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Office of Pesticides and
Toxic Substances
Washington, DC 20460

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Pesticides and Toxic Substances

EPA

Cadmium and Lead Levels in Human Blood and Kidney

A Literature Search

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June 1980

CADMIUM AND LEAD LEVELS IN HUMAN BLOOD AND KIDNEY
A LITERATURE SEARCH

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DISCLAIMER

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INTRODUCTION

This computerized literature search for data on cadmium and lead in human blood and kidney was accomplished for participants in the World Health Organization's Biological Monitoring Project. These data were collected from a comprehensive human body-burden data base being developed under the direction of the Environmental Protection Agency and the National Cancer Institute.

This limited search is provided to aid in the current planning stages of the World Health Organization's international program during which school teachers in a number of major cities around the world will be examined for cadmium and lead levels in their blood. In addition, kidney cortex tissues will be analyzed for cadmium levels. These autopsy specimens will be collected from cases of sudden deaths not related to kidney disease.

BACKGROUND ON THE DATA BASE

A comprehensive human body-burden data base has been established through the US Environmental Protection Agency/National Cancer Institute Collaborative Program. The objective of this effort is to provide a centralized source of information on chemicals that have been identified in human biological media. Body-burden data are needed by the US government and domestic and foreign scientists involved in human health research.

Approximately 85 journals are routinely searched for body-burden articles. Retrospective searching to 1974 has yielded over 2,000 pertinent documents of which over 800 have been entered into the data base. Over 500 chemicals were identified in human biological media from those sources.

The data base is published annually in tabular format with four indices for specific searching. The first publication, "Chemicals Identified in Human Biological Media: A Data Base," is available. A limited number of computerized searches are available in cases when the published version does not allow for retrieval of needed information or when special needs exist. It should be emphasized that the purpose of the data base is to provide a centralized resource for body-burden data and in no way is intended to obviate the need for the user to ultimately refer to the original literature or data sources. No screening or evaluation of the data is conducted.

The comprehensive data base has been established under the aegis of the Interagency Collaborative Group on Environmental Carcinogenesis (ICGEC), National Cancer Institute. The work is being done under the direction of EPA by the Oak Ridge National Laboratory's Health and Environmental Studies Program, through interagency agreements involving the National Cancer Institute, the Environmental Protection Agency, and the Department of Energy.

To obtain additional information about the comprehensive data base and copies of the first annual report, write to:

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USER'S GUIDE

The emphasis to date on inputting recent literature and significant research documents has resulted in a chronological mix of articles from 1974 to the present in the data base. Approximately one-third of the collected articles have been input as of this search. It is anticipated that by the time of the second annual report publication in October 1980, two-thirds of the collected documents will be in the data base.

When body-burden articles are identified, data are extracted and entered in the data base by chemical and tissue/body fluid. Each data entry comprises a single record (or line entry) and is assigned a record number. If a particular document deals with more than one chemical and/or tissue, there will be multiple records for that document. For example, a study of 5 chemicals in each of 3 tissues would have 15 different records (or 15 line entries) in the data base with 15 different record numbers. Record numbers are assigned consecutively to records through the entire data base and appear for each record in the upper left corner of the tissue column.

Information in the next five columns, EXPOSURE ROUTE, ANALYTICAL METHOD, NUMBER OF CASES, RANGE, and MEAN, is provided when available in the source document. All means are arithmetic unless designated geometric. When only graphically displayed data are available, estimates are calculated by the data extractor and so indicated in the table under GENERAL INFORMATION.

In the column headed GENERAL INFORMATION, a variety of information may be included such as that pertinent to the range and mean as well as experimental design, demography, health effects, pathology, morphology, toxicity, source, half-life, and use. Keywords (in uppercase letters) are provided for further insight into important aspects of the source documents. The use of a different chemical or tissue as a keyword indicates that studies on that chemical or tissue were also reported in the same document. In general, all supporting information deemed important for understanding the data presented will appear in this column.

Review articles are included in the data base; however, no data have been extracted from such documents since the original research articles are included. Review articles are designated in the GENERAL INFORMATION column by the word "Review."

ABBREVIATIONS FOR ANALYTICAL METHODS

AAS	Atomic absorption spectrometry
APDC-MIBK	Ammonium pyrrolidine diethiocarbamate-methylisobutyl ketone extraction
ASV	Anodic stripping voltammetry
CC	Column chromatography
ES	Emission spectrometry
MS	Mass spectrometry
NA	Neutron activation

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TISSUE	EXPOSURE ROUTE	ANALYTICAL METHOD	NUMBER OF CASES	RANGE	MEAN	GENERAL INFORMATION	REFERENCE
192 Blood		AAS	1954	1-30 ug/dl	5.0 ug/dl	Levels not significantly related to race, area of residence, educational attainment or smoking habits. Author comment: no complete trace metal exposure data for stated areas of residence. Military recruits from Chicago and adjacent areas in Illinois and Indiana inducted between June 2° and July 1°, 1969. BLOOD; CADMIUM; COPPER; LEAD; ZINC; METALS; AGE; SMOKING; TOBACCOS; DIETS; ILLINOIS; INDIANA; RACIAL STUDIES	Creason, J.P. Hammer, D.I. Colucci, A.V. Priester, L. Davis, J. 1976
193 Blood	Inhalation		a) 331 b) 332 c) 109 d) 109	a) 0.01-0.97 ug/100 ml b) 0.01-1.03 ug/100 ml c) 0.02-0.61 ug/100 ml d) 0.01-0.88 ug/100 ml	a) 0.12 ug/100 ml b) 0.10 ug/100 ml c) 0.20 ug/100 ml d) 0.07 ug/100 ml	a) Nonsmokers, mothers b) Newborn of nonsmokers c) Smokers, mothers d) Newborn of smokers Samples from 333 nonsmoking and 10° smoking European women and their newborn. The women lived in or near Brussels, Tournai, Leuven (Louvain), and Antwerp, Belgium representing rural, urban, and industrial areas. Cigarette smoke BLOOD; INFANTS; SMOKING; LEAD; MERCURY; CADMIUM; METALS; CARBON INORGANIC COMPOUNDS; COMPARATIVE EVALUATIONS; RURAL AREAS; URBAN AREAS; INDUSTRIAL AREAS; BELGIUM; PLACENTA; UMBILICAL CORD	Buchet, J.P. Roels, H. Hubermont, G. Lauwerys, R. 1978
194 Blood	Inhalation Ingestion		a) 501 b) 501 c) 472 d) 472 e) 29 f) 29	a) 0.01-1.01 ug/100 ml b) 0.01-1.03 ug/100 ml c) 0.01-0.97 ug/100 ml d) 0.01-1.03 ug/100 ml e) 0.04-1.01 ug/100 ml f) 0.01-0.47 ug/100 ml	a) 0.15 ug/100 ml b) 0.1 ug/100 ml c) 0.14 ug/100 ml d) 0.09 ug/100 ml e) 0.29 ug/100 ml f) 0.21 ug/100 ml	a) All women b) All newborn c) European women d) European newborn e) Afro-Asian women, aged 18-40 yr, mean 26 yr f) Afro-Asian newborn Samples taken at delivery from mothers by venipuncture and from newborn at the umbilical cord. The women lived in areas of Belgium (Antwerp, Brussels, Louvain, Tournai and Vilvoorde) with various degrees of industrialization and urbanization. BLOOD; ADULTS; INFANTS; LEAD; MERCURY; CADMIUM; CARBON INORGANIC COMPOUNDS; METALS; BELGIUM; COMPARATIVE EVALUATIONS; UMBILICAL CORD; PLACENTA	Lauwerys, R. Buchet, J.P. Roels, H. Hubermont, G. 1978

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TISSUE	EXPOSURE ROUTE	ANALYTICAL METHOD	NUMBER OF CASES	RANGE	MEAN	GENERAL INFORMATION	REFERENCE
195 Blood		AAS	216	a) Not given b) Not given c) Not given d) Not given e) Not given f) Not given	a) 0.5 ug/100 ml b) 0.7 ug/100 ml c) 0.5 ug/100 ml d) 0.4 ug/100 ml e) 0.9 ug/100 ml f) 0.8 ug/100 ml	a) Policemen on foot patrol b) Office workers in downtown Houston (control for (a)) c) Garage attendants d) Orderlies and custodians (control for (b)) e) Females living within 2 blocks of freeway f) Females living away from freeway (control for (e)) Six groups, each of 26 individuals, in the metropolitan area of Houston, TX, policemen on foot patrol, office workers in downtown Houston, garage attendants, orderlies and custodians, females living within two blocks of a freeway, and females living away from a freeway. CADMIUM; LEAD; TRACE ELEMENTS; TEXAS; BLOOD; URINE; HAIR; FECES; ZINC; MANGANESE; COPPER; PLATINUM; PALLADIUM; METALS; AUTOMOTIVE; OCCUPATIONAL HAZARDS	Johnson, D.E. Tillery, J.B. Prevost, R.J. 1975
196 Blood		ASV	a) 47 b) 90	a) <0.1-9.6 ug/100 ml b) 0.07-3.72 ug/100 ml	a) 1.71 ug/100 ml b) 0.57 ug/100 ml	a) Ann Arbor population b) Yanomamo population 100 blood donors, 18-58 yr old, from Ann Arbor, Michigan. 137 Yanomamo Indians from Venezuela. BLOOD; URINE; HAIR; VENEZUELA; MERCURY; CADMIUM; LEAD; COPPER; METALS; MICHIGAN	Hecker, L.H. Allen, H.E. Dinman, B.D. Neel, J.V. 1974
197 Blood		APDC-MIBK AAS	4	Not given	0.3 ug/100 ml	BLOOD; URINE; HAIR; CADMIUM; INTEGUMENT; KIDNEYS; LIVER; METALS	Ullucci, P.A. Hwang, J.Y. 1974
198 Blood	Ingestion Inhalation	APDC-MIBK AAS	369	0.0-2.8 ug/100 ml	0.3 ug/100 ml	Children, 1-8 hr in Newark, NJ. Paint CADMIUM; LEAD; ZINC; METALS; BLOOD; CHILDREN; PAINTS; POPULATION EXPOSURE; URBAN AREAS; NEW JERSEY	Bogden, J.D. Singh, M.P. Joselow, M.M. 1974
199 Blood		AAS	a) 22 b) 20	a) 0.4-4.0 ng/g b) 0.5-4.3 ng/g	a) 1.8 ng/g b) 1.5 ng/g	a) Preoperational values b) Postoperational values Preoperational values should be regarded as better indicators of long-term average values. Samples from routine gallbladder oeprations of 23 volunteers as follows: 19 women, 31-66 yr (mean of 47 yr and 4 men, 26-66 yr (mean of 32 yr). CADMIUM; METALS; BLOOD; LIVER; BILE	Elinder, C-G. Kjellstrom, T. Lind, B. Molander, M.-L. Silander, T. 1978

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TISSUE	EXPOSURE ROUTE	ANALYTICAL METHOD	NUMBER OF CASES	RANGE	MEAN	GENERAL INFORMATION	REFERENCE
200 Blood	Inhalation Ingestion	AAS	a) 40 b) 29 c) 45	a) 0.02-0.41 ug/100 ml b) 0.01-0.27 ug/100 ml c) 0.01-0.24 ug/100 ml	a) 0.11 ug/100 ml b) 0.06 ug/100 ml c) 0.07 ug/100 ml	a) <1 km from Pb smelter b) 2.5 km from Pb smelter c) Rural area (Controls) Samples from children, aged 10-14 yr, living and going to school at various distances from a Pb smelter in Leuven, Belgium. No remarkable socioeconomic differences were found between the groups. Follow-up study 18 months after pollution control measures were implemented. All children appeared in good health. Emissions from Pb smelter LEAD; CADMIUM; METALS; SHELTERS; CHILDREN; BLOOD; URINE; ENZYMES; INDUSTRIAL EMISSIONS; COMPARATIVE EVALUATIONS; BELGIUM; AIR POLLUTION	Roels, H.A. Buchet, J.P. Lauwerys, R. Bruaux, P. Claeys-Thoreau, F. Lafontaine, A. van Overschelde, J. Verduyn, G. 1978
201 Blood	Ingestion Inhalation	AAS	a) 2 b) 2 c) 17	a) 1.5-5 ng/g b) 0.8-65 ng/g c) 3-60 ng/g	a) Not given b) Not given c) Not given	a) Before Cd exposure b) After Cd exposure c) After 1 yr exposure Half-life calculated from data for 17 workers. Data form other Cd studies also used to derive and test model. Samples from 17 newly employed workers in a Cd battery factory (Sweden). Starting a week before first exposure, samples were collected at weekly to monthly intervals for about a year. Factory air was monitored. 77 days Dust in Cd battery factory CADMIUM; METALS; BLOOD; URINE; METABOLISM; KIDNEYS; LIVER; DUST; INDUSTRIAL POLLUTION; SMOKING; BIOACCUMULATION; SWEDEN	Kjellstorm, T. Nordberg, G.F. 1978
202 Blood		AAS		a) 0.3 - 4.8 ug/100 ml b) Not given	a) 1.64 ug/100 ml b) 1.56 ug/100 ml	a) Controls b) Autoworkers Autoworkers with high blood Pb levels. CADMIUM; NICKEL; MANGANESE; COPPER; CHROMIUM; METALS; OCCUPATIONAL HAZARDS; LEAD; LEVULINIC ACIDS; ENZYMES; HEMOGLOBINS; CARBON INORGANIC COMPOUNDS; AIR POLLUTION; AUTOMOTIVE; INDUSTRIAL PLANTS; BLOOD	Clausen, J. Pastogi, S.C. 1977b

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TISSUE	EXPOSURE ROUTE	ANALYTICAL METHOD	NUMBER OF CASES	RANGE	MEAN	GENERAL INFORMATION	REFERENCE
203 Blood		AAS	25	0.05-0.58 ug/g wet wt	0.17 ug/g wet wt	Samples from 30 cadavers in central Japan, mean age of 3[illegible] years, extent of heavy metal exposure unknown. METALS; ARSENIC; BERYLLIUM; BISMUTH; CADMIUM; CHROMIUM; COBALT; COPPER; MERCURY; METHYL MERCURY COMPOUNDS; MANGANESE; MOLYBDENUM; NICKEL; LEAD; ANTIMONY; VANADIUM; ZINC; BRAIN; TRACHEA; LUNGS; HEART; LIVER; PANCREAS; SPLEEN;KIDNEYS; ADRENAL GLANDS; INTESTINES; TESTES; OVARIES; MUSCLES; SKIN; BLOOD; BONES; ADIPOSE TISSUE; CADAVERS; JAPAN	Sumino, K. Hayakawa, K. Shibata, T. Kitamura, S. 1975
204 Blood		AAS	16	0.2-2.4 ug/100 g	Not given	Occupationally exposed workers. Cadmium-induced proteinuria was reversible in some workers, but still present in two workers after 10 years. Cadmium-induced anemia was also reversible. Fumes in work area METALS; CADMIUM; BLOOD; URINE; INDUSTRIAL POLLUTION	Tsuchiya, K. 1976
205 Blood		AAS	a) 8 b) 11 c) 12 d) 13 e) 13 f) 12 g) 12 h) 8	a) 0.006-0.12 ug/100 ml b) 0.03-0.06 ug/100 ml c) 0.06-0.61 ug/100 ml d) 0.09-0.31 ug/100 ml e) 0.02-0.10 ug/100 ml f) 0.03-0.09 ug/100 ml g) 0.05-0.76 ug/100 ml h) 0.06-0.39 ug/100 ml	a) 0.08 ug/100 ml b) 0.04 ug/100 ml c) 0.25 ug/100 ml d) 0.21 ug/100 ml e) 0.05 ug/100 ml f) 0.05 ug/100 ml g) 0.20 ug/100 ml h) 0.19 ug/100 ml	a) Male non-smokers aged 20-35 yr b) Male non-smokers aged 36-55 yr c) Male smokers aged 20-35 yr d) Male smokers aged 36-55 yr e) Female non-smokers aged 20-35 yr f) Female non-smokers aged 36-55 yr g) Female smokers aged 20-35 yr h) Female smokers aged 36-55 yr Healthy, nonoccupationally exposed individuals from urban and semirural areas of Sweden. METALS; CADMIUM; SWEDEN; MEASUREMENT METHODS; BLOOD	Ulander, A. Axelson, C. 1978

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TISSUE	EXPOSURE ROUTE	ANALYTICAL METHOD	NUMBER OF CASES	RANGE	MEAN	GENERAL INFORMATION	REFERENCE
206 Blood		AAS	a) 31 b) 31 c) 27 d) 22 e) 22	a) Not given b) Not given c) Not given d) Not given e) Not given	a) 1.99 ug/100 ml b) 0.97 ug/100 ml c) 3.0 ug/100 ml d) 2.6 ug/100 ml e) 0.7 ug/100 ml	a) Women occupationally exposed (mean time 4.08 yr) to 31 ug/cu m (total) and 1.4 ug/cu m (respirable) Cd dust b) Controls (women) c) Men occupationally exposed (mean time 8.6 yr) to 134 ug/cu m (total) and a maximum 88 ug/cu m (respirable) dust d) Men occupationally exposed (mean time 27.8 yr) to 66 ug/cu m (total) and 21 ug/cu m (respirable) Cd dust e) Controls (men) Workers at an electronic workshop, storage battery factory, and Cd producing plant. The mean ages were 30.5 yr(a), 38.6 yr(c) and 51.5 yr (d). 50% or more were smokers. Workers with >20 yr exposure had significant reductions in several pulmonary ventilatory functions and significant levels of kidney damage (68% showed excessive proteinuria). Workers with <20 yr exposure had no significant changes in pulmonary functions, but some showed evidence of kidney damage. Dust in workplace METALS; CADMIUM; INDUSTRIAL POLLUTION; BLOOD; URINE	Lauwerys, R.R. Buchet, J.P. Roels, H.A. Brouwers, J. Stanescu, D. 1974
1728 Blood	Ingestion Inhalation	AAS	a) 213 b) 216 c) 39	a) 1-6 ng/g b) 1-6 ng/g c) 1-6 ng/g	a) 4.5 ng/g b) 5.6 ng/g c) 4.5 ng/g	a) Japan, 20-55 yr old b) U.S., 19-53 yr old, smoking had no effect c) Sweden, adults, higher levels in smokers Because of differences in analytical techniques no quantitative comparisons can be made between the 3 countries. Subjects in Japan and U.S., no occupational exposure to Cd. Swedish subjects new employees of Cd battery factory. 77 days, median Food Tobacco METALS; CADMIUM; FOOD CONTAMINATION; TOBACCOS; SMOKING; AGE; SEX; COMPARATIVE EVALUATIONS; LIVER; KIDNEYS; PANCREAS; URINE; BLOOD; FECES; JAPAN; UNITED STATES; TEXAS; SWEDEN	Kjellstrom, T. 1979

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TISSUE	EXPOSURE ROUTE	ANALYTICAL METHOD	NUMBER OF CASES	RANGE	MEAN	GENERAL INFORMATION	REFERENCE
1949 Blood	Dermal Inhalation		1	a) Not applicable b) Not applicable c) 7.9-8.1 ug/100 g d) 5.0-17.1 ug/100 g e) 3.2-10.9 ug/100 g f) 3.3-7.1 ug/100 g	a) 5.9 ug/100 g b) 5.6 ug/100 g c) 8.0 ug/100 g d) 11.05 ug/100 g e) 8.3 ug/100 g f) 5.22 ug/100 g	a) 1972 b) 1973 c) 1974 d) 1975 e) 1976 f) 1977 Air levels about 0.2 mg/cu m Cd dust, 0.1 mg/cu m Cd fume, 0.2 mg/cu m SeO2, 1.0 mg/cu m H2SO4 and 5.0 mg/cu m HNO3 fume. 49-yr-old chemical plant worker (from 1966 to 1975) exposed primarily to CdS and selenide dust, some soluble Cd compounds. Patient treated for Pb poisoning in 1965. Lassitude, insomnia, lightheadedness, headache, muscle aches, joint pain, paresthesia in fingers, impotence, significant weight loss. Mild liver enlargement with possible cirrhotic pattern and calcified granuloma on left lung. METALS; CADMIUM; LEAD; SELENIUM; ZINC; BLOOD; URINE; KIDNEYS; METAL POISONING; OCCUPATIONAL HAZARDS; ADULTS	Lerner, S. Hong, C.D. Bozian, R.C. 1979
1968 Blood			a) 26 b) 19 c) 17 d) 54 e) 37 f) 17 g) 34 h) 38 i) 7 j) 9	a) 1.30-8.27 ppb b) 0.96-8.79 ppb c) 0.2-2.1 ppb d) 0.3-3.5 ppb e) 0.2-1.8 ppb f) 0.3-1.6 ppb g) 0.2-1.5 ppb h) 0.2-1.5 ppb i) 0.8-1.8 ppb j) 0.5-3.5 ppb	a) 2.36 ppb b) 2.16 ppb c) 0.9 ppb d) 0.8 ppb e) 0.8 ppb f) 0.68 ppb g) 0.62 ppb h) 0.66 ppb i) 0.65 ppb j) 1.17 ppb	a) 0-3 yr old hospital patients b) 4-6 yr old hospital patients c) Residents < 1 km from smelter, age 2-3 yr d) Residents 1-2 km from smelter, age 2-3 yr e) Residents > 2 km from smelter, age 2-3 yr f) Age 2-3 yr, blood Pb < 100 ppb g) Age 2-3 yr, blood Pb 101-150 ppb h) Age 2-3 yr, blood Pb 151-200 ppb i) Age 2-3 yr, blood Pb 201-250 ppb j) Age 2-3 yr, blood Pb > 250 ppb Dutch subjects aged 2 mo or older. METALS; CADMIUM; COPPER; IRON; LEAD; MANGANESE; ZINC; BLOOD; BLOOD SERUM; SMOKING; ORAL CONTRACEPTIVES; INDUSTRIES; SHELTERS; ADULTS; CHILDREN; SEX; NETHERLANDS	Zielhuis, R.L. del Castilho, P. Herber, R.F.M. Wibowo, A.A.E. 1978
2161 Blood		AAS	1	Not given	7.3 ug/100 ml	Patient employed at pigment factory in Australia 11 yr. Had history of heavy smoking and drinking. Increasing dyspnea on exertion, cough, and purulent sputum, acute bronchitis, proteinuria and raised plasma creatinine and urea levels. Cadmium carbonate dust in a pigment factory METALS; CADMIUM; BLOOD; OCCUPATIONAL HAZARDS; METAL POISONING; AUSTRALIA; CASE HISTORIES	Meerkin, H. Clarke, R. Oliphant, R. 1976

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TISSUE	EXPOSURE ROUTE	ANALYTICAL METHOD	NUMBER OF CASES	RANGE	MEAN	GENERAL INFORMATION	REFERENCE
2556 Blood	Inhalation		a) 90 b) 90 c) 25	a) Not given b) Not given c) Not given	a) 0.6 ug/100 ml b) 2.5 ug/100 ml c) 2.6 ug/100 ml	a) Controls b) Mean exposure time 7.5 yr c) Mean exposure time 27.5 yr Workers in cadmium-using and cadmium-producing factories, Belgium Cough, impairment of respiratory function, and proteinuria of mixed tubular/glomerular type. Kidney more sensitive than lung. Renal changes (tubular and glomerular dysfunction) found mainly in workers having higher than 1 mg Cd/100 ml blood and 10 mg Cd/g creatinine in urine. BELGIUM; BLOOD; CADMIUM; INDUSTRIAL PLANTS; OCCUPATIONAL HAZARDS; PROTEINS; METALS; URINE	Lauwerys, R.R. Roels, H.A. Buchet, J.P. Bernard, A. Stanescu, D. 1979
2778 Blood	Inhalation Ingestion	AAS	11	a) Not applicable b) 9-11 ug/100 ml c) 13.3 + or - 0.38 to 14.5 + or - 0.52 ug/100 ml d) 18.1 + or - 0.90 to 22.2 + or - 1.95 ug/100 ml e) 8.9 + or - 0.49 to 18.8 + or - 1.21 ug/100 ml Ranges of means + or - SE for c), d), e)	a) 0 ug/100 ml b) 10.0 ug/100 ml c) 13.9 ug/100 ml d) 18.2 ug/100 ml e) 13.7 ug/100 ml	a) 4 new employees, start of study b) 3 new employees, day 120 after start of study, values estimated from graphs c) 2, employed 23 wk at start of study, observed next 11-12 wk d) 2, employed 75 and 76 wk at start of study, observed next 80 wk e) 3, employed 188-266 wk at start of study, observed next 36 wk During observation period, 0.5-6.0 samples collected/mo/person Blood Cd increases linearly up to 120 days then plateaus Urine Cd increases rapidly during 0-15 days of exposure, more slowly 15-120 days, rapidly after 120 days Additional data available for exposure levels and kidney function. New and old employees, 28-47 yr old, of firm producing CdO and several Cd salts. 2/4 new employees and 6/7 old employees smoked >10 cigarettes/day. 3 workers with longest duration of exposure showed signs of kidney disturbances. Industrial atmosphere METALS; CADMIUM; METAL POISONING; BLOOD; URINE; OCCUPATIONAL HAZARDS; INDUSTRIAL ATMOSPHERES; INDUSTRIAL HYGIENE; COMPARATIVE EVALUATIONS; BIOACCUMULATION; METABOLISM; SMOKING; BELGIUM	Lauwerys, R. Roels, H. Regniers, M. Buchet, J.P. Bernard, A. Goret, A. 1979
2849 Blood	Ingestion	AAS	a) 169 b) 168	a) 0.015-0.323 ug/100 ml b) 0.021-0.330 ug/100 ml	a) 0.0903 ug/100 ml b) 0.1075 ug/100 ml	a) Subjects from Chicago, 1970 b) Subjects from Chicago, 1976 ADIPOSE TISSUE; BLOOD; CADMIUM; HAIR; ILLINOIS; KIDNEYS; LIVER; MUSCLES; PANCREAS; TEXAS; URINE	Kowal, N.E. Johnson, D.E. Kraemer, D.F. Fahren, H.F. 1979

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TISSUE	EXPOSURE ROUTE	ANALYTICAL METHOD	NUMBER OF CASES	RANGE	MEAN	GENERAL INFORMATION	REFERENCE
2975 Blood		AAS	a) 83 b) 123	a) Not given b) Not given	a) 0.093 + or - 0.115 ug/g b) 0.076 + or - 0.109 ug/g	a) Maternal b) Fetal Dry wt basis Samples from 4 hospitals in Nashville, TN. PLACENTA; METALS; TRACE ELEMENTS; TENNESSEE; BLOOD; HAIR; COMPARATIVE EVALUATIONS; MERCURY; LEAD; CADMIUM; SELENIUM; RUBIDIUM; IRON; ZINC; COBALT	Baglan, R.J. Bril, A.F. Schulert, A. Wilson, D. Larsen, K. Dyer, N. Fansour, M. Schaffner, W. Hoffman, L. Davies, J. 1974
207 Blood, serum		AAS		a) Not given b) Not given	a) 0.0017 ug/ml b) 0.0022 ug/ml	a) 10 ml sample b) 100 ml sample ZINC; METALS; BLOOD SERUM; METALLOPROTEINS; LIVER; MEASUREMENT METHODS; COPPER; CADMIUM	Falchuk, K.H. Evenson, M. Vallee, B.L. 1974
208 Blood, whole		AAS	37 35 Controls	a) Not given b) Not given c) Not given d) Not given e) Not given f) Not given	a) 2.38 ug/100 ml b) 2.02 ug/100 ml c) 4.33 ug/100 ml d) 3.70 ug/100 ml e) 6.58 ug/100 ml f) 6.45 ug/100 ml	a) Control, smokers b) Control, non-smokers c) Chronic renal failure, pre-dialysis, smokers d) Chronic renal failure, pre-dialysis, non-smokers e) Chronic renal failure, post-dialysis, smokers f) Chronic renal failure, post-dialysis, non-smokers No correlation between Cd concentrations and renal disorders or bone diseases. Hospital patients (smokers and non-smokers) with chronic renal failure. CADMIUM; BLOOD; URINE; KIDNEYS; DISEASES; BONE DISEASES; METALS; UNITED KINGDOM	Willien, E.G. Hyne, R.F.B. 1974
209 Blood, whole	Ingestion Inhalation	AAS	457, 259 Controls	a) Not given b) Not given c) Not given	a) 0.21 ug/100 ml b) 0.30 ug/100 ml c) 0.20 ug/100 ml	a) Lead smelter towns b) Zinc smelter towns c) Controls Samples from children living in 19 towns with primary non-ferrous smelters. Control group of same ages in three communities without smelters. Reports from industry of cadmium neuropathy could not be related to lower-level exposures described in this survey. Stack emissions ARSENIC; LEAD; CADMIUM; HAIR; URINE; BLOOD; ERYTHROCYTES; SMELTERS; COPPER; ZINC; CHILDREN; POPULATION EXPOSURE; METALS; AIR POLLUTION; WATER POLLUTION; NEW MEXICO; MISSOURI; ARIZONA; MONTANA; TENNESSEE; NEVADA; MICHIGAN; OKLAHOMA; TEXAS; PENNSYLVANIA	Baker, E.L., Jr. Hayes, C.G. Landrigan, P.J. Handke, J.L. Leger, R.T. Houseworth, W.J. Farrington, J.H. 1977

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Cadmium
7440-43-9
Cd
AtW 112.40, MP 321 C, BP 765 C, VP 1 mm Hg at 394 C, 10 mm Hg at 486 C

(CONTINUED)

TISSUE	EXPOSURE ROUTE	ANALYTICAL METHOD	NUMBER OF CASES	RANGE	MEAN	GENERAL INFORMATION	REFERENCE
210 Blood, whole		AAS	a) 125 b) 105 c) 35 d) 90 e) 26 f) 79	a) <0.04-1.77 ug/100 ml b) <0.04-0.69 ug/100 ml c) 0.06-0.62 ug/100 ml d) <0.04-1.77 ug/100 ml e) <0.04-0.69 ug/100 f) <0.04-0.42 ug/100 ml	a) 0.14 ug/100 ml b) 0.12 ug/100 ml c) Not given d) Not given e) Not given f) Not given	a) Persons living 2 km from smelter b) Controls c) Smokers living 2 km from smelter d) Non-smokers living 2 km from smelter e) Smokers, control area f) Non-smokers, control area Samples from residents of Denver, Colorado, age range 1-82 yr, 39% white, 18% black, 42% Mexican-American, 6.7 mean residential years in area, one case of possible occupational exposure. No indication of hematopoietic or renal dysfunction. Stack emissions CADMIUM; POPULATION EXPOSURE; METALS; COLORADO; SMELTERS; AIR POLLUTION; TOBACCOS; SMOKING; BLOOD; URINE	Wysowski, D.K. Landrigan, P.J. Ferguson, S.W. Fontaine, R.E. Tsongas, T.A. Porter, B. 1978
211 Blood, whole			31	<9-133 nmol/l	Not given	Residents near zinc mine. High value from industrial exposure, next highest value is 59 nmol/l. Residents of Shipham, Somerset, where soil Cd was high. 14 females, aged 29 to 9? yr, 17 males, aged 15 to 79 yr. Increased prevalence of hypertension and other stigmata of cardiovascular disease, evidence of renal tubular damage. CADMIUM; ZINC; LEAD; METALS; MINING; BLOOD; UNITED KINGDOM; METAL POISONING; FOOD CONTAMINATION	Carruthers, ?. Smith, B. 1979
212 Blood, whole	Ingestion	APDC-MIBK AAS	64	7-62 ng/g	26 ng/g (median)	Japanese women living in a contaminated area. Contaminated food and water METALS; CADMIUM; JAPAN; BLOOD; URINE	Kjellstrom, T. Shiroishi, K. Ervin, P.E. 1977
1723 Blood, whole	Inhalation	AAS	7 smokers, 8 non-smokers	a) 7.3-67.2 ug/l b) 8.0-62.6 ug/l c) 4.9-10.5 ug/l d) 4.3-13.2 ug/l	a) 22.7 ug/l b) 18.0 ug/l c) 7.0 ug/l d) 6.9 ug/l	a) Smokers, before vacation, average working time 5 yr b) Smokers, after 1 mo vacation, average working time 5 yr c) Non-smokers, before vacation, average working time 9 yr d) Non-smokers, after 1 mo vacation, average working time 9 yr. Battery factory workers, 28-60 yr old. CdO dust in a Ni-Cd battery factory. Tobacco smoke. CADMIUM; METALS; INDUSTRIAL ATMOSPHERES; SMOKING; BLOOD; URINE; COMPARATIVE EVALUATIONS; OCCUPATIONAL HAZARDS; SWEDEN	Adamsson, E. Piscator, M. Nogawa, K. 1979

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Cadmium
7440-43-9
Cd
AtW 112.40, MP 321 C, BP 765 C, VP 1 mm Hg at 394 C, 10 mm Hg at 486 C

(CONTINUED)

TISSUE	EXPOSURE ROUTE	ANALYTICAL METHOD	NUMBER OF CASES	RANGE	MEAN	GENERAL INFORMATION	REFERENCE
1936 Blood, whole	Inhalation Ingestion	AAS	35	a) 0.15-4.3 ug/100 ml b) 0.19-0.24 ug/100 ml	a) 0.93 ug/100 ml b) 0.38 ug/100 ml	a) Exposed workers, range for 9 subjects b) Unexposed workers, range for 2 subjects Levels correlated with length of employment. Workers, exposed and unexposed, in a handmade-jewelry plant. Dyspnea, chest pain, dysuria, dizziness, irritability, headache, fatigue, nasal congestion, dry mouth, polyuria, anosmia, eye irritation. Cadmium oxide fumes generated from heating cadmium-containing brazing alloy. METALS; CADMIUM; OCCUPATIONAL HAZARDS; HEALTH HAZARDS; METAL POISONING; BLOOD; URINE; HAIR; NEW MEXICO	Baker, E.L. Peterson, M.A. Holtz, J.L. Coleman, C. Landrigan, P.J. 1979
2536 Blood, whole	Dermal Inhalation	AAS	69	Not given	0.36 ug/dl	Lead smelter workers employed at least 1 yr Lead smelter workers, mean age 42.5 yr, mean employment 11.3 yr. Controls, mean age 49.7 yr, mean employment 9.8 yr. All from southern CA. METALS; LEAD; ARSENIC; CADMIUM; BLOOD; ADULTS; OCCUPATIONAL HAZARDS; COMPARATIVE EVALUATIONS; CALIFORNIA	Spivey, G.H. Brown, C.P. Baloh, R.W. Campion, D.S. Valentine, J.L. Massey, F.J. Browdy, B.L. Culver, B.D. 1979
232 Kidney		CC AAS	a) 14 b) 5 c) 21	a) Not given b) Not given c) Not given d) Not given e) Not given f) Not given	a) 15.20 ug/g dry wt b) 219 ug/g dry wt c) 83 ug/g dry wt d) 95 ug/g dry wt e) 147 ug/g dry wt f) 49 ug/g dry wt	a) Low metallothionein in cortex b) High metallothionein in cortex c) Reference group - no metallothionein in cortex d) Low metallothionein in medulla e) High metallothionein in medulla f) Reference group - no metallothionein in medulla The absence of metallothionein combined with a low body burden of cadmium seemed to be associated with longevity. Approximately half of the group had died of cardiovascular disease. In group b) 4 or 5 were smokers and eventually died from cardiovascular disease. CADMIUM; METALS; KIDNEYS; LIVER; POPULATION EXPOSURE; METALLOPROTEINS; ZINC; SMOKING; CARDIOVASCULAR DISEASES; NORWAY	Syversen, T.L.M. 1975

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TISSUE	EXPOSURE ROUTE	ANALYTICAL METHOD	NUMBER OF CASES	RANGE	MEAN	GENERAL INFORMATION	REFERENCE
233 Kidney	Ingestion Inhalation	AAS	a) 287 b) 9	a) 1-152 ug/g wet wt b) 5-156 ug/g wet wt	a) Not given b) Not given	a) Low-Cd exposure b) High-Cd exposure Values are for renal cortex Data supports premise of equimolar increases in Zn with increased Cd in kidneys if Cd is <60 ug/g wet wt 288 kidney cortex samples, 289 liver samples, and 285 pancreas samples from 292 autopsies performed in Stockholm, Sweden. The Stockholm area is a low-Cd exposure area so additional liver and kidney cortex samples were obtainedfrom autopsies on 6 men and 3 women who had lived near or worked in Cd-emitting plants. ZINC; CADMIUM; BIOACCUMULATION; SWEDEN; COMPARATIVE EVALUATIONS; LIVER; KIDNEYS; PANCREAS; METALS	Elinder, C-G. Piscator, M. Linnman, L. 1977
234 Kidney		AAS	50	602.56-5350.51 ppm	1548.82 ppm	Values given are expressed as ash weight. Correlations between kidney-liver Cd levels were strongest and hair-lung levels weakest. Autopsies of 50 subjects in New York City between the ages of 19 to 90 years. Most subjects were accident or homicide victims. Many suffered from narcotism, cancer, and cardiovascular diseases. CADMIUM; METALS; AUTOPSIES; NEW YORK; KIDNEYS; LIVER; LUNGS; HAIR; BIOACCUMULATION	Oleru, U.G. 1976
235 Kidney		AAS	3 samples (9 determinations)	2.1-167 ppm	72.6 ppm	Flameless technique Heterogenous distribution of Cd in the organ. Autopsy samples BLOOD; URINE; HAIR; CADMIUM; ENVIRONMENT; KIDNEYS; LIVER; METALS	Ullucci, P.A. Hwang, J.Y. 1974
236 Kidney		APDC-MIBK AAS	1	a) Not applicable b) Not applicable	a) 53 ppm wet wt b) 35 ppm wet wt	a) Renal cortex b) Renal medulla 74-year-old woman with Itai-itai disease, in the Ichi River basin. Severe pain throughout whole body Deformities of lower extremities LIVER; KIDNEYS; PANCREAS; LUNGS; MUSCLES; SKIN; TRACHEA; STOMACH; THYROID GLANDS; SPLEEN; ADRENAL GLANDS; BRAIN; RIBS; SPINAL CORD; TESTICLES; INTESTINES; ESOPHAGUS; CADMIUM; ZINC; METALS; DISEASES; URINE; CASE HISTORIES; AUTOPSIES	Nogawa, K. Ishizaki, A. Fukushima, M. 1975

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Cadmium
7440-43-9
Cd
At% 112.40, MP 321 C, BP 765 C, VP 1 mm Hg at 394 C, 10 mm Hg at 486 C

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TISSUE	EXPOSURE ROUTE	ANALYTICAL METHOD	NUMBER OF CASES	RANGE	MEAN	GENERAL INFORMATION	REFERENCE
237 Kidney		AAS	a) 7 b) 7 c) 10 d) 9 e) 17 f) 70	a) Not given b) Not given c) Not given d) Not given e) Not given f) Not given	a) 0.05 ppm wet wt b) 13.33 ppm wet wt c) 28.40 ppm wet wt d) 30.09 ppm wet wt e) 11.58 ppm wet wt f) 14.92 ppm wet wt	a) 0-1 month b) 2-5 yr c) 25-34 yr d) 55-64 yr e) Blacks - both sexes f) Whites - both sexes Autopsies of 107 cases from the Cincinnati area, fetal to old age. Thirty-five died from accidents, 9 were intoxication related, 9 cardiovascular, and 20 abortions 72 individuals suffered instantaneous deaths. CADMIUM; LIVER; KIDNEYS; HAIR; METALS; FETUS; BIOACCUMULATION; AUTOPSIES; AGE; RACIAL STUDIES; OHIO	Gross, S.B. Yeager, D.W. Hildendorf, M.S. 1976
238 Kidney		AAS	a) 33 b) 42	a) 2.7-85.1 ug/g dry wt b) 18.6-224 ug/g dry wt	a) 15.1 ug/g dry wt b) 57.1 ug/g dry wt Geometric means	a) 19th century samples b) Non-smoking adults who died in 1974-1975 Values are for renal cortex cadmium concentration. Samples from 33 people who died in the latter part of the 19th century. Kidneys were preserved at Uppsala and Lund Universities. Autopsy samples from 42 non-smokers between 20 and 79 yr who died in 1974 and 1975. CADMIUM; COPPER; ZINC; METALS; TRACE ELEMENTS; KIDNEYS; POPULATION EXPOSURE; SWEDEN	Flinder, C-G. Kjellstrom, T. 1977
239 Kidney	Ingestion	AAS	a) 222 b) 122	a) Not given b) Not given	a) 28.4 ug/g b) 34.3 ug/g	a) Males b) Females Biological half-times (BHT) obtained by observation of accumulation from 0-90 years and calculation by a mathematical model. Autopsy samples from Tokyo accident victims with no known occupational exposure. 17 yr CADMIUM; MERCURY; LEAD; METALS; AUTOPSIES; BIOACCUMULATION; AGE; SEX; FOODS; JAPAN	Sugita, M. 1978
240 Kidney		AAS	30	10-98 ug/g wet wt	47 ug/g wet wt	Samples from 30 cadavers in central Japna, mean age of 39 years, extent of heavy metal exposure unknown. METALS; ARSENIC; BERYLLIUM; BISMUTH; CADMIUM; CHROMIUM; COBALT; COPPER; MERCURY; METHYL MERCURY COMPOUNDS; MANGANESE; MOLYBDENUM; NICKEL; LEAD; ANTIMONY; VANADIUM; ZINC; BRAIN; TRACHEA; LUNGS; HEART; LIVER; PANCREAS; SPLEEN;KIDNEYS; ADRENAL GLANDS; INTESTINES; TESTES; OVARIES; MUSCLES; SKIN; BLOOD; BONES; ADIPOSE TISSUE; CADAVERS; JAPAN	Sumino, K. Hayakawa, K. Shibata, T. Kitamura, S. 1975

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Cadmium
7440-43-9
Cd
Atw 112.40, MP 321 C, BP 765 C, VP 1 mm Hg at 394 C, 10 mm Hg at 486 C

(CONTINUED)

TISSUE	EXPOSURE ROUTE	ANALYTICAL METHOD	NUMBER OF CASES	RANGE	MEAN	GENERAL INFORMATION	REFERENCE
241 Kidney						Review Chronic bronchitis, emphysema, anemia, hypertension Proteinuria, damage to renal tubules, formation of renal stones, Itai-Itai disease CADMIUM; METALS; INDUSTRIAL POLLUTION; AIR POLLUTION; WATER POLLUTION; FOOD CONTAMINATION; METABOLISM; BIOACCUMULATION; REVIEW; LIVER; KIDNEYS	Nordberg, G.F. 1976
242 Kidney		AAS	a) 6 b) 11 c) 11 d) 5 e) 10 f) 9	a) Not given b) Not given c) Not given d) Not given e) Not given f) Not given	a) 1260 ug/g ash wt b) 742 ug/g ash wt c) 1860 ug/g ash wt d) 933 ug/g ash wt e) 2890 ug/g ash wt f) 1630 ug/g ash wt	a) Normotensive nonsmokers b) Hypertensive nonsmokers c) Normotensive cigar, pipe, or cheroot smokers d) Hypertensive cigar, pipe, or cheroot smokers e) Normotensive cigarette smokers f) Hypertensive cigarette smokers Renal tissue taken at necropsy in 2 Danish hospitals. Samples from patients, aged 45-65, in 2 hospitals covering urban (Copenhagen) and rural (island of Zealand) districts. CADMIUM; METALS; KIDNEYS; SMOKING; DENMARK	Osterqaard, K. 1977
243 Kidney		NA	a) 115 b) 93 c) 12 d) 11	a) <87 ppm b) 87-200 ppm c) 200-248 ppm d) >248 ppm	a) Not given b) Not given c) Not given d) Not given	Groups based on percentiles a) To 50th b) To 90th c) To 95th d) Remainder Cd workers, with normal renal function. 78 with renal dysfunction had similar levels. 309 male workers in Cd plants in Belgium. CADMIUM; METALS; KIDNEYS; URINE; LIVER; BELGIUM; OCCUPATIONAL HAZARDS	Roels, H. Bernard, A. Buchet, J.P. Goret, A. Lauwerys, R. Chettle, D.R. Harvey, T.C. Al Haddad, I. 1979
1726 Kidney	Ingestion Inhalation	AAS	a) 154 b) 164 c) 285	a) 1.2-82.6 ug/g wet wt b) 7.4-26.3 ug/g wet wt c) 1.3-29.0 ug/g wet wt Range of means.	a) 40.7 ug/g wet wt b) 17.8 ug/g wet wt c) 10.1 ug/g wet wt	a) Japan, 1-79 yr old b) U.S., 10-59 yr old c) Sweden, 2-80 yr old Values for cortex. Levels increase to age 40-60 then decrease. Non-occupationally exposed victims of accidental or sudden death. Food Tobacco METALS; CADMIUM; FOOD CONTAMINATION; TOBACCOS; SMOKING; AGE; SEX; COMPARATIVE EVALUATIONS; LIVER; KIDNEYS; PANCREAS; URINE; BLOOD; RECIPES; JAPAN; UNITED STATES; TEXAS; SWEDEN	Kjellstrom, T. 1979

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Cadmium
7440-43-9
Cd
AtW 112.40, MP 321 C, BP 765 C, VP 1 mm Hg at 394 C, 10 mm Hg at 486 C

(CONTINUED)

TISSUE	EXPOSURE ROUTE	ANALYTICAL METHOD	NUMBER OF CASES	RANGE	MEAN	GENERAL INFORMATION	REFERENCE
2139 Kidney		AAS	91	1.0-40.3 ug/g	16.8 ug/g	Post mortem, subjects 6 months to 93 yr old, from Brisbane, Australia. METALS; CADMIUM; LEAD; KIDNEYS; URINE; OCCUPATIONAL HAZARDS; AUSTRALIA; COMPARATIVE EVALUATIONS	Miller, G.J. Wylie, M.J. McKeown, D. 1976
2848 Kidney	Ingestion	AAS	162	2.97-108.66 ug/g (wet)	20.99 ug/g (wet)	Cortex. Cd increases with age. Higher in smokers than in nonsmokers. White male accident victims, Dallas, TX ADIPOSE TISSUE; BLOOD; CADMIUM; HAIR; ILLINOIS; KIDNEYS; LIVER; MUSCLES; PANCREAS; TEXAS; URINE	Kowal, N.E. Johnson, D.E. Kraemer, D.F. Fahren, M.F. 1979
2987 Kidney		AAS	91	1.0-100 ug/g wet wt	28 ug/g wet wt	Cortex. Levels increase up to middle age, then decrease. Autopsies of males, aged 2 mo-88 yr, and females, aged 4 mo-98 yr, in Perth, Western Australia. METALS; CADMIUM; LIVER; KIDNEYS; AUSTRALIA; AUTOPSIES; BIOACCUMULATION	Spickett, J.T. Lazner, J. 1979
3042 Kidney		NA		100-200 ug/g	Not given	Levels about 10 times normal Residents of Shipham, United Kingdom, location of former Zn mine. Cigarette Smoking Industrial pollution METALS; CADMIUM; KIDNEYS; INDUSTRIAL POLLUTION; INDUSTRIAL AREAS; LAND POLLUTION; MEASUREMENT METHODS; POPULATION EXPOSURE; UNITED KINGDOM	Borman, S. 1980
3084 Kidney		ES	a) 134 b) 73 c) 88	a) Not given b) Not given c) Not given	a) 92.4 ppm b) 79.1 ppm c) 75.2 ppm	a) No renal disease b) Acute renal failures C) Chronic renal failures a) and c) different, P<0.02 Values are dry wt basis. Autopsies at UCLA Hospital. TRACE ELEMENTS; METALS; AUTOPSIES; CALIFORNIA; KIDNEYS; LIVER; SPLEEN; DISEASES; HYPERTENSION; SODIUM; POTASSIUM; CALCIUM; PHOSPHORUS; MAGNESIUM; CADMIUM; ZINC; COPPER; LEAD; IRON; MANGANESE; ALUMINUM; SILICON; TITANIUM; COBALT; NICKEL; MOLYBDENUM; TIN; CHROMIUM; STRONTIUM; BARIUM; LITHIUM; SILVER; VANADIUM; BORON	Indraprasit, S. Alexander, G.V. Gonick, H.C. 1974

Lead
7439-92-1
Pb
AtW 207.2, MP 327.4 C, BP 1740 C, VP 1.77 mm Hg at 1000 C, 1 mm Hg at 970 C, 10 mm Hg at 1160 C

TISSUE	EXPOSURE ROUTE	ANALYTICAL METHOD	NUMBER OF CASES	RANGE	MEAN	GENERAL INFORMATION	REFERENCE
701 Blood	Inhalation Ingestion	APDC-HIBK AAS	204	a) 5-40 ug/100 ml b) Not given c) Not given d) Not given	a) 15 ug/100 ml b) 18.2 ug/100 ml c) 13.0 ug/100 ml d) 14.9 ug/100 ml	a) All children b) Children with history of pica c) Children of occupationally exposed parents d) Children of non-occupationally exposed parents None of the children had abnormally high blood Pb. Children resided close to lead-smelting complex. CHILDREN; BLOOD; LEAD; METALS; AUSTRALIA; SHELTERS	Quw, H.K. Bimby, J.A. Shandar, A.G. 1976
702 Blood	Inhalation Ingestion	AAS	215 children, 105 mothers	a) 28-57 ug/100 ml b) 15-63 ug/100 ml	a) 40 ug/100 ml b) 32 ug/100 ml	a) 1-100 meters from smelting works b) 400-500 meters from smelting works Levels of 40 ug or more/100 ml blood suggests excessive exposure. There is no significant relationship between intelligence and behavior disorder and current Pb level. The people live in the vicinity of lead smelting works within 500 meters of the factory. A dump for battery-lead scrap is nearby. Smelting works, dump for battery lead scrap, wheels of vehicles, working clothes LEAD; CHILDREN; BLOOD; OCCUPATIONAL HAZARDS; INDUSTRIAL DISEASES; BEHAVIOR DISORDERS; METALS; SHELTERS; UNITED KINGDOM	Lansdown, R.G. Clayton, B.E. Graham, P.J. Shepherd, J. Delves, H.T. Turner, W.C. 1974
703 Blood	Inhalation	AAS	3, 3 Controls	a) 23-31 ug/100 ml b) 32-52 ug/100 ml	a) 26.5 ug/100 ml b) 41 ug/100 ml	a) Pre-exposure b) Post-exposure Fumes from firing weapons HEALTH HAZARDS; LEAD POISONING; FUMES; OCCUPATIONAL DISEASES; INDUSTRIAL HYGIENE; METALS; AIR POLLUTION; FLORIDA; BLOOD; URINE	Anania, T.L. Lucas, J.B. Seta, J.A. 1974
708 Blood	Ingestion Inhalation	AAS	2209, 355 Controls	a) Not given b) Not given c) Not given d) Not given	a) 55.8 ug/100 ml b) 39.4 ug/100 ml c) 10.8 ug/100 ml d) 10.2 ug/100 ml	a) Heavy occupational exposure, 20 or more cigarettes daily b) Heavy occupational exposure, never smoked c) Controls, 20 or more cigarettes daily d) Controls, never smoked Samples from 2209 men occupationally exposed to lead and from 355 controls representing the general population. Effect of smoking on lead absorption in workers may be explained by impairment of lung defense mechanisms. Environmental contamination of cigarettes and fingers with lead particles. LEAD; BLOOD; SMOKING; TOBACCOS; POPULATION EXPOSURE; OCCUPATIONAL HAZARDS; LUNGS; AGE; METALS; FINLAND	Tola, S. Nordmar, C.H. 1977

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TISSUE	EXPOSURE ROUTE	ANALYTICAL METHOD	NUMBER OF CASES	RANGE	MEAN	GENERAL INFORMATION	REFERENCE
705 Blood		AAS	64, 30 Controls	a) Not given b) Not given c) Not given	a) 25.5 ug/dl b) 18.7 ug/dl c) 18.8 ug/dl	a) Mentally retarded, etiology unknown b) Mentally retarded, probable etiology c) Controls Samples from subjects drawn from two clinics in New York City. Retarded subjects were patients at Developmental Evaluation Clinic, age range from 4-12, 65 males and 29 females, 62 Blacks, 23 Hispanics, 9 Caucasians, I.Q.'s of 55-84 in test group. BLOOD; LEAD; METALS; RETARDATION; CHILDREN; AGE; NEW YORK	David, O. Hoffman, S. McGann, B. Sverd, J. Clark, J. 1976
706 Blood	Inhalation Ingestion		73	a) 12-61 ug/100 ml b) 8-40 ug/100 ml	a) 31 ug/100 ml b) 19 ug/100 ml	a) Smelter area b) Urban control area Method of analysis not given. Survey between April and November, 1973 of 16 families living less than 150 meters from Smelter A and of 8 urban control families. Non-specific neurological abnormalities Reduction in peripheral nerve velocity Increased excretion of ALA and coproporphyrins. Increased density in bone metaphyses. LEAD; CHILDREN; ADULTS; DUST; METABOLISM; BLOOD; HAIR; SMELTERS; COPROPORPHYRINS; METALS; CANADA	Roberts, T.M. Hutchinson, T.C. Paciga, J. Chattopadhyay, A. Jervis, R.E. Van Loon, J. Parkinson, D.K. 1978
707 Blood		AAS	5	a) 50-60 ug/100 ml b) 20-40 ug/100 ml	a) 54 ug/100 ml b) 36 ug/100 ml	a) Before chelation therapy b) After chelation therapy Five adult male demolition workers from a work force dismantling old iron structures covered with lead-containing paint. LEAD; LIVER; PROTOPORPHYRINS; LEVULINIC ACIDS; ENZYMES; OCCUPATIONAL HAZARDS; METALS	Fischbein, A. Alvares, A.P. Anderson, K.E. Sassa, S. Kappas, A. 1977
708 Blood		AAS	18	2.1-6.0 ppm	3.7 ppm	Determinations were also done on soil and interior paint, possible sources of contamination. 18 preadolescent Negro children in a Charleston, SC dental clinic. BLOOD; HAIR; TEETH; CHILDREN; LEAD; SOILS; PAINTS; METALS; SOUTH CAROLINA	Habercam, J.W. Keil, J.E. Weigart, J.B. Croft, M.W. 1974

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TISSUE	EXPOSURE ROUTE	ANALYTICAL METHOD	NUMBER OF CASES	RANGE	MEAN	GENERAL INFORMATION	REFERENCE
709 Blood		AAS	119	2-81 ug/100 ml	26.2 ug/100 ml	Demonstration of a blood Pb concentration (BLC) of diagnostic significance in a family dog increased the probability sixfold of finding, in the family, child with a BLC similarly increased. 119 children from 83 low-income suburban Illinois families LEAD; CHILDREN; DOGS; BIOACCUMULATION; BLOOD; METALS; ILLINOIS	Thomas, C.W. Rising, J.L. Moore, J.K. 1976
710 Blood	Inhalation	AAS	a) 48 b) 47	a) Not given b) Not given	a) 32.9 ug/100 ml b) 14.3 ug/100 ml	a) Study group b) Controls Levels in 7 or 48 vendors exceeded 40 ug/100 ml, an accepted "level of concern." Samples from 48 gasoline vendors, employed in this capacity for a mean of 7.7 years, mean age of 31.6 years control group of 47 persons unconnected with gasoline industry, mean age of 25.5 years. LEAD; METALS; BLOOD; LEAD ORGANIC COMPOUNDS; OCCUPATIONAL HAZARDS; SKIN; GASOLINE; AUSTRALIA	Moore, P.J. Pridmore, S.A. Gill, G.P. 1976
711 Blood	Ingestion	AAS	a) 18 b) 5 c) 5 d) 4 e) 6	a) Not given b) Not given c) Not given d) Not given e) Not given	a) 21.8 ug/100 ml b) 41.6 ug/100 ml c) 86.2 ug/100 ml d) 65.0 ug/100 ml e) 73.3 ug/100 ml	a) 0-1000 ppm b) 1000-2000 ppm c) 2000-3000 ppm d) 5000-6000 ppm e) 7000-90,000 ppm Dust lead. Investigation during December, 1975 and January, 1976 in Memphis, Tennessee. Household contamination LEAD; BLOOD; CHILDREN; OCCUPATIONAL HAZARDS; METALS; METAL POISONING; TENNESSEE	Baker, E.L., Jr. Folland, D.S. Taylor, T.A. Frank, M. Peterson, M. Lovejoy, G. Cox, D. Housworth, J. Landrigan, P.J. 1977
712 Blood		AAS	a) 24 b) 23	a) 23-64 ug/100 ml b) 18-61 ug/100 ml	a) 37.1 + or - 10.9 ug/100 ml b) 35.8 + or - 10.1 ug/100 ml	a) Males b) Females Children, preschool, 4-5 yrs. Clinically asymptomatic with moderately high exposure to Pb. Neither elevated blood levels (over range 19-68 ug/100 ml) nor presence of lead worker in the residence had significant effects on developmental and behavioral functions tested. Group with Pb levels between 35 and 68 ug/100 ml did consistently less well than did those with lower lead levels. Nearby lead battery manufacturing works LEAD; BLOOD; CHILDREN; METALS; BEHAVIOR DISORDERS; UNITED KINGDOM	Ratcliffe, J.M. 1977

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TISSUE	EXPOSURE ROUTE	ANALYTICAL METHOD	NUMBER OF CASES	RANGE	MEAN	GENERAL INFORMATION	REFERENCE
713 Blood	Ingestion		a) 95 b) 210 c) 250	a) 12-150 ug/100 ml b) 10-78 ug/100 ml c) 10-160 ug/100 ml	a) 43.9 ug/100 ml b) 31.3 ug/100 ml c) 30.7 ug/100 ml	a) 1967 b) 1969 c) 1971 Data available for other areas, ages and ethnic groups. Children less than 6 yr, predominantly black, in urban area with high incidence of Pb poisoning. Symptoms of toxicity in 12% of patients treated in 1967 and in 4.2% of patients treated in 1971. Maturational delay in speech, impaired intellectual performance, impaired abstract reasoning and impaired verbalization of concepts were noted with elevated blood levels. One death from Pb poisoning occurred in 200,000 children tested between 1967-1971. There were 35 such deaths in the Chicago area. Peeling paint and plaster LEAD; METALS; ILLINOIS; CHILDREN; URBAN AREAS; METAL POISONING; BLOOD; BEHAVIOR DISORDERS; AGE; PICA; NERVOUS SYSTEM DISEASES; ILLINOIS	Sachs, H.K. 1974
714 Blood				10-44 ug/100 ml	18.3 ug/100 ml	Children 5-12 yrs old, NY City Children, 5-12 yrs of age, from impoverished areas of New York City. No frank lead poisoning and no manifest psychological difficulties. Behavioral evaluations correlated significantly with blood lead levels. Treatment of hyperactive and retarded children with penicillamine for 2 months resulted in improved behavior and an improvement in I.Q. of about 7 points (90-97). LEAD; METALS; CHILDREN; URBAN AREAS; BEHAVIOR DISORDERS; POPULATION EXPOSURE; BLOOD; NEW YORK	Anon 1978
715 Blood	Inhalation	AAS	a) 333 b) 333 c) 109 d) 109	a) 3.1-31 ug/100 ml b) 2.7-27.3 ug/100 ml c) 5.0-20.9 ug/100 ml d) 3.0-18.1 ug/100 ml	a) 10.0 ug/100 ml b) 8.1 ug/100 ml c) 10.5 ug/100 ml d) 8.9 ug/100 ml	a) Nonsmokers, mothers aged 16-43 yr, mean 26.3 yr b) Newborn of nonsmokers c) Smokers, mothers aged 27-36 yr, mean 25.6 yr d) Newborn of smokers Samples from 333 nonsmoking and 109 smoking European women and their newborn. The women lived in or near Brussels, Tournai, Leuven (Louvain), and Antwerp, Belgium representing rural, urban, and industrial areas. BLOOD; INFANTS; SMOKING; LEAD; MERCURY; CADMIUM; METALS; CARBON INORGANIC COMPOUNDS; COMPARATIVE EVALUATIONS; RURAL AREAS; URBAN AREAS; INDUSTRIAL AREAS; BELGIUM; PLACENTA; UMBILICAL CORD	Buchet, J.P. Roels, H. Hubermont, G. Lauwerys, R. 1978

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TISSUE	EXPOSURE ROUTE	ANALYTICAL METHOD	NUMBER OF CASES	RANGE	MEAN	GENERAL INFORMATION	REFERENCE
716 Blood	Inhalation Ingestion	AAS	a) 503 b) 503 c) 474 d) 474 e) 29 f) 29	a) 3.1-31 ug/100 ml b) 2.7-27.3 ug/100 ml c) 3.1-31 ug/100 ml d) 2.7-27.3 ug/100 ml e) 7.9-18 ug/100 ml f) 3.2-18.7 ug/100 ml	a) 10.2 ug/100 ml b) 8.4 ug/100 ml c) 10.1 ug/100 ml d) 8.3 ug/100 ml e) 10.8 ug/100 ml f) 9.4 ug/100 ml	a) All women b) All newborn c) European women, aged 16-45 yr, mean 26 yr d) European newborn e) Afro-Asian women, aged 18-40 yr, mean 26 yr f) Afro-Asian newborn Samples taken at delivery from mothers by venipuncture and from newborn at the umbilical cord. The women lived in areas of Belgium (Antwerp, Brussels, Louvain, Tournai and Vilvoorde) with various degrees of industrialization and urbanization. BLOOD; ADULTS; INFANTS; LEAD; MERCURY; CADMIUM; CARBON INORGANIC COMPOUNDS; METALS; BELGIUM; COMPARATIVE EVALUATIONS; UMBILICAL CORD; PLACENTA	Lauwerys, R. Buchet, J.P. Roels, H. Hubermont, G. 1978
717 Blood		AAS	216	a) Not given b) Not given c) Not given d) Not given e) Not given f) Not given	a) 23.1 ug/100 ml b) 18.4 ug/100 ml c) 28.3 ug/100 ml d) 21.3 ug/100 ml e) 12.9 ug/100 ml f) 11.9 ug/100 ml	a) Policemen on foot patrol b) Office workers in downtown Houston (control for (a)) c) Garage attendants d) Orderlies and custodians (control for (b)) e) Females living within 2 blocks of freeway f) Females living away from freeway (control for (e)) Six groups, each of 26 individuals, in the metropolitan area of Houston, TX, policemen on foot patrol, office workers in downtown Houston, garage attendants, orderlies and custodians, females living within two blocks of a freeway, and females living away from a freeway. CADMIUM; LEAD; TRACE ELEMENTS; TEXAS; BLOOD; URINE; HAIR; FECES; ZINC; MANGANESE; COPPER; PLATINUM; PALLADIUM; METALS; AUTOMOTIVE; OCCUPATIONAL HAZARDS	Johnson, D.E. Tillery, J.B. Prevot, R.J. 1975
718 Blood		AAS	43, 10 Controls	a) 66-124 ug/100 ml b) 80-85 ug/100 ml c) 43-76 ug/100 ml d) Not givne e) Not given	a) 97 ug/100 ml b) 83 ug/100 ml c) 60 ug/100 ml d) 25 ug/100 ml e) 19 ug/100 ml	a) Employees in furnace b) Employees in shop c) Employees in office d) Families adjacent to smelter e) Control Employees at a lead scrap smelter in Troy, Alabama. Six members of two families who resided 50 and 100 meters respectively from the smelter. Ten adult volunteers who resided 1.6-11.3 kilometers from the smelter. Lead poisoning, lead colic, confusion and hallucinations (lead encephalopathy). LEAD POISONING; SMELTERS; BLOOD; HAIR; ERYTHROCYTES; PORPHYRINS; METABOLISM; DISEASES; SOILS; VEGETATION; LEAD; MILK; METALS; ANIMAL POPULATIONS; OCCUPATIONAL HAZARDS; ALABAMA	Levine, P.J. Moore, R.M., Jr. McLaren, G.D. Barthel, W.F. Landrigan, P.J. 1976

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TISSUE	EXPOSURE ROUTE	ANALYTICAL METHOD	NUMBER OF CASES	RANGE	MEAN	GENERAL INFORMATION	REFERENCE
719 Blood		ASV	6	59-68 ug/100 ml	Not given	Analytical method, control values not given. Data from 6 patients of the Childhood Lead Clinic of the John F. Kennedy Institute in Baltimore. Control data derived from inpatients (Pediatric Clinical Research Unit of the Johns Hopkins Hospital) without neurological disorders. Controls resided in suburban areas in new housing. Hyperirritability, hyperactivity in 3 of 6 six children, disturbed heme synthesis, altered catecholamine metabolism. BLOOD; URINE; CHILDREN; LEAD; METALS; MICE; NEUROLOGIC MANIFESTATIONS; HEMES; MARYLAND	Silbergeld, E.K. Chisolm, J.J., Jr. 1976
720 Blood		AAS	2	a) Not given b) Not given	a) 40 ug/100 ml b) 42 ug/100 ml	a) Child b) Adult Other data given. Samples from residents of Denver, Colorado, age range 1-82 yr, 39% white, 18% black, 42% Mexican-American, 6.7 mean residential years in area, one case of possible occupational exposure. CADMIUM; POPULATION EXPOSURE; METALS; COLORADO; SMELTERS; AIR POLLUTION; TOBACCOS; SMOKING; BLOOD; URINE	Wysowski, D.K. Landrigan, P.J. Ferguson, S.W. Fontaine, R.E. Tsongas, T.A. Porter, B. 1978
721 Blood		AAS	a) 35 b) 37	a) 0.024-0.072 ug/10 (E+9) RBC b) 0.021-0.076 ug/10 (E+9) RBC	a) 0.044 ug/10 (E+9) RBC b) 0.037 ug/10 (E+9) RBC	a) Maternal erythrocytes b) Fetal erythrocytes Matched pairs of pregnant women and their fetuses residing in or near Cleveland, Ohio Selections made without regard for prenatal or intrapartum medical problems although indepth clinical information was recorded. Significant inhibition of ALAD in both maternal and fetal erythrocytes. ERYTHROCYTES; FETUS; PREGNANCY; ENZYMES; URBAN AREAS; POPULATION EXPOSURE; METALS; LEAD; BLOOD; OHIO	Kuhnert, P.M. Erhard, P. Kuhnert, B.R. 1977
722 Blood		ASV	a) 89 b) 90	a) <1-81 ug/100 ml b) 0-3.87 ug/100 ml	a) 14.6 ug/100 ml b) 0.83 ug/100 ml	a) Ann Arbor population b) Yanomamo population 10 blood samples cross-checked using atomic absorption showed the anodic stripping voltammetry analyses had a +13.7% bias. 100 blood donors, 18-58 yr old, from Ann Arbor, Michigan. 137 Yanomamo Indians from Venezuela. BLOOD; URINE; HAIR; VENEZUELA; MERCURY; CADMIUM; LEAD; COPPER; METALS; MICHIGAN	Hecker, L.H. Allen, H.E. Dinman, B.D. Neel, J.V. 1974

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TISSUE	EXPOSURE ROUTE	ANALYTICAL METHOD	NUMBER OF CASES	RANGE	MEAN	GENERAL INFORMATION	REFERENCE
723 Blood		Dithizone	a) 25 b) 21	a) 10-25 ug/100 ml b) 50-80 ug/100 ml	a) 20.4 ug/100 ml b) 56.9 ug/100 ml	a) Controls b) Subjects Children selected according to blood Pb level. No significant difference in protein, caloric or iron intake between children with Pb poisoning and controls. Forty-six children, aged 24 to 47 months who were patients at a neighborhood health center. Ethnic composition was 51% Black, 38% Spanish-surnamed, and 11% Caucasian. LEAD; CHILDREN; DIETS; METALS; IRON; LEAD POISONING; CONNECTICUT; BLOOD	Hooty, J. Ferrand, C.F., Jr. Harris, P. 1975
724 Blood		Dithizone	1 (31 samples)	12-42 ug/100 g	19.13 ug/100 g	The sample value of 42 ug/100 g is an outlying value. If rejected, the mean is 18.37 ug/100 g and range is 12 to 28 ug/100 g. 35 blood specimens obtained from a volunteer donor in a single collection. BLOOD; LEAD; MEASUREMENT METHODS; METALS; OHIO	Lerner, S. 1975
725 Blood			2	a) Not given b) Not given	a) 35 ug/100 ml b) 30 ug/100 ml	a) Physician b) Child Physician and 3 yr old daughter living in East Boston, site of dense traffic for airport, racetrack and seashore. Author comments, in letter to the Editor, that anemia is common in levels of 37 to 60 ug/100 ml, a level not far removed from that of himself and his daughter. LEAD; METALS; URBAN AREAS; HEMACCUMULATION; BLOOD; ANEMIA; AIR POLLUTION; AUTOMOTIVE; MASSACHUSETTS	Epstein, P. 1974
726 Blood		AAS	a) 11 b) 10 c) 6 d) 4	a) Not given b) Not given c) Not given d) Not given	a) 38.00 ug/100 ml b) 45.09 ug/100 ml c) 56.83 ug/100 ml d) 46.75 ug/100 ml	a) Before exposure b) 1 month post-exposure c) 3 months post-exposure d) 9 months post-exposure Samples from workers employed in storage battery plant in Italy. No symptoms of lead poisoning during the study. Rate of abnormal metaphases, mostly with chromatid and one-break chromosome aberrations, was approximately doubled after one month of work. Fumes LEAD; INDUSTRIAL PLANTS; CHROMOSOMAL ABERRATIONS; INDUSTRIAL HYGIENE; URINE; BLOOD; METALS; ITALY	Forni, A. Cambiaghi, G. Secchi, G.C. 1976

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TISSUE	EXPOSURE ROUTE	ANALYTICAL METHOD	NUMBER OF CASES	RANGE	MEAN	GENERAL INFORMATION	REFERENCE
727 Blood	Inhalation	Dithizone	a) 8 b) 8	a) Not given b) Not given	a) 26.6 ug/100 ml b) 97.82 ug/100 ml	a) Control group b) Lead-poisoned group Samples from print-shop workers in Turkey, mean age of 35.8 years, mean period of employment 20.1 years. Lead-induced colic, metallic taste, constipation, anorexia, arthralgia, paresthesia, and headache were observed in lead-intoxicated workers. Significant erythrocytosis and hypochromia. Mean corpuscular Hb was significantly lower than control values. Fumes LEAD; METALS; PRINTING INDUSTRY; INDUSTRIAL EMISSIONS; ANEMIA; TURKEY; BLOOD	Canberk, A. Sehirli, I. Canberk, Y. Koyuncuoglu, F. 1978
728 Blood	Inhalation Ingestion	AAS	a) 46 b) 78 c) 46 d) 78	a) 40-68 ug/100 ml b) 1-39 ug/100 ml c) 22-58 ug/100 ml d) 15-39 ug/100 ml	a) 48.3 ug/100 ml b) 26.9 ug/100 ml c) 43.5 ug/100 ml d) 26.5 ug/100 ml	a) Lead-absorption group, 1972 b) Controls, 1972 c) Lead absorption group, 1973 d) Controls, 1973 Samples from children between ages of 3 yr, 9 mo to 15 yr, 11 mo living within 6.6 km of a lead smelter in El Paso, Texas. Controls matched with age, sex, socioeconomic status, length of residence in area and language spoken. Chronic absorption may result in subtle but statistically significant impairment of non-verbal cognitive and perceptual-motor skills. However, impairment could have preceded lead absorption. Lead smelter LEAD; METALS; CHILDREN; SMELTERS; INDUSTRIAL EMISSIONS; NEUROLOGIC MANIFESTATIONS; PENICILLAMINE; BLOOD; PICA; TEXAS	Landrigan, P.J. Baloh, R.W. Barthel, W.F. Whitworth, R.H. Staehling, N.W. Rosenblum, B.F. 1975
729 Blood		ASV AAS	a) 192 b) 273	a) Not given b) Not given	a) 33.1 ug/100 ml b) 27.0 ug/100 ml	a) Children of leadworkers b) Controls Children (under 5 years old) of battery factory leadworkers. Control children's parents were not leadworkers. Mothers also tested. Battery factory near Manchester, England. LEAD; OCCUPATIONAL HAZARDS; BLOOD; INDUSTRIAL PLANTS; CHILDREN; BIOACCUMULATION; METALS; AGE; UNITED KINGDOM	Elwood, W.J. Clayton, B.E. Cox, B.A. Delves, H.T. King, E. Malcolm, D. Patcliffe, J.E. Taylor, J.F. 1977
730 Blood		PADC-MIBK AAS		Not given	0.178 ppm	10 samples PLATINUM; PALLADIUM; LEAD; METALS; BLOOD; URINE; FECES; HAIR; MEASUREMENT METHODS; TRACE ELEMENTS	Tillery, J.B. Johnson, D.E. 1975

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TISSUE	EXPOSURE ROUTE	ANALYTICAL METHOD	NUMBER OF CASES	RANGE	MEAN	GENERAL INFORMATION	REFERENCE
731 Blood		AAS	20	0.10-0.53 ug/g wet wt	0.29 ug/g wet wt	Samples from 30 cadavers in central Japan, mean age of 39 years, extent of heavy metal exposure unknown. METALS; ARSENIC; BERYLLIUM; BISMUTH; CADMIUM; CHROMIUM; COBALT; COPPER; MERCURY; METHYL MERCURY COMPOUNDS; MANGANESE; MOLYBDENUM; NICKEL; LEAD; ANTIMONY; VANADIUM; ZINC; BRAIN; TRACHEA; LUNGS; HEART; LIVER; PANCREAS; SPLEEN; KIDNEYS; ADRENAL GLANDS; INTESTINES; TESTES; OVARIES; MUSCLES; SKIN; BLOOD; BONES; ADIPOSE TISSUE; CADAVERS; JAPAN	Sumino, K. Hayakawa, K. Shibata, T. Kitamura, S. 1975
732 Blood		AAS	1	a) Not given b) 100-140 ug/100 ml c) 55-60 ug/100 ml	a) 260 ug/100 ml b) Not given c) Not given	a) Before treatment b) During chelation with EDTA c) During zinc sulfate administration b) and c) estimated from graph. A 37-year old man who had worked for 5 months in a lead battery factory and 25 years previously as a spray painter using lead-based paints. Vague pains in extremities, easily fatigued, generalized weakness, headache, loss of appetite. Mild neuropathy and myopathy LEAD; METALS; ZINC; CASE HISTORIES; OCCUPATIONAL HAZARDS; INDUSTRIAL PLANTS; PAINTS; LEVULINIC ACIDS; ENZYMES; BLOOD; BLOOD SERUM; URINE; HAIR	Thomasino, J.A. Zuroweste, E. Brooks, S.M. Petering, H.G. Lerner, S.I. Finelli, V.N. 1977
733 Blood		AAS	Approx 150, 28 controls	a) <60 ug/dl b) > or = 60 ug/dl c) >80 ug/dl	a) Not given b) Not given c) Not given	a) Controls b) 77% of workers c) 23% of workers Male workers, half of which were less than 30 yr, equally distributed as white or black race, currently employed in 2 secondary lead smelters. Controls were 28 workers from nearby plants with no known lead exposure. Lead anemia, lead colic, gastrointestinal symptoms, central nervous system symptoms, muscle and joint pains, hypertension, kidney disease. Incidence of non-colic abdominal pain higher in control group smelter workers. Cell hemoglobin concentration correlated with both blood-lead and ZPP (zinc protoporphyrin) levels. Results show that lead inhibits Hb synthesis but not red blood cell production. Industrial emissions ZINC; PROTOPORPHYRINS; LEAD; METALS; RADIOISOTOPES; OCCUPATIONAL HAZARDS; SMELTERS; BLOOD	Elsinger, J. Blumberg, W.E. Fischbein, A. Lilis, R. Selikoff, I.J. 1979

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TISSUE	EXPOSURE ROUTE	ANALYTICAL METHOD	NUMBER OF CASES	RANGE	MEAN	GENERAL INFORMATION	REFERENCE
734 Blood			a) 546 b) 282 c) 74	a) < or = 29 ug/100 ml b) 30-39 ug/100 ml c) >40 ug/100 ml	a) Not given b) Not given c) Not given	a) 39.3% with family of 4 or more children under 6 yr b) 42.9% with family of 4 or more children under 6 yr c) 17.9% with family of 4 or more children under 6 yr Strong association between Pb and socioeconomic factors interfering with supervision of small children Samples from children 1-6 years old living in lead-belt areas of New Haven, CT LEAD; METALS; CHILDREN; BLOOD; CONNECTICUT	Stark, A.D. Feigs, J.W. Fitch, R.F. Peloquin, E.P. 1978
735 Blood			1,369	> or = 40 ug/100 ml	Not given	Levels in 53% of children 1-9 years old living within 1.6 km of the smelter and in 18% of those living from 1.6-6.6 km. Children in the first 1.6 km with these blood levels were exposed to 6447 ppm Pb in dust. Of all persons tested, 9% had similar values. Random sample of persons of all ages living near a lead-emitting smelter in El Paso, Texas. LEAD; METALS; SHELTERS; BLOOD; DUST; CHILDREN	Landrigan, P.J. Gehlbach, S.H. Rosenblum, B.F. Shoults, J.A. Candelaria, R.M. Barthel, W.F. Liddle, J.A. Smrek, A.L. Staehling, R.S. Sanders, J.P. 1975
736 Blood	Inhalation Ingestion	AAS	a) 22 b) 15 c) 134	a) Not given b) Not given c) Not given	a) 18.9 ug/100 ml b) 32 ug/100 ml c) 28.7 ug/100 ml	a) Day Care children b) Controls (Non-Day Care children) c) Controls (Community children). Comparing ghetto children in Day Care Centers with ones not in centers. Age ranges: 12-35 months. Environmental pollution Pica BLOOD; LEAD; METALS; CHILDREN; URBAN AREAS	Adebonojo, F.O. Straus, S. 1978

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TISSUE	EXPOSURE ROUTE	ANALYTICAL METHOD	NUMBER OF CASES	RANGE	MEAN	GENERAL INFORMATION	REFERENCE
737 Blood	Inhalation	AAS	a) 156 b) 24 Controls	a) <40- greater than 80 ug/100 ml b) <40-59 ug/100 ml	a) Not given b) Not given	a) Workers, secondary Pb-smelters: 2 had <40 ug/100 ml, 38 had 40-59 ug/100 ml, 75 had 60-79 ug/100 ml, 45 had >80 ug/100 ml, 93 had >80 ug/100 ml at some time, over half the 93 had repeated Pb >80 ug/100 ml, biochemical and clinical findings correlated with Pb levels b) Controls: 10 had 40-59 ug/100 ml, 14 had <04 ug/100 ml. Workers from 2 secondary smelting plants. Various age groups, Pb-exposure periods, both black and white races. Controls 2 plants in same area. Reduced radial nerve-conduction velocity was found in 46% of 134 Pb-exposed workers. Central nervous system symptoms, muscle and joint pain and/or soreness, and loss of appetite and weight were found in a relatively high proportion of the workers. High zinc propoporphyrin levels strongly correlated with Pb levels & duration of Pb-exposure. BLOOD; LEAD; SMELTERS; METALS; OCCUPATIONAL DISEASES; PROTOPORPHYRINS; ZINC; ERYTHROCYTES; LEAD POISONING; BLOOD; OCCUPATIONAL HAZARDS; METAL POISONING; NERVOUS SYSTEM DISEASES	Lilis, R. Fischbein, A. Diamond, S. Anderson, H.A. Selikoff, I.J. Blumberg, W.E. Eisinger, J. 1977
738 Blood	Inhalation Ingestion		1189	a) Not given b) Not given c) Not given d) Not given e) Not given f) Not given	a) 57-75 ug/100 ml b) 40-55 ug/100 ml c) 31-36 ug/100 ml d) 28-35 ug/100 ml e) 17-25 ug/100 ml f) 20-37 ug/100 ml	a) 1 mile of Pb smelter b) 1-2.5 mile of Pb smelter c) 2.5-6 mile of Pb smelter d) 15-20 mile of Pb smelter e) Children living 85 miles from Pb smelter (Primary controls) f) Children living at old Pb mining site (Secondary controls) Means are geometric. More data in tables. 1189 children, aged 1-9 yr, living near a primary lead smelter in northern Idaho were surveyed in August 1974. Blood lead levels were correlated with analyses of environmental samples, social and medical history, and general observations of the home environment. Primary lead smelter LEAD; BLOOD; CHILDREN; LEAD POISONING; INDUSTRIAL EMISSIONS; INDUSTRIAL POLLUTION; SMELTERS; IDAHO; COMPARATIVE EVALUATIONS; DUST; METALS; AIR POLLUTION	Yankel, A.J. von Lindern, I.H. Walter, S.D. 1977
739 Blood	Ingestion Inhalation	APDC-MIBK AAS	379	9-102 ug/100 ml	30 ug/100 ml	Children in Newark, NJ, 1-8 yr, living in urban environment. [illegible]; LEAD; ZINC; METALS; BLOOD; CHILDREN; PAINTS; POPULATION EXPOSURE; URBAN AREAS; NEW JERSEY	Logden, J.D. Singh, N.P. Joselow, M.M. 1978

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Lead
7439-92-1
Pb
AtW 207.2, MP 327.4 C, BP 1740 C, VP 1.77 mm Hg at 1000 C, 1 mm Hg at 970 C, 10 mm Hg at 1160 C
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TISSUE	EXPOSURE ROUTE	ANALYTICAL METHOD	NUMBER OF CASES	RANGE	MEAN	GENERAL INFORMATION	REFERENCE
740 Blood		Colorimetry	a) 40 b) 5 c) 29 d) 25	a) 12-41 ug/100 ml b) 26-39 ug/100 ml c) 12-41 ug/100 ml d) Not given	a) 22.8 ug/100 ml b) 31.4 ug/100 ml c) 20.8 ug/100 ml d) 24.04 ug/100 ml	a) Taxi drivers (whole group) b) Taxi drivers with lead plumbing at home c) Taxi drivers with copper plumbing at home d) Controls (factory workers) Male taxi drivers, 25-64 years of age, who were refuelling at a central Manchester depot. LEAD; METALS; OCCUPATIONAL HAZARDS; COPPER; LEVULINIC ACIDS; BLOOD; SMOKING; UNITED KINGDOM; AUTOMOTIVE	Plinit, M.L.H. King, P. Walsh, D.B. 1976
741 Blood		AAS	a) 20 b) 31	a) Not given b) Not given	a) 1.00 umol/l b) 0.93 umol/l	a) Alcoholics b) Delinquents and criminals 51 prisoners, 20 of whom were alcohols (mean age = 52 years). Mean age of other 31 prisoners = 39 years BLOOD; LEAD; METALS; ALCOHOLIC BEVERAGES	Lob, M. Desbaumes, P. 1976
742 Blood		AAS	a) 78 b) 11 c) 24 d) 9	a) Not given b) Not given c) Not given d) Not given	a) 26.4 ug % b) 6.7 ug % c) 9.5 ug % d) 7.0 ug %	a) 1-2 wk between samples, macro blood lead of <40 ug % b) 0 wk between samples, macro blood lead of <40 ug % c) 1-2 wk between samples, macro blood lead of > or = 40 ug % d) 0 wk between samples, macro blood lead of > or = 40 ug % Values are for micro minus macro blood lead. Contamination problems in collection of micro samples. Delves Method, micro-and Hessel Method for macroanalysis. LEAD; METALS; CHILDREN; MEASUREMENT METHODS; BLOOD; CONNECTICUT	Juselius, R.E. Lupovich, P. Moriarty, E. 1975
743 Blood	Ingestion	AAS	10	a) >40 ug % b) >80 ug %	a) Not given b) Not given	a) Level of all children at initiation of study b) Level of 50% of children 3 months before study, chelation therapy required Study indicates substantial exposure due to ingestion of dust and dirt rather than paint. Samples from children in Connecticut, average age 4 1/3 yr. Ingestion of lead-containing dirt LEAD; METALS; CHILDREN; PICA; DUST; PAINTS; POPULATION EXPOSURE; BLOOD; BIOACCUMULATION; CONNECTICUT	Lepow, M.L. Bruckman, L. Rubino, R.A. Markowitz, S. Gillette, M. Kapish, J. 1974

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TISSUE	EXPOSURE ROUTE	ANALYTICAL METHOD	NUMBER OF CASES	RANGE	MEAN	GENERAL INFORMATION	REFERENCE
784 Blood		AAS	a) 57 b) 28 c) 24	a) Not given b) Not given c) Not given	a) 30.88 ug/100 ml b) 35.11 ug/100 ml c) 37.75 ug/100 ml	a) Toll booth at Tunnels entrance b) Allston location, on MA turnpike c) Weston location, Turnpike and Route 128 99 men worked at tunnel area as tollmen-guards, electricians or maintenance persons. Others worked as collectors at Allston and Weston booths, 6 1/2-7 hr/day. Automotive emissions HAIR; HEALTH HAZARDS; OCCUPATIONAL HAZARDS; LEAD; METALS; BLOOD; SMOKING; CARBON INORGANIC COMPOUNDS; BIOACCUMULATION; AIR POLLUTION; AUTOMOTIVE; MASSACHUSETTS	Burgess, W.A. Diberardinis, L. Speizer, F.E. 1977
785 Blood		Dithizone	a) 17 (c) b) 31 c) 18	a) <1.43 umol/l b) 1.98-3.88 umol/l c) > or = 3.42 umol/l	a) Not given b) Not given c) Not given	a) Glutathione reductase (GSSG-R) activity 0.98 units/ml, 5 aminolevulinic acid dehydratase (ALA-D) activity 28.47 units/ml, free sulfhydryl groups (SH) 1.49 umol/ml b) GSSG-R 1.48 units/ml, ALA-D 10.45 units/ml, SH 1.06 umol/ml c) GSSG-R 1.90 units/ml, ALA-D 4.63 units/ml, SH 0.93 umol/ml An unspecified number of subjects were workers from a lead battery factory LEAD; METALS; ENZYMES; BLOOD; ERYTHROCYTES; BIOACCUMULATION; UNITED KINGDOM; METABOLISM	Howard, J.K. 1978
786 Blood			80	7-66 ug %	24.3 ug %	No positive relationship between blood Pb and blood pressure was found. Samples from 80 New Hanover County, North Carolina children, 1 to 8 yrs old, mean age 4.5 yrs, 29 black male, 38 black females, 9 white males, 5 white females LEAD; METALS; BLOOD; BLOOD PRESSURE; HYPERTENSION; NORTH CAROLINA; CHILDREN	Rogan, W.J. Rogan, M.D. Chi, P.Y. Covan, D. 1978
787 Blood		AAS	a) 25 b) 50 c) 25 d) 50	a) Not given b) Not given c) Not given d) Not given	a) 16.2 ug/100 ml b) 15.3 ug/100 ml c) 13.8 ug/100 ml d) 13.1 ug/100 ml	a) Maternal blood, birth weights <2500 g b) Controls, birth weights >2500 g c) Cord blood, birth weights <2500 g d) Controls, birth weights >2500 g Differences not significant at P<0.05 level. Women giving birth in Newark, N.J. Test and control groups matched for age (19.4 and 19.8 years), weights, smoking habits, ethnicity (84% black, 16% Hispanic) and socioeconomic status. METALS; COPPER; LEAD; IRON; MAGNESIUM; CALCIUM; BLOOD; INFANTS	Fogden, J.D. Thind, I.S. Louria, D.B. Caterini, P. 1978

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TISSUE	EXPOSURE ROUTE	ANALYTICAL METHOD	NUMBER OF CASES	RANGE	MEAN	GENERAL INFORMATION	REFERENCE
748 Blood		AAS		a) Not given b) Not given c) Not given	a) 49.4 ug/100 ml b) 53.4 ug/100 ml c) 26.4 ug/100 ml	a) Exposure < 10 yr b) Exposure > 10 yr c) Controls. From secondary lead smelter workers (24% < 30 yr old, 52% 31-50 yr old and 31% > 50 yr old) and a control group (8% < 30 yr old, 62% 31-50 yr old 30% > 50 yr old). Significant inverse correlation between hemoglobin and blood lead levels. Smelter METALS; LEAD; BLOOD; HEMOGLOBINS; ANEMIA	Lilis, R. Eisinger, J. Blumberg, W. Fischbein, A. Selikoff, I.J. 1978
749 Blood	Inhalation Ingestion	AAS	a) 27 b) 32	a) 16-63 ug/100 ml b) 8-55 ug/100 ml	a) 31.8 ug/100 ml b) 21.72 ug/100 ml	a) Children of lead storage battery plant workers b) Control group Levels significantly different (P> 0.001). Children (age 1-6 yr) Dust from parents' clothes METALS; LEAD; BLOOD; CHILDREN	Watson, W.S. Witherell, L.E. Giguere, G.C. 1978
750 Blood		AAS	a) 49 b) 49 c) 49 d) 24	a) Not given b) Not given c) Not given d) Not given	a) 32.3 ug/100 ml b) 37.9 ug/100 ml c) 49.9 ug/100 ml d) 11.9 ug/100 ml	a) Average level in workers at time of tests b) Time weighted average for the same group c) Average maximum concentration for the same group d) Controls Finnish workers (39 mens and 10 women, mean age 33) at a storage battery plant or machine shop. The relationship between impaired psychological performance and blood lead concentration was significant. Visual intelligence and visual motor function were most affected. METALS; LEAD; BLOOD; OCCUPATIONAL HAZARDS	Haenninen, H. Hernberg, S. Mantere, P. Vesanto, R. Jalkanen, M. 1978
751 Blood	Ingestion		1	a) Not applicable b) Not applicable	a) 90 ug % b) 70 ug %	a) Before therapy for poisoning b) After Ca-EDTA therapy A 59-year-old woman poisoned by the lead in an herbal medication. Insomnia, irritability, diffuse pains. Anemia, basophilic stippling, erythroid hyperplasia of bone marrow. LEAD; METALS; LEAD POISONING; CASE HISTORIES; BLOOD; ANEMIA	Kalman, S.M. 1977

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Lead
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Pb
At# 207.2, BP 327.4 C, BP 1740 C, VP 1.77 mm Hg at 1000 C, 1 mm Hg at 970 C, 10 mm Hg at 1160 C
(CONTINUED)

TISSUE	EXPOSURE ROUTE	ANALYTICAL METHOD	NUMBER OF CASES	RANGE	MEAN	GENERAL INFORMATION	REFERENCE
752 Blood			6	24-52 ug/100 ml	Not given	Alkyl lead workers, levels taken weekly for 6 wk. No correlation between air and blood levels. LEAD; OCCUPATIONAL HAZARDS; METALS; OCCUPATIONAL DISEASES; LEAD POISONING; BLOOD; URINE; LEVULINIC ACIDS	Cope, R.F. Pancano, B.P. Rinehart, W.E. TerHaar, G.L. 1979
753 Blood	Ingestion	AAS	192	7-43 ug/100 ml	16.1 ug/ml	Children, 1-12 yrs, 1977. No correlation with levels in drinking water. Children from Bennington, Vermont LEAD; METALS; LEAD POISONING; BLOOD; CHILDREN; VERMONT; DRINKING WATER	Horse, D.L. Watson, W.N. Hounsworth, J. Witherell, L.E. Landrigan, P.J. 1979
754 Blood						Review LEAD; METALS; BLOOD; TEETH; BONES; HAIR; URINE; MEASUREMENT METHODS; BIOACCUMULATION; METABOLISM; REVIEW	Baloh, R.W. 1974
755 Blood						Review Decreased cognitive function, increase in behavioral abnormalities found in school-aged children with undue exposure to lead. Recommendations given for lead levels in paints to minimize exposure. LEAD; METALS; CHILDREN; BEHAVIOR DISORDERS; NEUROLOGIC MANIFESTATIONS; PAINTS; PICA; HEALTH HAZARDS; BLOOD; REVIEW	Chisolm, J.J. 1976
756 Blood						Review 'Normal' levels and exposure limits given. Author comment: About 1% of the work force is exposed to lead levels high enough to result in biochemical and, possibly, neurological damage. 25 days LEAD; METALS; INDUSTRIAL POLLUTION; OCCUPATIONAL HAZARDS; FOOD CONTAMINATION; POPULATION EXPOSURE; HEALTH HAZARDS; REVIEW; BLOOD; HAIR; URINE; TEETH; BONES	Grandjean, P. 1978

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Lead
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Pb
At# 207.2, MP 327.4 C, BP 1740 C, VP 1.77 mm Hg at 1000 C, 1 mm Hg at 970 C, 10 mm Hg at 1160 C
(CONTINUED)

TISSUE	EXPOSURE ROUTE	ANALYTICAL METHOD	NUMBER OF CASES	RANGE	MEAN	GENERAL INFORMATION	REFERENCE
757 Blood	Inhalation Ingestion	AAS	a) 40 b) 29 c) 45	a) 15.7-45.8 ug/100 ml b) 9.4-25.4 ug/100 ml c) 4.5-16.2 ug/100 ml	a) 26.4 ug/100 ml b) 13.6 ug/100 ml c) 9.1 ug/100 ml	a) <1 km from Pb smelter b) 2.5 km from Pb smelter c) Rural area (Controls) Children, aged 10-14 yr, living and going to school less than 1 km from a Pb smelter, 1.5-2.5 km from the Pb smelter, and in a rural area 4 km from the center of Leuven, Belgium. Study was conducted 19 mon after pollution control measures were implemented. Children seemed in good health. Pb and Cd emissions from Pb smelter LEAD; CADMIUM; METALS; SMELTERS; CHILDREN; BLOOD; URINE; ENZYMES; INDUSTRIAL EMISSIONS; AIR POLLUTION; COMPARATIVE EVALUATIONS; BELGIUM	Roels, H.A. Buchet, J.P. Lauwerys, R. Bruaux, P. Claeys-Thoreau, F. Lafontaine, A. van Overschelie, J. Verduyn, G. 1978
758 Blood		APDC-HIBK AAS	9	0.3-2.9 umol/l	1.7 umol/l	Lead workers Male volunteers, aged 21 to 63 yr. LEAD; METALS; COPROPORPHYRINS; URINE; BLOOD; BLOOD SERUM; PROTEINS	Araki, S. 1978
759 Blood		AAS	a) 41 b) 36	a) Not given b) Not given	a) 1.23 umol/l b) 1.01 umol/l	a) Blood lead levels within 2 wk of birth, for mentally retarded children b) Blood lead levels within 2 wk of birth, for controls Blood from P.K.U. cards used as source. More data available. Samples from 77 Scottish children Only cases of mental retardation of unknown etiology were used LEAD; METALS; BLOOD; INFANTS; CHILDREN; RETARDATION; SCOTLAND	Moore, M.P. Meredith, P.A. Goldberg, A. 1977
760 Blood	Ingestion	MS	3	a) <0.03 ug/g b) 0.03-0.07 ug/g c) 0.005-0.04 ug/g d) <0.005 ug/g	a) Not given b) Not given c) Not given d) Not given	a) 0-25 days b) 25-125 days c) 125-200 days d) 200-360 days Times during and after exposure to 100 ug/day for 100 days. Healthy males aged 25-53 yr. METALS; LEAD; INTEGUMENT; HAIR; BLOOD	Rabinowitz, M. Wetherill, G. Kopple, J. 1976

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TISSUE	EXPOSURE ROUTE	ANALYTICAL METHOD	NUMBER OF CASES	RANGE	MEAN	GENERAL INFORMATION	REFERENCE
761 Blood		AAS	a) 2 b) 30 c) 58 d) 15 e) 21	a) Not given b) Not given c) Not given d) Not given e) Not given f) Not given g) Not given	a) 69.4 ug/100 ml b) 65.4 ug/100 ml c) 73.8 ug/100 ml d) 78.1 ug/100 ml e) 38.0 ug/100 ml	a) Exposure <0.1 yr b) Exposure 0.3-0.9 yr c) Exposure 1.0-2.9 yr d) Exposure >10 yr e) Controls Secondary lead smelter workers Occupational exposures <1 yr produced symptoms of lead toxicity including CNS and GI abnormalities, muscle and joint pain, and lead colic. Elevated blood lead levels were accompanied by low hemoglobin and high zinc protoporphyrin values. Long term exposure resulted in kidney damage, hypertension and peripheral neuropathy. METALS; LEAD; INDUSTRIAL POLLUTION; SMELTERS; BLOOD	Lilis, R. Fischbein, A. Eisinger, J. Blumberg, W.E. Diamond, S.J. Anderson, H.A. Rom, W. Rice, C. Sarkozi, L. Kon, S. Selikoff, I.J. 1977
1601 Blood		AAS	305	0.2-5.3 umoles/l	Not given	Danish men occupationally exposed to Pb. PROTOPORPHYRINS; LEAD; OCCUPATIONAL HAZARDS; MEASUREMENT METHODS; BLOOD; HEMOGLOBINS; METABOLITES; DENMARK; ADULTS	Grandjean, P. 1979
1668 Blood			68	>60 ug/dl	Not given	Children with anemia. 38 of 68 hemoglobins <11 g/dl, 3 of 38 had normal serum iron levels. Patients at Milwaukee Children's Hospital. LEAD; IRON; HEMOGLOBINS; PROTEINS; METALS; BLOOD; BLOOD SERUM; LEAD POISONING; METAL POISONING; CHILDREN; WISCONSIN	Szold, P.D. 1978
1682 Blood		AAS	a) 78 b) 73	a) 13.1-20.2 ug % b) 16.3-22.8 ug % Range of means	a) Not given b) Not given	a) Suburban students b) Urban students Significant correlation of blood Pb and Pb in exterior dust tracked into the home. Little or no correlation with air Pb, interior dust, food or water. No correlation with gross availability of flaking paint. Students, aged 10-19 yr, residents of Omaha, NE METALS; LEAD; BLOOD; DUST; SOILS; CHILDREN; NEBRASKA; AIR POLLUTION; WATER POLLUTION	Angle, C.A. McIntire, M.S. Colucci, A.V. 1978
1716 Blood			28	16-51 ug/dl	26.9 ug/dl	Iron workers exposed to lead oxide. More data available. Iron workers repairing an elevated railroad network in New York City. LEAD; ZINC; METALS; TRACE ELEMENTS; PROTEINS; BLOOD; OCCUPATIONAL HAZARDS; NEW YORK	Fischbein, A. Lilis, R. 1977

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TISSUE	EXPOSURE ROUTE	ANALYTICAL METHOD	NUMBER OF CASES	RANGE	MEAN	GENERAL INFORMATION	REFERENCE
1718 Blood		Colorimetry	a) 57 b) 28 c) 52 d) 23	a) Not given b) Not given c) Not given d) Not given	a) 93.62 ug% b) 52.63 ug% c) 56.47 ug% d) 48.23 ug%	a) Exposed smelter workers b) Smelter worker controls c) Exposed miners d) Miner controls Workers in lead smelting plant and lead miners in Brazil. Lead poisoning symptoms in 'exposed' and 'control' groups. Possible masking of symptoms by parasitosis in majority of both groups. 'Exposed' and 'controls' had hemoglobin and hematocrit levels below those considered normal in developed areas. LEAD; METALS; BLOOD; INDUSTRIAL POLLUTION; MINING; SMELTERS; BRAZIL; INDUSTRIAL DISEASES; METAL POISONING; INFECTION	Mendes, O. 1977
1719 Blood	Ingestion	AAS	a) 32 b) 70 c) 18	a) Not given b) Not given c) Not given	a) 28.5 ug/100 ml b) 41.5 ug/100 ml c) 58.7 ug/100 ml	a) 72% currently or previously in "poor" housing b) 98% currently or previously in "poor" housing c) 94% currently or previously in "poor" housing Winter Levels "Poor" housing: peeling paint and/or broken plaster Rise in blood Pb of 10 ug/100 ml or greater from winter to summer predictable in children under 3 yr and/or those exposed to paint or plaster. Other data and statistics available. 70% Black, 29% Spanish-American, 73% from families on welfare Ages 10 mo - 12 yr. Paint or plaster AGE; CHILDREN; BLOOD; LEAD; METALS; NUTRITIONAL DISORDERS; PICA; PAINTS; NEW YORK	McCusker, J. 1979
1762 Blood	Ingestion	AAS	a) 15 b) 16 c) 12	a) 12-29 ug/100 ml b) 30-49 ug/100 ml c) 50-67 ug/100 ml	a) Not given b) Not given c) Not given	a) 56% exhibited pica b) 98% exhibited pica c) 93% exhibited pica Inverse correlation between Ca intake and blood Pb. 43 children, 1-6 yr old from section of Milwaukee, Wisconsin containing 95% of the Pb poisoning cases. 35 blacks, 4 Mexican Americans, 3 Caucasians, 1 Puerto Rican. Many households had paint with high Pb. Relative decrease in height percentile with increasing blood Pb. None of subjects treated for Pb toxicity. Paint PICA; LEAD POISONING; PAINTS; NUTRITIONAL DEFICIENCIES; TRACE ELEMENTS; ZINC; BLOOD; DIETS; CHILDREN; WISCONSIN; METALS	Johnson, N.E. Tenuta, E. 1979

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Lead
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Pb
AtW 207.2, MP 327.4 C, BP 1740 C, VP 1.77 mm Hg at 1000 C, 1 mm Hg at 970 C, 10 mm Hg at 1160 C
(CONTINUED)

TISSUE	EXPOSURE ROUTE	ANALYTICAL METHOD	NUMBER OF CASES	RANGE	MEAN	GENERAL INFORMATION	REFERENCE
1812 Blood		AAS	661	12-73 ug/100 ml	Not given	Children, outpatients in Montreal, Canada, most 3-7 yr old. METALS; LEAD; BLOOD; CHILDREN; CANADA	Mehteri, K.A. Romanowski, M. Smallbone, B. 1976
1813 Blood		AAS	a) 37 b) 18 c) 92	a) 19.7-41.1 ug/100 ml b) 14.9-27.6 ug/100 ml c) 4.7-15.6 ug/100 ml	a) 30.1 ug/100 ml b) 21.1 ug/100 ml c) 9.4 ug/100 ml	a) Children at school < 1 km from smelter b) Children at school 2.5 km from smelter c) Children at school in rural nonindustrialized area. Belgium children, ages 10-15 yr. Lead smelter METALS; LEAD; BLOOD; SMELTERS; CHILDREN; ADOLESCENTS; BELGIUM; INDUSTRIAL AREAS; RURAL AREAS	Roels, H. Buchet, J. Lauwerys, R. Hubermont, G. Bruaux, P. Claeys-Thoreau, F. Lafontaine, A. Overschelde, J.V. 1976
1814 Blood		AAS	a) 30 b) 32 c) 20	a) 5.0-10.2 ug/dl b) 9.0-17.0 ug/dl c) 14.5-36.5 ug/dl	a) 8.3 ug/dl b) 12.8 ug/dl c) 26.5 ug/dl	a) Rural population, minimal exposure b) Urban dwellers, no occupational exposure c) Individuals, moderate occupational exposure 10 families (parents with 1 child) from village north of Tokyo, 10 families (parents with 1-2 children) from urban Tokyo, 20 male lens-manufacturers in Tokyo. No clinical evidence of Pb poisoning. METALS; LEAD; BLOOD; LEAD POISONING; ERYTHROCYTES; ENZYMES; ADULTS; CHILDREN; JAPAN; OCCUPATIONAL HAZARDS; RURAL AREAS; URBAN AREAS	Wada, O. Takeo, K. Yano, Y. Tetsu, O. Nagahashi, Y. Seki, H. 1976
1953 Blood			1	Not applicable	33 ug/100 g	August 1977 49-yr-old chemical plant worker (from 1965 to 1975) exposed primarily to CdS and selenide dust, some soluble Cd compounds. Patient treated for Pb poisoning in 1965. Lassitude, insomnia, lightheadedness, headache, muscle aches, joint pain, paresthesia in fingers, impotence, significant weight loss. Mild liver enlargement with possible cirrhotic pattern and calcified granuloma on left lung. Occupational METALS; CADMIUM; LEAD; SELENIUM; ZINC; BLOOD; URINE; KIDNEYS; METAL POISONING; OCCUPATIONAL HAZARDS; ADULTS	Lerner, S. Hong, C.D. Perina, S.C. 1978

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Lead
7439-92-1
Pb
AtW 207.2, MP 327.4 C, BP 1740 C, VP 1.77 mm Hg at 1000 C, 1 mm Hg at 970 C, 10 mm Hg at 1160 C
(CONTINUED)

TISSUE	EXPOSURE ROUTE	ANALYTICAL METHOD	NUMBER OF CASES	RANGE	MEAN	GENERAL INFORMATION	REFERENCE
1962 Blood		AAS	a) 57 b) 51 c) 45 d) 43 e) 29 f) 19 g) 17 h) 54 i) 37 j) 13 k) 111 l) 36 m) 8 n) 7 o) 54 p) 23 q) 11 r) 3	a) Not given b) Not given c) Not given d) Not given e) 78-191 ppb f) 97-289 ppb g) 123-327 ppb h) 58-383 ppb i) 85-262 ppb j) 188-772 ppb k) 101-900 ppb l) Not given m) Not given n) Not given o) Not given p) Not given q) Not given r) Not given	a) 139 ppb b) 112 ppb c) 130 ppb d) 143 ppb e) 119 ppb f) 155 ppb g) 196 ppb h) 147 ppb i) 119 ppb j) Not given k) Not given l) 127 ppb m) 138 ppb n) 163 ppb o) 128 ppb p) 138 ppb q) 158 ppb r) 190 ppb	a) Males b) Females not using oral contraceptives c) Females using oral contraceptives d) Male students of similar age e) 0-3 yr old hospital patients f) 4-6 yr old hospital patients g) Residents <1 km from secondary Pb smelter and aged 2-3 yr h) Residents 1-2 km from secondary Pb smelter and aged 2-3 yr i) Residents >2 km from secondary Pb smelter and aged 2-3 yr j) Workers, car factory k) Workers, secondary Pb smelter l) Nonsmoking males m) Male smokers: 1-9 cigarettes/day n) Male smokers: 10-19 cigarettes/day o) Nonsmoking females p) Female smokers: 1-9 cigarettes/day q) Female smokers 10-19 cigarettes/day r) Female smokers: 20 or more cigarettes/day Dutch subjects aged 2 mo or older. METALS; CADMIUM; COPPER; IRON; LEAD; MANGANESE; ZINC; BLOOD; BLOOD SERUM; SMOKING; ORAL CONTRACEPTIVES; INDUSTRIES; SMELTERS; ADULTS; CHILDREN; SEX; NETHERLANDS	Zielhuis, R.L. del Castillo, P. Herber, R.F.M. Wibowo, A.A.E. 1979
2009 Blood						Review MAGNESIUM; LEAD; ZINC; METALS; TRACE ELEMENTS; DRINKING WATER; BLOOD; BLOOD SERUM; HEART; BONES; UNITED KINGDOM; CANADA; UNITED STATES; FINLAND	Sharrett, A.R. 1977
2023 Blood		AAS	18	33-68 ug/100 ml	Not given	Children ages 13-67 mo. Values correlated with erythrocyte protoporphyrin but not with urinary ALA, urinary Pb, or chelatable Pb. Children in prospective screening program at J.F. Kennedy Institute in 1972. LEAD; LEAD POISONING; METALS; METAL POISONING; COMPARATIVE EVALUATIONS; MARYLAND; MEASUREMENT METHODS	Chisolm, J.J., Jr. Barrett, M.B. Harrison, H.V. 1975

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Lead
7439-92-1
Pb
AtW 207.2, MP 327.4 C, BP 1740 C, VP 1.77 mm Hg at 1000 C, 1 mm Hg at 970 C, 10 mm Hg at 1160 C
(CONTINUED)

TISSUE	EXPOSURE ROUTE	ANALYTICAL METHOD	NUMBER OF CASES	RANGE	MEAN	GENERAL INFORMATION	REFERENCE
2116 Blood		AAS	a) 172 b) 199 c) 191 d) 163 e) 194 f) 89	a) Not applicable b) Not applicable c) Not applicable d) Not applicable e) Not applicable f) Not applicable	a) 98.8% b) 75% c) 28% d) 26% e) 12% f) 1-2%	a) 0-1.6 km b) 1.6-4.0 km c) 4.0-10.0 km d) 10.0-24.0 km e) 24.0-32.0 km f) Control (72 km) Values are % with 40 ug/dl Pb or higher by distance from smelter. Blood Cd, Sb, and As not correlated with distance from smelter. Children living near a primary lead smelter, and controls, all 1-9 yr of age. No frank neurologic abnormalities in 202 studied. Free erythrocyte protoporphyrin correlated and hematocrit negatively correlated with blood lead. No pathologic nerve conduction velocities. Lead smelter LEAD; IDAHO; CHILDREN; COMPARATIVE EVALUATIONS; BLOOD; ANEMIA; NEUROLOGIC MANIFESTATIONS	Landrigan, P.J. Baker, E.L., Jr. Feldman, R.G. Cox, D.H. Eden, K.V. Orenstein, W.A. Hather, J.A. Yankel, A.J. von Lindern, I.H. 1976
2118 Blood		AAS	a) 53 b) 45	a) 10-78 ug/100 ml b) Not given	a) 26 (SD=11) ug/100 ml b) 10 (SD=2) ug/100 ml	a) Occupationally exposed to Pb b) Controls Log erythrocyte ALA-dehydratase inversely correlated with blood Pb. Log erythrocyte Protoporphyrin directly related to blood Pb. No difference mean urinary ALA, exposed versus controls. Workers occupationally exposed to lead in a polyvinyl chloride factory for 3-19 yr. Healthy unexposed controls. LEAD; JAPAN; OCCUPATIONAL HAZARDS; COMPARATIVE EVALUATIONS; BLOOD; METALS	Tomokuni, K. Ogata, M. 1976
2142 Blood		AAS	a) 22 b) 37	a) 0.5-1.3 umol/l b) 0.6-4.2 umol/l	a) 0.8 umol/l b) 2.2 umol/l Medians.	a) Controls, no known occupational exposure b) Occupational exposure from 1 month to 25 yr. Controls, aged 18-48 yr, employed in mill processing edible oils and fatty acids. Exposed factory workers, aged 19-50 yr, employed in battery factory, radiator repair shop, lead-rolling mill, cable manufacturing. Psychological tests of exposed group: difficulty in transferring material from short-term to long term memory, depressed psychomotor speed, some impairment of cognitive functions. METALS; LEAD; BLOOD; HAIR; OCCUPATIONAL HAZARDS; COMPARATIVE EVALUATIONS; EXPERIMENTAL PSYCHOLOGY; ADULTS; DENMARK	Grandjean, P. Arnvig, E. Beckmann, J. 1978

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TISSUE	EXPOSURE ROUTE	ANALYTICAL METHOD	NUMBER OF CASES	RANGE	MEAN	GENERAL INFORMATION	REFERENCE
2288 Blood		AAS	7	71-138 ug/100 ml	99.7 ug/100 ml	All had clinical signs of Pb poisoning. Employees of ship-wrecking yard in Goteborg, Sweden, for 6 wk-20 yr, aged 26-66 yr. Weight loss, abdominal pain, constipation and/or diarrhea, fatigue, cramps, vomiting Old steel ship-hulls METALS; LEAD; BLOOD; URINE; ADULTS; OCCUPATIONAL HAZARDS; CASE HISTORIES; SWEDEN	Cramer, K. Goyer, R.A. Jagenburg, R. Wilson, M.H. 1974
2292 Blood	Ingestion		1	Not applicable	80 ug/dl	<6 mo old infant admitted to hospital in NY City. Seizures, listlessness, poor feeding, focal slowing and rare sharp waves in left postero-lateral area as shown by electroencephalogram, irritability Basophilic stippling of red blood cells, elevated free erythrocyte protoporphyria Earthenware pitcher METALS; LEAD; BLOOD; INFANTS; NEW YORK	Sitarz, A.L. 1975
2335 Blood	Ingestion		1	a) Not applicable b) Not applicable c) Not applicable d) Not applicable	a) 70 ug/100 ml b) 114 ug/100 ml c) 79 ug/100 ml d) 72 ug/100 ml	a) Time of admission b) 20 months after admission c) 28 months after admission d) 36 months after admission Black woman aged 46 yr from Jersey City, NJ Pulse rate of 106/min, grade II/VI midsystolic ejection murmur, grand mal seizure Anemia, Encephalopathy, lead nephropathy, vitiligo and hyperpigmentation of gums, pale conjectivae, uterus enlarged with fibromyomata. Soil LEAD; IRON; METALS; BLOOD; BLOOD SERUM; LEAD POISONING; ANEMIA; NEW JERSEY; NEUROLOGIC MANIFESTATIONS; NERVOUS SYSTEM DISEASES; URINE	Wedeen, R.P. Mallik, D.K. Batuman, V. Bogden, J.D. 1978
2338 Blood	Ingestion		1	96-120 ug/100 ml	108 ug/100 ml	Patient aged 24 living in Britain had purchased aphrodisiacs from Bangladesh. Constipation, precordial pain, generalized pain, colicky loin pain, nausea, and vomiting Intestinal ileus, sideroblastic anemia Aphrodisiac compounds LEAD; METALS; LEAD POISONING; UNITED KINGDOM; BLOOD; URINE; BLOOD SERUM	Brearley, W.L. Forsythe, A.B. 1978

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TISSUE	EXPOSURE ROUTE	ANALYTICAL METHOD	NUMBER OF CASES	RANGE	MEAN	GENERAL INFORMATION	REFERENCE
2403 Blood	Inhalation		a) 1 b) 1 c) 84	a) 36-118 ug/dl b) 40-177 ug/dl c) <10-50 ug/dl	a) Not given b) Not given c) Not given	a) Patient 1 admitted to hospital 3 times in 11 months. Maximum value and death followed third admission b) Patient 2 admitted to hospital twice c) Canadian Indian children Patients 1 and 2, 14 and 16 yr old males, respectively, with history of frequent gasoline sniffing, from Shamattawa Indian Reservation in Northeastern Manitoba, Canada. Children aged 9-17 yr from Little Grand Rapids Indian reservation in Eastern Manitoba, Canada, with history of multiple major social problems. Disorientation, tremors, ataxic gait, hallucinations, sleeplessness, hypotension, apnea, fever, cardiac arrest Basophilic stippling of RBC'S Tetraethyl lead METALS; LEAD; GASOLINE; LEAD ORGANIC COMPOUNDS; LEAD COMPOUNDS; BLOOD; METAL POISONING; LEAD POISONING; DRUG ABUSE; CASE HISTORIES; ADOLESCENTS; CHILDREN; CANADA	Boeckx, R.L. Postl, B. Coodin, F.J. 1977
2585 Blood		AAS ASV	20	70-140 ug/100 ml	Not given	Minor neurological and histological abnormalities noted had little relation to blood lead levels. Workers in lead smelting and refining plant in Denmark. 1 with history of chronic exposure had colic and high blood lead, and low hemoglobin, plus signs of lead neuropathy. Neurological abnormalities below point of neuropathy, found in 7 of 20 men. Slight increase in fibers with paranodal remyelination. Some internodes of small diameter, possibly marking onset of primary demyelination or of axonal damage. Lead smelting and refining BLOOD; DENMARK; LEAD; METALS; NEUROLOGIC MANIFESTATIONS; OCCUPATIONAL HAZARDS; SMELTERS	Buchthal, F. Behse, F. 1978

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TISSUE	EXPOSURE ROUTE	ANALYTICAL METHOD	NUMBER OF CASES	RANGE	MEAN	GENERAL INFORMATION	REFERENCE
2647 Blood	Inhalation	AAS	a) Not given b) Not given c) Not given d) 40-64 e) 23 f) 23	a) 53-78 ug/dl b) 48-77 ug/dl c) 29-43 ug/dl d) < 40-87 ug/dl e) less than 20 to > or = 60 ug/dl f) less than 20 to > or = 60 ug/dl	a) 60 ug/dl b) 56 ug/dl c) 35 ug/dl d) Not given e) 31.9 ug/dl f) 41.2 ug/dl	a) Firing range 1 instructors b) Firing range 2 instructors c) Firing range 3 instructors d) Firearms instructors e) Firearms instructors, after outdoor training period f) Firearms instructors, after indoor training period Employees of law enforcement agencies in New York, mean age 40.3 yr, mean duration of employment 6.6 yr. Headache, dizziness, fatigue, weakness, nervousness, hyperirritability, and sleep disturbances. Loss of appetite, weight loss, abdominal discomfort and pain. Firing range LEAD; OCCUPATIONAL HAZARDS; METALS; CENTRAL NERVOUS SYSTEM DISEASES; GASTROINTESTINAL SYSTEM; BLOOD; PROTOPORPHYRINS; NEW YORK	Fischbein, A. Rice, C. Sarkozi, L. Kon, S.H. Pectrocci, M. Selikoff, I.J. 1979
2648 Blood			215	47-471 ug/dl	Not given	Levels detected between 1966 and 1972. No correlation, in 47 cases tested 2-8 yr later, between Pb poisoning and certain mental traits. Patients detected through screening of high risk neighborhoods when 18-72 mo of age (mean-30 mo) Sibling controls. 18 patients with levels above 127 ug/dl suffered from vomiting, drowsiness, irritability or ataxia. METALS; LEAD; LEAD POISONING; COMPARATIVE EVALUATIONS; NEUROLOGIC MANIFESTATIONS; CHILDREN; INFANTS; BLOOD; ILLINOIS	Sachs, H.K. Krall, V. McCaughran, D.A. Rosenfeld, I.H. Youngsmith, M. Grove, G. Lazar, B.S. Novar, L. O'Connell, L. Payson, B. 1978
2662 Blood		Dithizone	43	Not given	0.21 ppm wet wt	Some decrease in mean levels with increasing age. Samples from autopsies from the Cincinnati area (1969-1971) of 46 white males, aged 20-84 yr. 19 traumatic deaths, 6 deaths due to drugs or carbon monoxide, 21 deaths due to medical causes. LEAD; METALS; BONES; ADIPOSE TISSUE; URINE; MUSCLES; INTESTINES; HEART; SKIN; BLADDER; STOMACH; BRAIN; TESTES; THYROID GLANDS; PROSTATE; BLOOD; ADRENAL GLANDS; LUNGS; SPLEEN; PANCREAS; KIDNEYS; LIVER; AORTA; AUTOPSIES; OHIO; BIOACCUMULATION	Gross, S.B. Pfitzer, E.A. Yeager, D.W. Kehoe, R.A. 1975

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TISSUE	EXPOSURE ROUTE	ANALYTICAL METHOD	NUMBER OF CASES	RANGE	MEAN	GENERAL INFORMATION	REFERENCE
2670 Blood			a) 1 b) 1 c) 56 d) 56	a) Not applicable b) Not applicable c) 10-30 ug/dl d) 10-32 ug/dl	a) 35 ug/dl b) 13 ug/dl c) 17.3 ug/dl d) 17.2 ug/dl	a) 6-mo-old exposed to newsprint log-burning b) Mother of 6-mo-old c) Control infants 0-6 mo of age d) Control mothers Room dust lead levels related to newsprint log-burning. 6-mo-old breast-fed baby and mother. Control infants and mothers in the same community. Marked elevation in erythrocyte prophyrin. Newsprint logs and hand-to-mouth contact LEAD; LEAD POISONING; NEW YORK; BLOOD; COMPARATIVE EVALUATIONS; METALS; METAL POISONING	Perkins, E.C. Oski, F.A. 1976
2675 Blood		AAS	133	2.5-52.5 ug/100 ml	12.4 ug/100 ml	No occupational exposure. City workers had significantly elevated blood Pb. Other correlations are presented. Healthy donors of transfusion blood during July-September of 1975. LEAD; METALS; BLOOD; AUSTRALIA; COMPARATIVE EVALUATIONS	Hancel, S.J. Thorp, R.H. 1976
2718 Blood	Ingestion		2	a) Not applicable b) Not applicable c) Not applicable d) Not applicable e) Not applicable f) 21-49 ug/dl	a) 96 ug/dl b) 41 ug/dl c) 26 ug/dl d) 60 ug/dl e) 72 ug/dl f) Not given	a) Mother before chelation therapy b) Mother after 2 days chelation therapy c) Mother at discharge, after delivery d) Cord blood e) Infant at 14 days f) Infant range for 3-19 mo with 2 periods of chelation therapy Newborn female and her 17-yr-old mother who had eaten paint chips during the last months of pregnancy Mother: pain in lower extremities for 3 wk, diagnosis of lead poisoning. Mother: some basophilic stippling of RBCs Infant: bone and RBC signs of elevated lead. Pica LEAD; METALS; NEW YORK; METAL POISONING; LEAD POISONING; PREGNANCY; INFANTS; NEWBORN; AMNIOTIC FLUID; BLOOD; PICA; UMBILICAL CORD	Timpo, A.E. Amin, J.S. Casalino, M.R. Yaceoglu, A.Y. 1979

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TISSUE	EXPOSURE ROUTE	ANALYTICAL METHOD	NUMBER OF CASES	RANGE	MEAN	GENERAL INFORMATION	REFERENCE
2769 Blood	Ingestion		98	> 0.5 ug/g	Not given	Levels in 98 of 705 children surveyed. Children in a run-down area of Boston. Lead toxicity noted. Central nervous systems effects: hyperactivity, behavior problems, learning disabilities. Paint and plaster LEAD; METALS; CHILDREN; BLOOD; NEUROLOGIC MANIFESTATIONS; BIOACCUMULATION; URBAN AREAS; BEHAVIOR DISORDERS; MASSACHUSETTS	Paneschel, S.T. 1974
2773 Blood		AAS	a) 3 b) 36 c) 22 d) 1	a) 20-34 ug/100 cc b) 43-87 ug/100 cc c) 48-108 ug/100 cc d) Not applicable	a) 28.6 ug/100 cc b) 57.1 ug/100 cc c) 78.2 ug/100 cc d) 235.2 ug/100 cc	a) Administrators, laboratory technician (air levels, 11.9-17.0 ug/m3) b) Workers: maintenance, loading, kitchen, battery assembling & sealing, grid smelting & casting, breaking & drying of plates, miscellaneous (air levels, 23-299 ug/m3) c) Workers: drying, breaking & finishing plates, formation, mixing, powder preparation, oven smelting, pasting & drying, oxide fabrication (air levels, 266-1315 ug/m3) d) Worker doing odd jobs, some evenings spent in factory. Battery factory workers mean age 37.8 (range 19-65), mean seniority 7.0 yr (range 1 mo-26 yr). Fatigue, headache, abdominal cramps, loss of appetite, or nausea reported by 13/26 workers with blood Pb levels of 20-59 ug/100 cc and by 23/35 workers with levels of 60+ ug/100 cc. Battery plant METALS; LEAD; BLOOD; BIOACCUMULATION; METAL POISONING; OCCUPATIONAL HAZARDS; INDUSTRIAL ATMOSPHERES; ISRAEL	Lichter, E.D. Yaffe, Y. Gruener, N. 1970
2816 Blood	Dermal	AAS	a) 10 b) 9	a) 10-25 ug/100 ml b) 11-78 ug/100 ml	a) 16.0 ug/100 ml b) 28.22 ug/100 ml	a) Non-exposed b) Exposed Difference between groups was significant. Employees of N.V. SIDMAR steel plant in Ghent, Belgium. Lead naphthenate METALS; LEAD; BLOOD; OCCUPATIONAL HAZARDS; BELGIUM	van Peteghem, T.H. deVos, H. 1974

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TISSUE	EXPOSURE ROUTE	ANALYTICAL METHOD	NUMBER OF CASES	RANGE	MEAN	GENERAL INFORMATION	REFERENCE
2889 Blood		Dithizone	a) 23 b) 42 c) 35 d) 23	a) Not given b) Not given c) Not given d) Not given	a) 78.5 + or - 26 ug/100 ml b) 52.8 + or - 21 ug/100 ml c) 41.0 + or - 12 ug/100 ml d) 23.0 + or - 14 ug/100 ml	a) Pb-poisoned workers b) Workers with moderately increased Pb absorption c) Workers with slightly increased Pb absorption d) Workers with physiologic Pb absorption, polluted environment Groups established on the basis of workers' complaints, clinical examination and toxicological tests. Workers employed 1-23 yr in a Hungarian storage battery plant. None of the cases of chronic Pb poisoning investigated had severe symptoms of colic or encephalopathy. Storage battery plant METALS; LEAD; BLOOD; URINE; OCCUPATIONAL HAZARDS; COMPARATIVE EVALUATIONS; SEX; HUNGARY	Lancranjan, I. Popescu, H.I. Gavanescu, O. Klepsch, I. Serbanescu, M. 1975
2951 Blood						Review REVIEW; LEAD; METAL POISONING; CHILDREN; INDUSTRIAL EMISSIONS; PAINTS; NUTRITIONAL DISORDERS; AGE; METALS; BLOOD	McCabe, L.B. 1979
2963 Blood		AAS	30	29-98 ug/100 ml	50.57 ug/100 ml	Adults (24-62 yr) working in refining, cutting or welding of Pb, New Jersey. METALS; LEAD; BLOOD; URINE; OCCUPATIONAL HAZARDS; NEW JERSEY	Vitale, L.F. Joselow, M.M. Wedeen, R.P. Paglia, M. 1975
2965 Blood			12,000	a) Not given b) Not given c) Not given	a) >60 ug/100 ml b) 135 ug/100 ml c) 86 ug/100 ml	a) Levels in 1 of 4 children tested prior to mass screening and in 3 of 100 during mass screening b) Symptomatic children on admission prior to mass screening c) Symptomatic children on admission during mass screening Children in Newark, NJ. Mean age 3 yr for symptomatic children, 6 yr for asymptomatic during mass screening period. 80% blacks. Absence of mass screening 1967-69, mass screening from 1970. METALS; LEAD; BLOOD; LEAD POISONING; METAL POISONING; CHILDREN; NEW JERSEY	Browder, A. Joselow, M.M. Louria, D.B. Lavenhar, M. Foster, J. 1978
2985 Blood		AAS	a) 84 b) 130	a) Not given b) Not given	a) 0.91 + or - 0.77 ug/g b) 0.58 + or - 0.93 ug/g	a) Maternal b) Fetal Dry wt basis. Maternal levels elevated by factor of 2-3 in late autumn and early winter. Samples from 8 hospitals in Nashville, TN. PLACENTA; METALS; TRACE ELEMENTS; TENNESSEE; BLOOD; HAIR; COMPARATIVE EVALUATIONS; MERCURY; LEAD; CADMIUM; SELENIUM; PORPHYRIN; IRON; ZINC; COBALT	Taglan, P.J. Brul, A.B. Schubert, A. Wilson, D. Larsen, K. Dyer, N. Mansour, M. Schaffner, W. Hoffman, L. Davies, J. 1978

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TISSUE	EXPOSURE ROUTE	ANALYTICAL METHOD	NUMBER OF CASES	RANGE	MEAN	GENERAL INFORMATION	REFERENCE
2994 Blood		AAS	a) 73 b) 36	a) 0-68.5 ug/100 ml b) 0-7.5 ug/100 ml	a) 18.4 + or - 12.9 ug/100 ml b) 4.0 ug/100 ml	a) Occupationally exposed b) Controls Workers exposed to Pb 2-15 yr in a polyvinyl chloride factory. Controls without occupational exposure. Dust from stabilizing agents in polyvinyl chloride factory LEAD; METALS; JAPAN; OCCUPATIONAL HAZARDS; BLOOD; URINE; MEASUREMENT METHODS; COMPARATIVE EVALUATIONS; ENZYMES; ADULTS	Tomokuni, K. 1974
3154 Blood			a) 39 b) 20 c) 100 d) 22	a) 36-89 ug/100 ml b) Not given c) Not given d) 24-82 ug/100 ml	a) 62.1 + or - 13.8 ug/100 ml b) 70 + or - 10.6 ug/100 ml c) 16 + or - 5.5 ug/100 ml d) 46.0 + or - 14.9 ug/100 ml	a) Storage battery workers before treatment with zinc and vitamin C b) Occupationally exposed battery workers, before treatment with zinc and vitamin C c) Controls d) Storage battery workers after 24 wk treatment with zinc and vitamin C Workers, aged 28 - 60 yr, employed at a battery plant from 4 - 34 yr. 100 controls with no known Pb exposure. LEAD; ZINC; COPPER; METALS; TRACE ELEMENTS; BLOOD; BLOOD SERUM; IRON; HEMOGLOBINS; URINE; DIETS; VITAMIN C	Papaioannou, P. Sohler, A. Pfeiffer, C.J. 1978
3160 Blood		AAS	a) 84 b) 69 c) 162	a) less than 30 - greater than 40 ug/100 ml b) less than 30 - greater than 40 ug/100 ml c) less than 30 - greater than 40 ug/100 ml	a) 33 ug/100 ml b) 26 ug/100 ml c) 24 ug/100 ml	a) Migrant farmworker children b) Non-farmworker children, Medicaid enrolled c) Non-farmworker children, not Medicaid enrolled Levels in farmworker boys have higher farmworker girls (35 and 28 ug/100 ml, respectively) BLOOD; CHILDREN; FARMS; LEAD; NEW YORK	Perrin, J. M. Merkens, M.J. 1979
3161 Blood	Ingestion		a) 56 b) 60 c) 50 d) 50	a) 0.9-3.3 umol/l b) 1.0-3.2 umol/l c) 0.3-2.0 umol/l d) 0.4-2.2 umol/l	1.9 umol/l 1.9 umol/l 0.7 umol/l 0.8 umol/l Medians	a) Adult females in houses with lead water pipes b) Children in houses with lead water pipes c) Adult females in houses with copper water pipes d) Children in houses with copper water pipes Levels fell to normal within 6 months of removal of lead pipes. Lead pipes BLOOD; CHILDREN; DRINKING WATER; ADULTS; COPPER; LEAD; UNITED KINGDOM	Thomas, H.F. Elwood, P.C. Welsby, E. St. Leger, A.S. 1979

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TISSUE	EXPOSURE ROUTE	ANALYTICAL METHOD	NUMBER OF CASES	RANGE	MEAN	GENERAL INFORMATION	REFERENCE
3162 Blood		AAS	1559	17.5-33.6 ug/100 ml	Not given	Range of means after factorial grouping by age, sex, and blood glucose-6-PO4 dehydrogenase status. Peaks at 1-3 yr of age (29.1 ug/100 ml) and 6 yr (28.1 ug/100 ml). Effects of other variables assessed. Black children of South Philadelphia examined from July 1972 to March 1973 at the Children's Hospital. Significant depression of hematocrit and hemoglobin with increasing blood lead in the 1-3 yr olds only. LEAD; PENNSYLVANIA; CHILDREN; BLOOD; METALS; HEMOGLOBINS; RACIAL STUDIES; SEX; AGE; ENZYMES; URBAN AREAS	Adebonojo, F.O. 1974
3163 Blood	Inhalation	AAS	1	a) Not applicable b) Not applicable	a) 67 ug/100 ml b) 40 ug/100 ml	a) While lead-base-painted wood was burned for heat b) After chelation therapy, and cessation of burning of painted wood 5 yr old white male No symptoms of lead poisoning Burning of lead-base-painted wood for heat LEAD; BLOOD; CHILDREN; METALS; PAINTS	De Castro, F.J. Lazzara, J. Bolfe, U.T. Engeler, E. 1975
3164 Blood			8	29-98 ug/100 ml	52.6 ug/100 ml	Initial Pb screening Pb workers chosen for study after screening tests suggested excessive body burdens. Two hospitalized with lead colic. Exposure: 3-6 yr. Ages 28-50 yr. Two subjects: lead colic 3 subjects: preclinical Pb nephropathy. Occupational Pb exposure LEAD; METALS; METAL POISONING; LEAD POISONING; BLOOD; URINE; OCCUPATIONAL HAZARDS; MINERAL METABOLISM	Wedeen, R.P. Maesaka, J.K. Weiner, S. Lipat, G.A. Lyons, M.M. Vitale, L.F. Joselow, M.M. 1975
1835 Blood, cells		AAS	a) 23 b) 52 c) 23 d) 52	a) Not given b) Not given c) Not given d) Not given	a) 26.0 ug/100 ml b) 26.7 ug/100 ml c) 25.0 ug/100 ml d) 25.7 ug/100 ml	a) Mothers, urban b) Mothers, rural c) Newborn, urban d) Newborn, rural Mothers and newborn in Italy, 23 pairs in Pavia, and 52 pairs in rural areas. LEAD; METALS; NEWBORN; BLOOD; ITALY; UMBILICAL CORD; COMPARATIVE EVALUATIONS	Cavalleri, A. Minoia, C. Pozzoli, L. Polatti, F. Bolis, P.F. 1978
2955 Blood, cells						Review REVIEW; METALS; LEAD; HEALTH HAZARDS; CHILDREN; ADULTS; METAL TOXICITY; METABOLITES; BLOOD PLASMA; BLOOD SERUM; BONES; URINE; AUTOMOTIVE; ERYTHROCYTES; BLOOD; HAIR; NAILS; SALIVA	Posner, H.S. 1977

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TISSUE	EXPOSURE ROUTE	ANALYTICAL METHOD	NUMBER OF CASES	RANGE	MEAN	GENERAL INFORMATION	REFERENCE
2993 Blood, cells		AAS	a) 40 b) 25 c) 23	a) 14.5-41.8 ug/100 ml b) Not given c) Not given	a) 23.61 ug/100 ml b) 41.6 + or - 2.5 ug/100 ml c) 29.5 + or - 2.8 ug/100 ml	a) High school students ages 14-19 yr b) Black males and females ages 10-14 yr in school adjacent to a battery plant c) Black males ages 12-16 yr in schools not near battery plant. LEAD; METALS; BLOOD; BLOOD PLASMA; ERYTHROCYTES; COMPARATIVE EVALUATIONS; ADOLESCENTS	Angle, C.R. McIntire, M.S. 1974
762 Blood, fetal		AAS	253	a) Not given b) Not given c) Not given	a) 4.6 ug/100 g b) 14.2 ug/100 g c) 17.5 ug/100 g	a) Term pregnancies b) Term pregnancies with premature membrane rupture c) Preterm delivery All subjects lived in lead-belt area. More data available. Incidence of premature delivery 13.04% in lead belt region as compared to 3% in control region. Air pollution from lead smelters LEAD; METALS; BLOOD SERUM; PREGNANCY; FETUS; ABORTION; MINING; MISSOURI; POPULATION EXPOSURE; UMBILICAL CORD; PLACENTA	Fabia, M.S. Fabia, Z. Hall, D.G. 1976
763 Blood, plasma		AAS	165	a) Not given b) Not given c) Not given	a) 3.10 ug/100 ml b) 3.0 ug/100 ml c) 3.10 ug/100 ml	a) Undue exposure b) Newborn c) Controls Values did not differ significantly from those of controls. Some patients with encephalopathy were included in groups of children with lead intoxication and sickle cell disease. CHILDREN; NEWBORN; LEAD; METALS; BLOOD; ERYTHROCYTES; BLOOD PLASMA; CALCIUM	Rosen, J.F. Trinidad, E.E. 1974
764 Blood, plasma		AAS	a) 30 b) 34 c) 17 d) 12	a) 0.3-0.9 ug/100 ml b) 0.2-1.3 ug/100 ml c) 0.7-4 ug/100 ml d) 0.2-12.0 ug/100 ml	a) 0.58 ug/100 ml b) 0.61 ug/100 ml c) 1.69 ug/100 ml d) 4.42 ug/100 ml	a) 10-20 ug/100 ml b) 21-40 ug/100 ml c) 41-80 ug/100 ml d) >80 ug/100 ml Method sensitivity-0.2 ug/100 ml plasma 64 hospitalized subjects--no previous exposure 29 subjects with history of occupational exposure, some of which showed severe symptoms of intoxication LEAD; BLOOD; BLOOD PLASMA; OCCUPATIONAL HAZARDS; URINE; METALS; CALIFORNIA	Cavalleri, A. Minoia, C. Pozzoli, L. Baruffini, A. 1978

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Lead
7439-92-1
Pb
AtW 207.2, MP 327.4 C, BP 1740 C, VP 1.77 mm Hg at 1000 C, 1 mm Hg at 970 C, 10 mm Hg at 1160 C
(CONTINUED)

TISSUE	EXPOSURE ROUTE	ANALYTICAL METHOD	NUMBER OF CASES	RANGE	MEAN	GENERAL INFORMATION	REFERENCE
1834 Blood, plasma		AAS	a) 23 b) 52 c) 23 d) 52	a) Not given b) Not given c) Not given d) Not given	a) 0.75 ug/100 ml b) 0.63 ug/100 ml c) 0.62 ug/100 ml d) 0.62 ug/100 ml	a) Mothers, urban b) Mothers, rural c) Newborn, urban d) Newborn, rural Mothers and newborn in Italy, 23 pairs in Pavia, and 52 pairs in rural areas. LEAD; METALS; NEWBORN; BLOOD; ITALY; UMBILICAL CORD; COMPARATIVE EVALUATIONS	Cavalleri, A. Minoia, C. Pozzoli, L. Polatti, F. Bolis, P.F. 1978
1957 Blood, plasma	Dermal	AAS	a) 69 b) 35	a) Not given b) Not given	a) 3.4 ug/100 ml b) 3.6 ug/100 ml	a) Workers at Pb smelter, employed at least 1 yr b) Controls Cd levels within normal limits. Employees from secondary Pb smelter and controls from nearby Al processing plant in Southern California. Industrial METALS; ARSENIC; LEAD; BLOOD; BLOOD PLASMA; HAIR; COMPARATIVE EVALUATIONS; HEARING; NEUROLOGIC MANIFESTATIONS; OCCUPATIONAL HAZARDS; INDUSTRIES; SMELTERS; CALIFORNIA	Baloh, R.W. Spivey, G.H. Brown, C.P. Morgan, D. Campion, D.S. Browdy, B.L. Valentine, J.L. Gonick, H.C. Massey, F.J. Culver, B.D. 1979
2954 Blood, plasma						Review REVIEW; METALS; LEAD; HEALTH HAZARDS; CHILDREN; ADULTS; METAL TOXICITY; METABOLITES; BLOOD PLASMA; BLOOD SERUM; BONES; URINE; AUTOMOTIVE; ERYTHROCYTES; BLOOD; HAIR; NAILS; SALIVA	Posner, H.S. 1977
2992 Blood, plasma		AAS	40	4.5-7.2 ug/100 ml	Not given	High school students ages 14-18 yr LEAD; METALS; BLOOD; BLOOD PLASMA; ERYTHROCYTES; COMPARATIVE EVALUATIONS; ADOLESCENTS	Angle, C.R. McIntire, M.S. 1978
2953 Blood, serum						Review REVIEW; METALS; LEAD; HEALTH HAZARDS; CHILDREN; ADULTS; METAL TOXICITY; METABOLITES; BLOOD PLASMA; BLOOD SERUM; BONES; URINE; AUTOMOTIVE; ERYTHROCYTES; BLOOD; HAIR; NAILS; SALIVA	Posner, H.S. 1977

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TISSUE	EXPOSURE ROUTE	ANALYTICAL METHOD	NUMBER OF CASES	RANGE	MEAN	GENERAL INFORMATION	REFERENCE
765 Blood, whole		AAS	1690	2-225 ug/dl	35.2 ug/dl	Blacks had higher blood Pb than whites People from outstate areas showed higher mean Pb than those in urban or suburban areas. Contamination of samples during storage may explain elevated levels. No complete trace metal exposure data for stated areas of residence. Military recruits from Chicago, Illinois and adjacent areas in Illinois and Indiana inducted between June 2nd and July 10, 1969 BLOOD; CADMIUM; COPPER; LEAD; ZINC; METALS; AGE; SMOKING; TOBACCOS; DIETS; ILLINOIS; INDIANA; RACIAL STUDIES	Creason, J.P. Hamner, D.I. Colucci, A.V. Priester, L. Davis, J. 1976
766 Blood, whole		APDC-MIBK AAS	320	8-86 ug/100 ml	36 ug/100 ml	No correlation between the Pb and Tl. Children between the ages of 1 and 5 years, predominantly black and Spanish-speaking residents of Newark, NJ. 320 blood samples collected over a 4-year period, (1971-1974). BLOOD; THALLIUM; LEAD; CHILDREN; BIOACCUMULATION; METALS; NEW JERSEY	Singh, M.P. Bogden, J.D. Joselow, M.M. 1975
767 Blood, whole	Ingestion Inhalation	AAS	1414, 258 controls	a) Not given b) Not given c) Not given d) Not given	a) 16.34 ug/100 ml b) 16.36 ug/100 ml c) 21.04 ug/100 ml d) 16.56 ug/100 ml	a) Lead smelter towns b) Copper smelter towns c) Zinc smelter towns d) Controls Samples from children living in 19 towns with primary non-ferrous smelters. Control group of same ages in three communities without smelters. Few children had blood levels high enough to be associated with hematologic or neurologic toxicity. Stack emissions ARSENIC; LEAD; CADMIUM; HAIR; URINE; BLOOD; ERYTHROCYTES; SMELTERS; COPPER; ZINC; CHILDREN; POPULATION EXPOSURE; METALS; AIR POLLUTION; WATER POLLUTION; NEW MEXICO; MISSOURI; ARIZONA; MONTANA; TENNESSEE; NEVADA; MICHIGAN; OKLAHOMA; TEXAS; PENNSYLVANIA	Baker, E.L., Jr. Hayes, C.G. Landrigan, P.J. Handke, J.L. Leger, R.T. Housworth, W.J. Harrington, J.M. 1977
768 Blood, whole	Inhalation	AAS	a) 15 b) 12 c) 7	a) Not given b) Not given c) Not given	a) 70 ug/100 ml b) 68 ug/100 ml c) 76 ug/100 ml	a) Pain for >3 mo b) Pain subsided in 3 mo c) No pain Duration of abdominal pain (lead colic) Workers in a secondary smelter who were treated for lead poisoning between June 1973 & December 1975. Mean employment time 4.7 yrs. (0.5-23 yrs). Blood Pb in workers should not exceed 50 ug/100 ml to minimize illness. LEAD; BLOOD; URINE; OCCUPATIONAL HAZARDS; METALS; CALIFORNIA	Dahlgren, J. 1978

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Lead
7439-92-1
Pb
AtW 207.2, MP 327.4 C, BP 1740 C, VP 1.77 mm Hg at 1000 C, 1 mm Hg at 970 C, 10 mm Hg at 1160 C
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TISSUE	EXPOSURE ROUTE	ANALYTICAL METHOD	NUMBER OF CASES	RANGE	MEAN	GENERAL INFORMATION	REFERENCE
769 Blood, whole	Ingestion	AAS	a) 211 b) 228 c) 124 d) 89	a) 14.6-19.0 ug/100 ml b) 11.5-14.8 ug/100 ml c) 14.2-19.0 ug/100 ml d) 14.1-16.9 ug/100 ml	a) 15.3 ug/100 ml b) 12.5 ug/100 ml c) 17.7 ug/100 ml d) 16.2 ug/100 ml	a) Adults-males b) Adults-females c) Children-males d) Children-females Lead solder in electric kettles LEAD; CANADA; CHILDREN; ADULTS; BLOOD; METALS	Wigle, D.T. Charlebois, E.J. 1978
770 Blood, whole		AAS	502	a) Not given b) Not given c) Not given	a) 14.3 ug/100 g b) 25.6 ug/100 g c) 29.1 ug/100 g	a) Maternal, term pregnancy b) Maternal term with premature membrane rupture c) Maternal, preterm All subjects live in lead belt area. Samples from 249 pregnant women in Region I with no lead mining activity and 253 in Region II 30-50 miles west of the new lead belt area. Patients were 20-25 years of age, had resided in their respective regions for atleast 10 years and had incomes of $7000-10,000 a year. Increased incidence of early membrane rupture during pregnancy LEAD; METALS; BLOOD; FETUS; PREGNANCY; ABORTION; MINING; POPULATION EXPOSURE; MISSOURI; BLOOD SERUM; UMBILICAL CORD; PLACENTA	Fahim, M.S. Fahim, Z. Hall, D.G. 1976
771 Blood, whole		AAS	a) 80 b) 35 c) 49	a) 17-29 ug/dl b) 30-59 ug/dl c) 60-160 ug/dl	a) 23 ug/dl b) 48 ug/dl c) 84 ug/dl	a) Controls, blood Pb 29 ug/dl or less b) Blood Pb 30-59 ug/dl c) Blood Pb 60 ug/dl or higher Samples from Black or Puerto Rican children in the Bronx. Ages ranged from 1 to 6 years. All were seen at Montefiore Hospital and Medical Center between 1971 and 1975. No metabolic bone disease observed. LEAD; METALS; CALCIUM; MINERAL METABOLISM; HYDROXYCHOLECALCIFEROLS; VITAMIN D; NUTRITIONAL DEFICIENCIES; CHILDREN; BLOOD; NEW YORK; BLOOD SERUM	Sorrell, M. Rosen, J.F. Kojirsky, M. 1977

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Lead
7439-92-1
Pb
At# 207.2, BP 327.4 C, BP 1740 C, VP 1.77 mm Hg at 1000 C, 1 mm Hg at 970 C, 10 mm Hg at 1160 C
(CONTINUED)

TISSUE	EXPOSURE ROUTE	ANALYTICAL METHOD	NUMBER OF CASES	RANGE	MEAN	GENERAL INFORMATION	REFERENCE
772 Blood, whole	Inhalation		a) 216 b) 106 c) 32 d) 13 e) 16 f) 40 g) 31 Controls h) 23 Controls	a) 2.8-125 ug/100 ml b) 11.0-125 ug/100 ml c) 5.0-78 ug/100 ml d) 2.8-89.0 ug/100 ml e) 8.1-97.5 ug/100 ml f) 13.0-92.5 ug/100 ml g) 11.5-86.0 ug/100 ml h) 2.5-32.0 ug/100 ml	a) 44.8 ug/100 ml b) 44.6 ug/100 ml c) 40.0 ug/100 ml d) 38.2 ug/100 ml e) 42.8 ug/100 ml f) 42.0 ug/100 ml g) 23.4 ug/100 ml h) 12.1 ug/100 ml	a) All autoworkers, 16-68 yr b) Mechanics, 17-68 yr c) Apprentice mechanics, 16-25 yr d) Smiths and welders, 22-63 yr e) Painters, 16-65 yr f) Miscellaneous workers, 16-68 yr g) Controls, male, 21-71 yr h) Controls, female, 21-73 yr Control data from previous study. Blood biochemical, and medical data compared. Samples from 216 individuals working in 10 garages (autoworkshops) on the island of Funen, Denmark. Abnormal hematological findings, high blood pressure in mechanics. Painters' symptoms related to the nervous system. Various other health findingswere giddiness, headaches, tremor in hands, daily stomach pain, rash on hands and arms, rash on face, and rheumatic pain. Hypertension Automobile exhaust gas, paints, lead given off in process of welding, and lead-containing grease and gasoline. Lead in: triethyl lead, tetraethyl lead, lead naphthenate. LEAD; LEAD POISONING; OCCUPATIONAL DISEASES; INDUSTRIAL POLLUTION; DENMARK; LUBRICANTS; LEAD COMPOUNDS; COMPARATIVE EVALUATIONS; METALS; AUTOMOTIVE; BLOOD	Clausen, J. Pastogi, S.C. 1977a
773 Blood, whole		AAS	a) 37 b) 48	a) Not given b) Not given	a) 1.3 umole/l b) 4.2 umole/l	a) Controls b) Exposed subjects At Pb concentrations of 2 or more umole/l and erythrocyte ALA.D activity of less than 18 nmole ALA utilised/min/mlRBC, heme synthesis is depressed, thus inducing ALA.S activity. 48 male lead poisoned subjects, 22-56 yr. 37 controls (28 male, 9 female), 18-52 yr. LEAD; METALS; METABOLISM; OCCUPATIONAL HAZARDS; ENZYMES; BLOOD; URINE; ERYTHROCYTES; LEUKOCYTES; HEMES	Meredith, P.A. Moore, M.R. Campbell, B.C. Thompson, G.E. Goldberg, A. 1978

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TISSUE	EXPOSURE ROUTE	ANALYTICAL METHOD	NUMBER OF CASES	RANGE	MEAN	GENERAL INFORMATION	REFERENCE
774 Blood, whole		AAS	a) 1 b) 1 c) 1 d) 1	a) 43-57 ug/dl b) 47-50 ug/dl c) 47-60 ug/dl d) 19-70 ug/dl	a) Not given b) Not given c) Not given d) Not given	a) Mother, pre-natal exposure (5 months) b) Mother, after exposure (2 months), before birth of child c) Mother, during lactation (8 months) d) Child, values decreased rapidly to 28 ug/dl during first 2 months from initial high value, then decreased slowly during next 6 months to 19 ug/dl Values estimated from graph. Time given in months from birth. Samples from mother who had been employed by a manufacturer of electrical storage batteries until seven weeks before delivery. Healthy baby was breast-fed 8 1/2 mo LEAD; METALS; OCCUPATIONAL HAZARDS; BLOOD; INFANTS; ADULTS; CASE HISTORIES	Kyu, J.E. Ziegler, E.E. Fomon, S.J. 1978
775 Blood, whole		MS	a) 5 b) 5 c) 1	a) 7.2-11.8 ug/100 g b) 10.4-21.7 ug/100 g c) Not applicable	a) Not given b) Not given c) 7.6 ug/100 g	a) Females b) Males c) Umbilical cord Subjects reside in Dallas, Texas. Two South African subjects had blood lead isotopically distinct from native-born subjects. Some had high to moderate exposures to airborne lead. BLOOD; LEAD; OCCUPATIONAL HAZARDS; TEETH; AIR POLLUTION; METALS; BIOACCUMULATION; DIETS; UMBILICAL CORD	Manton, W.I. 1977
776 Blood, whole	Ingestion		1	Not applicable	90 ug/dl	Lead level after taking pills containing 0.5 mg lead per pill (30 pills per day). Samples from 59 yr old woman admitted to Stanford University Hospital. Anemia, diffuse pain, abdominal pain, depression, irritability LEAD; METAL POISONING; METALS; CASE HISTORIES; LEAD POISONING; BLOOD; URINE; CALIFORNIA	Lightfoote, J. Blair, J. Cohen, J.P. 1977
777 Blood, whole		AAS	a) 2401 b) 1562 c) 263	a) <40 ug/100 ml b) 40-55 ug/100 ml c) > or,= 60 ug/100 ml	a) Not given b) Not given c) Not given	a) 58.4%, 72.4%, 82.6% of children living >200 ft, 100-200 ft, <100 ft, respectively, from major roadway b) 26.9%, 20.2%, 14.3% of children living >200 ft, 100-200 ft, <100 ft, respectively, from major roadway c) 8.7%, 7.4%, 3% of children living >200 ft, 100-200 ft, <100 ft, respectively, from major roadway. Children, residents of Newark. Measurements made at the College of Medicine and Dentistry of New Jersey during 1971. LEAD; METALS; BLOOD; LEAD POISONING; URBAN AREAS; NEW JERSEY; CHILDREN; AUTOMOTIVE; AIR POLLUTION	Caprio, R.J. Margulis, H.L. Joselow, M.M. 1972a

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TISSUE	EXPOSURE ROUTE	ANALYTICAL METHOD	NUMBER OF CASES	RANGE	MEAN	GENERAL INFORMATION	REFERENCE
778 Blood, whole			31	0.45-1.65 umol/l	1.05 umol/l	Residents near a zinc mine. Residents of Shipham, Somerset, where Cd was high.. 14 females, aged 28 to 83 yr, 17 males, aged 15 to 72 yr. CADMIUM; ZINC; LEAD; METALS; MINING; BLOOD; UNITED KINGDOM; METAL POISONING; FOOD CONTAMINATION	Carruthers, M. Smith, P. 1979
779 Blood, whole			a) 10 b) 20 c) 15 d) 45	a) Not given b) Not given c) Not given d) Not given	a) 58.8 ug/dl b) 51.2 ug/dl c) 45.9 ug/dl d) 21.4 ug/dl	a) Pb encephalopathy b) Long-term Pb exposure c) Short-term Pb exposure d) No Pb exposure Data from psychologic and neurologic examinations also available. Children with lead encephalopathy had worse scores in all categories. Children, 6 to 8 yr, 45 with high lead levels and 45 controls that were matched for sex, race, and age. Controls attended neighborhood health clinics in Providence, Rhode Island Symptoms of lead encephalopathy include irritability, drowsiness, convulsions. LEAD; LEAD POISONING; METALS; CHILDREN; BLOOD; BIOACCUMULATION; RHODE ISLAND	Russo, J.M. Smith, D.K. Russo, N.J. Brown, J.F. 1979
780 Blood, whole		AAS	a) 22 b) 48 c) 72 d) 32 e) 70 f) 240 g) 260 h) 140	a) Not given b) Not given c) Not given d) Not given e) Not given f) Not given g) Not given h) Not given	a) 28.0 ug/100 ml b) 33.8 ug/100 ml c) 45.8 ug/100 ml d) 49.9 ug/100 ml e) 52.7 ug/100 ml f) 64.0 ug/100 ml g) 77.7 ug/100 ml h) 55.6 ug/100 ml	a) Female clerical workers, red blood cell (RBC) delta-aminoilevulinic acid dehydrase (ALAD) activity = 22.3 milliunits/ml RBC b) Male clerical workers and traffic policemen, ALAD activity = 17.3 milliunits/ml RBC c) Motorway tollgate attendants, ALAD activity = 11.5 milliunits/ml RBC d) Chronicalcoholics, ALAD activity = 8.58 milliunits/ml RBC e) Recent occupational exposure, ALAD activity = 8.7 milliunits/ml RBC f) Subclinical intoxication cases, ALAD activity = 1.6 milliunits/ml RBC h) Previous intoxication, ALAD activity = 3.3 milliunits/ml RBC. Other data available. 174 subjects in Milan, aged 25-45 yr, and 710 occupationally exposed workers. LEAD; METALS; BLOOD; LEAD POISONING; OCCUPATIONAL HAZARDS; ITALY; ENZYMES	Secchi, G.C. Alessio, L. 1974

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TISSUE	EXPOSURE ROUTE	ANALYTICAL METHOD	NUMBER OF CASES	RANGE	MEAN	GENERAL INFORMATION	REFERENCE
781 Blood, whole		AAS	a) 125 b) 85	a) 16.6-51.8 ug/100 g b) 13.2-16.7 ug/100 g	a) 32.1 ug/100 g b) 13.9 ug/100 g	a) Exposed to low Pb. Range is of means for various departments. delta-Aminolevulinic acid dehydrase range: 37.3-95.1 units/ml red blood cells, mean, 64.8 units/ml RBC b) Controls in same plant, range of means for 3 departments. ALAD range: 101.8-111.0 units/RBC, mean, 108.2 units/RBC ALA, hemoglobin, hematocrit, RBC, and subjective symptoms also available. No statistical variation. Workers in a rubber hose and automobile tire factory. Mean age 30.5 yr, controls, 27.4 yr. Mean exposure for 5.0 yr. LEAD; METALS; LEAD POISONING; BLOOD; OCCUPATIONAL HAZARDS; ENZYMES; JAPAN	Sakurai, H. Sagita, H. Tsuchiya, K. 1974
782 Blood, whole			a) 16 b) 8 c) 6 d) 3 e) 5 f) 81	a) Not given b) Not given c) Not given d) Not given e) Not given f) 8-48 ug/100 ml	a) 91 ug/100 ml b) 63 ug/100 ml c) 72 ug/100 ml d) 96 ug/100 ml e) 36 ug/100 ml	a) Foremen, furnace workers, truck unloaders at a Pb smelter, mean free erythrocyte protoporphyrin concentration (FEP)=423 ug/100 ml b) Maintenance workers and those with several jobs, mean FEP=262 ug/100 ml c) Workers involved with forklift operation and battery wrecking, mean FEP=346 ug/100 ml d) Casters, mean FEP=468 ug/100 ml e) Office or lab workers, mean FEP=96 ug/100 ml f) Household contacts of the employees, FEP range=10-[illegible] ug/100ml. Pb smelter near St. Paul, Minnesota. Median ages: plant workers, 32 yr, lab workers, 56 yr. Fatigue, cough, diarrhea, irritability, anorexia, hand tremors - symptoms of Pb poisoning. LEAD; METALS; LEAD POISONING; BLOOD; PROTOPORPHYRINS; OCCUPATIONAL HAZARDS; MINNESOTA	Winegar, D.A. Levy, B.S. Andrews, J.S. Landrigan, P.J. Scruton, W.H. Krause, R.J. 1977
783 Blood, whole			5	0.012-0.015 mg/100 g	0.014 mg/100 g	Multiple sclerosis patients 5 patients, aged 25-56 yr, 1 black, 4 whites, Duration of disease: 2 mo to 10 yr. LEAD; URINE; BLOOD; BONES; CENTRAL NERVOUS SYSTEM DISEASES	Westerman, M.P. Bruetman, M. Pfitzer, E. 1974
784 Blood, whole		AAS	a) 58 b) 8 c) 9 d) 8 e) 27	a) Not given b) Not given c) Not given d) Not given e) Not given	a) 26.33 ug/100 ml b) 41.06 ug/100 ml c) 23.89 ug/100 ml d) 29.88 ug/100 ml e) 22.15 ug/100 ml	a) Hyperactive children with no known cause for condition b) Hyperactive children with history of lead poisoning c) Hyperactive children with highly probable cause for condition d) Hyperactive children with possible cause for condition e) Controls Outpatients in 1 of 3 clinics in Kings County Hospital - Downstate Medical Center Complex in Brooklyn, NY, aged 3.5-12 yr. LEAD; METALS; BLOOD; URINE; CHILDREN; LEAD POISONING; BEHAVIOR DISORDERS	David, O.J. 1974

TISSUE	EXPOSURE ROUTE	ANALYTICAL METHOD	NUMBER OF CASES	RANGE	MEAN	GENERAL INFORMATION	REFERENCE
785 Blood, whole			30	31-75 ug/100 ml	47.5 ug/100 ml	Children evaluated for Pb absorption Samples from 30 children, aged 1-5 yr, at Children's Hospital of Philadelphia. Correlation between free erythroporphyrin levels and age corrected tooth Pb. LEAD; BLOOD; TEETH; PENNSYLVANIA; METALS; MEASUREMENT METHODS; CHILDREN; POPULATION EXPOSURE	Shapiro, I.M. Burke, A. Mitchell, G. Bloch, P. 1978
1685 Blood, whole		AAS	a) 10 b) 6	a) Not given b) Not given	a) 0.12 mg/l b) 0.11 mg/l	a) Ate food contaminated with methylmercury b) Controls Residents of Sweden. METALS; MERCURY; LEAD; SWEDEN; BLOOD; FOOD CONTAMINATION	Skerfving, S. Hansson, K. Mangs, C. Lindsten, J. Ryman, N. 1974
1833 Blood, whole		AAS	a) 60 b) 30 c) 30	a) 10-60 ug/dl b) 12-38 ug/dl c) 12-40 ug/dl	a) 30 ug/dl b) 20.8 ug/dl c) 20.9 ug/dl	a) Mentally retarded children-etiology unknown b) Controls, normal children c) Controls, mentally retarded children - etiology known Children from Athens, Greece area. LEAD; METALS; MENTAL RETARDATION; LEAD POISONING; BLOOD; ERYTHROCYTES; CHILDREN; GREECE; COMPARATIVE EVALUATIONS	Youroukos, S. Lyberatos, C. Philippidou, A. Gardikas, C. Tsoni, A. 1978
1981 Blood, whole	Ingestion	AAS	1309	a) Not given b) Not given c) Not given d) Not given e) Not given f) Not given	a) 31.7 ug/100 ml b) 31.1 ug/100 ml c) 30.7 ug/100 ml d) 34.0 ug/100 ml e) 31.5 ug/100 ml f) 31.3 ug/100 ml	a) Lodge Expressway area, males b) Gratiot Avenue area, males c) Grand River Avenue area, males d) Lodge Expressway area, females e) Gratiot Avenue area, females f) Grand River Avenue area, females Areas are at increasing distances from 3 major roadways in Detroit. Higher levels correlated with poor housing and younger age. No correlation between lead levels and distance from highway. Mostly 2-5 yr olds Paint, plaster METALS; LEAD; AGE; CHILDREN; SEX; BLOOD; MICHIGAN	Ter Haar, G. Chadzinski, L. 1979
1955 Blood, whole	Dermal	AAS	a) 69 b) 35	a) Not given b) Not given	a) 61.3 ug/100 ml b) 22.0 ug/100 ml	a) Workers at Pb smelter, employed at least 1 yr b) Controls Cd levels within normal limits. Employees from secondary Pb smelter and controls from nearby Al processing plant in Southern California. METALS; ARSENIC; LEAD; BLOOD; BLOOD PLASMA; HAIR; COMPARATIVE EVALUATIONS; HEARING; NEUROLOGIC MANIFESTATIONS; OCCUPATIONAL HAZARDS; INDUSTRIES; SMELTERS; CALIFORNIA	Baloh, R.W. Spivey, G.H. Brown, C.P. Morgan, D. Campion, D.S. Browdy, B.L. Valentine, J.L. Gonick, H.C. Massey, F.J. Culver, B.D. 1979

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TISSUE	EXPOSURE ROUTE	ANALYTICAL METHOD	NUMBER OF CASES	RANGE	MEAN	GENERAL INFORMATION	REFERENCE
2286 Blood, whole		AAS	a) 40 b) 75	a) 19.5-81 ug/100 ml b) 19.5-71 ug/100 ml	a) Not given b) Not given	a) 30-35% hematocrit b) 36-42% hematocrit Preschool children from old housing areas in Charleston, SC. METALS; LEAD; BLOOD; CHILDREN; SOUTH CAROLINA	Chisolm, J.J., Jr. Mellits, E.D. Keil, J.E. Barrett, B.B. 1978
2471 Blood, whole		AAS	2	a) 39-61 ug/dl b) 27-50 ug/dl	a) 50 ug/dl b) 40.6 ug/dl	a) Mother, 6/6/75 to 9/23/75, peak on 8/13/75 and low on 9/23/75 b) Infant, 9/22/75 to 6/17/76, peak at birth (9/22/75) and 10/16/75, and low on 12/9/75. Pregnant 20 yr old, in 3rd trimester, with sandpaper and torch removed paint from house. 3200 gm female born after 40 wk gestation. Mother had Pb poisoning 20 days before delivery. Development of infant normal at 10 mo, but at 12 mo child was at 9-12 mo in cognitive skills. Paint METALS; LEAD; BLOOD; AMNIOTIC FLUID; LEAD POISONING; INFANTS; ADULTS; FETUS; PAINTS	Singh, N. Donovan, C.M. Hanshaw, J.B. 1978
2520 Blood, whole		AAS	a) 11 b) 19 c) 16 d) 13	a) Not given b) Not given c) Not given d) Not given	a) 49.6 ug/dl b) 33.2 ug/dl c) 31.2 ug/dl d) 26.7 ug/dl	a) 0-3 yr old b) 3-6 yr old c) 6-10 yr old d) 10 yr and older Dust samples from homes indicated excessive Pb. Boys and girls (from 10 mo to 15 yr) with at least 1 parent working at battery factory in Raleigh, NC. No symptoms of lead poisoning Clothes of lead-acid storage battery plant workers METALS; LEAD; BLOOD; LEAD POISONING; OCCUPATIONAL HAZARDS; INDUSTRIES; DUST; CHILDREN; NORTH CAROLINA	Holcourt, J.L. Haarick, R.J. O'Tuama, L.A. Wooten, J. Baker, R.L. 1979
2530 Blood, whole	Dermal Inhalation	AAS	a) 69 b) 25	a) Slightly <60-slightly >90 ug/dl b) Not given	a) 61.3 ug/dl b) 22.0 ug/dl	a) Smelter workers employed at least 1 yr b) Aluminum workers (controls) employed at least 1 yr Air levels for Pb, Cd, and As also given. Lead smelter workers, mean age 42.5 yr, mean employment 11.3 yr. Controls, mean age 40.7 yr, mean employment 8.8 yr. All from southern CA. METALS; LEAD; ARSENIC; CADMIUM; BLOOD; ADULTS; OCCUPATIONAL HAZARDS; COMPARATIVE EVALUATIONS; CALIFORNIA	Spivey, G.H. Brown, C.P. Baloh, R.W. Campion, D.S. Valentine, J.L. Massey, F.J. Prowdy, B.L. Culver, B.D. 1979

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Lead
7439-92-1
Pb
AtW 207.2, MP 327.4 C, BP 1740 C, VP 1.77 mm Hg at 1000 C, 1 mm Hg at 970 C, 10 mm Hg at 1163 C
(CONTINUED)

TISSUE	EXPOSURE ROUTE	ANALYTICAL METHOD	NUMBER OF CASES	RANGE	MEAN	GENERAL INFORMATION	REFERENCE
2900 Blood, whole	Ingestion	AAS	931	a) Not given b) Not given c) Not given d) Not given	a) 24.8 + or - 1.4 ug/dl b) 22.0 + or - 1.4 ug/dl c) 19.3 + or - 1.2 ug/dl d) 21.5 + or - 1.4 ug/dl Geometric means + or - SGD	a) 132 subjects from urban commercial area (near battery plant) b) 599 subjects from urban residential area c) 110 subjects from suburban area d) All subjects Blood levels correlated with air, soil and housedust concentrations Statistical analysis done. Children, 1-9 yr old, from three general areas in Omaha, 1971-1977. Urban subjects mostly black, suburban subjects white. Environment METALS; LEAD; BIOACCUMULATION; ADOLESCENTS; CHILDREN; BLOOD; COMPARATIVE EVALUATIONS; ATMOSPHERE; URBAN AREAS; NEBRASKA	Angle, C.R. McIntire, M.S. 1979
2898 Blood, whole	Ingestion		1	85-136 ug/dl (8.6-6.6 umol/l)	115.5 ug/dl (5.6 umol/nl)	Source of Pb Morgan's perfumed pomade containing "Plumb. acet. 3%" 4-yr-old, with West Indian parents, in habit of putting her fingers into cosmetics and licking them. Erythrocyte protoporphyrin levels averaged 510 ug/dl. Hair dye METALS; LEAD; METAL POISONING; LEAD POISONING; PROTOPORPHYRINS; BLOOD; ERYTHROCYTES; CHILDREN; UNITED KINGDOM	Waldron, H.A. 1979
2952 Blood, Whole						Review REVIEW; METALS; LEAD; HEALTH HAZARDS; CHILDREN; ADULTS; METAL TOXICITY; METABOLITES; BLOOD PLASMA; BLOOD SERUM; BONES; URINE; AUTOMOTIVE; ERYTHROCYTES; BLOOD; HAIR; NAILS; SALIVA	Posner, H.S. 1977
2990 Blood, whole		AAS	115	19-81 ug/100 ml	39.37 ug/100 ml	Prospective study, Pb significantly related to blood protoporphyrin. Children, ages <1-7 yr, from old housing areas of Charleston, SC. LEAD; BLOOD; CHILDREN; MEASUREMENT METHODS; PROTOPORPHYRINS; SOUTH CAROLINA; METALS	Chisolm, J.J., Jr. Mellits, E.D. Keil, J.E. Barrett, M.B. 1974
2991 Blood, whole		AAS	80	5.6-27.8 ug/100 ml	Not given	High school students ages 16-18 yr LEAD; METALS; BLOOD; BLOOD PLASMA; ERYTHROCYTES; COMPARATIVE EVALUATIONS; ADOLESCENTS	Angle, C.R. McIntire, M.S. 1974

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Lead
7439-92-1
Pb
Atw 207.2, MP 327.4 C, BP 1740 C, VP 1.77 mm Hg at 1000 C, 1 mm Hg at 970 C, 10 mm Hg at 1160 C
(CONTINUED)

TISSUE	EXPOSURE ROUTE	ANALYTICAL METHOD	NUMBER OF CASES	RANGE	MEAN	GENERAL INFORMATION	REFERENCE
815 Kidney		APDC-MIBK AAS	21	0.40-3.8 ug/g, wet wt	1.9 ug/g wet wt	The association between age and Pb content of organs is shown. Liver, kidney, lung and pancreas samples from Baltimore City residents over 17 years of age who had died suddenly and who had no disease condition at time of death. LIVER; KIDNEYS; PANCREAS; LUNGS; URBAN AREAS; BIOACCUMULATION; CARDIOVASCULAR DISEASES; METALS; MARYLAND	Poklis, A. Freimuth, H.C. 1976
816 Kidney		AAS	28	0.16-1.2 ug/g wet wt	0.47 ug/g wet wt	Samples from 30 cadavers in central Japan, mean age of 39 years, extent of heavy metal exposure unknown. METALS; ARSENIC; BERYLLIUM; BISMUTH; CADMIUM; CHROMIUM; COBALT; COPPER; MERCURY; METHYL MERCURY COMPOUNDS; MANGANESE; MOLYBDENUM; NICKEL; LEAD; ANTIMONY; VANADIUM; ZINC; BRAIN; TRACHEA; LUNGS; HEART; LIVER; PANCREAS; SPLEEN; KIDNEYS; ADRENAL GLANDS; INTESTINES; TESTES; OVARIES; MUSCLES; SKIN; BLOOD; BONES; ADIPOSE TISSUE; CADAVERS; JAPAN	Susino, F. Hayakawa, N. Shibata, T. Kitamura, S. 1975
817 Kidney	Ingestion	AAS	a) 80 b) 55	a) Not given b) Not given	a) 0.391 ug/g b) 0.369 ug/g	a) Males b) Females Biological half-times (BHT) obtained by observation of accumulation from 0-99 years and calculation by a mathematical model. Autopsy samples from Tokyo accident with no known occupational exposure. 5.9 years CADMIUM; MERCURY; LEAD; METALS; AUTOPSIES; BIOACCUMULATION; AGE; SEX; FOODS; JAPAN	Sugita, M. 1978
2199 Kidney		X-ray Spectrometry	a) 8 b) 7	a) Not given b) Not given	a) 7.06 ppm dry wt b) 7.35 ppm dry wt	a) Medulla b) Cortex 2 samples per case. 2 analyses per sample. 1978 autopsies of 10 Pima Indians, a Papago, and a Creek Indian. POTASSIUM; CALCIUM; IRON; COPPER; ZINC; RUBIDIUM; NICKEL; LEAD; METALS; TRACE ELEMENTS; LIVER; SPLEEN; AORTA; KIDNEYS; ADIPOSE TISSUE; PANCREAS; MEASUREMENT METHODS; AUTOPSIES	Mangelson, N.F. Hill, M.W. Nielson, K.K. Eatough, D.J. Christensen, J.J. Izatt, R.M. Richards, D.D. 1979

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Lead
7439-92-1
Pb
At# 207.2, MP 327.4 C, BP 1740 C, VP 1.77 mm Hg at 1000 C, 1 mm Hg at 970 C, 10 mm Hg at 1160 C
(CONTINUED)

TISSUE	EXPOSURE ROUTE	ANALYTICAL METHOD	NUMBER OF CASES	RANGE	MEAN	GENERAL INFORMATION	REFERENCE
2467 Kidney		Dithizone	45	a) Not given b) Not given	a) 0.79 ppm wet wt b) 0.88 ppm wet wt	a) Cortex b) Medulla, 44 of 45 Levels decreased with increasing age. People with nephrosclerotic disease had levels of 0.56 ppm, compared to 0.93 ppm for others. Samples from autopsies from the Cincinnati area (1969-1971) of 46 white males, aged 20-84 yr. 19 traumatic deaths, 6 deaths due to drugs or carbon monoxide, 21 deaths due to medical causes. LEAD; METALS; BONES; ADIPOSE TISSUE; URINE; MUSCLES; INTESTINES; HEART; SKIN; BLADDER; STOMACH; BRAIN; TESTES; THYROID GLANDS; PROSTATE; BLOOD; ADRENAL GLANDS; LUNGS; SPLEEN; PANCREAS; KIDNEYS; LIVER; AORTA; AUTOPSIES; OHIO; BIOACCUMULATION	Gross, S.B. Pfitzer, E.A. Yeager, D.W. Kehoe, R.A. 1975
3093 Kidney		ES	a) 119 b) 52 c) 66	a) Not given b) Not given c) Not given	a) 5.76 ppm b) 4.02 ppm c) 5.07 ppm	a) No renal disease b) Acute renal failures c) Chronic renal failures a) and b) different ($P<0.02$), b) and c) different ($P<0.05$) Values are dry wt basis. Autopsies at UCLA Hospital. TRACE ELEMENTS; METALS; AUTOPSIES; CALIFORNIA; KIDNEYS; LIVER; SPLEEN; DISEASES; HYPERTENSION; SODIUM; POTASSIUM; CALCIUM; PHOSPHORUS; MAGNESIUM; CADMIUM; ZINC; COPPER; LEAD; IRON; MANGANESE; ALUMINUM; SILICON; TITANIUM; COBALT; NICKEL; MOLYBDENUM; TIN; CHROMIUM; STRONTIUM; BARIUM; LITHIUM; SILVER; VANADIUM; BORON	Indraprasit, S. Alexander, G.V. Gonick, H.C. 1974

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16. ABSTRACT

A comprehensive data base of chemicals identified in human biological media (tissues and body fluids) had been established under the direction of the Environmental Protection Agency's Office of Toxic Substances Survey and Analysis Division. This centralized resource of body-burden information was inspired by the concern of government scientists over continuing reports of toxic chemicals in human tissues and body fluids.

Data are obtained primarily from the open literature through manual searches of selected journals. Retrospective searching to 1974 is complete and has yielded over 2000 pertinent documents of which approximately 800 have been entered into the data base as of this report. These sources identify over 500 chemicals which have been found in human biological media.

A specific search of the data base for cadmium and lead levels in blood and kidney is presented in this report. This report was prepared by the EPA OPTS Survey and Analysis Division's Design and Development Branch in support of the World Health Organization's Biological Monitoring Project.

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