48.70	58.95	58.95	58.95
91	NA	NA	NA	NA	NA	NA	NA	NA	NA
92	17.02	14.13	3.49	69.63	46.57	47.24	50.16	54.94	60.15
93	12.75	10.86	2.18	57.11	29.53	29.88	30.82	31.36	48.65

Goldberg Table 6. Distribution of Mean Daily Sulfates from TSP ($\mu g/m^3$) Averaged over all Monitoring Stations by Year, Montreal, 1986-1993

					Percentiles:				
Year	Mean	Median	Minimum	Maximum	95th	96th	97th	98th	99th
84	5.66	4.60	1.00	17.91	12.80	13.08	16.11	16.11	17.91
85	4.64	4.04	1.44	12.13	9.50	9.55	9.84	9.84	12.13
86	5.24	4.48	0.78	18.25	12.22	12.74	13.00	13.00	18.25
87	4.05	3.28	0.59	15.03	9.15	9.34	9.56	9.56	15.03
88	4.33	3.80	0.98	19.21	9.11	12.21	15.03	15.03	19.21
89	4.23	3.64	0.26	14.73	9.60	9.85	10.84	10.84	14.73
90	3.65	2.74	0.70	13.71	10.55	10.61	10.80	10.80	13.71
91	3.53	2.87	0.56	14.63	7.82	7.83	12.47	12.47	14.63
92	3.38	3.05	0.70	12.60	5.86	6.66	6.97	6.97	12.60
93	3.81	3.52	0.41	13.82	8.41	12.65	13.15	13.15	13.82

Goldberg Table 7. Distribution of Mean Daily Sulfates from PM_{10} ($\mu g/m^3$) Averaged over all Monitoring Stations by Year, Montreal, 1986-1993

					Percentiles:				
Year	Mean	Median	Minimum	Maximum	95th	96th	97th	98th	99th
84	5.69	3.95	1.14	26.20	16.34	16.62	16.62	26.20	26.20
85	4.09	3.05	0.87	15.43	10.03	10.03	10.95	10.95	15.43
86	4.91	4.08	0.38	30.71	13.41	13.41	16.19	16.19	30.71
87	4.81	3.98	0.83	12.43	11.45	12.31	12.31	12.43	12.43
88	4.62	3.28	0.83	25.94	16.53	16.53	19.18	19.18	25.94
89	5.19	4.06	1.02	17.51	12.60	12.60	16.51	16.51	17.51
90	5.67	3.73	1.03	19.60	16.83	16.83	19.60	19.60	19.60
91	NA	NA	NA	NA	NA	NA	NA	NA	NA
92	5.48	3.00	0.69	25.32	24.34	24.34	24.34	25.32	25.32
93	3.42	2.13	0.32	15.47	10.92	12.13	14.10	14.10	15.47

Goldberg Table 8. Distribution of Mean Daily Sulfates from $PM_{2.5}$ ($\mu g/m^3$) Averaged over all Monitoring Stations by Year, Montreal, 1986-1993

					Percentiles:				
Year	Mean	Median	Minimum	Maximum	95th	96th	97th	98th	99th
84	5.11	3.47	0.65	26.06	15.68	15.91	15.91	26.06	26.06
85	3.55	2.73	0.61	14.43	9.31	9.31	10.04	10.04	14.43
86	4.42	3.45	0.22	29.15	12.40	12.40	15.97	15.97	29.15
87	4.29	3.49	0.76	11.57	10.20	10.48	10.48	11.57	11.57
88	4.22	2.96	0.65	25.89	16.24	16.24	19.03	19.03	25.89
89	4.70	4.10	0.81	17.64	12.10	12.56	14.30	14.30	17.64
90	5.00	3.22	0.75	17.71	15.70	15.70	17.71	17.71	17.71
91	NA	NA	NA	NA	NA	NA	NA	NA	NA
92	5.08	2.75	0.54	24.77	23.45	23.45	23.45	24.77	24.77
93	3.09	1.80	0.26	14.28	10.40	11.62	13.60	13.60	14.28

HARVARD SCHOOL OF PUBLIC HEALTH

Department of Environmental Health
Environmental Epidemiology Program

20 June 1997

John Bachmann
Planning & Management Staff
US EPA – MD 10
Research Triangle Park, NC 27711

Dear John,

As requested, we are enclosing a disk copy of the dichotomous sampler mass data collected in the Harvard Six Cities Study between 1979 and 1988. These data summarize the fine and coarse mass measurements provided to us by the Environmental Science Research Laboratory of the Environmental Protection Agency. I understand that EPA has the original records of these data.

Two ASCII files are included on the disk. One labeled "dichot.data" includes the city, date, fine mass, and coarse mass. The second file labeled "means.lst" gives summary statistics by city which should be used to check for proper transfer of the data.

A more detailed description of the measurements is attached. Please note that it is our practice to record the data values exactly as measured. Thus, values below the minimum detectable level are presented as reported. Small negative concentrations are sometimes reported for days with near zero concentrations.

Sincerely yours,

Douglas W. Dockery
Associate Professor
Environmental Epidemiology

DWD:jpb

665 Huntington Avenue Boston, Massachusetts 02115-6096 617 432-1244 Fax: 617 277-2382

HARVARD SIX CITIES STUDY: DICHOTOMOUS SAMPLER PARTICLE DATA
Description of Aerosol Sampling and Chemical Analysis[1]

Data Collection. Dichotomous aerosol samplers were operated for 24 hours, midnight to midnight, at Stuebenville, Ohio; Watertown, Massachusetts; Portage, Wisconsin; Topeka, Kansas; St. Louis, Missouri; and Harriman, Tennessee as part of the Harvard Air Pollution Health Study. Table 1 lists the sampling locations and a brief site description. Beckman dichotomous virtual impactors collected samples in two size fractions: fine particles (FP) having aerodynamic diameters (d_a) < 2.5 μm and coarse particles (CP15) with 2.5 μm $< d_a < 15$ μm. In April 1984 we changed to Anderson inlets on all dichotomous samplers and began collecting coarse particles (CP10) with an upper cut-off of 10 μm. By summing the mass concentrations from both the fine and coarse samples (FP+CP15 or FP+CP10), we can estimate the inhalable particle mass concentration as collected by the dichotomous sampler.

The dichotomous samplers were operated every other day until June 1983, when they were operated every third day. When health teams were testing lung functions in the cities, the sampling schedule of FP and CP was switched to every day.

Sample Analysis. Table 2 summarizes the Harvard sampling/database information for each site including particle size fractions and analysis techniques. The analysis technique used for FP and CP changed during the course of the study. The mass measurements for samples collected through October 1981 were determined by beta-ray attenuation at EPA's Environmental Science Research Laboratory in Research Triangle Park, North Carolina. Between November 1981 and January 1984, mass determinations were made gravimetrically at the Harvard School of Public Health. After February 1984, mass measurements were made using beta-ray attenuation by Northrop Services, Inc. at Research Triangle Park. The sensitivity of the beta-ray measurement technique and its comparability to gravimetric methods is described by Jaklevic et al. (1980) and Courtney et al. (1982). A complete description of the quality assurance program used at Harvard to validate the FP and CP data set is reported in Briggs et al. (1982) and Briggs (1983).

A negative artifact in the coarse mass concentration due to loss of coarse particles from filters during transit from the sites to EPA was reported by Dzubay and Barbour (1983). This loss has been estimated to be 19-53% by Dzubay and Barbour, and has been confirmed as 30-35% average coarse fraction mass loss by our tests. As a result, when Northrop Services started providing filters and mass measurements in 1983, filters collecting coarse particles were oiled.

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[1] Abstracted from Spengler JD, Briggs SLK, Ozkaynak. (1986) Relationships between TSP measurements and size-fractionated particle mass measurements in six cities participating in the Harvard Air Pollution Health Study. Report to Office of Air Quality, Planning, and Standards, US EPA, Dec 5, 1986.

Table 1

Description of Monitoring Sites and Areas for Cities Participating in the Harvard Air Pollution Health Study

City	*Location (Long, Lat)*	*Area/ Site Description*
Steubenville, OH	80° 37.5' W, 40° 22.5' N	• heavily industrialized city of 26,00 on the Ohio River • site located on plateau overlooking river valley
Watertown, MA	71° 11' W, 42° 22' N	• residential non-industrial of 120,000 • site located at town's high school athletic field
Portage, WI	89° 28' W, 43° 32.5' N	• farming community of 8,000 north of Madison and 4 miles north of Columbia 1,000 MW coal-fired power plant • site located beside county road surrounded by agricultural land
Topeka, KS	95° 42' W, 39° 2' N	• non-industrial city of 120,000 • site located in a grass field adjacent to parking lot on university campus about two miles SW of downtown area
St. Louis, MO	90° 16' W, 38° 34' N	• SE section of industrialized metropolitan city of 425,000 • site located in residential/light commercial area, bordered by railroad tracks and adjacent to unpaved parking lot
Harriman, TN	84° 33' W, 35° 55' N	• rural community of 8,300, 40 miles SW of Knoxville and 5 miles W of Kingston • 1,700 MW coal-fired power plant

Table 1I

Harvard Air Pollution Health Study Particle Database

City	F+CP15						F+CP10	
	Beta-gauge		*Gravimetric*		*Beta-gauge*[a]		*Beta-gauge*[a]	
	Start	*End*	*Start*	*End*	*Start*	*End*	*Start*	*End*
Steubenville, OH	4/13/79	11/08/81	11/14/81	1/16/84	1/19/84	3/29/84	3/31/84	9/26/87
Watertown, MA	5/03/79	11/28/81	11/30/81	2/15/84	2/18/84	4/06/84	4/12/84	1/2/86
Portage, WI	3/22/79	10/13/81	10/23/81	2/09/84	2/12/84	3/28/84	3/31/84	12/31/87
Topeka, KS	9/23/79	11/02/81	11/04/81	1/30/84	2/21/84	3/29/84	4/06/84	10/18/88
St. Louis, MO	9/22/79	10/25/81	11/12/81	1/19/84	1/25/84	3/28/84	3/31/84	1/19/87
Harriman, TN	5/09/80	11/16/81	11/18/81	1/16/84	1/14/84	3/29/84	3/31/84	1/1/88

[a] Coarse filters oiled

Bibliography

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Briggs SLK. (1983) A Q.A. program applied to a particle sampler network. *Proceedings of the American Society for Quality Control, Quality Congress Transactions*, Boston, MA.

Courtney WJ, Shaw RW, Dzubay TD. (1982) Precision and accuracy of a beta-gauge for aerosol mass determination. *ES&T* **16**:236.

Dzubay TG and Barbour RK. (1983) A method to improve the adhesion of aerosol particles on Teflon filters. *JAPCA* **33**:692.

Jaklevic JM, Gatti LC, Goulding FS, Loo BW. (1980) Beta Gauge Instrumentation for the Measurement of Aerosol Mass. Environmental Sciences Research Laboratory, US EPA, Research Triangle Park, NC.

"Chock, David (D.P.)"
<dchock@ford.com>
12/15/2004 05:54 PM

To Mary Ross/RTP/USEPA/US@EPA
cc
bcc
Subject FW: request for air quality distribution information

Mary:

Here are the statistics for the 1989-1991 Allegheny County, PA (greater Pittsburgh) PM data set (ug/m^3) that you requested. They are prepared by Sandy Winkler, a co-author of the work. Note that the sum of the PM2.5 and PM10-PM2.5 columns do not necessarily equal the PM10 column even if they all have the same numbers of observations.

	PM10	PM2.5	PM10-PM2.5
Min	6.5	3.0	0
Median	33.0	17.0	14.8
Mean	40.2	20.5	21.6
95th	90.65	45.55	63.0
96th	96.0	49.0	66.94
97th	99.0	50.33	71.32
98th	112.1	53.22	80.11
99th	124.0	60.33	99.28
Max	240.0	86.0	208.0
#obs	1095	490	490

Best Regards,
David P. Chock
Senior Technical Leader
Phys. and Env. Sciences Dept., EPSS R&A
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-----Original Message-----
From: Ross.Mary@epamail.epa.gov [mailto:Ross.Mary@epamail.epa.gov]
Sent: Monday, December 13, 2004 11:38 AM
To: Chock, David (D.P.)
Cc: Richmond.Harvey@epamail.epa.gov
Subject: request for air quality distribution information

Dear Dr. Chock:

Early in the process of developing the Staff Paper for PM, I sent a note to researchers requesting information on distribution of the air quality data for PM2.5 and PM10-2.5 used in epidemiologic studies. At that time, your paper (see citation below) was not included in the list of studies included in the risk assessment.