

Chapter 1 : ICD Diagnosis Code TX1A Toxic effect of lead and its compounds, accidental, init

One of the most toxic of all synthetic substances to some animals The type and degree of its toxicity to humans is largely unknown LD 50 of ug/Kg body mass in male guinea pigs.

On average rivers contain between 3 and 30 ppb. Phytoplankton contains approximately ppm lead dry mass , freshwater fish approximately 0. The World Health Organization WHO stated a legal limit of 50 ppb for lead in , which is decreased to 10 ppb in In what way and in what form does lead react with water? Under normal conditions lead does not react with water. However, when lead comes in contact with moist air reactivity with water increases. A small lead oxide PbO layer forms at the surface of the metal. When both oxygen and water are present, metallic lead is converted to lead hydroxide Pb OH 2: A well-known example of a water soluble lead compound is lead sugar lead II acetate , which derived its name from its sweet nature. Lead frequently binds to sulphur in sulphide form S²⁻ , or to phosphor in phosphate form PO In these forms lead is extremely insoluble, and is present as immobile compounds in the environment. Lead compounds are generally soluble in soft, slightly acidic water. Why is lead present in water? Lead waterworks were often applied in former days, and these may still be present in old buildings. Lead from pipes may partially dissolve in the water flowing through. Lead may bind to carbonate, therefore lower amounts of lead dissolve in hard water. Inside the pipes, a layer of hardly soluble alkalic lead carbonate is formed. This layer functions as a protective coating for the underlying lead of the pipes. The Romans often filled the pipes with wine on holidays, causing the layer to dissolve and form lead sugar. Despite its toxicity, the above-mentioned lead II acetate was applied far into the 19th century, to sweeten wine and other beverages and food stuffs. Water pollution containing lead compounds derived from lead ores in the mining industry was first mentioned by architect Vitruvius, in 20 B. In Rome lead was often released as a by-product of silver mining. Lead white, an alkalic lead carbonate 2PbCO₃. Pb OH 2 , is a white pigment. It is no longer applied because of its extreme toxicity. Selling tubes of lead white is now prohibited in the European Union. Organic lead is applied in petroleum production, and inorganic lead compounds are applied for battery and paint production. Most industrially processed lead is applied for fabricating computer and TV screens. The lead compound tetra-ethyl lead is applied as an additive in fuels. This organic lead compounds is quickly converted to inorganic lead, and ends up in water, sometimes even in drinking water. Fortunately, this form of release of lead is less and less abundant. In architecture lead is applied in roofs and in stained glass windows. Generally, lead dissolved or suspended in wastewater mostly stems from streets, pipes and soils. In The Netherlands, lead in food causes about half of the human lead exposure. What are the environmental effects of lead in water? Lead and lead compounds are generally toxic pollutants. Lead II salts and organic lead compounds are most harmful ecotoxicologically. Lead salts are attributed to water hazard class 2, and consequently are harmful. The same applies to lead compounds such as lead acetate, lead oxide, lead nitrate, and lead carbonate. Lead limits plant chlorophyll synthesis. Nevertheless, plants can take up high levels of lead up to ppm from soils. Higher concentrations negatively influence plant growth. Through plant uptake, lead enters food chains. Consequently, lead pesticide application is prohibited in most countries. Lead accumulates in organisms, sediments and sludge. Lead in wastewater mostly stems from streets and roofs. Lead exists as four stable isotopes, and no less than 26 instable isotopes. What are the health effects of lead in water? The human body contains approximately mg of lead. Symptoms over overexposure to lead include colics, skin pigmentation and paralysis. Generally, effects of lead poisoning are neurological or teratogenic. Organic lead causes necrosis of neurons. Inorganic lead causes axonal degeneration and demyelination. Both species of lead may cause cerebral oedema and congestion. Organic lead compounds are absorbed quicker, and therefore pose a greater risk. Organic lead derivates may be carcinogenic. Women are generally more susceptible to lead poisoning than men. Lead causes menstrual disorder, infertility and spontaneous abortion, and it increases the risk of stillbirth. Foetuses are more susceptible to lead poisoning than mothers, and generally foetuses even protect mothers from lead poisoning. A long time ago lead was applied as a measure of birth control, for example as a spermicidal, and to induce abortion. Consequently, children are generally more susceptible for lead poisoning than adults. Symptoms

include lower IQs, behavioural changes and concentration disorder. Lead accumulates in leg tissue. The most severe type of lead poisoning causes encephalopathy. Lead toxicity is induced by lead ions reacting with free sulfhydryl groups of proteins, such as enzymes. Furthermore, lead may interact with other metal ions. Which water purification technologies can be applied to remove lead from water?

Chapter 2 : Lead and its organic compounds

T Toxic effects of lead and its compounds TX Toxic effects of lead and its compounds TX1 Toxic effect of lead and its compounds, accidental (unintentional).

Ge, tin Sn, lead Pb, and flerovium Fl. Occurrence and distribution Lead is mentioned often in early biblical accounts. The Babylonians used the metal as plates on which to record inscriptions. The Romans used it for tablets, water pipes, coins, and even cooking utensils; indeed, as a result of the last use, lead poisoning was recognized in the time of Augustus Caesar. The compound known as white lead was apparently prepared as a decorative pigment at least as early as bce. Modern developments date to the exploitation in the late s of deposits in the Missouri-Kansas-Oklahoma area in the United States. Cosmically, there is 0. The cosmic abundance is comparable to those of cesium, praseodymium, hafnium, and tungsten, each of which is regarded as a reasonably scarce element. Although lead is not abundant, natural concentration processes have resulted in substantial deposits of commercial significance, particularly in the United States but also in Canada, Australia, Spain, Germany, Africa, and South America. Significant deposits are found in the United States in the western states and the Mississippi valley. Rarely found free in nature, lead is present in several minerals, but all are of minor significance except the sulfide, PbS galena, or lead glance, which is the major source of lead production throughout the world. Lead may be extracted by roasting the ore and then smelting it in a blast furnace or by direct smelting without roasting. Additional refining removes impurities present in the lead bullion produced by either process. Almost half of all refined lead is recovered from recycled scrap. For commercial production, see lead processing. Uses of the metal Only a single crystalline modification, with a close-packed metallic lattice, is known. Properties that are responsible for the many uses of elemental lead include its ductility, ease of welding, low melting point, high density, and ability to absorb gamma radiation and X-radiation. Molten lead is an excellent solvent and collector for elemental silver and gold. The structural applications of lead are limited by its low tensile and fatigue strengths and its tendency to flow even when only lightly loaded. When freshly cut, lead oxidizes quickly, forming a dull gray coating, formerly thought to be lead suboxide, Pb_2O , but now recognized as a mixture of lead and lead monoxide, PbO , which protects the metal from further corrosion. Similarly, although lead is soluble in dilute nitric acid, it is only superficially attacked by hydrochloric or sulfuric acids because the insoluble chloride $PbCl_2$ or sulfate $PbSO_4$ coatings that are formed prevent continued reaction. Because of this general chemical resistance, considerable amounts of lead are used in roofing, as coverings for electric cables placed in the ground or underwater, and as linings for water pipes and conduits and structures for the transportation and processing of corrosive substances. The ease of oxidation of lead is enhanced by complex formation. The electrodeposition of lead is best effected from aqueous solutions containing lead hexafluorosilicate and hexafluorosilicic acid. Lead has many other applications, the largest of which is in the manufacture of storage batteries. It is used in ammunition shot and bullets and as a constituent of solder, type metal, bearing alloys, fusible alloys, and pewter. In heavy and industrial machinery, sheets and other parts made from lead compounds may be used to dampen noise and vibration. Because lead effectively absorbs electromagnetic radiation of short wavelengths, it is used as a protective shielding around nuclear reactors, particle accelerators, X-ray equipment, and containers used for transporting and storing radioactive materials. Together with the compound lead oxide PbO_2 and with lead-antimony or lead-calcium alloys, it is employed in common storage batteries. Properties of the element Lead and its compounds are toxic and are retained by the body, accumulating over a long period of time—a phenomenon known as cumulative poisoning—until a lethal quantity is reached. The toxicity of lead compounds increases as their solubility increases. In children the accumulation of lead may result in cognitive deficits; in adults it may produce progressive renal disease. Symptoms of lead poisoning include abdominal pain and diarrhea followed by constipation, nausea, vomiting, dizziness, headache, and general weakness. Elimination of contact with a lead source is normally sufficient to effect a cure. The elimination of lead from insecticides and paint pigments and the use of respirators and other protective devices in areas of exposure have reduced lead poisoning materially. For full treatment of lead and lead mining and

refining, see also lead poisoning. Nuclear properties Lead is formed both by neutron-absorption processes and the decay of radionuclides of heavier elements. Lead has four stable isotopes ; their relative abundances are lead, 1. Three stable lead nuclides are the end products of radioactive decay in the three natural decay series: More than 30 radioactive isotopes have been reported. Of the radioactive isotopes of lead, the following appear as members of the three natural decay series: The atomic weight of natural lead varies from source to source, depending on its origin by heavier element decay. Among the many important lead compounds are the oxides: Lead monoxide exists in two modifications, litharge and massicot. Litharge, which is produced by air oxidation of lead, is the most important commercial compound of lead; it is used in large amounts directly and as the starting material for the preparation of other lead compounds. Considerable quantities of PbO are consumed in manufacturing the plates of lead-acid storage batteries. High-quality glassware lead crystal contains as much as 30 percent litharge, which increases the refractive index of the glass and makes it brilliant, strong, and resonant. Litharge is also employed as a drier in varnishes and in making sodium plumbite, which is used for removing malodorous thiols a family of organic compounds containing sulfur from gasoline. PbO₂, found in nature as the brown-to-black mineral plattnerite, is commercially produced from trilead tetroxide by oxidation with chlorine. It decomposes upon heating and yields oxygen and lower oxides of lead. PbO₂ is used as an oxidizing agent in the production of dyestuffs, chemicals, pyrotechnics, and matches and as a curing agent for polysulfide rubbers. Trilead tetroxide known as red lead, or minium is produced by further oxidation of PbO. It is the orange-red to brick-red pigment commonly used in corrosion-resistant paints for exposed iron and steel. It also reacts with ferric oxide to form a ferrite used in making permanent magnets. In addition, it is utilized in the production of other lead compounds and in gold cyanidation plants, where it primarily serves to precipitate soluble sulfides from solution as PbS. Various other salts, most notably basic lead carbonate, basic lead sulfate, and basic lead silicate, were once widely employed as pigments for white exterior paints. Since the mid-th century, however, the use of such so-called white lead pigments has decreased substantially because of a concern over their toxicity and attendant hazard to human health. The use of lead arsenate in insecticides has virtually been eliminated for the same reason.

Chapter 3 : Lead(II,IV) oxide - Wikipedia

Lead and its compounds are toxic and are retained by the body, accumulating over a long period of time—a phenomenon known as cumulative poisoning—until a lethal quantity is reached. The toxicity of lead compounds increases as their solubility increases.

Preparation[change change source] Lead is made from galena. Galena is made pure by froth flotation to get all the impurities out. Then the lead sulfide is roasted in a furnace to make lead II oxide. The lead II oxide is heated with coke to make liquid lead metal. As an element[change change source] The dark bricks are made of lead. They are meant to keep people safe from the radioactive material inside. Lead is used in the ballast of sailboats. It is also used in weight belts for scuba diving. It is also used to make shotgun pellets and bullets for small arms. Some printing presses use lead type because it can be easily shaped. It can be used outside because it does not corrode in water. Most lead is used in lead acid batteries , though. The lead is oxidized , making electricity. Sheets of lead are used to block sound in some places. Lead is used in radiation shielding. Molten lead can be used as a coolant in nuclear reactors. It used to be mixed with tin to make the pipes in pipe organs. Different amounts of lead make different sounds. In addition, lead has found its usage in solder. It is used in some solder. It is used in covering for wires that carry high voltage. Some tennis rackets have lead in them to make them heavier. It is used to balance wheels of cars, to make statues, and to make decorative looks in buildings. As chemical compounds[change change source] Many lead compounds are used to make colored glazes in ceramics. Lead can be used in PVC pipes. Lead compounds are added to candles to make them burn better. Lead glass has lead II oxide in it. Lead compounds are still used as pigments in some places. Lead compounds were added to gasoline, but are now outlawed. Some lead compounds are semiconductors and are used in photodetectors.

Chapter 4 : ICD-9 Code -Toxic effect of lead and its compounds (including fumes)- AAPC Coder

Lead is present in a variety of compounds such as lead acetate, lead chloride, lead chromate, lead nitrate, and lead oxide. (1,2) Pure lead is insoluble in water; however, the lead compounds vary in solubility from insoluble to water soluble.

WHO, LC50 4. WHO, LC50 3. WHO, LC50 WHO, LC50 7. WHO, LC50 6. WHO, LC50 1. WHO, LC50 0. WHO, Characteristic effects: Lead can be absorbed by inhalation of dusts or by eating foods containing lead and - in the case of plants - by way of soluble lead salts in soils. Whereas inhalation is the major source of intake in workplace exposure, ingestion and resorption in the gastro-intestinal tract predominate in the population in general. It has recently become established that considerable quantities of lead enter the human body via drinking water lead pipes. Lead inhibits the various enzymes of the haemoglobin metabolism thus reducing the oxygen balance and the respiratory volume. Lead reduces the activity of the δ -aminolaevulinic acid-dehydratase in the erythrocytes. Symptoms of chronic poisoning are lead deposits along the edge of the gums as well as colic fits and spasms. Apathy, irritability, insomnia and - in some cases - behavioural irregularities in children are indications of damage to the nervous system. Lead passes through the placenta and accumulates in the foetus. Inorganic lead compounds are resorbed in the gastro-intestinal tract. Children resorb lead more easily than adults DVGW, It is deposited above all in the bones. Plants mainly absorb lead from the soil, but only to a small extent from the atmosphere. Lead has a toxic effect on growth: There is an adverse influence on photosynthesis, respiration and other metabolic processes. As a final step, lead inhibits the intake of essential nutrients from the soil. Generally speaking, it is the quality rather than the yield which suffers. Compared to the toxicity in humans, the phytotoxicity of lead is of minor importance. Surface water forms an accumulation sink for lead compounds. Insoluble lead compounds sink and are adsorbed in the sediment or accumulate on suspended matter in particular the clay fraction. Aquatic plants likewise accumulate lead. The biochemical oxidation of organic substances is inhibited at lead concentrations above 0. Groundwater is adversely affected by soluble lead compounds e. Nevertheless, it has been established that drinking water that passes through lead pipes may contain high lead concentrations depending on the groundwater chemism. Lead is not chemically affected by deoxygenated water. In lead pipes, carbonated water forms lead carbonate deposits on the inner pipe surface. Large quantities of lead are released into the atmosphere by combustion processes. There is a major difference between urban and rural areas. Lead compounds may be transported over a considerable distance depending on the speed and direction of the wind as well as precipitation and humidity. However, most of the lead in the atmosphere directly sediments or is removed by precipitation. Lead bonds to small dust particles in the air which in turn are deposited on vegetation and soil. Lead from motor-vehicle emissions accumulates in the immediate vicinity of roads. The absorption rate depends on the properties of the soil. There is a considerable affinity with humic substances. The pH is important for the availability of lead from its compounds. A low pH is linked to a high degree of desorption into the soil solution. However, as lead is quite immobile e. Soils thus represent an important sink for lead compounds. Additional contamination results from the deposition of sewage sludge containing lead on farmland. Only extremely high contamination rates constitute a hazard to groundwater. The biological half-life in blood is between 20 and 40 days; in bones up to several years WHO, Lead is found in all foodstuffs and fodders because it is ubiquitous. Vegetable foodstuffs generally contain more lead than animal products. This is the result of their special exposure: In higher life forms, the maximum concentrations are found in internal organs such as the liver and kidneys. The increase in concentration is as follows in aquatic systems: At places where lead is produced or processed, atmospheric pollution is an additional problem.

Chapter 5 : Lead and its inorganic compounds

Toxic effect of lead and its compounds, undetermined, sequela. Billable/Specific Code POA Exempt. TX4S is a billable/specific ICD-9-CM code that can be used to indicate a diagnosis for reimbursement purposes.

Hydrogen Fluoride Hydrofluoric Acid: Fluorine is a naturally occurring element in the earth. It is usually found in the form of the mineral fluorite, CaF_2 . Fluorine is a yellow-green gas with a strong, sharp odour like pool chlorine. It combines with hydrogen to make hydrogen fluoride, a colourless gas with a strong irritating odour. Hydrogen fluoride dissolves in water to make hydrofluoric acid. Hydrogen fluoride will corrode most substances except lead, wax, polyethylene, and platinum. Hydrogen fluoride is used to manufacture other fluorine-based chemicals including Sodium fluoride, which is a white powder, although sometimes it is dyed blue for identification purposes. Small amounts of sodium fluoride help prevent tooth decay, but high levels may harm your health. In children whose teeth are forming, excessive fluoride levels may cause dental fluorosis with visible changes in the teeth. In adults, high fluoride over a long time may lead to skeletal fluorosis with denser bones, joint pain, and limited joint movement. High levels of fluorine or hydrogen fluoride gas can cause muscle spasms, harm the lungs and heart and cause death. At low levels they can irritate the eyes, skin and lungs. Contact with hydrofluoric acid even diluted can burn the eyes causing blindness and skin, causing severe burns deep beneath the skin damaging internal tissues. This can occur hours after contact, even if no pain is initially felt. Contact with hydrofluoric acid happens mainly in the workplace. Long-term exposures may damage the kidneys and liver. Entering the body Fluoride compounds may enter the body by inhaling or ingestion. Exposure Workers in the industries that use or produce fluoride compounds are at greatest risk of exposure. Consumers are most likely to be exposed to fluoride compounds when using consumer products containing fluoride compounds; especially toothpaste or fluoride enhanced water. Residents in close proximity to production and processing facilities using fluoride compounds may also receive very low levels of fluoride exposure. Health guidelines Worksafe Australia: For hydrogen fluoride the eight hour time weighted average TWA exposure limit is 2. Worksafe Australia reports this product causes severe burns, and is toxic by inhalation. For fluorine the eight hour time weighted average TWA exposure limit is 1. Description Hydrogen fluoride will exist as a particle in the air if released to the atmosphere. It dissolves when mixed with water. Insufficient data are available to predict the short-term or long term effects of hydrogen fluoride to aquatic life, plants, birds or land animals. Concentrated hydrogen fluoride is very corrosive and would badly burn any plants, birds or land animals exposed to it. The concentrations of hydrogen fluoride found in close proximity to sources may adversely affect some species of plants. Small quantities of hydrogen fluoride will be neutralised by the natural alkalinity in aquatic systems. Larger quantities may lower the pH for extended periods of time. Fluorides are not expected to bioaccumulate. Entering the environment Industrial emissions of fluoride compounds can produce elevated concentrations in the atmosphere. Hydrogen fluoride will exist as a particle, which may dissolve in clouds, fog, rain, dew, or snow. In clouds and moist air it will travel along the air currents until it is deposited as wet acid deposition acid rain, acid fog, etc. In waterways it readily mixes with the water. Where it ends up Hydrogen fluoride may enter the air during production, use and transportation. The gas dissolves in clouds, fog, rain, or snow. In the environment it will react with other chemicals present ammonia, magnesium, calcium to form salts, neutralising the acid. Environmental guidelines No national guidelines. Industry sources The primary sources of fluoride emissions are the industries that manufacture it or use it in production. Some of the industries that use it in production are aluminium industry, oil drilling and refining, the chemical and plastics industries, agricultural and pesticide chemical manufacturers, dye manufacturers, manufacturers of metal parts. These are emissions to the air unless there is a spill. Diffuse sources, and industry sources included in diffuse emissions data Other possible emitters of fluoride are metal cleaning operations, glass and enamel manufacturing and glazing, toothpaste, and fluoride enhanced water. These emissions may be to the soil, water, or air. Natural sources Fluorine is a naturally occurring element in the earth, but elemental fluorine is too reactive to be found in nature. Fluorine is found in nature as part of the mineral fluorite. Water in rivers or streams that flow over

rocks rich in fluorine-containing minerals such as fluorspar may naturally contain dissolved fluoride. Transport sources No known mobile sources. Consumer products Toothpaste, pesticides, ceramic and glass polishing etching and frosting materials, special dyes, drinking water in some areas may be naturally or artificially enriched in fluoride.

Chapter 6 : Fluoride compounds: Sources of emissions | National Pollutant Inventory

ICD TX1D Short Description: Toxic effect of lead and its compounds, accidental, subs Long Description: Toxic effect of lead and its compounds, accidental (unintentional), subsequent encounter This is the version of the ICDCM diagnosis code TX1D Valid for Submission The code TX1D is valid for submission for HIPAA-covered transactions.

If a pure compound is desired, PbO can be removed by a potassium hydroxide solution: The best known natural specimens come from Broken Hill , New South Wales , Australia, where they formed as the result of a mine fire. However, it is soluble in hydrochloric acid present in the stomach , and is therefore toxic when ingested. It also dissolves in glacial acetic acid and a diluted mixture of nitric acid and hydrogen peroxide. Use[edit] Lead tetraoxide is most often used as a pigment for primer paints for iron objects. Due to its toxicity , its use is being limited. In the past, it was used in combination with linseed oil as a thick, long-lasting anti-corrosive paint. The combination of minium and linen fibres was also used for plumbing , now replaced with PTFE tape. Currently it is mostly used for manufacture of glass , especially lead crystal glass. Red lead is used as a curing agent in some polychloroprene rubber compounds. It is used in place of magnesium oxide to provide better water resistance properties. It is also used as an adultering agent in turmeric powder. In case of high dose, the victim experiences a metallic taste, chest pain, and abdominal pain. When ingested, it is dissolved in the gastric acid and absorbed, leading to lead poisoning. High concentrations can be absorbed through skin as well, and it is important to follow safety precautions when working with lead-based paint. Long-term contact with lead II,IV oxide may lead to accumulation of lead compounds in organisms, with development of symptoms of acute lead poisoning. Chronic poisoning displays as agitation, irritability, vision disorders, hypertension , and a grayish facial hue. Lead II,IV oxide was shown to be carcinogenic for laboratory animals. Its carcinogenicity for humans was not proven. Lead II,IV oxide was used as a red pigment in ancient Rome , where it was prepared by calcination of white lead. In the ancient and medieval periods it was used as a pigment in the production of illuminated manuscripts , and gave its name to the minium or miniature , a style of picture painted with the colour. As a finely divided powder, it was also sprinkled on dielectric surfaces to study Lichtenberg figures. In traditional Chinese medicine , red lead is used to treat ringworms and ulcerations , though the practice is limited due to its toxicity.

Chapter 7 : ICD 10 Code for Toxic effects of lead & its compounds TX

Introduction. Lead (Pb) is ubiquitous and one of the earliest metals discovered by the human race. Unique properties of lead, like softness, high malleability, ductility, low melting point and resistance to corrosion, have resulted in its widespread usage in different industries like automobiles, paint, ceramics, plastics, etc.

Intense exposure of short duration – Muscle pain, fatigue, abdominal pain, headache, vomiting, seizures and coma
Chronic poisoning Repeated low-level exposure over a prolonged period 40–60 Open in a separate window
Lead significantly affects the heme synthesis pathway in a dose dependent manner by downregulating three key enzymes involved in the synthesis of heme. The initial and final steps of heme synthesis take place in the mitochondria, whereas the intermediate steps take place in the cytoplasm. Lead inhibits the three aforementioned vital enzymes of this pathway but its effect on ALAD is more profound and its inhibition has been used clinically to gauge the degree of lead poisoning. Inhibition of ferrochelatase results in increased excretion of coproporphyrin in urine and accumulation of protoporphyrin in erythrocytes EP. Moreover, inhibition of this enzyme results in the substitution of iron by zinc in the porphyrin ring forming zinc protoporphyrin ZPP. The concentration of ZPP thus gets increased, which can also be used as an indicator to monitor the level of lead exposure Jangid et al. Thus, the collective inhibition of these three key enzymes blocks the heme production via the heme synthesis pathway. The mechanism responsible for shortening the life cycle of erythrocytes is not well understood. One of the earliest observed hematological effects of lead revealed basophilic stipplings of red blood cells presence of dense material in red blood cells, which is also a potential biomarker for the detection of lead poisoning. These aggregates are degradation products of ribonucleic acid Patrick, Renal functional abnormality can be of two types: Acute nephropathy is characterized functionally by an impaired tubular transport mechanism and morphologically by the appearance of degenerative changes in the tubular epithelium along with the occurrence of nuclear inclusion bodies containing lead protein complexes. Chronic nephropathy on the other hand, is much more severe and can lead to irreversible functional and morphological changes. It is characterized by glomerular and tubulointerstitial changes, resulting in renal breakdown, hypertension and hyperuricemia Rastogi, Cardiovascular Effects Both chronic and acute lead poisoning causes cardiac and vascular damage with potentially lethal consequences including hypertension and cardiovascular disease Navas-Acien et al. Other major disorders include ischemic coronary heart disease, cerebrovascular accidents and peripheral vascular disease. Although evidence of causal relationship of lead exposure and hypertension was reported, it applies only in cases of cardiovascular outcomes of lead toxicity Navas-Acien et al. Reproductive Health Effects Lead causes a number of adverse effects on the reproductive system in both men and women. Common effects seen in men include: Women on the other hand, are more susceptible to infertility, miscarriage, premature membrane rupture, pre-eclampsia, pregnancy hypertension and premature delivery Flora et al. Moreover, during the gestation period, direct influence of lead on the developmental stages of the fetus has also been reported Saleh et al. Effect on Bone The primary site of lead storage in the human body are bones Renner, ; Silbergeld et al. There are two compartments in bones where lead is believed to be stored. The exchangeable pool present at the surface of bone and the non-exchangeable pool located deeper in the cortical bone. Lead can enter into plasma at ease from the exchangeable pool but can leave the non-exchangeable pool and move to the surface only when bone is actively being re-absorbed Patrick, Mechanism of toxicity Lead is probably the most extensively studied heavy metal. Studies carried out in this field have reported the presence of various cellular, intracellular and molecular mechanisms behind the toxicological manifestations caused by lead in the body. It has been reported as a major mechanism of lead induced toxicity.

Chapter 8 : ICDCM Diagnosis Codes * : Toxic effect of lead and its compounds (including fumes)

ICD TX1A Short Description: Toxic effect of lead and its compounds, accidental, init Long Description: Toxic effect of lead and its compounds, accidental (unintentional), initial encounter This is the version of the ICDCM diagnosis code TX1A Valid for Submission The code TX1A is valid for submission for HIPAA-covered transactions.

An alloy is made by melting and then mixing two or more metals. The mixture has properties different from those of individual metals. The most important use of arsenic in the United States is in wood preservatives. Discovery and naming Arsenic can be produced from its ores very easily, so many early craftspeople may have seen the element without realizing what it was. Since arsenic is somewhat similar to mercury, early scholars probably confused the two elements with each other. Credit for the actual discovery of arsenic often goes to alchemist Albert the Great Albertus Magnus, He heated a common compound of arsenic, orpiment As_2S_3 , with soap. Nearly pure arsenic was formed in the process. By the mid-seventeenth century, arsenic was well known as an element. Textbooks often listed methods by which the element could be made from its compounds. Physical properties Arsenic occurs in two allotropic forms. Allotropes are forms of an element with different physical and chemical properties. The more common form of arsenic is a shiny, gray, brittle, metallic-looking solid. The less common form is a yellow crystalline solid. It is produced when vapors of arsenic are cooled suddenly. When heated, arsenic does not melt, as most solids do. Instead, it changes directly into a vapor gas. This process is known as sublimation. Arsenic has a density of 5. Chemical properties Arsenic is a metalloid. A metalloid is an element that has properties of both metals and non-metals. Metalloids occur in the periodic table on either side of the staircase line that starts between boron and aluminum. When heated in air, arsenic combines with oxygen to form arsenic oxide As_2O_3 . A blue flame is produced, and arsenic oxide can be identified by its distinctive garlic-like odor. Arsenic combines with oxygen more slowly at room temperatures. The thin coating of arsenic oxide that forms on the element prevents it from reacting further. Arsenic does not dissolve in water or most cold acids. Occurrence in nature Arsenic rarely occurs as a pure element. It is usually found as a compound. These compounds are obtained as a by-product of the mining and purification of silver metal. The United States does not produce any arsenic. Isotopes One naturally occurring isotope of arsenic exists, arsenic Isotopes are two or more forms of an element. Isotopes differ from each other according to their mass number. The mass number represents the number of protons plus neutrons in the nucleus of an atom of the element. The number of protons determines the element, but the number of neutrons in the atom of any one element can vary. Each variation is an isotope. About 14 radioactive isotopes of arsenic are known also. A radioactive isotope is one that breaks apart and gives off some form of radiation. Radioactive isotopes are produced when very small particles are fired at atoms. These particles stick in the atoms and make them radioactive. None of the isotopes of arsenic have any important commercial use. Extraction The process of recovering arsenic from its ores is a common one used with metals. The ore is first roasted heated in air to chemically convert arsenic sulfide to arsenic oxide. The arsenic oxide is then heated with charcoal pure carbon. The carbon reacts with the oxygen in arsenic oxide, leaving behind pure arsenic: Common lead storage batteries used in cars and trucks contain alloys of arsenic. Uses Arsenic is mostly used in compounds. A much smaller amount of the element itself is used in alloys. For example, certain parts of lead storage batteries used in cars and trucks contain alloys of lead and arsenic. Arsenic has also been used to make lead shot in the past. The amount of arsenic used in these applications is likely to continue to decrease. It is too easy for arsenic to get into the environment from such applications. Minute amounts of arsenic are used in the electronics industry. It is added to germanium and silicon to make transistors. LEDs produce the lighted numbers in hand-held calculators, clocks, watches, and a number of other electronic devices. Compounds Arsenic has a fascinating history as a healer and killer. Early physicians, such as Hippocrates c. In more recent times, compounds of arsenic have been used to treat a variety of diseases, including syphilis and various tropical diseases. Arsenic has a special place in the history of modern medicine. In , German biologist Paul Ehrlich invented the first drug that would cure syphilis, a sexually transmitted disease. This drug, called salvarsan, is a compound of arsenic. Its chemical name is arsphenamine. On July 9, , the twelfth president of

the United States, Zachary Taylor, died in office. He had served as president for a little more than sixteen months. The cause of death was widely reported as gastroenteritis an inflammation in the stomach and intestines. He had gotten sick after eating a mixture of cherries and buttermilk. But for years, historians wondered whether Taylor had been murderedâ€”poisoned by arsenic! Scientists used a process that measured the amount of arsenic in the tissue samples. Most human bodies do contain traces of arsenic. So the key issue was whether there would be more arsenic in the tissue samples than would be normal for someone who had been dead for years. If there were, that would mean Taylor was probably poisoned; if not, death by natural causes was more likely. The Kentucky medical examiner a public official who studies corpses to find the cause of death came to a conclusion. So while some still wonder whether Taylor was poisoned, arsenic was certainly not the chemical element used. And, more than likely, it was the cherries and buttermilk! Compounds of arsenic have long been used for less happy purposes. Especially during the Middle Ages, they were a popular form of committing murder. At the time, it was difficult to detect the presence of arsenic in the body. A person murdered by receiving arsenic was often thought to have died of pneumonia. The toxic properties of arsenic compounds made them useful as rat poison. However, they are seldom used for this purpose today. Safer compounds are used that do not present a threat to humans, pets, and the environment. Today, the most important use of arsenic is in the preservation of wood. It is used in the form of a compound called chromated copper arsenate CCA. CCA accounts for about 90 percent of all the arsenic used in the United States. It is added to wood used to build houses and other wooden structures. It prevents organisms from growing in the wood and causing it to rot. In , about 19,, metric tons of arsenic were used for this purpose. There is significant concern about the use of arsenic-treated wood in playground equipment and raised garden beds because of toxicity. Health effects Arsenic and its compounds are toxic to animals. In low doses, arsenic produces nausea, vomiting, and diarrhea. In larger doses, it causes abnormal heart beat, damage to blood vessels, and a feeling of "pins and needles" in hands and feet. Small corns or warts may begin to develop on the palms of the hands and the soles of the feet. Direct contact with the skin can cause redness and swelling. The most important use of arsenic is in the preservation of wood. Long term exposure to arsenic and its compounds can cause cancer. Inhalation can result in lung cancer. If swallowed, cancer is likely to develop in the bladder, kidneys, liver, and lungs. In large doses, arsenic and its compounds can cause death.

Toxic effect of lead and its compounds (including fumes) > Lead is a metal that occurs naturally in the earth's crust. People have spread it through the environment in many ways.

Any paint that relies on lead compounds for its colour. White lead, or lead II carbonate $PbCO_3$, is a typical example, and was once widely used to paint wooden surfaces in homes. Other lead compounds, like vivid yellow lead chromate $PbCrO_4$, were used as coloured pigments. As well as giving the paint its tint, lead pigments are highly opaque, so that a relatively small amount of the compound can cover a large area. White lead is very insoluble in water, making the paint highly water-resistant with a durable, washable finish. Lead carbonate can also neutralise the acidic decomposition products of some of the oils that make up the paint, so the coating stays tough, yet flexible and crack-resistant, for longer. Lead is toxic, and as young children tend to chew things, they are particularly prone to ingesting it. Not good for their vulnerable, developing brains. It was increasingly recognised in the first half of the 20th century that children were being poisoning with lead paint, and its use in cots and toys had been phased out in the West by the s. However, lead-based decorative household paints were still used for another couple of decades before this too ended due to health concerns. Why is lead toxic? Lead can disrupt numerous crucial bodily functions, and hence has a wide variety of symptoms, from vomiting to madness to death. It is also able to displace a series of other metals from doing their normal job in the body - most significantly, calcium, iron and zinc. A particular problem is that lead displaces the zinc from the enzyme delta-aminolaevulinate dehydratase, which is crucial for the biosynthesis of heme, the iron-binding part of the haemoglobin molecule that carries oxygen around the blood. This results in cells around the body being short of oxygen, causing a cascade of associated problems. All lead paints have been banned then? In the EU, lead paint can now only be used for the restoration and maintenance of works of art and historical buildings. How was the toxic paint found? Mattel identified the toxic paint during routine safety checks. Atomic absorption and x-ray fluorescence spectroscopy are both general methods that can reveal the presence of lead, while inductively coupled plasma mass spectrometry can detect lead in less than part-per-billion quantities, he added. China is gradually cracking down on the use of lead, banning leaded petrol in , for example. However, lead paint is cheaper than the alternatives, which seems to have tempted certain Chinese manufacturers to use it in preference to the non-toxic, and legal, replacements.