Univ of Pennsylvania Med. Sch.
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The Medical Control of Industrial Exposure to Lead

1. Is it necessary, in view of the relative success of modern environmental control?

   Do cases of lead poisoning occur in significant numbers in American industry?

   Are the cases of such severity as to be medically and hygienically significant?

   (a) Incidence (Unknown because of unsatisfactory quality of medical practice in industry generally and negligible coverage of small industry)

   Foundries - brass - fume from furnaces and molten alloys, dust from molding materials

   Storage battery manufacture - dust - some fume (burning)

   Smelters - particularly of scrap - fume (furnaces), dust (scrap of batteries, etc.)

   Manufacture of paint pigments - oxides, chromate, carbonate - dust

   Coatings - dust, spray (batch mixing of pigments, etc.)

   Lead burners in chemical plants - fume (dirty shop work)

   Potteries - glazes - glass manufacture - dust and spray of glazing materials

   Car body work - dust - finely divided metallic lead

   Manufacture of wire - dust - finely divided metal (wiping)

   Manufacture of cans - extensive, continuous soldering - fume, dust (wiping)

   Ship building but particularly ship cutting - volatilized paint

Bridge building - volatilized paint (paint burning and riveting)

Paint spraying - especially objects of variable shape and size, for which hooding is difficult to design

(Many types of uncontrolled operations in small industries (everything))

(b) Severity (Unknown in any precise sense because of poor quality of medical supervision and records)

Recurrent cases - prolonged disability - paralyses rare but do occur, occasional encephalopathy, occasional prolonged weakness with anemia or myalgia or arthralgia

First episode - often prolonged absence from exposure required with dislocation of employment (6 months or more)

2. Prevention requires recognition of hazard

How recognized?

(a) By detailed observation of plant operations - criteria?

(1) Evidence of uncontrolled, or inadequately controlled sources of fume in high temperature operations - furnaces, making castings, cutting operations

(2) Evidences of uncontrolled or inadequately controlled sources of dust

Nature of operations - nature of ventilating devices

Housekeeping

Watch men at work and see what they do and how they do it

Use of respirators

Evidence, in themselves, of inadequate control of cleanliness of air - bad sign usually

Misuse of respirators - evidence of lack of discipline and supervision

3. Prevention - real prevention - requires regular, periodic (interval depends on degree of hazard) measurement of hazard

How? By direct observation of working conditions and by use of appropriate technical measures

(This is a procedure subject to medical interpretation)

To be used as marginal notes

(a) Air analyses - orderly, systematic, representative

(This is a medical procedure and it should be carried out as such)

(b) Analytical determination of lead absorption (blood or urine or both)

(1) Measurement of intrinsic hazard of each occupation

Determination of extent of control of environment and location of chief occupational hazards

(2) Measurement of total hazards to individuals

Determination of extent of control (instruction, supervision) of personnel

(3) Careful investigation of circumstances associated with occurrence of cases, or undue fluctuation in environment or personnel

4. Control of Occupational Hazard, when known to be significant, generally or focally, involves certain carefully executed medical procedures

(a) Medical examinations, the periodicity of which should depend upon the degree of hazard - more frequent in relation to operations of relatively great hazard

(1) Investigation of symptoms

(2) Search for physical signs of absorption

(3) Investigation of extent of absorption -

Hematologic evidence vs specific analytical evidence

urinary porphyrins - significance

(4) Placement of personnel

(b) Complete familiarity with plant operations at all times, including nature of jobs and manner of their performance, and full knowledge of all environmental conditions

(c) Educational program - managers, supervisors, exposed personnel

(d) Removal of persons who give evidence of hazardous absorption from job - partially or entirely

Mechanism and criteria for transfer to another job involving less exposure

Criteria for removal from all occupational exposure

Criteria for return to work involving exposure

(e) Systematic rotation of men in and out of exposure

Criteria for determining necessity and interval