Associations between Brian Arndt's non-cancer health issues and his occupational exposures

Collated by Elizabeth O'Brien, The LEAD Group Inc

Erectile dysfunction and lead exposure

Health Impacts of Lead Poisoning - A preliminary listing of the health effects & symptoms of lead poisoning - updated January 2014 and April 2018 – by Vella, Vance; O'Brien, Elizabeth; Idris, Elisa; Wibowo, Erik; Zhu, Hugh Xin Xi; & Choong, Emily, The LEAD Group, https://www.lead.org.au/fs/fst7.html includes:

> **Perinatal Development and Reproductive Health Effects**
>
> **Adults**
>
> Erectile dysfunction, impotence (3) (Reference 3: National Research Council (US). (1993). **Measuring lead exposure in infants children and other sensitive populations**. National Academy Press, Washington DC.)

NTP Monograph on Health Effects of Low-Level Lead: Appendix E: Human Studies of Reproductive and Developmental Effects of Lead Considered in Developing Conclusions, by NTP (National Toxicology Program), US Department of Health and Human Services (DHHS), 13th June 2012, http://ntp.niehs.nih.gov/NTP/ohat/Lead/Final/LeadAppendixE_Final_508.pdf states:

> In a case control study by Anis (2007) in Cairo Egypt: Blood Pb and penile cavernous tissue Pb was higher in men with erectile dysfunction. Reference: Anis TH, ElKaraksy A, Mostafa T, Gadalla A, Imam H, Hamdy L, Abu el-Alla O. 2007. Chronic lead exposure may be associated with erectile dysfunction. *J Sex Med* 4(5): 1428-1434; discussion 1434-1426. https://www.jsm.jsexmed.org/article/S1743-6095(15)31652-0/fulltext

Chronic lead exposure may be associated with erectile dysfunction, by Tarek H. Anis, MD, Ahmed ElKaraksy, MD, Taymour Mostafa, MD, Amr Gadalla, MD, Hager Imam, PhD, Lamya Hamdy, PhD, Omayma Abu el-Alla, PhD, in J Sex Med. 2007 Sep;4(5):1428-34; discussion 1434-6. https://www.ncbi.nlm.nih.gov/pubmed/17727353 states in the **Abstract:**

> **INTRODUCTION:** Heavy metals constitute significant potential threats to human health in both occupational and environmental settings. Research examining the etiology of lead toxicity-induced hypertension reveals that the free radical production and lowering of inherent antioxidant reserves resulting from lead

toxicity are directly related to vasoconstriction underlying lead-induced hypertension. A similar mechanism would affect smooth muscle relaxation in the cavernous tissue leading to erectile dysfunction (ED).

AIM: Is to study the possible hazardous effect of chronic lead exposure on the erectile function, and to document the deposition of lead in the cavernous tissue.

METHODS: ...Sixteen of the 34 patients [with ED in the study group], and none of the 15 controls, had elevated lead serum levels (above 25 µg/dL)....

RESULTS: The ED group had significantly higher blood lead level when compared with the control group. A significant positive correlation was found between the blood lead level and cavernous tissue lead level of the ED group. Individuals with high blood lead had significantly higher levels of serum ROS and significantly lower levels of serum antioxidants, compared with those having low blood lead. Histological sections from patients with high blood lead showed deposition of grayish lead granules in the cavernous tissue.

CONCLUSIONS:

Chronic lead exposure may be associated with ED [erectile dysfunction].

Lead was recognized as a reproductive toxicant 2000 years ago

Chapter 6 on *Lead Exposure and Its Effects on the Reproductive System,* by Rebecca Z. Sokol Department of Obstetrics and Gynecology and Medicine Keck School of Medicine, University of Southern California, in *Metals, Fertility, and Reproductive Toxicity*, edited by Mari S Golub, CRC/Taylor and Francis, Boca Raton, 2006, https://epdf.pub/metals-fertility-and-reproductive-toxicity.html begins:

> Greek physicians described lead poisoning over 2000 years ago. Both the Greeks and the Romans recognized lead as an abortifacient and a reproductive toxicant.... Since the 1970s, animal and clinical studies have documented reproductive toxicity in both men and women exposed to lead in their workplace and in their environment.

Brian Arndt may well have been exposed to vanadium, another reproductive toxicant in the petrol

Adverse Effects of Aluminum, Uranium, and Vanadium on Reproduction and Intrauterine Development in Mammals Jose L. Domingo Laboratory of Toxicology and Environmental Health, School of Medicine, "Rovira i Virgili" University, Reus, Spain, in the Golub book: includes:

> Vanadium is also one of the metallic components contained in crude petroleum oils... [in mammals] reproductive and developmental toxicity have been demonstrated to occur following vanadium exposure.

Workplace hazards which cause infertility can only be observed by the absence of offspring

In his review of the above Golub book, *Book Review: Metals, Fertility and Reproductive Toxicity,* 27th March 2006, Professor Chris Winder (late, of The LEAD Group's Technical Advisory Board) - +

(from Professor Winder's archives he donated to The LEAD Group's Library), he made the pertinent observation (considering that Brian Arndt had one child before he began working at the refinery and developed erectile dysfunction soon after working there, and fathered no further children) that:

> Effects on fertility, reproduction and development are one health consequence where it is difficult in the main, to show that a workplace or an environmental hazard has produced an adverse effect. The causes of the majority of birth defects are invariably unknown, as is the aetiology of the majority of malformations. As well as observable adverse effects, one major end result of reproductive or developmental problems is infertility, which can only usually be measured by observing an absence of reproductive outcome.

Shell says refinery organic lead additives (TEL/TML) are "toxic to reproduction"

Reference: *Table 7a (i) Refinery: Chemical Agent Inventory: Examples of chemical agents and the principal areas in which they may occur*, from "Shell Occupational Health Hazard Inventory", web-published by Petroleum Development Oman on 6th May 2012, available as link at:
https://www.pdo.co.om/hseforcontractors/Health/Documents/Forms/AllItems.aspx?Paged=TRUE&p_SortBehavior=0&p_FileLeafRef=PDO%20HEALTH%20HAZARD%20REGISTER%20122016%2exlsx&p_ID=370&RootFolder=%2fhseforcontractors%2fHealth%2fDocuments%2fHRAs&PageFirstRow=31&&View={CA6B6393-9515-41E4-8223-61BADE2DAB33}

Balance problems and lead exposure

Health Impacts of Lead Poisoning - A preliminary listing of the health effects & symptoms of lead poisoning - updated January 2014 and April 2018 – by Vella, Vance; O'Brien, Elizabeth; Idris, Elisa; Wibowo, Erik; Zhu, Hugh Xin Xi; & Choong, Emily, The LEAD Group, https://www.lead.org.au/fs/fst7.html includes:

Peripheral nervous system

Proprioreceptive pathways involved in balance altered (2) (Reference 2: Silbergeld, E. K. (1992). **Neurological perspective on lead toxicity. In Human Lead Exposure**, ed H. L. Needleman, CRC Press.)

Balance problems and exposure to gasoline fumes

Gasoline poisoning, Updated by: Jesse Borke, MD, FACEP, FAAEM, Attending Physician at FDR Medical Services/Millard Fillmore Suburban Hospital, Buffalo, NY. Also reviewed by David Zieve, MD, MHA, Medical Director, Brenda Conaway, Editorial Director, and the A.D.A.M. Editorial team; Medline Plus, US National Library of Medicine, 16th October 2017, https://medlineplus.gov/ency/article/002806.htm includes the following symptoms of exposure to gasoline/petrol fumes:

Symptoms

Gasoline poisoning can cause symptoms in various parts of the body:...
NERVOUS SYSTEM...

- Dizziness...
- Staggering

Psychotic dreaming and exposure to Tetraethyl Lead (TEL) or Tetramethyl Lead (TML)

See *19651208 Dept of Health letter re considerable risk of lead poisoning from handling leaded sludge* in this newsletter.

The abovementioned 8th December 1965 Letter on behalf of New Zealand Division of Public Health Director to the Medical Officer of Health to Director-General of Health notes that worker's exposure to leaded [petrol tank] sludge must be medically supervised, including blood or urine lead surveillance and that:

> The warning sign [of organic lead poisoning] is considerable dreaming, usually of an unpleasant content.

Handbook on the Toxicology of Metals, Edited by Lars Friberg, Gunnar F Nordberg and Velimir B Vouk, Elsevier/North-Holland Biomedical Press, Amsterdam, New York, Oxford 1979 says on page 477:

> The toxic effects of tetramethyllead do not differ essentially from those of TEL...
>
> The earliest symptom of TEL poisoning is insomnia, and the main organ affected is the central nervous system. The poisoning is usually acute, developing into toxic

psychosis with hallucinations, delusions, excitement and bad dreams, and may result in death.

And on page 478:

> The most important measure for detecting accidental exposure and for preventing early effects of TEL is the periodic monitoring of urinary lead levels and lead concentrations in the air of working environments.

Toxnet - Hazardous Substances Data Bank (HSDB), Toxicology Data Network, US National Library of Medicine, US National Institutes of Health: TETRAETHYL LEAD - CASRN: 78-00-2, by Toxnet - Toxicology Data Network, US National Library of Medicine, US National Institutes of Health, reviewed 8th May 2008, https://toxnet.nlm.nih.gov/cgi-bin/sis/search/a?dbs+hsdb:@term+@DOCNO+841 includes:

Clinical Effects:

0.2.1 SUMMARY OF EXPOSURE

0.2.1.1 ACUTE EXPOSURE

Severe ***exposure [to*** TETRAETHYL LEAD] ***leads*** to delusions, hallucinations, mania, ***psychotic*** behavior, ...

0.2.7 NEUROLOGIC

0.2.7.1 ACUTE EXPOSURE

A) Clinical neurologic effects of TEL intoxication can be divided into MILD, MODERATE, and SEVERE.

B) MILD - Anxiety, irritability, insomnia, lurid dreams,

anorexia, metallic taste, dizziness, pallor, lassitude,

tremor, incoordination, and cerebellar ataxia.

C) MODERATE - Disorientation, hyperexcitability,

hyperreflexia, and lurid dreams, tremors, and chorea.

Metabolism/Pharmacokinetics:
Metabolism/Metabolites:

..... Tetramethyl lead (TML) is metabolized more slowly than tetraethyl lead (TEL) to the trialkyl derivative, and hence is considered somewhat less toxic than TEL; however, it is more volatile than TEL, and thus probably is more available for respiratory absorption.

The association of hypertension with lead exposure

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> **Adult**
>
> **Cardiovascular and circulation**
>
> Hypertension, elevated blood pressure (2,14,17,22,35,38,60)
>
> (Reference 2: Silbergeld, E. K. (1992). **Neurological perspective on lead toxicity. In Human Lead Exposure**, ed H. L. Needleman, CRC Press;
>
> Reference 14: Wedeen R. P. (1992). **Lead, the kidneys and hypertension**. In Human Lead Exposure, ed H. L. Needleman, CRC Press;
>
> Reference 17: Schwartz, J. (1992). **Lead, blood pressure and cardio-vascular disease** In Human Lead Exposure, ed H. L. Needleman, CRC Press;
>
> Reference 22: Hu, H., Pepper, L. & Goldman, R. **Effect of repeated occupational exposure to lead, cessation of exposure, and chelation on levels of lead in bone**.. American Journal of Industrial Medicine 1991;20(6):723-35. http://www.ncbi.nlm.nih.gov/pubmed/1805610 Abstract.;
>
> Reference 35. Royce, S. E. (1992). **Lead toxicity**. US Dept of Health and Human Services Agency for Toxic Substances and Disease Registry. Sept . http://wonder.cdc.gov/wonder/prevguid/p0000017/p0000017.asp ;
>
> Reference 38: Werbach, M. F. (1997). **Foundations of nutritional medicine**. Third Line press, Tarzana California;
>
> Reference 60: National Toxicology Program (NTP). **NTP Monograph on Health Effects of Low-Level Lead**. U.S Department of Health and Services 2012.)

NTP Monograph on Health Effects of Low-Level Lead: Appendix C: Human Studies of Cardiovascular Effects of Lead Considered in Developing Conclusions, by National Toxicology Program (NTP), US Department of Health and Human Services (DHHS) 2012, http://ntp.niehs.nih.gov/NTP/ohat/Lead/Final/AppendixC-CardioEffects-prepubliation_508.pdf; (ie the abovementioned Reference 60: NTP Monograph) lists the Prospective Cheng (2001) study in Boston, MA, USA with a study population described as:

> 519 men in the Normative Aging Study who were not hypertensive when baseline Pb levels were measured and followed for 3 to 6 years (n=474);

Year 1991-1997; Male = 100%

And observed effect:

> Bone Pb [bone lead measured by XRF] was significantly associated with higher BP [blood pressure] 3 to 6 years later, but blood Pb [blood lead] was not associated. [Reference: Cheng Y, Schwartz J, Sparrow D, Aro A, Weiss ST, Hu H. 2001. Bone lead and blood lead levels in relation to baseline blood pressure and the prospective development of hypertension: the Normative Aging Study. *Am J Epidemiol* 153(2): 164-171.)

Thus the importance of the availability of bone XRF machines!!

Lead, Ageing and Death, by Ewan MacAulay McDonnell (revision of original factsheet by Alycia Bailey, The LEAD Group Inc, 20th April 2008, https://lead.org.au/fs/fst24.html includes:

Adults who have been exposed to lead in the workplace and at home throughout their lives are more susceptible to lead-related health risks such as cardiovascular disease, high blood pressure (hypertension), stroke, renal failure and osteoporosis. (**5**; **6**; **7**; **9**; **10**)

> Reference 5: Chicago Tribune, 20021227, Kotulak, Ronald , "**Study links early adult deaths to lead - 30 million in U.S. could be at risk**"
> http://inchesnetwork.net/updates_jan03_36.htm
>
> Reference 6: Hu, Howard; Aro, Antonio; Payton, Marinelle; Korrick, Susan; Sparrow, David; Weiss, S & Rotnitzky A, "**The Relationship Of Bone And Blood Lead To Hypertension - The Normative Aging Study** [abstract]"
> http://www.ncbi.nlm.nih.gov/pubmed/8609684?dopt=Abstract

Crumbling teeth and lead poisoning

George W. Kell Esq pages 58-60 in AFFIDAVITS Safe Water Association Incorporated (Plaintiff) vs Fond du Lac County (Defendant) PRESS RELEASE June 30 1993: Judge Grimm found fluoridation harmful but did not have the power to "enjoin" (forbid) the practice, State of Wisconsin Circuit Court, Fond Du Lac County, at https://firewaterfilm.files.wordpress.com/2013/04/affidavits-safe-water-assn_plaintiff-vs-fond-du-lac_defendant.pdf claims:

> I found several texts which discussed chronic lead poisoning, and the symptoms of chronic lead poisoning closely paralleled, to the point of almost virtual identity, those symptoms that I had been experiencing.
>
> The reason for this: lead and fluoride are both "free radicals", which assault the enzymes, and impairment of various enzymes was the cause of my physical deterioration [including brittle and crumbling teeth].