EL PLOMO COMO ELEMENTO DE RIESGO EN ALEACIONES BASE COBRE

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INTRODUCCIÓN

Al estar en las puertas de acceder a un nuevo milenio, el mundo ha ido eliminando las fronteras comerciales con el fin de tener acceso a productos de una mejor calidad y a un menor costo, tendiendo a aprovechar las ventajas comparativas de cada país para, en una segunda etapa privilegiar las ventajas competitivas.

Es conocido el hecho que cada vez más países tienden a establecer acuerdos comerciales disminuyendo o eliminando las barreras arancelarias para llegar a establecer un intercambio importante de productos fabricados en mejores condiciones de precio y manufacturación.

En estos acuerdos se incorporan resguardos a los subsidios estatales de los tipos arancelarios o para-arancelarios, y entre estos últimos se indican los resguardos medioambientales y a las personas del mundo laboral, es decir, la protección y/o resguardo de la salud de los trabajadores.

Esto último es considerado dumping país por intermedio de los trabajadores, lo que naturalmente estaría penalizado por estos acuerdos comerciales.

La Región Metropolitana en Chile concentra la mayor parte de la actividad económica del país. La base industrial de la región es diversa, incluyendo el rubro Metales Básicos.

El presente trabajo entrega una reseña sobre el impacto ambiental interno de las fundiciones no ferrosas que emplean Plomo en las aleaciones base Cobre, como también identifica las medidas de prevención de los potenciales impactos y las medidas de control de la contaminación recomendados.

Se indica, analiza y da a conocer la generación de un tipo de riesgo laboral ambiental, que en la consecución de un objetivo de satisfacer una necesidad pasa por el riesgo de enfermar profesionalmente al personal que en estas empresas labora.

I. PROCESO METALÚRGICO

En el imperativo de satisfacer las necesidades de calidad de producto para el usuario, los profesionales del área de la metalurgia adaptiva determinaron aleaciones de metales que cumplieran requisitos técnicos en la fabricación de piezas para poder cumplir eficientemente con las solicitaciones dadas por el uso que se les daría.

En este proceso de investigación se llegó a determinar que las aleaciones en base a Cobre cumplirían estas características técnicas.

Para la fusión de estas aleaciones se utilizan hornos de los tipos Morgan y hornos de Inducción Eléctrica, combinándose con hornos de mantención y de colada continua.

II. COBRE Y SUS ALEACIONES

Las aleaciones de Cobre son principalmente los bronces y los latones:

- Los bronces contienen cobre sobre un 80%, estaño entre un 5 y un 15%, plomo y zinc.
- Los latones contienen Cobre sobre un 50%, zinc entre un 15 y 48% y Plomo.

Naturalmente al analizar los elementos de esta aleación, para un Profesional del área de Prevención de Riesgos, el Plomo sería el elemento de mayor preocupación.

III. CARACTERÍSTICAS DE LAS ALEACIONES

Las aleaciones en base a cobre tienen propiedades relevantes para muchas aplicaciones industriales en donde se presentan problemas de:

- Fricción y desgaste.
- Resistencia a la corrosión.
- Exposición a altas temperaturas.
- Alta conductibilidad.
- Resistencia al choque e impacto.
- Determinadas características mecánicas.

IV. CUPRO–ALEACIONES MÁS UTILIZADAS

Las Cupro-Aleaciones más utilizadas en el mercado son las siguientes:

- Bronces
- Bronces al plomo
- Crupro-Aluminio

- Cupro Manganeso
- Latones

V. BRONCES

La denominación correcta de bronce, corresponde a las aleaciones de cobre-estaño. Pero a ésta se le añaden otros elementos que modifican sus propiedades como el Zinc, Plomo, Aluminio, Níquel, etc., y a éstos se les denomina considerando el elemento de adición más importante. Este grupo corresponde a los bronces binarios (Cu-Sn).

VI. BRONCES AL PLOMO

El Plomo es prácticamente indisoluble en la matriz de Cu Sn. En estas aleaciones el Plomo se dispersa formando un constituyente blando y plástico. Reduciendo la dosificación de Sn y elevando el Plomo mejora la plasticidad de la aleación, aumenta sus propiedades antifricción y pierde tenacidad y dureza.

VII. CARACTERIZACIÓN DEL BRONCE AL PLOMO

Esta aleación está compuesta principalmente de tres elementos: Cobre, Estaño y Plomo, los cuales presentan riesgos para la salud de las personas en distinta magnitud.

De estos tres elementos el Plomo es el que representa lo más agresivo para los trabajadores de este sector industrial, sin menospreciar los riesgos

1. Plomo

Entre los humos metálicos es sumamente nocivo el del Plomo, que produce la Enfermedad Ocupacional llamada Saturnismo o Plumbismo.

El Plomo representa el segundo problema en orden de importancia, inmediatamente después de la Sílice, pero su decrecimiento en los últimos 50 años ha sido notable, lo que comprueba la efectividad de las medidas preventivas adoptadas.

El Plomo inorgánico ingresa al organismo principalmente por la vía respiratoria al inhalar sus humos, polvos o niebla.

Otro medio de entrada es por la vía digestiva. Esto sucede cuando se ingieren partículas atrapadas en la parte superior del aparato respiratorio o son introducidas en la boca con los alimentos, tabaco, dedos, u otros objetos.

La toxicidad de los compuestos de Plomo está influenciada por varios factores, entre los cuales se pueden destacar: su solubilidad y tiempo de contacto con el suero sanguíneo y otros fluidos orgánicos, cantidad ingerida, inhalada o absorbida y cantidad presente en la circulación en un momento dado.

El Plomo es tóxico sólo cuando pasa a la circulación, así puede ser almacenado en el organismo y sólo llega a ser peligroso cuando entra a la circulación en cantidades mayores que las que pueden ser eliminadas sin riesgo.

Hay muchos procesos en los que se requiere que el plomo sea fundido, por lo que la variable temperatura es importante.

2. Tensión de Vapor del Plomo

En los procesos en los que se funde sólo Plomo, o en aleaciones, la variable temperatura es importante:

Temperatura	Tensión de Vapor (mmHg)	Concentración (mg/m³ a 25° C)
507	0,000016	0,18
527	2,000033	0,37
636	0,001	11,30
808	0,08	900,00
985	1,0	—

El Plomo fundido no produce grandes cantidades significativas de humo bajo 500°C pero el PbO formado en la superficie puede llegar al aire cuando aquél es vaciado o agitado.

El punto de fusión del Plomo es de 327°C

El Límite Permisible Ponderado de acuerdo a la legislación en Chile, es de 0,12 mg/mt3 en aire.

3. Usos del Bronce al Plomo

Las aleaciones en las que se utiliza el Plomo se muestran en la siguiente Tabla:

PLOMO EN ALEACIONES BASE COBRE

Número de la aleación	Composición Química			
	Cu	Sn	Zn	Pb
1	85	5	5	5
2	83	7	3	7
3	81	7	3	9
4	86	5		9
5	80	10		10
6	79	6		15
7	70	5		25
8	73	7		20
9	85	5	5	7
10	83	4	7	6
11	81	3	9	7

ellas poseen buenas propiedades mecánicas, excelentes cualidades antifricción y resistencia al desgaste bajo condiciones de alta velocidad.

Principalmente se utiliza en la fabricación de bujes.

Aleación 5

Se caracteriza por su resistencia a presiones, golpes y vibraciones; resistencia a la corrosión por ácidos y buen comportamiento en aguas minerales y sulfuros.

Se utiliza en la fabricación de bujes para maquinaria de altas solicitaciones, cojinetes de bombas de agua y combustibles.

Aleaciones 6, 7, 8

Los bronces de mayor contenido de Plomo se emplean preferentemente cuando se desea cierta plasticidad y donde la lubricación puede ser imperfecta, ya que el Plomo actúa en cierto modo como lubricante.

Tienen regular resistencia mecánica y al desgaste, no resisten golpes, tienen excelentes cualidades antifricción, resistentes a la corrosión, buena conformabilidad, no desgastan ejes blandos.

Se utilizan en la fabricación de bujes, descansos.

Aleaciones 9, 10, 11

Estas tres aleaciones se utilizan en la fabricación de fittings de cañería para el agua potable, no presentando grandes diferencias en cuanto a su resistencia mecánica, colabilidad, resistencia a la tracción, límite de fluencia, dureza y maquinabilidad.

Aleación 1

Aleación de fácil moldeo, se obtienen productos compactos de elevada estanquidad, de fácil maquinado, tiene regular resistencia mecánica y a la corrosión.

Se utilizan en válvulas de baja presión, acoplamientos de tuberías, fittings hidráulicos y en algunos tipos de cojinetes blandos.

Aleaciones 2, 3, 4

En estas aleaciones sus propiedades varían en relación directa al contenido de Sn y Pb; todas

Sí en este último aspecto técnico mejora el índice de maquinabilidad en directa relación al aumento de Plomo en la aleación.

VIII. PRODUCTOS

En las empresas en análisis los productos que se fabrican son los siguientes:

- Fittings
- Llavería
- Válvulas
- Bujes
- Barras sólidas y huecas
- Bocinas
- Barrotes
- Lingotes

IX. PROCESOS METALÚRGICOS Y MECÁNICOS EN LA FABRICACIÓN DE PIEZAS DE BRONCE AL PLOMO

Para la fabricación de piezas que anteriormente se han indicado, se efectúan las siguientes etapas:

1. Compra de lingotes de Cobre, Plomo, Estaño y Zinc.

   Compra y selección de chatarra de Cobre, Plomo, Estaño y Zinc.

2. Preparación de las aleaciones.

   Carguío de horno.

3. Fusión de la aleación. Colada del metal desde el horno a la cuchara.

   Colada del metal desde la cuchara a los moldes y/o coquillas.

4. Desmoldeo de la pieza.

   Limpia de la pieza.

   Terminación de la pieza.

   Desbastado.

   Corte.

   Esmerilado.

   Torneado.

   Pulido.

X. EVALUACIONES AMBIENTALES

La evaluación de humos metálicos y partículas de éstas tienen por objetivo principal conocer la cantidad de ellos presentes en el ambiente de trabajo. Los trabajadores sometidos a concentraciones mayores al Límite Permisible Ponderado durante tiempos variables pueden enfermarse.

La evaluación significa tomar muestras representativas en el tiempo y en el espacio, con análisis en laboratorios.

El propósito de los muestreos es determinar las concentraciones en el ambiente laboral de las personas para así analizar el riesgo para la salud y comprobar la eficiencia de las medidas de control una vez aplicadas.

Para la toma de muestras se utilizaron bombas de aspiración del aire ambiental conectado por intermedio de una manguera a un porta-filtro el que contenía un filtro de celulosa, para posteriormente ser analizado en un laboratorio especializado. Estas bombas se ubicaban directamente en el trabajador o en el ambiente de trabajo.

XI. RESULTADOS DE LAS EVALUACIONES AMBIENTALES

Los resultados de las evaluaciones ambientales que a continuación se indicarán, se efectuaron en las distintas etapas de la fabricación de piezas.

El muestreo fue del tipo personal y ambiental, pero en la mayoría de los casos fueron personales, y su muestreo entre 90 y 120 minutos aproximadamente en condiciones normales de operación. Se tomaron aproximadamente 300 muestras, en un período de 3 años.

El resultado de las evaluaciones se indica en Anexo 1, en el cual se muestran los valores máximos y mínimos de las concentraciones ambientales en los distintos puestos de trabajo en algunas de las fundiciones evaluadas.

En la siguiente tabla se indican los valores máximos de la concentración ambiental en cada uno de los puestos de trabajo de las distintas empresas, como también el valor mínimo evaluado en ese puesto de trabajo, en la empresa en que se aplicaron medidas de control del Plomo en aire.

CONCENTRACIONES AMBIENTALES DE PLOMO

Puesto de trabajo	Plomo en aire (mg/mt3)	
	Valor máximo	Valor mínimo
Fab. de almas	0,56	0,05
Moldeador	1,11	0,06
Hornero	2,35	0,15
Vaciador	2,51	0,18
Desmoldeador	0,53	0,10
Corte y desbaste	3,07	0,02
Limpia y Terminado	3,29	0,02
Pulido	0,89	0,04
Tornero	0,67	0,03

XII. ANÁLISIS Y CONCLUSIONES

1 En la fabricación de piezas de bronces al plomo, la concentración ambiental del plomo en los puestos de trabajo de las distintas secciones, tales como:

- Almas
- Moldeo
- Desmoldeo
- Fusión
- Colada
- Limpia
- Terminado
- Torneado
- Pulido,

se encuentra sobre el Límite Permisible Ponderado.

2 Las personas que trabajan en esta secciones presentan riesgo de enfermarse profesionalmente por exposición a este agente químico.

3. La utilización del Plomo como elemento de aleación, genera concentraciones ambientales peligrosas para la salud de los trabajadores que en ella laboran, por estar muy por sobre el Límite Permisible.

4. El mantener toda la operación de fabricación de piezas de bronces al plomo bajo un mismo galpón, es decir, sin separación física entre las secciones, permite la contaminación de áreas en las cuales no se trabaja con plomo (fabricación de almas, moldeo de piezas).

5. La aplicación de medidas de control ingenieril son necesarias de aplicar para reducir la concentración de Plomo en el ambiente laboral.

6. En todas las etapas de la fabricación de piezas de Bronce al Plomo, se generan concentraciónes ambientales de Plomo, que van más allá de lo permisible.

7. El Plomo se utiliza por sus características técnicas propias, que le agrega a la aleación de base Cobre, pero debe investigarse en la probable utilización de otro metal de menor o mínimo riesgo para la salud de los trabajadores, que permita mantener las actuales características mecánicas.

8. La voluntad de aplicar medidas de control ambientales de captación del Plomo en aire, en las distintas etapas de la fabricación de piezas, permite reducir sustancialmente sus concentraciones y por ende disminuye el riesgo para el personal.

9. La normativa de aplicar medidas de higiene personal en los trabajadores expuestos, de no fumar e ingerir alimentos en las áreas de trabajo, reduce el riesgo de intoxicación en los operarios y personal en general.

10. El fundir y colar en canchas hacia moldes, genera gran cantidad de humos metálicos al ambiente de trabajo.

XIII. MEDIDAS DE CONTROL Y/O MITIGACIÓN AMBIENTALES

1. Encapsulamiento de los hornos, incorporándole sistemas de extracción de gases generados en el proceso de fusión.
2. Implementación de sistemas de colada continua desde los hornos a los moldes o lingotes, a través de canalizaciones encapsuladas.
3. Crear y mantener separaciones físicas entre las distintas etapas (secciones), de la fabricación de este tipo de piezas.
4. Instalación de campanas de extracción en las áreas de colada en canchas.
5. Instalación de sistemas de captación desplazables (brazo articulado), sobre las cucharas de colada, para que se mantengan en la trayectoria y sobre la cuchara mientras se vacía metal a los moldes (Anexo 2).
6. Mantención de cabinas de escoriado con sistemas de captación y extracción de humos metálicos, cerca de los puntos de colada del metal.
7. Instalar sistemas de extracción local, para las partículas metálicas que se generan en los trabajos de limpia y terminado de estas piezas.
8. Todos los sistemas de captación de humos o partículas de plomo deben ir conectados a un Filtro Colector.

XIV. MEDIDAS DE CONTROL Y/O MITIGACIÓN EN LAS PERSONAS

1. La utilización de elementos de protección respiratoria es absolutamente necesaria para toda persona que trabaje en la fabricación de piezas con Plomo en la aleación.
2. Se debe normar y supervisar el aseo personal de los trabajadores de este tipo de empresas, antes de ingerir alimentos y retirarse a sus hogares.
3. Todo trabajador debe contar con doble casillero, en donde dispondrá la ubicación de la ropa personal y la de trabajo, separada una de otra.
4. Debe existir la prohibición de fumar e ingerir alimentos en las áreas de trabajo.
5. La capacitación para dar a conocer los riesgos y las medidas de prevención a los trabajadores debe ser calendarizada anualmente.
6. El personal expuesto a este agente contaminante debe ser controlado regularmente por médicos para evitar intoxicaciones.

XV. RECOMENDACIONES GENERALES

Deben definirse políticas industriales y al interior de este sector industrial, para avanzar en la investigación de un metal sustituto del Plomo, en las piezas que actualmente fabrican.

Para concretar lo anterior pueden establecer convenios con las Universidades en el país, a objeto de que la solución salga desde estos establecimientos educacionales, de las propias empresas, o conjuntamente.

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ANEXO 1

RESULTADOS DE LAS EVALUACIONES AMBIENTALES

El muestreo fue del tipo personal y ambiental, pero en la mayoría de los casos fueron personales, y se mostró entre 90 y 120 minutos aproximadamente en condiciones normales de operación.

Empresa	Puesto de trabajo	Plomo en aire (mg/mt³)	
		Mínimo	Máximo
Fundición N° 1	Fab. de almas	0.35	0.56
	Moldeador	0,24	0,27
	Hornero	0,21	0,92
	Vaciador	0,36	0,52
	Desmoldeador	0,23	0,53
	Corte y desbaste	0,91	3,07
Fundición N° 2	Moldeador	0,10	0,10
	Hornero	0,15	2,35
	Vaciador	0,24	0,31
	Corte y desbaste	0,10	0,44
	Limpia y terminado	0,16	3,29
	Tornero	0,06	0,28
Fundición N° 3	Corte y desbaste	0,02	0,77
	Limpia y terminado	0,02	0,12
	Limpia y terminado	0,04	0,08
	Pulidor	0,05	0,10
Fundición N° 4	Fab. de almas	0,05	0,15
	Moldeador	0,06	1,11
	Hornero	0,16	0,39
	Vaciador	0,18	0,22
	Corte y desbaste	0,19	2,22
	Pulido	0,17	0,89
	Tornero	0,04	0,67
Fundición N° 5	Moldeador	0,11	0,12
	Hornero	0,15	0,18
	Vaciador	0,34	2,51
	Desmoldeador	0,10	0,13
	Corte y desbaste	0,38	0,71
	Limpia y terminado	0,30	0,59
	Tornero	0,03	0,11

Plomo, un nuevo enemigo público

Dieciséis marcas de pintura nacional contienen el tóxico

Carmen Eugenia Bravo
SANTIAGO

Causante de infertilidad, de estimular la adicción a las drogas, la violencia y el fracaso escolar, el plomo es el gran enemigo público que acaba de denunciar el Colegio Médico y que mañana tendrá su momento culmine, cuando se den a conocer oficialmente las marcas de los productos que contienen este material altamente tóxico.

Un estudio hecho por el Instituto de Salud Pública encendió la alerta roja, cuando señaló que de 21 marcas de pinturas nacionales 16 contienen plomo por sobre los niveles permitidos, pasando a la categoría de peligrosas.

"El historiador norteamericano Gilfillan sostiene que la caída del Imperio Romano se debió al plomo, que afectó a la clase gobernante que bebía vinos y jugos almacenados en vasijas de ese material", dice el doctor Andrés Tchernitchin, presidente de la Comisión Salud y Medio Ambiente del Colegio Médico. "El resultado fue la infertilidad y una alta incidencia de psicosis", agrega.

Dos productos con quienes los chilenos conviven día a día contienen el tóxico letal: la bencina y las pinturas que cubren muros, juguetes y toda clase de artefactos. La orden profesional enfocó su artillería en el plomo, porque estudios hechos en 1992 por el Ministerio de Salud, en una muestra de 900 niños de Santiago y San Felipe, demostraron altas concentraciones de plomo que excedían las normas internacionales a medida que aumentaban en edad.

"En Santiago hay más afectados por la bencina, pero en San Felipe están aumentando y en ese caso los causantes podrían ser las pinturas", precisa el facultativo, y señala que "algunas están cerca del límite y otras muy altas", dice Tchernitchin. El ISP, por su parte, agregó otras 30 marcas. Luego medirán la cantidad de plomo de los juguetes de madera y goma que se pintan con pinturas que contienen el metal.

El nivel de plomo en la sangre de los niños de 1 año en Santiago es de 5,46 promedio, en tanto que los de San Felipe es de 3,9. De mantenerse las condiciones se sabe que los niveles obtenidos a esa edad se triplican cuando los menores cumplen 5 años.

En Santiago, el 8,6% de los pequeños en estudio está por sobre 10, nivel de concentración de plomo que causa un daño irreversible a la capacidad intelectual. En San Felipe, en cambio, ninguno llegó a esa cifra.

"Siguiendo esta tendencia tendremos que el 8,6% de los niños tendrá un promedio de plomo de 30 o más", concluye Tchernitchin, afirmando que se estaría provocando un lento envenenamiento de la población infantil.

CARLOS ESPINOZA

Información adecuada

El ministro de Salud, Alex Figueroa, dijo ayer que la forma más eficiente de evitar riesgos con los excesos de plomo existentes en algunas pinturas es informar adecuadamente a la población, de modo que puedan elegir aquellos productos que no les causarían daños, y manipular adecuadamente los más riesgosos.

No obstante ello, informó que su secretaría prepara un reglamento que incorporará los datos aportados por el estudio del Instituto de Salud Pública.

¿Dónde está?

- La bencina, cuyas inhalaciones son muy altas en las grandes ciudades atochadas por la congestión de automóviles.
- El polvo domiciliario, porque las pinturas al caer se transforman en polvo que se vierte sobre los alimentos o es aspirado por los bronquios.
- Las cañerías de agua potable fabricadas de plomo en los edificios viejos.
- Los juguetes o todo tipo de artefactos con pintura con plomo que los niños chupan.

MINERALES PELIGROSOS

- Los minerales nocivos están presentes en la naturaleza y, por el proceso de meteorización de las rocas, se desizan hacia otros sectores, inclusive a las aguas dulces que se utilizan para el regadío.
- De esta forma llegan a los vegetales, a los animales y luego al hombre, a través de lo que ingerimos.
- Los metales de más poder toxicológico son el cadmio, el plomo, el mercurio y el arsénico.
- Este mineral, arsénico, compite con el calcio en el sistema óseo, produciéndose una desmineralización ósea. Fuentes de contaminación son los esmaltes, colorantes para plástico y el cigarrillo.
- El plomo produce anemia, pues inhibe la formación de glóbulos rojos. Fuentes de contaminación son los gases producidos por los vehículos, los envases de conservas, los esmaltes, baterías y la minería.
- El mercurio produce una enfermedad conocida como minamata, que ocasiona daño neurológico con síntomas como agresividad y cefalea.
- La contaminación por cadmio se puede producir a través de la actividad volcánica, plantas de cloro y soda cáustica, y algunos pesticidas.
- El arsénico ataca la piel; el sistema respiratorio y el nervioso. La principal fuente de contaminación es la minería.

También en la bencina

Chile se encuentra seriamente atrasado en el compromiso que, en diciembre de 1994, suscribieran los jefes de Estado de 34 naciones de América Latina y el Caribe para prevenir la contaminación en el hemisferio. En esa oportunidad se formuló un proyecto para facilitar la eliminación de la gasolina con plomo.

Según lo que han indicado consultores internacionales, Chile no ha manifestado su voluntad de dejar de lado la utilización del mencionado combustible.

Cuadros estadísticos indican que el país pasó de 310 toneladas de plomo anuales como agregado a la gasolina, a 250 toneladas/año en 1995. En 1996 continuará con 200 toneladas anuales, hasta el año 2000. Según los entendidos esta cantidad es muy alta. Agregan que el país debe enfrentar el tema de mejor manera y con políticas más certeras.

Indican también que, pese a la eliminación del plomo de la bencina, los problemas de contaminación seguirán estando presentes, ya que el combustible sin este mineral igual produce un importante nivel de partículas tóxicas. Esta situación tampoco se ve optimizada por el uso de catalizadores, ya que cuando éstos se encuentran en mal estado contaminan más que aquellos vehículos que no lo poseen.

Juguetes de doble filo

Jordi Berenguer
SANTIAGO

Del total de intoxicaciones que se producen por plomo, las infantiles ocupan una parte importante y lo más grave es que un porcentaje de ellas se producen por la contaminación de los productos que los niños usan a diario, como los juguetes y los lápices de colores o de cera.

En el país el fenómeno no se encuentra regulado en forma consistente, pero a nivel internacional la situación es distinta, sobre todo en Europa, en donde como norma los países de la comunidad prácticamente han prohibido su presencia en los aparatos que manipulan los pequeños.

A nivel latinoamericano, la cosa no varía mucho en relación a Chile, sin embargo, se está despertando una conciencia que apunta a modificar el estado actual del tema.

Los test realizados por diversos institutos, a solicitud de la International Organization of Consumers Unions, IOCU, han demostrado que en la pintura de los juguetes se encuentran importantes cantidades de metales pesados, los más comunes son el mercurio, el cadmio, el zinc y el plomo, todos altamente nocivos para la salud (ver recuadro). Estas investigaciones indican que por lo general las pinturas con que se cubren los juguetes tienen mala adherencia, pues se desprenden al entrar en contacto con la saliva de los pequeños.

Elimination of lead in gasoline in Latin America and the Caribbean

Aide - Memoire of coordination meeting

June 5, 1996 - - room G5-140

At the initiative of the World Bank, a meeting took place with representatives of OAS, EPA, PAHO, US-AID and US-Dept. of State[1] to review the progress in the activities these organizations are carrying out related to the lead elimination project, and to start preparations for a Workshop to present these activities to the Focal Points, nominated in each LA - Caribbean country to assist in formulating and implementing the national programs for the elimination of lead in gasoline.

1. The meeting participants congratulated the World Bank for issuing a Press Release presenting a clear-cut position and policy in relation to the lead problem. Participants were also informed about discussions taking place among the organizations represented in setting a TF for coordinating the implementation of the Hemispheric Partnership for Pollution Prevention (PPP) and, more specifically of the forthcoming meeting of Environmental Attachés of the LA-Caribbean embassies in Washington that would like to be informed on the proposed activities of the lead elimination project. This meeting would take place end-June, beginning of July at the Canadian Embassy. The OAS representative circulated a list with the references of the 20 National Focal Points already nominated by their respective governments.

2. Survey and Diagnosis Study: The World Bank Staff reported on the Montevideo meeting at Arpel headquarters which reviewed the progress on the compilation of data and the completion of the diagnosis study. The organizations recommended taking the necessary provisions for making the data-base easily accessible to all possible users. It is expected that the consultants will complete their draft report next week and that a meeting of WB and Arpel experts, tentatively proposed to take place in Santiago de Chile by June 27-28, will review the draft and prepare for its presentation to the Focal Points and wider diffusion.

3. Health impact studies: PAHO, with WB support is launching a consultant study on overall health related issues. The TOR for this study and the draft consultant report were circulated for comments. Cor van der Sterren will collect the comments of the organizations and pass them to Luiz Galvao, PAHO, counterpart for this study.

Further, USAID circulated preliminary Terms of Reference for preparing a model to evaluate and monitor environmental and health impacts. The meeting requested clarifications as to the background and precise objectives of this model - basically a tool to monitor progress when a lead phase out program is in place. USAID is ready to contribute $50,000 to finance the consultants fees and travel expenses to present the model at the Focal Points Workshop, and requested from WB additional resources for taking care of the costs of undertaking a pilot study in a selected country. Participants will comment on the draft TOR. USAID will provide an estimated budget with the revised TOR for this activity.

4. EPA described the progress made in preparing a training course addressing the Focal Points needs for assisting in formulating and implementing a national program for

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[1] Attached is the list of participants.

lead elimination. Coordination for this training course is well advanced in Argentina and the first course is expected to take place in this country by mid-October. EPA is strongly supporting the end-August workshop and would take this opportunity for presenting to the Focal Points, in general, the EPA experience in dealing with the lead problem and, in particular, for offering them this training course. EPA indicated that the Workshop should be considered a continuation of the PPP and of the Puerto Rico initiative.

5. The WB explained the on-going activities to prepare technical studies, including the use of CNG and LPG as alternative cleaner motor fuels and the review of problems in phasing out leaded gasoline in the case of old manufactured vehicles. A draft of the letter study will be soon circulated for comments by the group.

6. The meeting gave a preliminary consideration of the different aspects to be taken care of when preparing for the workshop, scheduled end-August 1996. Among the issues discussed were:

- *place, precise date:* The OAS representative informed the meeting participants of the conversation that took place with the Chilean Ministry of Energy who in principle accepted to host the workshop in Santiago on the proposed dates: Aug. 26-28. A letter to be sent by the OAS Secretary General, indicating the background and objectives of the meeting will be prepared, rapidly reviewed by the group and issued at the beginning of next week.

- *objectives and tentative Agenda* - The WB summarized the objectives of the meeting (i) - to explain the project framework and to present the survey and technical tools/on-going activities that the organizations are currently preparing as described in the para. above; (ii) to allow the FP to meet and exchange their own experiences and difficulties; (iii) to identify the countries' specific TA, studies and investment needs; and (iv) to prepare a declaration of the FP group to the Regional Summit. Attached is a draft program still under consideration, which underlines the importance given to the active participation of the Focal Points.

- *participants* -It was agreed to invite representatives from the different sectors (energy, environment, health, transport) that are involved in the lead problem and its solution. However, governmental or non-governmental participants of a given country will have to be grouped under a country delegation lead by the nominated *Focal Points.*

- *speakers* - It is expected that at the opening session high ranking officials (i) from the Chilean Government will welcome the participants, (ii) the Taskforce on PPP will set the framework of the workshop as part of the PPP, and (iii) from the WB will explain the Bank policy in relation to lead elimination. For the Technical Presentations on the second day, EPA, PAHO and the WB will as soon as possible select their respective speakers. For the Third day, ARPEL and DOE will be requested to propose the speakers to take care of the industry views on the subject.

- *Expected FP role* - FP will be requested (1) to make a very brief presentation to other FP of countries in similar situations in their countries current lead elimination program and to focus on obstacles and difficulties. This exchange is expected to take place the first afternoon when the workshop will break into smaller groups of FP from countries confronted with similar problems. Available data and a list of issues will be distributed. Also the FP will be encouraged to prepare themselves for this presentation by organizing in their respective countries a multisectorial national preparatory meeting and to include experts from the different sectors in their delegations. Furthermore the FP will be requested (2) to indicate their TA and investment needs as part of the formulation or

implementation of the national programs for lead elimination. This will be the subject of the afternoon of the second day.

- *logistic arrangements and invitations* It is expected that a delegation of the WB, Arpel and possibly other organizations would visit Santiago by end of June to set the logistic arrangements, complete the Agenda and start issuing the invitations.

- *budget considerations* - The WB indicated that some CIDA funds are available for organizing the Workshop but these funds would not be sufficient to pay for all delegations expenses.

7. Other business - The meeting participants were informed of the energy activities taking place related to the lead elimination project, in particular, the proposed harmonization of product spec.'s and the identification of investment requirements in the refineries in the LA and Caribbean region.

Proposed Agenda for end-Aug. Workshop

First Day	Second Day	Third Day
am. Welcome by Chilean Authorities Opening presentations: Setting the Workshop as part of the PPP and giving the WB overall policy. 1. Host Country-Case (by a Chilean expert) 2. Presentation of the project framework (by WB) 3. The Survey and Diagnosis Study (by Al-consult)	**am.** Technical Session: 1. PAHO-Health Issues 2. WB-Car fleets 3. WB- alternative fuels 4. EPA - Training 5. AID-Health monitoring ... This session will be designed to present to the FP the available "tools" and TA possibilities that they could need for developing and implementing the national plans.	**am.** Plenary Session: 1. Industry views (Arpel) — How companies are reacting 2. Presentation by each F.P group on their problems and needs 3. General debate
pm. Grouping the National FP: - by sub-region - small-large countries The FP Groups will exchange experiences and identify (common) problems, status of national plans and main difficulties summary session	**pm.** Cont...., the F.P groups will assess the tools presented and further discuss on regulatory and cooperation/trade issues as well as identify their specific T.A and investment needs. summary session	**pm.** Final Session - Recommendation to be presented to the Summit. - Recommendations for country case studies and specific T.A and investments needs.

Private sector role/organization of industry
- control
- commercial aspects

Reporting Mechanism → SIRG — Sept. 30/Oct. 1 at State
Not clear on whether P3 on the agenda

Daryl working w/ Wayne on this. → OAS will draft letter of invite to focal pts. next wk.

000442

List of Participants

Organization	Name
OAS	Wayne Park
DOE (ARA/SCO)	Darrell Jenks Lauren Shifflett
Natural Resources Defense Council	Arturo Garcia-Costas
EPA	Michelle Keene Sylvia Conea
PAHO	Luiz Galvao
USAID	Gilbert Jackson Steven Ault John Borrazzo Frederick Freeman
WB	Eleodoro Mayorga-Alba Cor van der Sterren

June ~~August~~ 27-28 missing

ARPEL
WB — who ?
EPA

→ survey in English
→ Childcus in Spanish

→ alessandro Jdreclic
PhD economist — Harvard
MO Energy

000444

Draft: June 4, 1996

TERMS OF REFERENCE: USAID/EHP ACTIVITY WITH PAHO/WHO

LEAD EXPOSURE SURVEILLANCE SYSTEM TO AID IN THE PROMOTION OF LEAD PHASE-OUT IN LATIN AMERICA AND THE CARIBBEAN FOR PUBLIC HEALTH PROTECTION

Goal:

Phase out the use of leaded gasoline in the Americas rapidly, to protect the health (including development) of young children and adults, improve environmental quality, and promote expanded trade opportunities.

Partners:

PAHO, World Bank.

Purpose:

The purpose of this activity is to establish a (set of) model human biological lead surveillance and environmental lead exposure monitoring program(s), including a baseline set of data, which will be adopted, adapted and used throughout the LAC region . The activity is meant to support the work to phase out leaded gasoline in the region. Phase out of leaded gasoline is promoted by the Alliance to Prevent Contamination which was established under Declaration 23 of the Plan of Action of the Summit of the Americas (Miami, 1995). The activity is also selected as one which supports the Environmental Initiative of the Americas (EIA) of USAID's Bureau for Latin America and the Caribbean, and will be funded (in part) by the Bureau.

Product:

A model human biological lead surveillance and environmental lead exposure monitoring program for children and adults.

Outcomes:

(1) To provide information to high-level government and industry policy-makers on declining exposures to lead in children and adults[1] as an expected result of leaded gasoline phaseout (with awareness of confounding factors such as lead in water, food, ceramics, paint and from smelters). We are providing this information (a) to show the collateral socioeconomic, trade and health benefits of the phase-out and result in the continual promotion/support of lead phase-out by key policy-makers, and (b) to strengthen the national health infrastructures. This information will be derived from the monitoring programs.

→ feedback on from country
→ what countries want to host pilots

Tasks:

1. Design a monitoring system for biological lead and environmental lead for adoption in the LAC region. (May-July 1996).

- Summarize existing monitoring capability in the LAC region (use results of OLADE and ARPEL surveys; coordinate with ECO).

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[1] The focus of the monitoring system should be on young children, but may address adult health.

- Design a simple monitoring system for biological lead and environmental lead, including sampling protocol.
- Evaluate and decide on existing quantitative models as to their utility in or as part of the monitoring system (e.g. UBK lead model of US EPA, NHEXAS framework of US EPA, or other quantitative models).

2. Develop a monitoring system for biological lead and environmental lead for adoption by the LAC region countries. (May- August 1996).

- Identify regional centers for biological lead and environmental lead analysis.
- Recommend the best entity to maintain the database for the biological lead monitoring system. For example, the consultant will explore the feasibility of linking the surveillance system database to the GEMS/AIR monitoring network established by WHO and whose database is managed by US EPA, or the databases at the Latin American Center for Health Science Information in Bireme, Brasil funded by PAHO.
- Identify training needs in ministries to enable countries to collect valid useful samples of biological lead and environmental lead.
- Develop a case study to be presented at an August 1996 EHP Workshop, based upon existing experiences with establishment of biological lead baselines for national monitoring programs (USA, Mexico City) which will follow the Santa Cruz, Bolivia meeting of energy ministers in July 1996.

3. Hold a workshop to review the proposed monitoring system with focal points and stakeholders. (26-28 August 1996, Santiago, Chile)

- Lead a workshop with World Bank Focal Points, and representatives from LAC Ministries of Health and Ministries of Environment or Labor to refine the biological lead and environmental sampling protocols and the monitoring system.
- Present the case study developed under task 2 above.
- Present the feasibility and basic strategy on how to implement a reliable monitoring program (e.g., occasional surveys of representative high-risk populations), including collection of baseline data and follow-up sampling/surveillance, under the National Plans.
- Identify one or more host countries that will pilot-test the biological lead and/or environmental sampling protocols in a city this year, and establish a baseline before phase-out begins.
- Identify sites/institutions for the databases and laboratory analyses.

4. Pilot Test and finalize the monitoring system (September 1996 - April 1997)

- Conduct a pilot study of the biological lead and/or environmental sampling protocols in one city.
- Convey the information to a common source or consortium for data analysis (a database institution).
- Develop methods which facilitate a country's easy access to the data (e.g., Internet access similar to the WHO GEMS air monitoring program).
- Revise and finalize the monitoring system based on the pilot study's outcome.
- Deliver an interim report on the creation of the model monitoring system(s) in the follow-up conference on the Summit of the Americas. (December 1996)
- Write up and report results of pilot study/studies, and implement distribution plan for surveillance system document (by April 1997)

Consultant's Preferred Qualifications:

Language
- English fluency; Spanish helpful

Training/Education
- doctoral level education preferred, MD or PhD or DrPH; MS/MPH acceptable.
- epidemiological surveillance
- H/MIS

Experience
- lead policy experience
- experience in large scale monitoring program for environmental lead or biological lead
- H/MIS experience
- work experience in Latin America

Timeline:

May- June 1996:
Outline and finalize terms of reference with PAHO
Coordinate with World Bank on linked budget items (see Notes/Provisos below)
Prepare EHP's Activity Implementation Plan, and open the activity.
EHP recruit consultant
World Bank recruits workshop facilitator for August EHP workshop
Team planning meeting with consultant here at EHP with PAHO
Consultant attends proposed World Bank meeting with Focal Points and government delegations
Consultant develops workplan
Consultant travels to ECO/PAHO in Mexico and other sites as needed

July 1996:
Submit draft monitoring system to EHP and PAHO for comment and response.
Workshop materials translated, reproduced, and sent to workshop participants in advance.
Announce EHP/PAHO's activity at the Santa Cruz, Bolivia meeting of energy ministers.

August 1996:
Hold EHP workshop, as part of the World Bank/OAS/OLADE/ARPEL Workshop in 26-28 August in Santiago, Chile.
Distribute the draft guidelines to workshop participants.

September 1996- March 1997
Conduct pilot study/studies in one or more cities.
Consultant travels to assist in pilot study implementation, as needed

December 1996
Report out (interim report) on guidelines and development of monitoring system, at next Summit of the Americas follow-up meeting.

April 1997
Write up the final guidelines (model surveillance system document) and the results of pilot study/studies, and distribute the final guidelines.

Notes/Provisos:
1. USAID will pay for the EHP consultants costs associated with the August 1996 workshop, with the existing $50,000 grant to EHP. The World Bank will be asked to pay for a workshop facilitator, all workshop costs (e.g., hotel and room rental, meals, equipment and supplies), and participant costs - as a part of the Bank's commitment of funds to the development of the National Plans to eliminate lead in

gasoline. The Bank has expressed interest in doing so.

2. One or more countries will need to volunteer to conduct the pilot study. The World Bank will be asked to cover these costs - as a part of the Bank's commitment of funds to the development of the National Plans to eliminate lead in gasoline. The Bank has expressed interest in doing so. USAID Missions and RHUDO will be informed about the project and asked to support a pilot test site.
3. The World Bank would need to pay for the implementation of the monitoring programs in each country - as a part of the Bank's commitment of funds to the development of the National Plans to eliminate lead in gasoline. The Bank has expressed interest in doing so. USAID Missions and RHUDO will also be asked to co-fund this work.
4. During the pilot test phase the World Bank may be asked to supply MIS expertise.

BIBLIOGRAFIA

Title Lead intoxication in children with pervasive developmental disorders. Shannon M; Graef JW Children's Hospital, Harvard Medical School, The Massachuetts Poison Control System, Boston, MA 02115, USA. J Toxicol Clin Toxicol, 34: 2, 1996, 177-81 OBJECTIVE: To investigate the observation that children with pervasive developmental disorders have later and more prolonged lead exposure and are more likely to be reexposed when compared to lead-poisoned children without pervasive developmental disorders. DESIGN: Retrospective chart review. SETTING: A large, urban lead treatment program. RESULTS: Over a six year period 17 children with pervasive developmental disorders (including autism) were treated. Compared to a randomly selected group of 30 children without pervasive developmental disorders who were treated for plumbism over the sam interval, those with pervasive developmental delay were significantly older at diagnosis (46.5 vs 30.3 months, p = .03) and had a longer period of elevated blood lead levels (39.1 vs 14.1 months, p = .013) during management. Despite close monitoring, state-mandated environmental inspection and prompt lead hazard reduction or alternative housing, 75% of children with pervasive developmental disorders were reexposed to lead during medical management compared with 23% of children without pervasive developmental disorders (p = .001). CONCLUSIONS: 1) lead intoxication among children with pervasive developmental disorders may appear de novo beyond the third year of life and is associated with a high rate of reexposure; 2) the provision of deleaded housing (by current techniques) may not be sufficient to protect these children from repeated lead exposure; 3) these data support recommendations by the Centers for Disease Control that children with developmental delays be closely monitored for the appearance of lead intoxication. This monitoring should continue beyond the third year of life. An unknown risk group of lead poisoning: the gypsy children. Redondo MJ; Guisasola FJ Departamento de PediatrÀl Àa, Facultad de Medicina, C/RamÀ; Àn y Cajal, Valladolid, Spain. Eur J Pediatr, 154: 3, 1995 Mar, 197-200 Õ { M © 4 ÕAbstract The differences in average blood lead levels (PbB) between iron-deficient children of both gypsy and Caucasian origin were determined. PbB were assayed in 89 iron-deficient children (Group ID): 25 gypsies and 64 Caucasians. Two sub-groups were established: sub-group ID1, 57 iron-deficient children without anaemia (11 gypsies, 46 Caucasians), and sub-group ID2, 32 children with iron deficiency anaemia (14 gypsies; 18 Caucasians). Group IS composed of 41 iron-sufficient children (11 gypsies and 30 Caucasians) served as controls. Blood counts, red-cell indices, serum iron concentrations, serum ferritin, and PbB were determined for the entire study population. The average PbB for gypsy and Caucasian iron-deficient children, were 14.25 and 7.25 micrograms/dl (P < 0.01) respectively. The prevalence of iron-deficient children with toxic PbB (> 20 micrograms/dl) was higher in gypsies (24%) than in Caucasians (1.5%) (P < 0.01). A difference in average PbB between the two ethnic groups was also seen in children with normal iron metabolism (average PbB, 10.23 vs 5.65 micrograms/dl for gypsies and Caucasians, respectively, P < 0.001). CONCLUSION Gypsy children should be considered as a population group at risk of lead poisoning in our environment. Õ Õ ($ $ ÕTitle Contribution of tissue lead to blood lead in adult female subjects based on stable lead isotope methods [see comments] Author Gulson BL; Mahaffey KR; Mizon KJ; Korsch MJ; Cameron MA; Vimpani G Commonwealth Scientific and Industrial Research Organization, Sydney, Australia. Source J Lab Clin Med, 125: 6, 1995 Jun, 703-12 Public health and medical recommendations on prevention of lead toxicity rely on use of blood lead concentrations to assess lead exposure and predict onset of adverse health effects. Blood lead levels have generally been thought to reflect recent environmental lead exposures. However, tissue lead stores are accumulated over a long time period (i.e., years). These tissue stores, primarily from bone, can be remobilized as part of both normal physiologic and pathologic processes. Although chemical analyses do not differentiate lead isotopes, mass spectrometric determinations can differentiate the quantities of stable lead isotopes present in particular samples (e.g., lead 207, lead 206, lead 204, and lead 208). Selected geographic locations may have distinct isotopic profiles. For example, on mainland Australia the 206Pb/204Pb ratios reported in both environmental lead sources and blood samples are typically less than 17.0. ByÕ " P- <.<.<.Ø Ø 2Ý " ÕŒ contrast, stable lead isotope profiles in blood samples of adult women immigrating from Eastern Europe and the former Soviet Union usually have 206Pb/204Pb ratios greater than 17.5 and as high as 18.5 on entry into Australia. Longitudinal monitoring of blood samples to determine stable lead isotope profiles by mass spectrometry and chemical analyses of blood samples for total lead content were conducted over a 300-day period. These data show that between 45% and 70% of lead in blood comes from long-term tissue lead stores. Recognition that the predominant source of lead in blood was tissue stores rather than the contemporaneous environment should greatly modify recommendations on use of blood lead to monitor occupational or environmental interventions. In addition, internal biokinetics of lead, documented through presence of tissue lead in blood, underlie the long-term health risks of lead exposure. Transfer of lead to the fetus from maternal tissue stores represents a special area of concern. Content of some metals in mean tissue of salt-water and fresh-water fish and in their products. Krelowska-Kulas M Department of Food Commodity Science, Academy of Economics, Cracow, Polan. Nahrung, 39: 2, 1995, 166-72 The main goal of this work was to determine the concentration of some metals in meat tissue of salt-water and fresh-water fish and in their products. These studies refer to 13 species of fish most often eaten in Poland, caught in 1992. Fish (samples) for testing and examination were taken from each species once every month during the term of 6 months. The lead content in tested fish and their products did not exceed the set limits (0.6 mg Pb/kg), which were exceeded only in preserve from oyster. The average content of cadmium in flounder, Alaska pollack, Baltic herring, pickled herring pieces and in preserves with shrimp, crab and oyster exceeded the set limits (0.05 mg Cd/kg). The copper and zinc content in tested fish and their products is also within the set domestic limits (10.0 mg Cu/kg and 50.0 mg Zn/kg). The iron (3.6-24.2 mg/kg), magnesium (170-380 mg/kg) and manganese (0.12-0.31 mg/kg) contents in muscle tissue of the tested fish and their products seem to be typical. The presence of absolutely toxic metals (lead and cadmium) in some species of fish and their products points to extreme contamination of water environment by those metals. Violence in schools: why--and what can we do about it? Gilbert SE 2nd School of Education, Purdue University, West Lafayette, IN 47907-1442, USA. J Health Care Poor Underserved, 6: 2, 1995, 205-8 This paper discusses the causes and effects of the violence that occurs in schools. The author explores the notion of need (to be a part of, to belong, and to be connected) as it relates to the tendency toward violence, and conversely, the association between success in school, which allows for the development of positive self-esteem and therein socially acceptable behavior, with a tendency toward nonviolence. The paper explains how behavioral factors common to poor and disadvantaged

students, such as a lack of esteem for self and for their educational institution contributes to a failure cycle. The paper also suggests that the development of the affective domain, coupled with sensitivity to culture, good instruction, and an educational environment that nurtures success, leads to an effectively functioning individual with a social, economic, political, and ethnic identity. Lead and cadmium in human placentas and maternal and neonatal blood (in a heavily polluted area) measured by graphite furnace atomic absorption spectrometry. Baranowska I Department of Analytical and General Chemistry, Silesian Technical University, Gliwice, Poland. Occup Environ Med, 52: 4, 1995 Apr, 229-32 OBJECTIVE--To measure the concentrations of the trace elements lead and cadmium in human placenta and in maternal and neonatal (cord) blood. To assess the influence of the strongly polluted environment on the content of metals in tissues and on the permeability of placenta to cadmium and lead. Various methods of mineralisation were tested before analysis. METHODS--Graphite furnace atomic absorption spectrometry was used for the determination of lead and cadmium. The samples for analysis were prepared by mineralisation under pressure in a Teflon bomb (HNO3, 110 degrees C), by wet ashing under normal pressure (HNO3 + H2O2 for 12 hours), and by microwave digestion in concentrated nitric acid. RESULTS--In analysed samples the following mean concentrations of cadmium and lead were found: in venous blood Pb = 72.50 ng/ml, Cd = 4.90 ng/ml; in placenta Pb = 0.50 microgram/g, Cd = 0.11Õ " P- <.<.<.Ø Ø 2Ý " ÕŒ microgram/g; in cord blood Pb = 38.31 ng/ml, Cd = 1.13 ng/ml. CONCLUSION--High concentrations of lead and cadmium were found in placentas and in maternal blood whereas in neonatal blood there was an increased concentration of lead and only traces of cadmium. It is concluded that the placenta is a better barrier for cadmium than for lead. Among the examined methods of mineralisation, microwave digestion was the best. Oral dimercaptosuccinic acid and ongoing exposure to lead: effects on heme synthesis and lead distribution in a rat model. Pappas JB; Ahlquist JT; Allen EM; Banner W Jr Department of Pediatrics, University of Utah, Salt Lake City 84112, USA. Toxicol Appl Pharmacol, 133: 1, 1995 Jul, 121-9 Lead (Pb) exposure and subsequent toxicity continues to be a significant problem in the United States. Treatment with meso-2,3-dimercaptosuccinic acid (DMSA) has been reported to be effective in reducing the body's Pb burden, with fewer adverse side effects than other chelating agents. The oral availability and relative safety of DMSA presents the controversial option of treating patients with Pb poisoning on an outpatient basis. Despite recommendations that children be removed from the Pb contaminated environment, some children will inevitably be exposed to environmental Pb whileÕ " - <.<.<.Ø Ø à+Ð " ÕŒ receiving oral DMSA therapy. The study hypothesized that oral DMSA chelation therapy is beneficial even when faced with continued dietary Pb. Sprague-Dawley rats were exposed to Pb in water for 35 days and then placed in various treatment groups, including groups administered oral DMSA with and without concurrent Pb exposure. The concentration of Pb in blood and critical organs and Pb diuresis were measured. The effect of Pb on heme synthesis was determined by assaying the urinary delta-aminolevulinic acid (delta-ALA), and blood zinc protoporphyrin (ZPP). DMSA reversed the hematological effects of Pb, decreased the blood, brain, bone, kidney, and liver Pb concentration, and produced a marked Pb diuresis, even when challenged with ongoing Pb exposure. In conclusion, even though DMSA treatment without exposure to Pb is optimal, oral DMSA could be beneficial even when challenged with ongoing Pb exposure. Renal

effects in children living in the vicinity of a lead smelter. Bernard AM; Vyskocil A; Roels H; Kriz J; Kodl M; Lauwerys R Industrial Toxicology and Occupational Medicine Unit, University of Louvain, Brussels, Belgium. Environ Res, 68: 2, 1995 Feb, 91-5 A cross-sectional study was carried out to determine whether environmental exposure of children to lead may cause renal effects. The study involved a total of 195 children aged 12 to 15 years. One hundred forty-four children (63 boys and 81 girls) were recruited from two schools in the vicinity of a lead smelter and 51 (25 boys and 26 girls) from a school in a rural area. Compared to their referents, boys and girls from the two schools in the polluted area had significantly higher levels of lead in blood (PbB) but similar levels of cadmium (CdB) and zinc protoporphyrins (ZPP). The functional integrity of the kidney was assessed by measuring the urinary excretion of beta 2-microglobulin, Clara cell protein, retinol-binding protein (RBP), albumin and beta-N-acetyl-D-glucosaminidase. The most significant and consistent finding of the study was that children from the two schools in the polluted area showed a significant elevation of the urinary excretion of RBP that paralleled the level of lead in blood or in the dust collected on the school playgrounds. A similar pattern was observed for the prevalence of elevated values of urinary RBP which increased from 3.9% in the control area up to 17% in the most polluted school. Urinary RBP was found to be associated with PbB (partial r2 = 0.046, P = 0.005) in a stepwise regression analysis testing also the influence of age, sex, CdB, and ZPP. In conclusion, the present study suggests that lead contaminating the environment may cause slight effects on the proximal tubule function in children at exposure levels close to those associated with CNS deficit. The potential utility of animal poisoning data to identify human exposure to environmental toxins. Hungerford LL; Trammel HL; Clark JM Department of Veterinary Pathobiology, College of Veterinary Medicine, University of Illinois, Urbana-Champaign 61801, USA. Vet Hum Toxicol, 37: 2, 1995 Apr, 158-62 The database of the National Animal Poison Control Center (NAPCC) was evaluated as a source for animal poison data indicating human health hazards in indoor and outdoor environments. From 14,150 calls in the 1985 database, 259 cases were identified with histories suggesting human exposure. A subgroup of 25 cases with known human exposure was found. Dogs were the most common sentinel animal, but bird cases represented the highest proportional selection from the total 1985 call list. Indoor exposures represented 43.2% of cases; the most common toxicants were insecticides, lead and toxic fumes. Exposures associated with lawns were mainly due to insecticides and herbicides and constituted 25.5% of cases. Other outdoor exposures composed the remaining 31.7% of cases, with insecticides, herbicides and unidentified toxins the leading categories. Many of the specific agents identified, such as organophosphate insecticides, lead, gas and fume toxins, and phenoxy herbicides are also risk factors in human diseases. This study indicates that databases such as NAPCC could serve as sources of sentinel animal intoxications for followup studies to evaluate known and potential human health hazards. Ô " - <.<.<.Ø Ø à+Ð " ÕŒ™Title Elevated environmental lead levels in a day care setting. Weismann DN; Dusdieker LB; Cherryholmes KL; Hausler WJ Jr; Dungy CI Department of Pediatrics, University of Iowa, Iowa City, USA. Arch Pediatr Adolesc Med, 149: 8, 1995 Aug, 878-81 OBJECTIVE: To determine the risk of lead poisoning among children enrolled in day care centers with elevated environmental lead burdens. DESIGN: Survey. SETTING: Six day care centers on properties owned by a major state-supported

university. PATIENTS AND OTHER PARTICIPANTS: One hundred fifty-five of 234 eligible children (mean age, 4.8 years) enrolled in these centers were screened by questionnaire for risk factors of lead exposures. Blood samples for lead levels were also obtained. Observations of day care activities relative to lead exposure risks were recorded. Analyses of lead levels in paint, dust, and/or soil samples at the six centers were obtained. MAIN OUTCOME MEASURES: Prevalence of elevated blood lead levels and associated behavioral risk factors for lead exposure in children attending day care centers. RESULTS: Elevated levels of lead in paint (2.4% to 40% lead) were present in all day care facilities. Three day care centers had elevated lead levels in windowsill dust (62,000 to 180,000 g of lead per square meter) or soil (530 to 1100 mg of lead per kilogram): Questionnaires documented low risk for lead exposure to children in the home environments. Direct observations in the day care setting revealed optimal supervision and hygiene of the children. Blood lead levels were less than 0.5 mumol/L (10 micrograms/dL) in all but one of the 155 children screened. CONCLUSIONS: Children attending day care centers with high environmental lead burdens need further documentation of blood lead levels, at-risk behaviors, and lead exposure risks in the home environments as an adjunct to the instigation of lead abatement procedures at the day care centers. Blood lead concentrations in school children of Upper Silesian Industrial Zone, Poland. Zejda JE; Sokal A; Grabecki J; Panasiuk Z; Jarkowski M; Skiba M Institute of Occupational Medicine and Environmental Health, Sosnowiec, Poland. Cent Eur J Public Health, 3: 2, 1995 May, 92-6 Upper Silesian Industrial Zone (Katowice Voivodship, Poland), the country most industrialized and densely populated region is well recognized for the magnitude of environmental problems. Due to local lead mining and processing environmental exposure to lead is considered one of the most important hazards to the health of children. In the past, clinically confirmed cases of lead intoxication in children have been found and recent blood lead monitoring in major point source impact areas have documented increased blood lead concentration in children. However, much less is known about blood lead concentrations in general population of children who are exposed to increased levels of lead in ambient and soil. The study was undertaken in order to estimate the mean blood lead concentration (PbB) and its range in children aged seven years residing in urban non-point source impact area of Katowice Voivodship, and to examine potential determinants of increased blood lead concentration in these children. In a systematic sample of 431 children aged 7 years (208 girls and 223 boys), living in two large cities in the centre of Upper Silesian Industrial Zone the geometric mean and standard deviation of PbB was 7.94 +/- 1.48 micrograms/dl (range 4.0-38.0 micrograms/dl) and did not depend on sex or the city of residence. PbB equal to or larger than 15 micrograms/dl was found in 8.1% of children and PbB equal to or larger than 10 micrograms/dl in 27.4% of children. Blood lead concentration was associated with a number of factors that could be classified as family factors, housing and environmental factors. The identified risk factors add credibility to suggested directions of preventive measures that should extend beyond already implemented lead emission control in the industry and involve increased use of unleaded gasoline, upgrading of housing conditions and promotion of proper hygienic standards on a household level. The findings of the study indicate that children living in urban area of Upper Silesian Industrial Zone are at risk of overexposure to lead in environment, and justify the implementation of population-based screening program targeting children in younger age groups in the region.

Ô " - <.<.<.Ø Ø à+Ð " ÔŒ Electrical activity, growth cone motility and the cytoskeleton. Neely MD; Nicholls JG Department of Pharmacology, University of Basel, Switzerland. J Exp Biol, 198 (Pt 7):1995 Jul, 1433-46 The development of the nervous system takes place in two main steps: first an extensive preliminary network is formed and then it is pruned and trimmed to establish the final form. This refinement is achieved by mechanisms that include cell death, selective growth and loss of neurites and the stabilization and elimination of synapses. The focus of this review is on selective neurite retraction during development, with particular emphasis on the role of electrical activity. In many developing vertebrate and invertebrate neurones, the frequency and duration of ongoing impulse activity determine the final arborizations and the pattern of connections. When impulse traffic is silenced, axons fail to retract branches that had grown to inappropriate destinations in the mammalian visual system, cerebellum and neuromuscular junctions. Similarly, in crustaceans, Drosophila melanogaster and leeches, refinements in axonal morphology during development are influenced by impulse activity. From experiments made in culture, it has been possible to mimic these events and to show a clear link between the density of voltage-activated calcium channels in a neurite and its retraction following stimulation. The distribution of these calcium channels in turn is determined by the substratum with which the neurites are in contact or by the formation of synapses. Several lines of evidence suggest that calcium entry into the growth cone leads to collapse by disruption of actin filaments. One candidate for coupling membrane events to neurite retraction is the microfilament-associated protein gelsolin which, in its calcium-activated state, severs actin filaments. Open questions that remain concern the differential effects of activity on dendrites and axons as well as the mechanisms by which the growth cone integrates information derived from stimuli in the cell and in the extracellular environment. Health risks associated with prenatal metal exposure. Zelikoff JT; Bertin JE; Burbacher TM; Hunter ES; Miller RK; Silbergeld EK; Tabacova S; Rogers JM New York University Medical Center, New York 10016, USA. Fundam Appl Toxicol, 25: 2, 1995 May, 161-70 A symposium entitled Health Risks Associated with Prenatal Metal Exposure was held at the 33rd Annual Meeting of the Society of Toxicology (SOT) in Dallas, Texas. The symposium was cosponsored by the Metals and Reproductive and Developmental Specialty Sections of SOT and was designed to elaborate the health risks associated with in utero exposure to metals commonly found in the workplace and/or ambient environment on the mother and developing offspring. Epidemiological and toxicological evidence that demonstrates the health effects and underlying mechanisms associated with exposure to arsenic (As), lead (Pb), and methyl mercury (MeHg) were discussed, as well as the legal ramifications and personal implications associated with prenatal metal exposure. The following is a summary of each of the individual presentations. *********Title Predictors of blood lead levels in organolead manufacturing workers. McGrail MP; Stewart W; Schwartz BS Department of Environmental Health Sciences, Johns Hopkins University, School of Hygiene and Public Health, Baltimore, Maryland 21205, USA. J Occup Environ Med, 37: 10, 1995 Oct, 1224-9 The relations between recent and cumulative exposure to organic and inorganic lead and blood lead levels were examined in 222 organolead manufacturing workers. Personal monitoring data grouped by 29 exposure zones wereÔ " - <.<.<.Ø Ø à+Ð " ÔŒ used to derive estimates of recent and cumulative occupational exposure. Recent exposure to organic lead and recent combined exposure to organic and

inorganic lead were significantly and positively associated with blood lead levels. Exposure duration was found to modify the relation between recent inorganic lead exposure and blood lead levels. Age and cigarette smoking were positively associated with blood lead levels, whereas alcohol use was associated with lower blood lead levels. This is in notable contrast to the influence of alcohol consumption on blood lead levels among inorganic lead workers or the general population. Furthermore, the data suggested that current alcohol use modified the relation between recent organic lead exposure and blood lead levels (P = .08): current alcohol users evidenced less of an increase in blood lead levels with increasing recent organic lead exposures than did workers who did not currently use alcoholic beverages. The data suggest that organic lead exposure affects blood lead levels, probably after dealkylation to inorganic lead. The associations with alcohol consumption may be evidence for differences in enzyme-mediated metabolism of organolead compounds. Finally, the data suggest that recent external lead exposure and internal lead stores both influenced blood lead levels in these workers. Relationship between blood lead and nutritional factors in preschool children: a cross-sectional study. Lucas SR; Sexton M; Langenberg P University of Maryland School of Medicine, Department of Epidemiology and Preventive Medicine, USA. Pediatrics, 97: 1, 1996 Jan, 74-8 OBJECTIVE. The purpose of this study was to assess the relationships between selected nutritional factors and blood lead levels of preschool children. METHODOLOGY. Data on 296 children, aged 9 to 72 months, who were cared for at the University of Maryland at Baltimore Pediatric Ambulatory Center were examined in this cross-sectional study. Nutritional status, socioeconomic aspects, medical history, and potential sources of lead exposure were assessed. Blood samples were evaluated for levels of blood lead, serum iron (ferritin), free erythrocyte photoporphyrin, calcium, and hematocrit. RESULTS. The average blood lead level was 11.4 micrograms/dL. Multicollinearity of nutritional factors was addressed using regression techniques. After adjusting for confounders, significant positive associations with blood lead were found for total caloric intake (P = .01) and dietary fat (P = .05). CONCLUSIONS. The findings of this study suggest that even when behavioral and environmental exposures to lead were statistically controlled, total caloric intake and dietary fat each had an independent and significant association with the level of blood lead. Lead-binding proteins in brain tissue of environmentally lead-exposed humans. Quintanilla-Vega B; Smith DR; Kahng MW; HernÃ Ãndez JM; Albores A; Fowler BA Toxicology Program, University of Maryland, Baltimore 21227, USA. Chem Biol Interact, 98: 3, 1995 Dec 22, 193-209 This study reports the partial purification and characterization of cytosolic lead binding proteins (PbBPs) in human brain tissue of environmentally Pb-exposed subjects. The isolated proteins were initially characterized based upon the presence of endogenously associated Pb. Following partial purification (Sephadex G-75 and A-25 DEAE anion-exchange chromatography), the isolated PbBPs (contained within a single DEAE peak) showed a single class of high affinity binding sites with an apparent Kd of 10(-9) M, based upon competition assays using radioactive 203Pb and Hill and Scatchard analysis. The presence of endogenously bound Pb with the isolated proteins indicated the association of Pb with the protein(s) in vivo in these environmentally Pb-exposed subjects, since the samples were prepared in an ultraclean lead analysis laboratory. Moreover, the persistence of Pb-protein binding throughout the initial two steps (Sephadex G-75 and A-25 DEAE) of the purification scheme is consistent with the high affinity and stability of binding measured with the radiolead competition assays. The DEAE isolated PbBPs were further purified by denaturing reversed-phase HPLC analysis, resulting in the isolation of two proteins, thymosin beta 4 (5 kDa, pI 5.1) and a second as yet unidentified protein with an approximate molecular mass of 20Ô " - ‹.‹.‹.Ø Ø à+Ð " ÔŒ kDa and a pI of 5.9. Qualitative 203Pb-binding analysis of these HPLC purified proteins suggested that they may be primarily responsible for the observed Pb binding in the single DEAE peak. Nearly identical results were obtained in brain cytosols from male and female, and young and adult individuals, although further quantitative analyses are needed to investigate possible sex and age relationships. These data are significant because they contribute to a better understanding of the presence of PbBPs in a sensitive target organ for Pb toxicity in humans, suggesting a possible role of these or similar proteins as sensitive biomarkers of Pb exposure and toxicity. Nutrition and lead: strategies for public health. Mahaffey KR Environmental Criteria and Assessment Office, U.S. Environmental Protection Agency, Cincinnati, Ohio, USA. Environ Health Perspect, 103 Suppl 6:1995 Sep, 191-6 Abstract not available online. The disproportionate impact of environmental health threats on children of color. Mott L Natural Resources Defense Council, San Francisco, CA 94105, USA. Environ Health Perspect, 103 Suppl 6:1995 Sep, 33-5 Children receive greater exposures to environmental pollutants present in air, food, and water because they inhale or ingest more air, food, or water on a body-weight basis than adults do. Communities of color are disproportionately exposed to hazardous wastes, dioxin, and air pollution. Existing data demonstrate that children of color are the subgroup of the population most exposed to certain pollutants, including lead, air pollution, and pesticides. Government standards do not take into account children's differential exposures or the cumulative nature of these exposures. Federal regulations fail to protect the most highly exposed and most sensitive subgroups of the population. More often than not this group is children of color. The effects of air pollution on children. Bates DV Department of Health Care and Epidemiology, University of British Columbia, Vancouver, Canada. Environ Health Perspect, 103 Suppl 6:1995 Sep, 49-53 Air pollutants have been documented to be associated with a wide variety of adverse health impacts in children. These include increases in mortality in very severe episodes; an increased risk of perineonatal mortality in regions of higher pollution, and an increased general rate of mortality in children; increased acute respiratory disease morbidity; aggravation of asthma, as shown by increased hospital emergency visits or admissions as well as in longitudinal panel studies; increased prevalence of respiratory symptoms in children, and infectious episodes of longer duration; lowered lung function in children when pollutants increase; lowered lung function in more polluted regions; increased sickness rates as indicated by kindergarten and school absences; the adverse effects of inhaled lead from automobile exhaust. These impacts are especially severe when high levels of outdoor pollution (usually from uncontrolled coal burning) are combined with high levels of indoor pollution. In developed countries, where indoor pollution levels are lower, increasing traffic density and elevated NO2 levels with secondary photochemical and fine particulate pollution appear to be the main contemporary problem. By virtue of physical activity out of doors when pollution levels may be high, children may experience higher exposures than adults. Air pollution is likely to have a greater impact on asthmatic children if they are without access to routine medical care.

[Effect of carbaryl and lead on phenols, chlorophyll and proteins of the microalga Ankistrodesmus falcatus] Ô " - <.<.<.Ø Ø à+Ð " ÔŒOriginal Title Efecto del carbaril y del plomo sobre fenoles, clorofila y proteÀl Ànas de la microalga Ankistrodesmus falcatus. MartÀl Ànez-Tabche L; GermÀ Àn-Faz C; RamÀl Àrez-Mora B; Galar-CastelÀ Àn I Laboratorio de ToxicologÀl Àa AcuÀ Àtica, Departamento de ToxicologÀl Àa de Graduados, Escuela Nacional de Ciencias BiolÀ; Àgicas, I.P.N., MÀ) Àxico, D.F., Mexico. Rev Latinoam Microbiol, 37: 2, 1995 Apr-Jun, 93-9 Considering that Ankistrodesmus falcatus is very sensitive to different pollutants, in this work the effect of lead, carbaryl and a mixture of both pollutants on protein, chlorophyll and phenols concentration in this microalga have been studied. At different lots of Ankistrodesmus falcatus in the middle of the log growth phase, different concentrations of lead, carbaryl and a mixture of both pollutants were added, during 24, 48 and 72 h. Chlorophyll, proteins and phenols concentration was measured. The results show that the mixture of lead-carbaryl produces a major toxic effect than the xenobiotics by themselves, so it has been suggested that to establish permissible limits it is necessary to consider the synergism presented in simultaneous exposure to both xenobiotics. It is suggested to use phenols determination as a primary indicator of environmental impact in an aquatic ecosystem. [Content of lead, cadmium, mercury, zinc and copper in fruit from various regions of Poland] Title Zawartosc olowiu, kadmu, rteci,cynku i miedzi w owocach z rÀ; Àznych regionÀ; Àw Polski. Wojciechowska-Mazurek M; Zawadzka T; Karlowski K; Starska K; Cwiek-Ludwicka K; Brulinska-Ostrowska E Zakladu Badania Zywnosci i PrzedmiotÀ; Àw Uzytku Panstwowego Zakladu Higieny. Rocz Panstw Zakl Hig, 46: 3, 1995, 223-38 The content of lead, cadmium, mercury, zinc and copper was determined in various species of fruit gathered in Poland in the period 1989-1991. Samples for the determinations were taken from regions not directly exposed to air pollution from industrial plants and traffic. The content of Pb, Cd, Zn and Cu was determined after dry mineralization (at about 400 degrees C) by the flame ASA technique: Cu and Zn were determined directly in mineralizate solution, Pb and Cd after extraction of their complexes with APDC; Hg after wet mineralization by flameless ASA "cold vapour" method. About 10000 samples of fruit and about 300 samples of soil from the sites where the fruit was collected were investigated. The highest lead levels were found in strawberries, raspberries and currants (about 0.1 mg/kg on average), cadmium in raspberries and strawberries (mean 0.02 mg/kg). Mercury, zinc and copper levels were low. The levels of all these metals were lowest in apples and pears (Pb-mean 0.010-0.089 mg/kg, Cd mean 0.001-0.006 mg/kg, Cd mean 0.001-0.006 mg/kg). The content of metals in fruit, but ever more in soil, from highly industrialized areas was significantly higher. The authors suggest lowering in the Polish legislation of the maximal acceptable lead concentration in all types of fruit down to 0.20 mg/kg, and cadmium to 0.03 mg/kg for all types of berries and 0.02 mg/kg for the remaining fruit types. Utility of a risk assessment questionnaire in identifying children with lead exposure. Dalton MA; Sargent JD; Stukel TA Department of Pediatrics, Dartmouth-Hitchcock Medical Center, Lebanon, NH, USA. Arch Pediatr Adolesc Med, 150: 2, 1996 Feb, 197-202 OBJECTIVE: To evaluate the utility of the Centers for Disease Control and Prevention (CDC) Risk Questionnaire and a behavioral risk factor questionnaire in identifying children with blood lead concentrations of 0.48 mumol/L (10Ô " - <.<.<.Ø Ø à+Ð " ÔŒ micrograms/dL) or more. DESIGN: Cross-sectional study of 463 urban Massachusetts children (6 to 72 months of age) screened for lead with venous blood. RESULTS: Twenty-two percent of the children had elevated blood lead concentrations. Of the five CDC questions, only one was significantly associated with an increased adjusted odds ratio for elevated blood lead: having a sibling, housemate, or playmate who was followed up or treated for lead poisoning (odds ratio, 2.7; 95% confidence interval, 1.7 to 4.2; P < .001). Children who had at least one positive or equivocal response to any of the five CDC questions (n = 318 [68.7%]) were not at higher risk than were children who displayed a negative response to all five questions (odds ratio, 1.1; 95% confidence interval, 0.7 to 1.8; P = .69). Of nine behaviors surveyed, two were associated with an increased adjusted odds for elevated blood lead: use of a pacifier (odds ratio, 2.4; 95% confidence interval, 1.3 to 4.4; P = .01) and playing near the outside of the home (odds ratio, 3.4; 95% confidence interval, 2.0 to 5.8; P < .001). CONCLUSIONS: In this population of children, the CDC risk questionnaire did not identify a group at higher risk for lead exposure. We suggest that practitioners in urban communities screen all children according to the same schedule. We conclude that risk factors differ by community and no risk questionnaire developed at the national level should be applied across communities to target screening. [Lead in drinking water, determination of its concentration and effects of new recommendations of the World Health Organization (WHO) on public and private networks management] TitleÔ Ô ($É" Ô Le plomb dans les eaux d'alimentation, dÀ) Àtermination de sa concentration et incidence des nouvelles recommandationsl'Organisation Mondiale de la SantÀ) À (OMS) sur la gestion des rÀ) Àseaux de distribution, publics et privÀ) Às. Vilagines R; Leroy P Centre de Recherche et de ContrÀ= Àle des Eaux de la Ville de Paris (CRECEP), Paris. Bull Acad Natl Med, 179: 7, 1995 Oct, 1393-408 In 1993, the World Health Organization (WHO) has given a guideline value of 10 microgram/l for lead in drinking water, a phased approach should lead to a temporary parametric value of 25 micrograms/l within 5 years the final concentration value of 10 micrograms/l being achieved after 15 years. So far the current European Community Directive 80/778 and the French decree 89/3 stipulate a Maximum Admissible Concentration (MAC) for lead of 50 micrograms/l. In a first step we studied the mechanisms of plumbosolvency in corrosive and scaling water. In the first case we have shown that simple oxidative corrosion of lead pipes forms a coating of lead carbonate and hydroxicarbonate on the inside wall of the pipe but "plumbosolvent" waters can dissolve those products, although at a lower level, resulting in a rather high lead concentration. In the case of scaling waters there is a co-precipitation of insoluble calcium carbonate but only on the microcathodics zones of the lead pipe. As this precipitate is poorly cohesive and does not cover the entire surface of the pipe its oxidative corrosion can proceed. In a second step we have shown the major importance of sampling for the determination of lead concentration in drinking water. We therefore compared random day time sampling, first draw and flushed samplings and composite proportional sampling. Only this last method gave a reasonably accurate idea of lead's amounts ingested by drinking water's consumers. The control of corrosion in lead-containing materials involves two successive steps: the reduction of lead concentration to 25 micrograms/l within five years and the compliance with the final 10 micrograms/l concentration 15 years later. The first step consists in water treatments such as pH increase, adjustment of alkalinity and addition of orthophospates. But available data suggest that it is unlikely that lead concentration could be reduced

consistently to below 10 micrograms/l by avalable water treatment methods alone but it would enable to match the parametric 25 micrograms/l value in the great majority of cases. Therefore, to unable compliance with the 10 micrograms/l parametric value, it will be necessary to replace all the internal plumbing and supply lead pipes (70,000 buildings for Paris only). Data for materials able to replace lead such as plastic pipes are not yet complete and an currently under investigations. Although the United States Environmental Protection Agency have suggested in its 1988 report on air quality criteria for lead report (EPA 600/8-33-028 aF-dF) that each 1 microgram/l of lead in water can lead to an increase of blood lead levels of approximately 0.2 micrograms/l for a child, the data are still uncertain. The considerable cost of these works (143 billion of french francs for France and 347 billions of french francs for Europe), unrelated to any important Public Health problems, arises an ethical problem which has to be considered in view of many others letal illnesses such as heart and circulatory diseases, cancer and AIDS. Ô " - <.<.<.Ø Ø à+Ð " ÔŒ™Title [Toxicity of chemical elements] Title Aspetti della tossicitÀ! À da elementi chimici. Olibet G; Coccini T; Rossi AD; Castoldi AF; Manzo L Fondazione Clinica del Lavoro, Pavia. Ann Ist Super Sanita, 31: 2, 1995, 283-8 A survey is presented of the most important facets of toxicity due to chemical elements as well as of the mechanisms through which it may be triggered. In particular, a detailed discussion is made on the characteristics shown by arsenic, cadmium, chromium, lead, mercury, barium and beryllium, with specific reference to the influence exerted by physiological, environmental and life-style factors. Health effects of outdoor air pollution. Part 2. Committee of the Environmental and Occupational Health Assembly of the American Thoracic Society. Anonymous Am J Respir Crit Care Med, 153: 2, 1996 Feb, 477-98 Although sources of airborne lead have been reduced over the last decade, particularly with the use of lead-free gasoline, there are still relatively high levels of lead contamination in soils and the residential housing stock built before the 1970s, which pose a risk for continued direct exposure through ingestion or airborne exposure if resuspended. Neurobehavioral effects, particularly as a result of early childhood exposures, have been documented, and, because of the way lead is stored in the body, late effects can become manifest during periods of high bone turnover (e.g., pregnancy, lactation, or hyperthyroidism). Late consequences not only relate to lead excretion affecting the fetus or newborn but also appear to be associated with hypertension in adults. Control of exposure in early life is an important component of appropriate preventive action. Lead toxicity and public health policy. Millstone E; Russell J Science Policy Research Unit, Sussex University, Brighton. J R Soc Health, 115: 6, 1995 Dec, 347-50 Senior UK scientists have recently acknowledged that lead exerts neurotoxic effects at blood lead levels even as low as 10 micrograms/dL. The implications of these findings for public policy are outlined, especially in relation to contamination of drinking water, soil and household dust. Estimates of the proportion of 6 year old children with elevated blood lead levels for several locations are also provided. Effect of lead on tube formation by cultured human vascular endothelial cells. Kishimoto T; Oguri T; Ueda D; Tada M Department of Environmental Medicine, Shimane Medical University, Izumo, Japan. Arch Toxicol, 69: 10, 1995, 718-21 Ô " - <.<.<.Ø Ø à+Ð " ÔŒAbstract The effect of lead acetate (Pb) on the growth of and tube formation by cultured human umbilical vascular endothelial cells (HUVEC) was examined. HUVEC were collected by enzymatic digestion with collagenase. The number of viable cells of HUVEC was negligibly affected by cultivation with Pb at concentrations of 1-100 microM, but was slightly reduced by cultivation at 500 microM. Tube formation was studied by culturing the cells on a gelled basement membrane matrix (Matrigel). Treatment of HUVEC with 0.1-50.0 microM Pb for 24 h inhibited tube formation dose-dependently. The length of tube formation decreased time-dependently with 1.0 microM Pb. These findings suggest that Pb inhibits the formation of a capillary network by HUVEC, and that Pb could be injurious to endothelial cell function. Background exposure of general population to cadmium and lead in Tainan city, Taiwan. Ikeda M; Zhang ZW; Moon CS; Imai Y; Watanabe T; Shimbo S; Ma WC; Lee CC; Guo YL Department of Public Health, Kyoto University Faculty of Medicine, Japan. Arch Environ Contam Toxicol, 30: 1, 1996 Jan, 121-6 Venous blood samples, 24-h total food duplicate samples, and rice samples were collected from 52 adult non-smoking women in the city of Tainan, southern Taiwan, in 1994, and analyzed for cadmium (Cd) and lead (Pb) by wet-digestion followed by graphite furnace atomic absorption spectrophotometry. Daily dietary intake was 10 micrograms for Cd and 22 micrograms for Pb as geometric means, of which Cd and Pb in rice accounted for 34% and 1.4% of daily Cd and Pb intakes, respectively. The counterpart values for blood were 1.11 ng/ml and 44.5 ng/ml for Cd and Pb, respectively. International comparison with recently published data suggests that the exposure to Cd in Tainan should be among the lowest in the world. [Toxic compounds in our environment--challenge or cost of prosperity] Title Schadstoffe in unserem Lebensraum--Herausforderung oder Preis fÀG Àr den Wohlstand? Forth W Walther-Straub-Institut fÀG Àr Pharmakologie und Toxikologie, Ludwig-Maximilians-UniversitÀ Àt M%aunchen. Zentralbl Hyg Umweltmed, 197: 1-3, 1995 Apr, 162-79 The goal of this contribution was the description of the possibilities as well as the limitations to which a toxicologist is confronted when evaluating potential toxic compounds to which human beings can be exposed during their lifetime. The number of substances is overwhelming. The available methods for the evaluation are not satisfactory for everybody. Nevertheless, the results are not as bad as sometimes is asserted: in the industrial societies, the expected life span of men increases. The evaluation of the effects is unsatisfactory especially for the carcinogenic and allergic potential of foreign compounds. This is the consequence of our limited knowledge about the biological processes underlaying these effects, or, in other words, research must be intensified in this field. Finally, the experiences of the public as well as of the media with risks and their evaluation are not satisfactorily developed. The intellectual development of the public is rather slow compared to that in business life and economics. This means that everybody oughts to acquire knowledge in order to be able to make appropriate decisions in a world increasingly complicated. Otherwise, our society ends up with a convenient home for the aged combined with a cemetery. And this, by the way, is less than a recreation center (Freizeitpark). Trace and heavy metal analyses of a skeletal population representing the town people in Turku (Abo), Finland in the 16th-17th centuries: with special reference to gender, age and social background. Ô " - <.<.<.Ø Ø à+Ð " ÔŒ Vuorinen HS; Pihlman S; Mussalo-Rauhamaa H; Tapper U; Varrela T Department of Public Health, University of Helsinki, Finland. Sci Total Environ, 177: 1-3, 1996 Jan 5, 145-60 The Julin site in the city of Turku, Finland, was excavated in 1964, 1983-1985 and 1987. On this site are the remains of

the church of the Holy Spirit with its cemetery. The burial period of the excavated skeletons lasted most probably from the 1580s to the 1650s. Sodium, phosphorus, calcium, manganese, iron, copper, zinc, bromine, strontium and lead concentrations of ribs from skeletal remains of 141 individuals were analyzed. The main finding is that the concentrations of Sr and Zn in younger women tend to be lower than that in men of a corresponding age, and in older people both the strontium and zinc values tend to be higher in women than men. On the basis of this study the Pb exposure in the early modern population in Finland was at a very low level. We conclude that the role of migration and the source of grain supply on the variation of the elemental values are more difficult to evaluate than the role of diagenesis. An epidemiological perspective on environmental health indicators. Pastides H Department of Biostatistics and Epidemiology, School of Public Health, University of Massachusetts at Amherst, USA. World Health Stat Q, 48: 2, 1995, 140-3 There is a great amount of ongoing discussion about the need to develop new ways to assess and monitor a population's disease susceptibility to environmental factors. The ultimate goal in developing these tools, called environmental health indicators, is to increase the public health community's capacity for implementing interventions to prevent disease. Much of the discussion focuses on the requirement that the indicators be relatively easy and quick to apply. However, in the rush to find useful existing indicators, or to develop new ones, there is the danger that certain other important attributes of the indicator may be overlooked. These include: (a) whether the indicator truly represents an underlying causal relationship between an environmental exposure and a health consequence; and (b) whether the proposed indicator is a reasonably valid estimate of the underlying causal factor. This article provides a framework for relating environmental health indicators to the methods of epidemiology including some guidance for selecting and evaluating the appropriateness of proposed environmental health indicators. Examples are given which demonstrate how environmental health indicators can lead to a biased interpretation of underlying associations between environmental factors and the potential for disease when they are improperly conceived. These problems can be avoided by employing routine epidemiological concepts and methods as indicators are developed and evaluated. Linkage failures in ecological studies. Nurminen M Department of Epidemiology and Biostatics, Finnish Institute of Occupational Health, Helsinki, Finland. World Health Stat Q, 48: 2, 1995, 78-84 Ecological studies require a methodological theory distinct from that used in individual-level epidemiological studies. This article discusses the special problems that need to be considered when planning ecological studies or using the results of such studies. Ecological studies are much more sensitive to bias from model mis-specification than are results from individual-level studies. For example, deviations from linearity in the underlying individual-level regressions can lead to inability to control for confounding in ecological studies, even if no misclassification is present. Conditions for confounding differ in individual-level and ecological analyses. For ecological analyses ofÔ "

 means, for example, a covariate will not be a confounder if its mean value in a study region is not associated with either (i) the mean exposure level across regions, or (ii) the mean outcome (disease rate) across regions. On the other hand, effect modification across areas can induce ecological bias even when the number of areas is very large and there is no confounding. In contrast to individual-level studies, independent and nondifferential misclassification of a dichotomous exposure usually leads to bias away from the null hypothesis in aggregate data studies. Failure to standardize disease, exposure and covariate data for other confounders (not included in the regression model) can lead to bias. It should be borne in mind that there is no method available to identify or measure ecological bias. While this conclusion may sound like a general criticism of ecological studies, it is not. It does, however, serve as a reminder of the problems that need to be considered when one designs, analyses, or critically evaluates ecological studies. A pilot study of take-home lead exposure in New Jersey. Czachur M; Stanbury M; Gerwel B; Gochfeld M; Rhoads GG; Wartenberg D University of Medicine and Dentistry of New Jersey's Occupational and Environmental Health Clinic Center Graduate Program in Public Health, Piscataway, USA. Am J Ind Med, 28: 2, 1995 Aug, 289-93 Studies in various industries have found an association between worker exposure to lead and elevated blood lead levels in workers' children, but the magnitude of this problem is unknown. In an effort to characterize this problem further, a pilot study was undertaken to obtain blood lead levels of children of lead-exposed workers with elevated blood lead levels who had been reported by laboratories to the New Jersey Department of Health. Fifteen workers' families participated in this study, including 28 children. Thirty-two percent of the children were found to have blood lead levels > or = 10 micrograms/dl, the level of concern set by the Centers for Disease Control and Prevention for medical monitoring. This finding is in contrast to population-based data collected from the Third National Health and Nutrition Survey, where the overall prevalence of blood lead levels > or = 10 micrograms/dl was only 4.5%. PBK modeling for metals. Examples with lead, uranium, and chromium. O'Flaherty EJ University of Cincinnati College of Medicine, Department of Environmental Health, OH 45267-0056, USA. Toxicol Lett, 82-83:1995 Dec, 367-72 Physiologically-based models for metals differ in several key respects from models for organic compounds. Although sequestration by binding to specific metal-binding proteins in liver, kidney, and red cell may be important, neither the magnitude and pattern of metabolism nor potential accumulation in fat is a component of models of metal kinetics. In addition, the long residence times of bone-seeking elements require that bone turnover and metabolism be incorporated into physiologically-based models for these elements. Three mechanism (rapid exchange at bone/blood interfaces, trapping or incorporation with forming bone and loss with resorbing bone, and slow exchange throughout the total bone volume) are potentially important in the overall interchange of bone-seeking elements between blood and bone. Three examples are given of applications of physiologically-based kinetic models for the bone-seeking elements lead, chromium, and uranium to assist in answering practical questions relating to bioavailability, distribution, and data interpretation. Lead in human blood from children living in Campania, Italy. Amodio-Cocchieri R; Arnese A; Prospero E; Roncioni A; Baruffo L; Ullucci R; Romano V Ô " Cattedra di Igiene, Istituto di Microbiologia Agraria, UniversitÃ! Ã di Napoli "Federico II", Naples, Italy. J

Toxicol Environ Health, 47: 4, 1996 Mar, 311-20 Blood lead (PbB) levels were determined in children living in Campania (in Naples and in a rural zone in the district of Caserta). Atmospheric lead (PbA) concentration in these considered areas was monitored for 1 yr (1993-1994). The children tested were questioned about common sources of lead, other than atmospheric, relating to their living and dietary habits. The PbB levels in children living in Naples were, at the 50th percentile, 13.8 micrograms/dl in males and 13.7 micrograms/dl in females; in children living in the rural area the median PbB levels were 8.9 micrograms/dl in males and and 8.8 micrograms/dl in females. The annual mean values of atmospheric lead were 1.15 +/- 0.24 micrograms/m3 in Naples and 0.23 +/- 0.07 micrograms/m3 in the rural area. Significant and congruent mean differences between urban and rural sites were found in children's blood and concurrent air lead. Considering the PbB level of 10 micrograms/dl as the maximum level that is not associated any known adverse effect in children, the Neapolitan group can be considered at risk of chronic intoxication by lead. Updated estimates of earnings benefits from reduced exposure of children to environmental lead. Salkever DS Department of Health Policy and Management, Johns Hopkins University School of Hygiene and Public Health, Baltimore, Maryland 21205, USA. Environ Res, 70: 1, 1995 Jul, 1-6 The recent and important study by Schwartz found that almost three-fourths of the benefits of reduced lead exposure in children are in the form of earnings gains (earnings losses avoided). New data on recent trends in returns to education and cognitive skills in the labor market suggest a need to revise this estimate upward. Based on an analysis of data from the National Longitudinal Survey of Youth, the present study estimates that an upward revision of at least 50% (or $2.5 billion per annual birth cohort) is indicated. The study also finds evidence that percentage earnings gains are considerably larger for females than for males. Occupational and environmental lead and PCB exposure at a scrap metal dealer. Malkin R Division of Surveillance, Hazard Evaluations and Field Studies, National Institute for Occupational Safety and Health, Cincinnati, Ohio 45226-1998, USA. Environ Res, 70: 1, 1995 Jul, 20-3 Blood lead levels (BPb) and serum polychlorinated biphenyl levels (PCB) were obtained from 17 employees at two adjacent scrap metal dealers. One facility was located outdoors, directly on top of soil known to be contaminated with lead and PCBs, and the other was located indoors with a concrete floor. BPbs ranged from 4.0 to 39.8 microgram/dl (mean 19.9 microgram/dl, geometric mean 17.5 microgram/dl) and PCB levels ranged from <1 to 65.3 ppb (mean 7.5 ppb). There was no significant difference in either BPb or serum PCB between the two sites. BPb was significantly correlated with the number of cigarettes smoked at work, and both BPb and serum PCB were significantly related to eating lunch outside the lunchroom, suggesting hand-to-mouth contact as a source of exposure. The lack of difference in BPb between employees of the two scrap metal dealers suggests an ongoing source of lead exposure at the sites, other than the soil. Updating about reductions of air and blood lead concentrations in Turin, Italy, following reductions in the lead content of gasoline. Ô " -

<.<.<.Ø Ø à+Ð " ÔŒ Bono R; Pignata C; Scursatone E; Rovere R; Natale P; Gilli G Department of Hygiene and Community Medicine, University of Turin, Italy. Environ Res, 70: 1, 1995 Jul, 30-4 Considering its well-know toxicity and the chronic human exposure to lead, international law-makers enforced some directives or laws calling for the reduction of lead content of gasoline. All of these legislative acts aimed to reduce health risks for the general population. The aim of this study was to consider the effectiveness of these laws on air lead levels and consequently on blood lead levels in a randomly selected urban Italian population. In particular, these markers were analyzed over the course of several years, corresponding to the periods just before and after enforcements of the reductions of lead in petrol. Data presented point out some considerations: (1) enforcement of legislative measures concerning the reduction of lead in petrol has reduced atmospheric levels of lead. This result demonstrates a major environmental success in primary prevention efforts. (2) This success is clear especially considering that the actual Pb-B levels can be extended to the urbanized populations. Pb-B levels were consistently higher for drinkers, for older adults, and for males. The mean of Pb-B level for the present urbanized population is higher than the U.S. overall population (6.4 vs 3 microgram/dl). This difference can be also explained considering the different historical period of enforcement of the restriction laws. A longitudinal study of low-level lead exposure and impairment of renal function. The Normative Aging Study. Kim R; Rotnitsky A; Sparrow D; Weiss S; Wager C; Hu H Channing Laboratory, Department of Medicine, Brigham and Women's Hospital, Harvard Medical School, Boston, MA 02115, USA. JAMA, 275: 15, 1996 Apr 17, 1177-81 OBJECTIVE: To determine whether low-level lead exposure is associated with impaired renal function. DESIGN: Retrospective cohort study. SETTING AND PARTICIPANTS: Subjects were 459 men randomly selected from the participants of the Normative Aging Study who were originally recruited from healthy veterans in the greater Boston area in 1961 and were periodically examined at the Department of Veterans Affairs Outpatient Clinic every 3 to 5 years. We reconstructed blood lead concentrations for the period between 1979 and 1994 using samples of either archived red blood cells or fresh whole blood. MAIN OUTCOME MEASURES: Serum creatinine concentration. RESULTS: After adjustment for age, body mass index, smoking, alcohol consumption, educational level, and hypertension, blood lead concentration was positively and significantly associated with concurrent concentration of serum creatinine (P=.005). A 10-fold increase in blood lead level predicted an increase of 7 micromol/L (0.08 micrograms/dL) in serum creatinine concentration, which is roughly equivalent to the increase predicted by 20 years of aging. The association was also significant among subjects whose blood lead concentrations had never exceeded 0.48 micromol/L (10 micrograms/L) throughout the study period. The age-related increase in serum creatinine level was earlier and faster in the group with the highest-quartile levels of long-term lead exposure than in the group with the lowest-quartile levels. CONCLUSIONS: Low-level exposure to lead may impair renal function in middle-aged and older men. Longitudinal data suggest an acceleration of age-related impairment of renal function in association with long-term low-level lead exposure. No lead is good lead [editorial; comment] Donovan J Med J Aust, 164: 7, 1996 Apr 1, 390-1 Abstract not available online. Blood lead concentrations of preschool children in central and southern Sydney [see comments] Mira M; Bawden-Smith J; Causer J; Alperstein G; Karr M; Snitch P; Waller G; Fett MJ Ô " - <.<.<.Ø Ø à+Ð "

ÔŒAddress Division of General Practice, Central Sydney Area Health Service, Sydney, NSW, Australia. Med J Aust, 164: 7, 1996 Apr 1, 399-402 OBJECTIVES: To determine the prevalence of elevated blood lead concentrations in preschool children in central and southern Sydney. PARTICIPANTS AND SETTING: Children aged from 9 months to 5 years living in 32 randomly selected geographical areas in Central and southern Sydney. METHODS: Venous blood lead concentrations were estimated by atomic absorption spectrometry. RESULTS: 953 children were identified and 726 had parental consent to participate. A blood sample for lead estimation was obtained from 718 children. The geometric mean blood level concentration was 0.34 mu mol/L (7.0 mu/dL). The proportion of children with elevated blood lead concentrations was: 16.1% (>0.48 mu mol/L [10mu/dL]), 3.9% (>0.72 mu mol/L[15mu/dL]) and 0.3% (>1.21mu mol/L [25 mu/dL], respectively. The blood lead levels for children living with a 10-km radius of the Sydney Central Business district were: 25% (>0.48 mu mol/L [10mu/dL]) and 7% (>0.72 mu mol/L [15mu/dL]), respectively. Corresponding findings for children living 10 km outside this radius were: 9% (>0.48 mu mol/L [10mu/dL]) and 1.5% (0.72 mu mol/L [15mu/dL]), respectively. CONCLUSIONS: The proportion of children with elevated blood lead concentrations in Central and Southern Sydney as a whole does not exceed current National Health and Medical Research Council (NHMRC) recommendations. However, in those areas within a 10-km radius of the Central Business District, NHMRC interventional guidelines for communities where more that 5% of children have blood lead concentrations higher than 0.72 mu mol/L (15 mu/dL) should be applied. Lead intoxication in children with pervasive developmental disorders. Shannon M; Graef JW Children's Hospital, Harvard Medical School, The Massachuetts Poison Control System, Boston, MA 02115, USA. J Toxicol Clin Toxicol, 34: 2, 1996, 177-81 OBJECTIVE: To investigate the observation that children with pervasive developmental disorders have later and more prolonged lead exposure and are more likely to be reexposed when compared to lead-poisoned children without pervasive developmental disorders. DESIGN: Retrospective chart review. SETTING: A large, urban lead treatment program. RESULTS: Over a six year period 17 children with pervasive developmental disorders (including autism) were treated. Compared to a randomly selected group of 30 children without pervasive developmental disorders who were treated for plumbism over the sam interval, those with pervasive developmental delay were significantly older at diagnosis (46.5 vs 30.3 months, p = .03) and had a longer period of elevated blood lead levels (39.1 vs 14.1 months, p = .013) during management. Despite close monitoring, state-mandated environmental inspection and prompt lead hazard reduction or alternative housing, 75% of children with pervasive developmental disorders were reexposed to lead during medical management compared with 23% of children without pervasive developmental disorders (p = .001). CONCLUSIONS: 1) lead intoxication among children with pervasive developmental disorders may appear de novo beyond the third year of life and is associated with a high rate of reexposure; 2) the provision of deleaded housing (by current techniques) may not be sufficient to protect these children from repeated lead exposure; 3) these data support recommendations by the Centers for Disease Control that children with developmental delays be closely monitored for the appearance of lead intoxication. This monitoring should continue beyond the third year of life. Elevated environmental lead levels in a day care setting [letter] Robertson WO Arch Pediatr Adolesc Med, 150: 5, 1996 May, 556 Abstract not available online. Lead exposure and conventional and ambulatory blood pressure: a prospective population study. PheeCad Investigators [see comments] Ô " - <.<.<.Ø Ø à+Ð " ÔŒAuthor Staessen JA; Roels H; Fagard R Hypertension and Cardiovascular Rehabilitation Unit, Department of Molecular and Cardiovascular Research, University of Leuven, Belgium. JAMA, 275: 20, 1996 May 22-29, 1563-70 OBJECTIVE.- To evaluate in a prospective fashion the association between low-level lead exposure and blood pressure. DESIGN.- Prospective cohort study. SETTING.- General population. PARTICIPANTS.- A random population sample (N=728; 49% men; age range, 20-82 years) was studied in Belgium for 1985 through 1989 and reexamined for 1991 through 1995. MEAN OUTCOME MEASURES.- At baseline and follow-up, blood pressure was measured by conventional sphygmomanometry (15 total readings) and at follow-up also by 24-hour ambulatory monitoring. Lead exposure was estimated from blood lead and zinc protoporphyrin concentrations. Multivariate analyses controlled for sex, age, body mass index, smoking and drinking habits, physical activity, exposure at work, social class, menopausal status, use of medications (antihypertensive medication, oral contraceptives, hormonal replacement therapy), hematocrit or hemoglobin, serum total calcium concentration, 24-hour urinary sodium and potassium excretion, and gamma-glutamyltransferase activity. RESULTS.- At baseline, mean (SD) systolic/diastolic conventional blood pressure was 130 (17)/77 (9) mm Hg. The mean blood lead concentration was 0.42 micromol/L (8.7 microgram/dL), and the mean zinc protoporphyrin concentration was 1.0 microgram per gram of hemoglobin. Over the 5.2-year median follow-up, the mean blood lead concentration dropped by 32% (0.14 micromol/L [2.9 microgram/dL]) (P<.001). Small but significant (P<.01) changes occurred in systolic (-1.5 mm Hg) and diastolic (+1.7 mm Hg) conventional blood pressure and in zinc protoporphyrin concentration (+0.5 microgram per gram of hemoglobin). Over the follow-up period, no consistent associations emerged between the changes in conventional blood pressure and in blood lead or zinc protoporphyrin concentrations. In addition, after adjustment for sex, age, and body mass index, blood lead and zinc protoporphyrin concentrations at baseline did not predict the development of hypertension in 47 patients (risk ratio for doubling of the initial lead concentration, 1.2; 95% confidence interval, 0.7-2.0). In a time-integrated analysis in which each person was characterized by all available measurements, conventional blood pressure did not correlate with blood lead or zinc protoporphyrin concentrations in a consistent manner. Similarly, the mean (SD) 24-hour blood pressure at follow-up (119 [11]/71 [8] mm Hg; N=684) did not show a consistent relationship with blood lead or zinc protoporphyrin concentrations at baseline or at follow-up. CONCLUSIONS.- Lead exposure at the intensity studied (<1.45 micromol/L [<30 microgram/dL]) was not consistently associated with increased conventional or 24-hour blood pressure in the general population or with increased risk of hypertension. These findings argue against the hypothesis that current lead exposure levels are associated with excess cardiovascular morbidity and mortality caused by hypertension. Blood lead levels in Toronto children and abatement of lead-contaminated soil and house dust. Langlois P; Smith L; Fleming S; Gould R; Goel V; Gibson B Texas Department of Health, Austin, USA. Arch Environ Health, 51: 1, 1996 Jan-Feb, 59-67 South Riverdale in Toronto, Canada, underwent a lead-abatement program. In 1988, lead-contaminated soil was replaced at 970 properties, and in 1989, professional housecleaning for lead removal was conducted in 717 households. The effect of "abatement" on blood lead levels in young children was investigated. Data were analyzed from 12

cross-sectional blood-screening surveys that were conducted during an 8-y period in South Riverdale and in two comparison areas. Responses regarding behavioral, household, lifestyle, neighborhood, and environmental factors, all of which were gleaned from associated questionnaires, were also analyzed. Response rates varied between 32% and 75%. During the years between 1984 and 1992, blood lead decreased in all study areas. There appeared to be a minimal blood lead level of 2-3 micrograms/dl for urban Ontario children who were less than 6 y of age. The significant difference between South Riverdale and the control areas disappeared by 1992. AlthoughÔ " - <.<.<.Ø Ø à+Ð " ÔŒ abatement activity in South Riverdale was associated with an accelerated decline in blood lead levels, it was difficult to distinguish this from effects of decreased Toronto air lead levels or decreased smelter emissions. Within South Riverdale, abatement appeared to be associated with a slower decline in blood lead levels over time, likely the result of selection bias, soil mixing, or recontamination from the smelter. No difference was observed between the separate effects of housecleaning or soil replacement. The findings could neither strongly support nor refute beneficial effects of abatement. Lead exposure in the city of Arar, Saudi Arabia. Al-Saleh I; Mustafa A; Dufour L; Taylor A; Hiton R Biological and Medical Research Department, King Faisal Specialist Hospital and Research Centre, Riyadh, Saudi Arabia. Arch Environ Health, 51: 1, 1996 Jan-Feb, 73-82 In follow-up to a case of lead encephalopathy, high prevalences of lead exposure (23%) and iron deficiency (60%) were found in children who lived in Arar, Saudi Arabia. Environmental factors had minor effects on the blood lead concentrations of these children. We concluded that traditional cosmetics and remedies were the major sources of lead exposure in this Arar population. Environmental lead and renal effects in children. Verberk MM; Willems TE; Verplanke AJ; De Wolff FA Coronel Laboratory for Occupational and Environmental Health, Academic Medical Centre, Amsterdam, The Netherlands. Arch Environ Health, 51: 1, 1996 Jan-Feb, 83-7 The effect of lead on five renal-effect parameters was studied in 151 children (i.e., 3-6-y-olds) who resided at different distances from a lead smelter in Baia Mare, Romania. A relationship was found between concentration of lead in blood (mean +/- standard deviation: 342 +/- 224 microgram/l) and the activity of N-acetyl-beta-D-glucosaminidase in urine, as demonstrated by a 14% increase of N-acetyl-beta-D-glucosaminidase per 100 micrograms/l blood lead that was indicative of renal tubular damage. No relationship was found between blood lead level and the renal-effect parameters albumin, alpha-1-microglobulin, retinol binding protein, or alanine aminopeptidase in urine. Cadmium in blood was not elevated. It is well known that N-acetyl-beta-D-glucosaminidase is a sensitive parameter for renal effects, resulting from lead exposure in adults and from diabetes and nephrotoxic medicines in children. This study is the first to demonstrate an effect of environmental lead exposure on renal integrity in children. Lead alters growth and reduces angiotensin II receptor density of rat aortic smooth muscle cells. Carsia RV; Forman D; Hock CE; Nagele RG; McIlroy PJ Department of Cell Biology, University of Medicine and Dentistry of New Jersey-School of Osteopathic Medicine, Stratford 08854, USA. Proc Soc Exp Biol Med, 210: 2, 1995 Nov, 180-90 Environmental lead (Pb2+) contributes a small but significant risk to human hypertension. It is postulated that the hypertensinogenic action of Pb2+ may be due, in part, to its direct action on vascular smooth muscle cells. ToÔ " - <.<.<.Ø Ø à+Ð " ÔŒ investigate this hypothesis, freshly isolated rat aortic smooth muscle (RASM) cells were propagated in defined media containing one of two Centers for Disease Control-based concentrations of Pb2+ (as lead citrate): 100 and 500 micrograms Pb2+/l (i.e., equivalent to 5.5 and 27.5 micrograms Pb2+/dl blood; designated 100-RASM and 500-RASM). Control (CON-RASM) cells received sodium citrate. 500-RASM cells exhibited suppressed propagation and fell out of propagation synchrony with CON-RASM cells: when CON-RASM cell approached confluence (approximately 90%), 500-RASM cell density was 6.4% that of CON-RASM cell density. By contrast, 100-RASM cells exhibited marked hyperplasia albeit this was not apparent until passage 3 (p3). Overall, when p3-p6 CON-RASM cells approached confluence, 100-RASM cell density was 107.6% greater than CON-RASM cell density. The protein content of CON-RASM and 100-RASM was not different, whereas that of 500-RASM cells was 29% greater than that of CON-RASM and 100-RASM cells. Phase-contrast microscopy revealed that 100 micrograms Pb2+/l converted normal spindle-shaped/ribbon-shaped RASM cells into less spread, cobblestone-shaped, neointimal-like cells. Immunocytochemical analysis revealed that 100-RASM cells lacked or had markedly fewer actin cables, characteristic of rapidly dividing cells. In addition, Pb(2+)-treated RASM cells exhibited altered membrane fatty acyl composition with a trend towards an increase (by as much as 50%) in membrane arachidonic acid. Interestingly, hyperplastic 100-RASM cells exhibited a 70.6% reduction in angiotensin II (Ang II) receptor concentration whereas the concentrations of alpha 1- and beta-adrenergic and atrial natriuretic peptide (ANP) receptors were not affected. In addition, in experiments designed to control for Pb(2+)-associated differences in RASM cell propagation, there was a concentration-dependent decrease in Ang II receptor concentration: for 100 and 500 micrograms Pb2+/l, Ang II receptor concentration was decreased 39.6% and 65.5%, respectively. Thus, although Pb2+, depending on its concentration, had contrasting effects on RASM cell propagation, it had a consistent, concentration-dependent inhibitory effect on Ang II receptor concentration. Recovery (r) from Pb2+ required at least two additional passages. At p71r the enhanced propagation (+54%) and reduced Ang II receptor concentration (-49%) of 100r-RASM cells persisted.(ABSTRACT TRUNCATED AT 400 WORDS) ELPAT program report: background and current status (July 1995). Environmental Lead Proficiency Analytical Testing. Schlecht PC; Groff JH Department of Health and Human Services, Centers for Disease Control and Prevention, National Institute for Occupational Safety and Health, Division of Physical Sciences and Engineering, Robert A. Taft Laboratories, Cincinnati, OH 45226, USA. Am Ind Hyg Assoc J, 56: 10, 1995 Oct, 1034-40 Abstract not available online. Associations of delta-aminolevulinic acid dehydratase genotype with plant, exposure duration, and blood lead and zinc protoporphyrin levels in Korean lead workers. Schwartz BS; Lee BK; Stewart W; Ahn KD; Springer K; Kelsey K Department of Environmental Health Sciences, Johns Hopkins University, Baltimore, MD 21205, USA. Am J Epidemiol, 142: 7, 1995 Oct 1, 738-45 Previous studies have suggested that polymorphisms in delta-aminolevulinic acid dehydratase (ALAD), a heme synthetic enzyme, may be associated with differences in blood lead levels, perhaps due to differential binding of lead in erythrocytes. The authors examined associations of ALAD genotype with blood lead and zinc protoporphyrin (ZPP) levels, exposure duration, sex, and plant in 308 currently exposed lead workers in three lead storage battery manufacturing plants in the Republic of Korea in 1993. The overall prevalence of the variant allele, ALAD2, was 11%, but prevalence varied by plant (p = 0.02: 8.6% in plant A, 20% in plant B, and 22% in plant C). While ALAD2 was not

associated with mean blood lead levels, the allele was associated with blood lead levels greater than or equal to 40 micrograms/dl (crude odds ratio (OR) = 2.6, 95% confidence interval (CI) 1.1-6.3; adjusted OR = 2.3, 95% CI 0.8-6.2, with adjustment for sex, plant, and exposure duration) and with exposure durations greater than 6 years (adjusted OR = 2.5, 95% CI 1.2-5.4, with adjustment for blood lead, sex, and plant). Among workers in plant C, the highest exposure plant, ALAD2 was associated with lower ZPP levels when controlling forÔ " - <.<.<.Ø Ø à+Ð " ÔŒ blood lead levels. These data suggest that lead toxicokinetics may be modified by ALAD genotype and that ALAD2 may be protective for the health effects of lead. ALAD genotype also appears to have been a selection factor for current lead exposure status in the studied workers. Clinical application of in vivo tibial K-XRF for monitoring lead stores. Wedeen RP; Ty A; Udasin I; Favata EA; Jones KW Research Service, VA Medical Center, East Orange, New Jersey, USA. Arch Environ Health, 50: 5, 1995 Sep-Oct, 355-61 We used in vivo tibial K-x-ray fluorescence for clinical evaluation of bone lead stores in 31 patients suspected of excessive lead absorption. Four clinical situations were examined: (1) postchelation therapy, (2) renal failure, (3) home exposure, and (4) occupational exposure. K-x-ray fluorescence assisted in determining the magnitude of body lead stores in patients with known excessive lead exposure. Serial measurements revealed a reduction in bone lead that occurred over the years, during which there was an absence of continued exposure; this reduction occurred more rapidly during chelation therapy. Sustained high bone lead levels following chelation therapy in two children were consistent with elevated lead stores from prior pica. In a patient with renal failure, K-x-ray fluorescence demonstrated massive lead stores at a time when chelation testing was not possible. In other cases, bone lead levels indicated the possible contribution of lead nephropathy to renal diseases of other etiologies. In individuals exposed to lead during home renovations, K-x-ray fluorescence provided reassurance that past exposure did not result in elevated body lead stores decades later. In the occupational setting, K-x-ray fluorescence documented cumulative lead stores in workers whose exposures varied in intensity and duration. The examples discussed here show how physicians can use K-x-ray fluorescence to deal with practical questions of patient management. As the test becomes more generally available, its safety, specificity, and simplicity should make it an important alternative to cumbersome chelation tests and potentially misleading blood lead measurements. [Lead poisoning in children: from epidemiology to public health] Title Le saturnisme chez l'enfant: de l'epidÃ) Ãmilogie Ã! Ã la santÃ) Ã publique. Roustit C Institut SantÃ) Ã-DÃ) Ãveloppement, universitÃ) Ã Paris-VI, France. Arch Pediatr, 2: 9, 1995 Sep, 886-90 Epidemiological research has provided a better knowledge of lead poisoning effects on neuro-cognitive development of children. The increased sensitivity of screening biological tests and the decrease of the therapeutic threshold of intervention make primary prevention even more necessary. The oral route being responsible for the most severe morbidity of lead poisoning in children, screening must first specify the risk factors associated with oral lead absorption according to the age of children and local exposure to sources of lead. Lead screening in children with attention deficit hyperactivity disorder and developmental delay. Kahn CA; Kelly PC; Walker WO Jr Department of Pediatrics, Madigan Army Medical Center, Fort Lewis, Washington 94831-5000, USA. Clin Pediatr (Phila), 34: 9, 1995 Sep, 498-501 Abstract not available online. Race, class, and environmental health: a review and systematization of the literature. Ô " - <.<.<.Ø Ø à+Ð " ÔŒ Brown P Brown University, Providence, Rhode Island 02912, USA. Environ Res, 69: 1, 1995 Apr, 15-30 This paper analyzes and systematizes the race and class differentials in exposure to toxic hazards and actual health outcomes. Research is categorized into the following: Proximity to known hazards includes (1) presence of hazardous waste sites and facilities (landfills, incinerators, Superfund sites), (2) exposure to air pollution, (3) exposure to various environmental hazards, e.g., toxic releases and hazards in pesticides and foods; Regulation, amelioration and cleanup includes (4) record of decisions (RODs) and cleanups at NPL sites, (5) regulatory action, as measured by assessed fines for environmental pollution; Health effects includes (6) specific health outcomes which are related to environmental burden (e.g., blood lead levels). Proximity to prospective hazards includes (7) sitting decisions for incinerators, hazardous waste sites, and nuclear storage sites. The overwhelming bulk of evidence supports the "environmental justice" belief that environmental hazards are inequitably distributed by class, and especially race. Chronic lead treatment accelerates photochemically induced platelet aggregation in cerebral microvessels of mice, in vivo. al Dhaheri AH; el-Sabban F; Fahim MA Department of Hematology, Al Ain Hospital, United Arab Emirates. Environ Res, 69: 1, 1995 Apr, 51-8 Effects of two chronic treatment levels with lead on platelet aggregation in cerebral (pial) microcirculation of the mouse were investigated. Exposure to lead was made by subcutaneous injections for 7 days of lead acetate dissolved in 5% glucose solution, vehicle. Two doses of lead were used, a low dose of 0.1 mg/kg and a high dose of 1.0 mg/kg. Adult male mice were divided into three groups, 10 each; one group was injected with vehicle (control), another was injected with the low dose, and the third was injected with the high dose. Additional mice were used for the determination of hematological parameters and for the lead level in serum of the three groups. On the eighth day, platelet aggregation in pial microvessels of these groups of mice was carried out in vivo. Animals were anesthetized (urethane, 1-2 mg/g, ip), the trachea was intubated, and a craniotomy was performed. Platelet aggregation in pial microvessels was induced photochemically, by activation of circulating sodium fluorescein (0.1 mg/25 g, iv) with an intense mercury light. The time required for the first platelet aggregate to appear in pial arterioles was significantly shorter in the lead-treated mice than in control. This effect was in a dose-dependent manner; 113 +/- 44 sec for low dose and 71 +/- 18 sec for high dose vs 155 +/- 25 sec for control, P < 0.02 and P < 0.001, respectively. Between the two lead-treated groups, the high dose significantly (P < 0.05) shortened the time to first aggregate. These data evidenced an increased susceptibility to cerebrovascular thrombosis as a result of exposure to lead. The exposure of cyclists, car drivers and pedestrians to traffic-related air pollutants. van Wijnen JH; Verhoeff AP; Jans HW; van Bruggen M Municipal Health Service, Department of Environmental Medicine, Amsterdam, The Netherlands. Int Arch Occup Environ Health, 67: 3, 1995, 187-93 Volunteers provided with personal air sampling (PAS) equipment covered concurrently, by car or bicycle, various selected routes. These comprised two inner city routes in Amsterdam (ICR 1 and 2) as well as a route including a tunnel on a busy highway (TR) and a rural route just south of Amsterdam (RR). A third inner city route, a busyÔ " - <.<.<.Ø Ø à+Ð " ÔŒ narrow street, was subsequently also selected, and covered by bicycle or walking (ICR 3). Each run lasted about 1 h; the sampling

time on the TR route was approximately 30 min. The sampling periods in January and May lasted 2 weeks with four sampling days per week. In August only ICR 3 was covered, this sampling period lasted 2 days. CO, NO2, benzene, toluene and xylenes were measured in the personal air samples. A monitoring vehicle covered the routes concurrently and measured CO, NO2 and pm10 (semi) continuously. Lead and PAH content in pm10 was determined. The ventilation of the volunteers was measured while they were using a car or a bicycle. The route and the type of transport influenced (P < 0.001) the concentrations of CO, benzene, toluene and xylenes. The daily average temperature was positively associated with the exposure of car drivers and cyclists to most compounds measured. A volunteer exhaled on average 2.3 times more air as a cyclist than as a car driver. Despite the much higher concentrations in the personal air samples of car drivers, the uptake of CO, benzene, toluene and xylenes of cyclists sometimes approached that of the car drivers. The uptake of NO2 of cyclists was clearly higher than that of car drivers. Predictors of lead stores in male veterans. Sokas RK; Weller SC; Stolley PD Div. of Occupational/Environmental Medicine, George Washington University, Washington, DC 20037, USA. J Environ Pathol Toxicol Oncol, 14: 1, 1995, 53-9 Thirty-two male veterans participated in a study to determine cumulative lead exposure in an urban population. Subjects were chosen on the basis of blood pressure status in order to attempt to compare lead exposure between patients with and without hypertension. Patients currently enrolled in hypertension clinic and on treatment were recruited and matched with controls for age, race, and socioeconomic status. Each subject underwent provocative chelation via slow intravenous infusion of CaNa2 EDTA and 6-h urinary lead measurement and completed an interviewer-administered questionnaire. Twenty blacks and 12 whites participated, with a median age of 52 years (range: 27 to 72). Urinary lead excretion ranged from below detection limits to frankly toxic levels in an individual with heavy moonshine ingestion. Lead levels were higher than reported in other non-workplace populations. The distribution of lead values was skewed, as expected, with a median excretion of 75 mcg lead/6 h (corresponding to a median 24 degrees post-chelation urinary lead excretion of 286 mcg) and modal values between 50 and 75 micrograms lead. Levels of 95 mcg lead/6 h (corresponding to 24 degrees levels of 333 mcg lead) and above were considered "high" (N = 11) and the remainder were "low" (N = 21). Among those able to recall various characteristics of their first childhood dwellings, the presence of flaking paint in a multiple family dwelling was strongly associated with "high" lead excretion (X2 = 9.32, p = 0.009). Hypertensives excreted slightly more lead than nonhypertensives, although the difference was not statistically significant in this small sample. Lead excretion was not associated with current (treated) blood pressure determinations among hypertensives. However, lead excretion was associated with systolic pressure as recorded on entry to the hypertension clinic (N = 21, R2 = 0.24, p = 0.03). [Methods for determining lead and cadmium in blood; cadmium, copper, nickel and chromium in urine using flameless atomic absorption spectrometry] Title Metody oznaczania kadmu i olowiu we krwi, kadmu, miedzi, niklu i chromu w moczu technika bezplomieniowej absorpcyjnej spektrometrii atomowej. Razniewska G; Trzcinka-Ochocka M Zakladu Monitoringu Biologicznego Instytutu Medycyny Pracy, Lodzi. Poloni Med Pr, 46: 4, 1995, 347-58 The estimation of environmental and occupational exposure to metals is based on the determination of metalÔ " - <.<.<.Ø Ø à+Ð " ÔŒ concentrations in biological material. This paper describes methods for determining lead and cadmium

in blood, and cadmium, copper, nickel and chromium in urine. The methods are evaluated in view of their linearity, precision, repeatability, reproducibility and detectability. The reliability of the methods was verified by determining lyphilized standards of known metal concentrations (Behring). The reproducibility expressed by the value of relative standard deviation ranged from 1.2% to 7.8%. In the case of lead and cadmium determinations, the reliability of results was confirmed due to the participation of our laboratory in the UK NEQAS external control project, the Queen Elizabeth Hospital, Birmingham. The results of external quality control (MR VIS = 19 for lead, as compared with the mean = 41 for all the project participants and MR VIS = 29 for cadmium, mean = 62) prove undoubtedly correctness of the methods applied. A small volume of sample to be analyzed is their major advantage, and due to adopted analytical parameters the methods can be used to determine metals in biological material in order to assess occupational or environmental exposure. Lead mobilisation during pregnancy [letter] Gulson BL; Calder IC Med J Aust, 163: 8, 1995 Oct 16, 447 Abstract not available online. Lead in children from older housing areas in the Wellington region. Bates M; Malcolm M; Wyatt R; Garrett N; Galloway Y; Speir T; Read D Communicable Disease Centre, Porirua. N Z Med J, 108: 1009, 1995 Oct 13, 400-4 AIMS. To examine blood lead levels in children, aged 12 to 23 months, living in old housing areas of Wellington and Lower Hutt, and to investigate risk factors for high lead levels. METHOD. Children were selected from Plunket Society rolls. Venous blood samples were collected, and care givers were interviewed with a questionnaire. Soil samples were taken from around the children's homes. Both soil and blood samples were analysed for lead content. RESULTS. Blood samples and completed questionnaires were obtained for 143 children. The geometric mean blood lead level for all the children was 0.25 mumol/L (5.1 micrograms/dL) (95% confidence interval [95% CI]: 0.22-0.28 mumol/L). Three children had blood lead levels that exceeded the level for notification in New Zealand 1.45 mumol/L and a further 13 had blood lead levels exceeding 0.48 mumol/L. Children with elevated lead levels were likely to live in a house greater than 50 years old where paint removal had taken place in the last 2 years (risk ratio [RR] = 14.4, 95% CI: 2-107). Eating dirt, particularly for children who usually played outside within 2 metres of the house, was also a risk factor for elevated blood lead levels. Soil lead levels generally increased with the age of the house and were weakly correlated with blood lead levels (r = 0.32). CONCLUSION. Paint removal in old houses is a major risk factor for elevated blood lead levels. However, the number of study children living in houses less than 50 years old was limited. Because of this and possible participant selection bias, the results of this study require confirmation in a separate population-based study. Information about the specific paint removal procedures that cause high lead levels is also needed. Biological monitoring of lead in workers exposed to tetraethyllead. Vural N; Duydu Y Ankara University, Faculty of Pharmacy, Department of Toxicology, Turkey. Sci Total Environ, 171: 1-3, 1995 Oct 27, 183-7 The excretion of inorganic, and total lead was investigated in the urine of workers who were exposed to tetraethyllead (TEL) at gasoline stations. Concentrations of total and inorganic lead after chelation-extraction were determined by flame atomic absorption spectrophotometry (FAAS) in combination with a slotted quartz tube. TheÔ " - <.<.<.Ø Ø à+Ð " ÔŒ limit of detection was 5.2 x 10(-3) micrograms Pb/ml; average total lead and inorganic lead concentrations in the