

**Welcome to The Societal Benefits of
Copper webinar series.**

This session will be recorded.

**To ensure the best audio possible, kindly
mute your phone lines when not speaking.**

Thank you.



**International Copper
Association**
Copper Alliance

The Societal Benefits of Copper webinar series

Copper's role in Human Health
04/09.05.12



Agenda

Cu

Introduction—Steve Kukoda

Anti-Trust Guidelines – Amy D’Agostino, Esq. Chadbourne & Parke LLP

The Societal Benefits of Copper campaign—Steve Kukoda

Copper’s Role in Human Health—Ruth Danzeisen

Question and Answers

ANTITRUST GUIDELINES FOR COPPER INDUSTRY TRADE ASSOCIATION MEETINGS

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The following guidelines with respect to compliance with antitrust laws of the United States, Japan and European Community are intended to govern the conduct of participants in copper industry trade association meetings, both at the meeting itself and in informal discussions before or after the formal meeting.

Price. Competitors should not discuss future prices (including terms of sale) of their products. There is no blanket prohibition against the mention of or reference to current or past prices but limits must be observed. Such references or mentions should occur only when necessary in connection with the development of association programs. For example, reference to a particular price level in comparing the cost of a copper product to a competing product is permitted. Whenever possible, such references should be discussed in advance with legal counsel.

Competitive Information. Competitors should not discuss the market share of a particular copper producer or copper fabricator's products. Furthermore, nothing should be said at a meeting which could be interpreted as suggesting prearranged market shares for such products or producer production levels. The overall market share of copper products may be discussed with regard to competition with non-copper products and general market acceptance.

New Products. Competitors should not encourage or discourage the introduction of a new product by another competitor or reveal a particular copper company's plans to change the production rate of an existing product or to introduce a new product. No company should disclose to another company whether it is in a position to make or market a new product. New products may be discussed in a technical manner or from the standpoints of competition with non-copper products and general market acceptance. In addition, proposed methods for and results of field and laboratory testing can be considered.

The Role of Legal Counsel. Legal counsel attends association meetings to advise association staff and other meeting attendees regarding the antitrust laws and to see that none of the matters discussed or materials distributed raise even the appearance of antitrust improprieties. During the course of a meeting, if counsel believes that the discussion is turning to a sensitive or inappropriate subject, counsel will express that belief and request that the attendees return the discussion to a less sensitive area.

A paper entitled "Copper Industry Trade Associations and the Antitrust Laws" is available upon request.

10/92, 5/93

Introduction

At no other time in ICA's history have we better understood how important copper is to addressing many of man's greatest challenges.

At no other time in ICA's history have we had such strong and positive messages about copper and its benefits to society.

Societal concerns

Cu

-
- Food supply
 - Public health
 - Climate change, CO₂ reduction
 - Responsible use of energy, alternative energy
 - World electrification
 - Green building
 - Air quality

Question

- What do all of these issues have in common?

Answer

- Copper is uniquely able to make a positive contribution to all of them
- No other material can do the same
- And, we have the communications messages to prove it

Sustainable Development (SD)

- On the minds of governments, companies, people
- Another unique advantage for copper:
 - Other materials need to communicate on the actual sustainability of the material
 - With copper we can communicate that copper makes the things that contain it more sustainable

Societal Benefits of Copper

Cu

-
- Develop and disseminate positive messages about copper's role in addressing sustainable development concerns to the benefit of society
 - Yes, we have the messages ... but these messages belong not just to the ICA but to ICA's members

Top-level Goals

- Reposition copper as a *material* that addresses sustainable development concerns
- Reposition the *copper industry* as a key contributor to addressing many of society's greatest challenges

Societal Benefits of Copper

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- New issue once every two months
 - Stand-alone communications tools (Executive Summary, Fact Sheet, Press Release, Case Studies, Q&A, etc.)
- For each issue, webinar led by relevant ICA initiative/project leader
- Communications personnel within copper industry companies
- Use these messages, where appropriate
 - Internal and external audiences
 - Online, print, conferences, etc.
- Members have requested program expansion
 - Regional/local members
 - Other industry organizations
 - Non-industry organizations

Launch of campaign: June 2011

Cu

2011 Campaign

- Aquaculture: Copper's role in addressing food supply concerns
- Public Health: A positive impact on infection control (Antimicrobial Copper[®])
- Sustainable Energy: A positive impact on climate change and CO₂ reduction

2012

- Renewable Energy: Energy and CO₂ reduction
- Human Health: Copper is fundamental

Upcoming topics

- Energy Access (World Electrification), Technology, Earthquake Dissipation, Air Quality, Water Quality, Green Building and much more



International Copper
Association
Copper Alliance

Copper's Role in Human Health

Ruth Danzeisen – ICA Health, Environment and Sustainable Development Program, Assistant Director-Human Health
Webinar, 04.05.12



We need copper ...

Cu

... to “run” our lives: in our cars, phones, or homes ¹

... also as natural part of our body ²

... at all stages of life ²

Copper cannot be made in the body ²

Copper needs to be obtained from what we eat ²

Copper is “essential” ²



¹ International_Copper_Association. <http://copperalliance.org/>

² Uauy, R., M. Olivares, and M. Gonzalez, *Essentiality of copper in humans*. Am J Clin Nutr, 1998. 67(5 Suppl): p. 952S-959S.

Copper—needed for life as we know it ^{1, 2, 3}

Cu



¹ Lipman, C.B. and G. Mackinney, *Proof of the Essential Nature of Copper for Higher Green Plants*. Plant Physiology, 1931. **6**(3): p. 593-9.

² Dunlop, G., *Prevention of swayback symptoms in lambs by administration of copper sulfate to the pregnant ewe*. Nature, 1951. **168**(4278): p. 728-9.

³ Uauy, R., M. Olivares, and M. Gonzalez, *Essentiality of copper in humans*. Am J Clin Nutr, 1998. **67**(5 Suppl): p. 952S-959S.

We need copper ...

Cu

... even before we are born:

“During pregnancy, the developing fetus needs copper. Copper is a central part of many biological processes. It is important to brain development, skin structure, and muscle function.”



Prof. Harry J. McArdle
Deputy Director, Rowett Institute of
Nutrition and Health, University of
Aberdeen, UK



See also Keen, C.L., et al., *Effect of copper deficiency on prenatal development and pregnancy outcome*. The American Journal of Clinical Nutrition, 1998. **67**(5 Suppl): p. 1003S-1011S.

We need copper ...

Cu

- ... to develop our brain during fetal and post-natal growth ¹
- ... for the maintenance of brain health throughout life ²
- ... for effective anti-oxidative defense in the brain throughout life ³

¹ Prohaska, J.R. and W.R. Bailey, *Persistent regional changes in brain copper, cuproenzymes and catecholamines following perinatal copper deficiency in mice*. The Journal of Nutrition, 1993. **123**(7): p. 1226-34.

² Kumar, N., *Copper deficiency myelopathy (human swayback)*. Mayo Clin Proc, 2006. **81**(10): p. 1371-84.

³ Uriu-Adams, J.Y. and C.L. Keen, *Copper, oxidative stress, and human health*. Mol Aspects Med, 2005. **26**(4-5): p. 268-98.



We need copper ...

Cu

... for the efficient communication between our nerve cells throughout life ^{1, 2}



- 1 Prohaska, J.R., W.R. Bailey, and P.M. Lear, *Copper deficiency alters rat peptidylglycine alpha-amidating monooxygenase activity*. J Nutr, 1995. **125**(6): p. 1447-54.
- 2 Schlieff, M.L. and J.D. Gitlin, *Copper homeostasis in the CNS: a novel link between the NMDA receptor and copper homeostasis in the hippocampus*. Molecular Neurobiology, 2006. **33**(2): p. 81-90.

We need copper ...

Cu

... for the maintenance of healthy skin

... for the stability of our connective tissue (the substance, that binds different parts of the body to another)



- 1 Hostynek, J.J. and H.I. Maibach, *Copper and the skin*. Dermatology: Clinical and Basic Science Series, ed. H.I. Maibach 2006, New York, London: informa healthcare. 305.
- 2 Romero-Chapman, N., et al., *Purification, properties and influence of dietary copper on accumulation and functional activity of lysyl oxidase in rat skin*. Biochem J, 1991. **275 (Pt 3)**: p. 657-62.

We need copper ...

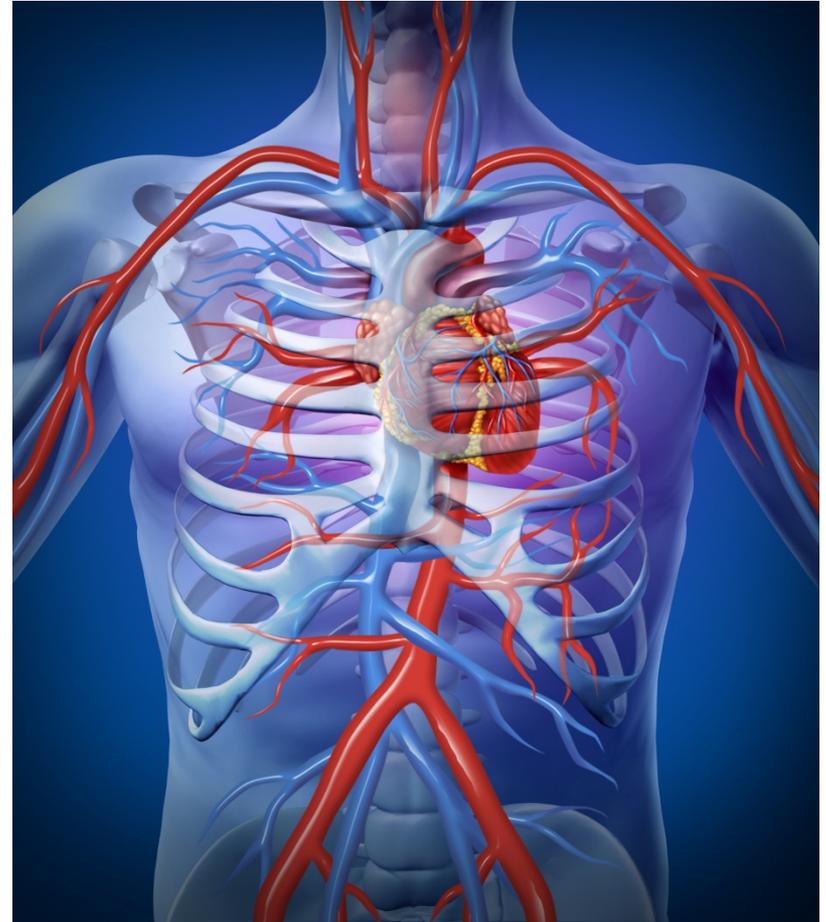
Cu

- ... for the structural integrity and function of heart and blood vessels ¹
- ... for the growth of new blood vessels ²
- ... for proper structure and function of circulating blood cells ³

1 Vadlamudi, R.K., et al., *Copper deficiency alters collagen types and covalent cross-linking in swine myocardium and cardiac valves*. *Am J Physiol*, 1993. **264**(6 Pt 2): p. H2154-61.

2 Gerard, C., et al., *The stimulation of angiogenesis and collagen deposition by copper*. *Biomaterials*, 2010. **31**(5): p. 824-31.

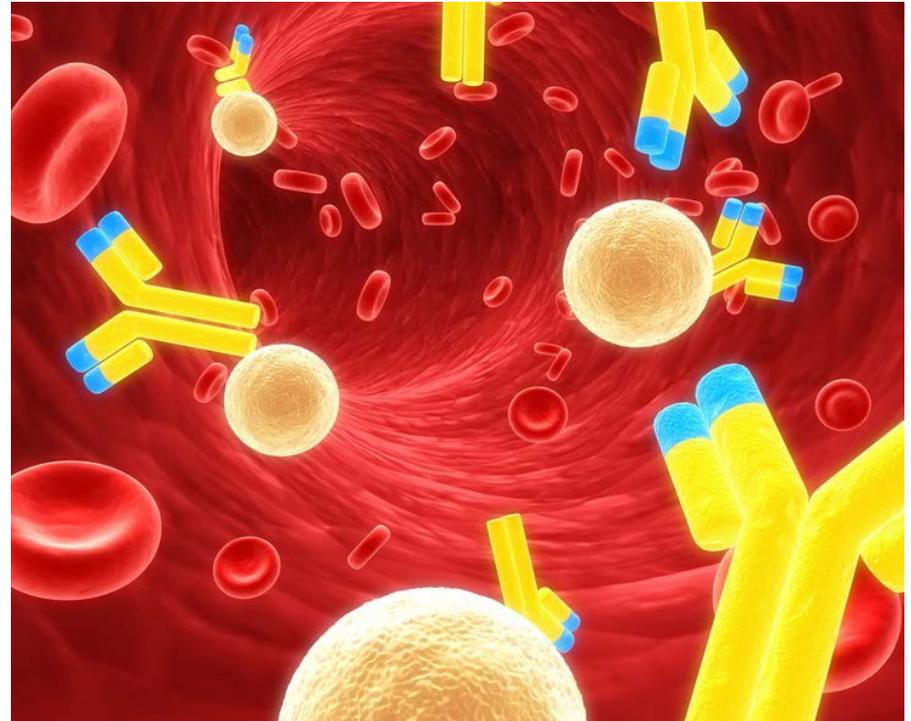
3 Huff, J.D., et al., *Copper deficiency causes reversible myelodysplasia*. *Am J Hematol*, 2007. **82**(7): p. 625-30.



We need copper ...

Cu

- ... for the formation of the cells of our immune system (white blood cells)
- ... for a healthy and effective immune response



Huff, J.D., et al., *Copper deficiency causes reversible myelodysplasia*. Am J Hematol, 2007. **82**(7): p. 625-30. Lazarchick, J., *Update on anemia and neutropenia in copper deficiency*. Current Opinion in Hematology, 2012. **19**(1): p. 58-60.

We need copper ...

Cu

... for wound healing



Canapp, S.O., Jr., et al., *The effect of topical tripeptide-copper complex on healing of ischemic open wounds*. *Vet Surg*, 2003. **32**(6): p. 515-23.
Cangul, I.T., et al., *Evaluation of the effects of topical tripeptide-copper complex and zinc oxide on open-wound healing in rabbits*. *Vet Dermatol*, 2006. **17**(6): p. 417-23.

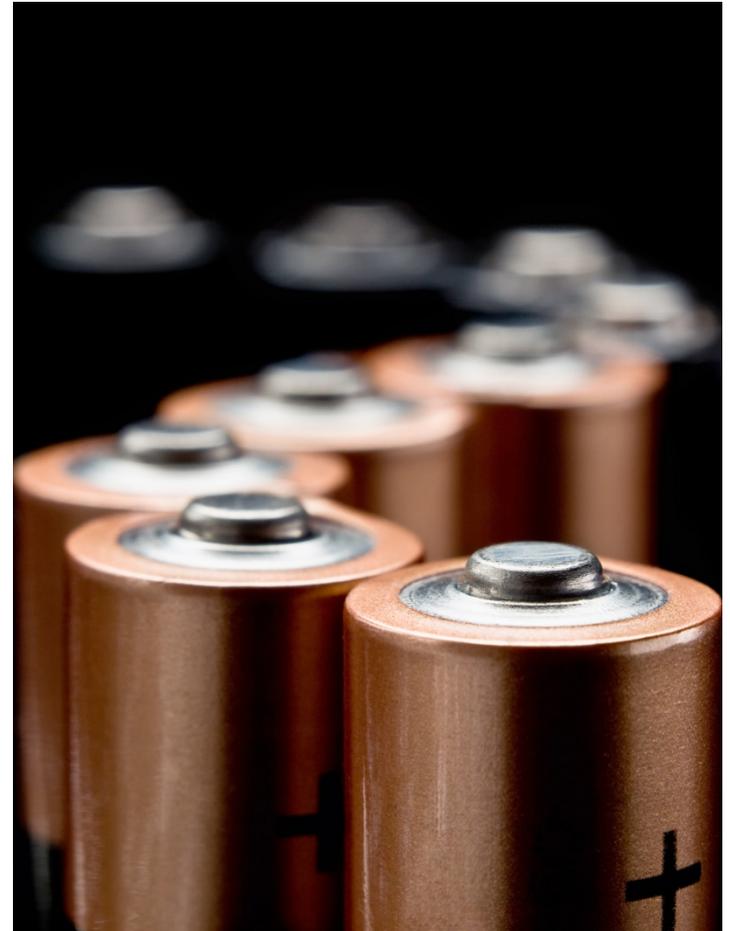
We need copper...

Cu

... to generate and store energy in the power plants of our cells, the mitochondria

Olivares, M. and R. Uauy, *Copper as an essential nutrient*. Am J Clin Nutr, 1996. **63**(5): p. 791S-6S.

Prohaska, J.R., *Changes in tissue growth, concentrations of copper, iron, cytochrome oxidase and superoxide dismutase subsequent to dietary or genetic copper deficiency in mice*. J Nutr, 1983. **113**(10): p. 2048-58.



Copper deficiency—a problem?

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“While the essentiality of copper is well established, numerous dietary survey studies suggest that **many humans consume diets that just barely provide the recommended intakes of this essential nutrient**, while the diets of many fall short of current recommended intakes”

Prof. Carl Keen, Dept. of Nutrition & Internal Medicine, University of California, Davis



See also Danzeisen, R., et al., *How reliable and robust are current biomarkers for copper status?* Br J Nutr, 2007. **98**(4): p. 676-83.

Copper deficiency—a problem?

Cu

World Health Organization (WHO):

People worldwide are at greater risk of adverse health effects from copper deficiency than from excess copper.

Copper: Essentiality and Toxicity. IPCS News—The Newsletter of the International Programme on Chemical Safety December 1996
<http://www.who.int/ipcs/publications/newsletters/en/10.pdf>

The dose makes the poison

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“Poison is in everything, and no thing is without poison. The dosage makes it either a poison or a remedy.”

Paracelsus (1493 – 1541)

born Philippus Aureolus Theophrastus Bombastus von Hohenheim was a German-Swiss Renaissance genius physician and scientist. Many of his groundbreaking advances in the field of medicine are relevant to this day.

See also www.wikipedia.org/paracelsus



Copper deficiency—a problem?

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“Copper deficiency can occur in obese patients who have undergone surgery of the gut, such as gastric bypass bariatric surgery, because the absorption of copper in the upper part of the gut is greatly reduced.

“In many cases, copper deficiency goes untreated because patients and their doctors do not recognize the problem.

“Over the long term, copper deficiency can lead to permanent damage to muscles and nerves, and even to paralysis.”

Dr. Nana Gletsu Miller,
Dept. of Nutrition Science
Purdue University

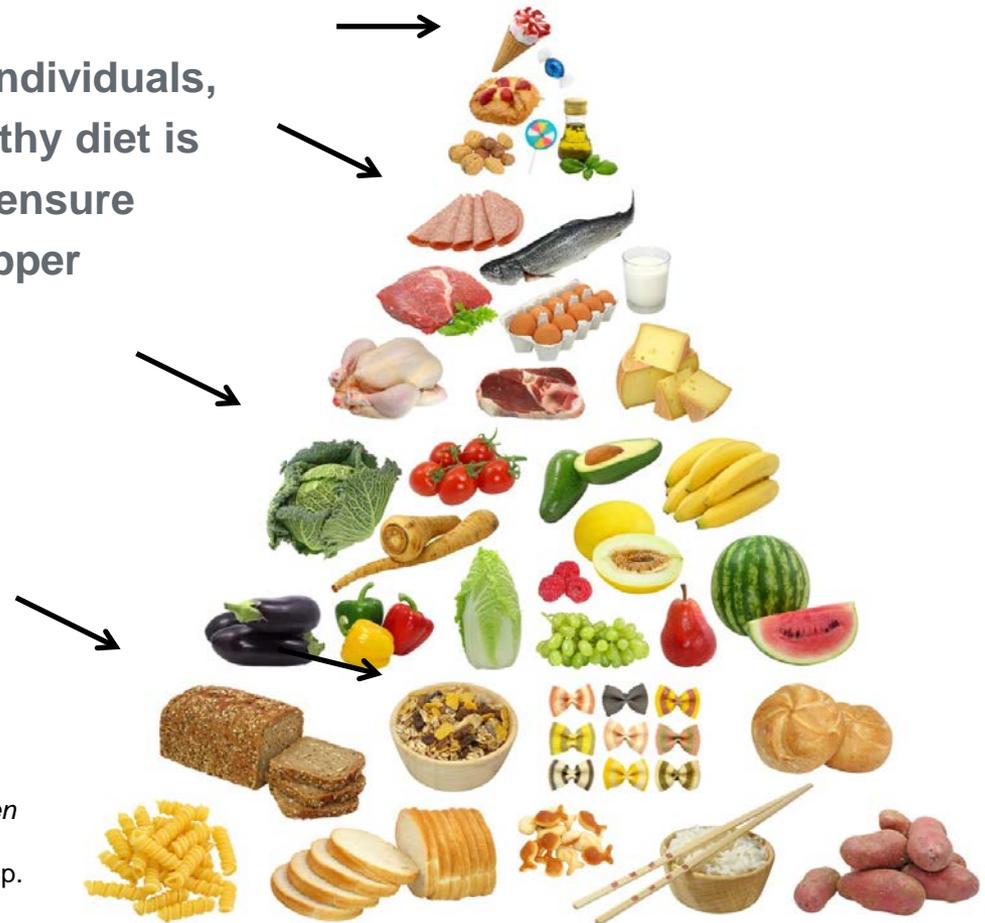


See also Griffith, D.P., et al., *Acquired copper deficiency: a potentially serious and preventable complication following gastric bypass surgery*. *Obesity*, 2009. **17**(4): p. 827-31.

Copper sources

Cu

For healthy individuals,
a varied healthy diet is
sufficient to ensure
adequate copper
supply



See also HealthAliciousness, U.N.N.D.f.S.R., Release 20. *Top Ten Food Highest in Copper*. 2012; Available from: <http://www.healthaliciousness.com/articles/high-copper-foods.php>.

Copper sources

Cu

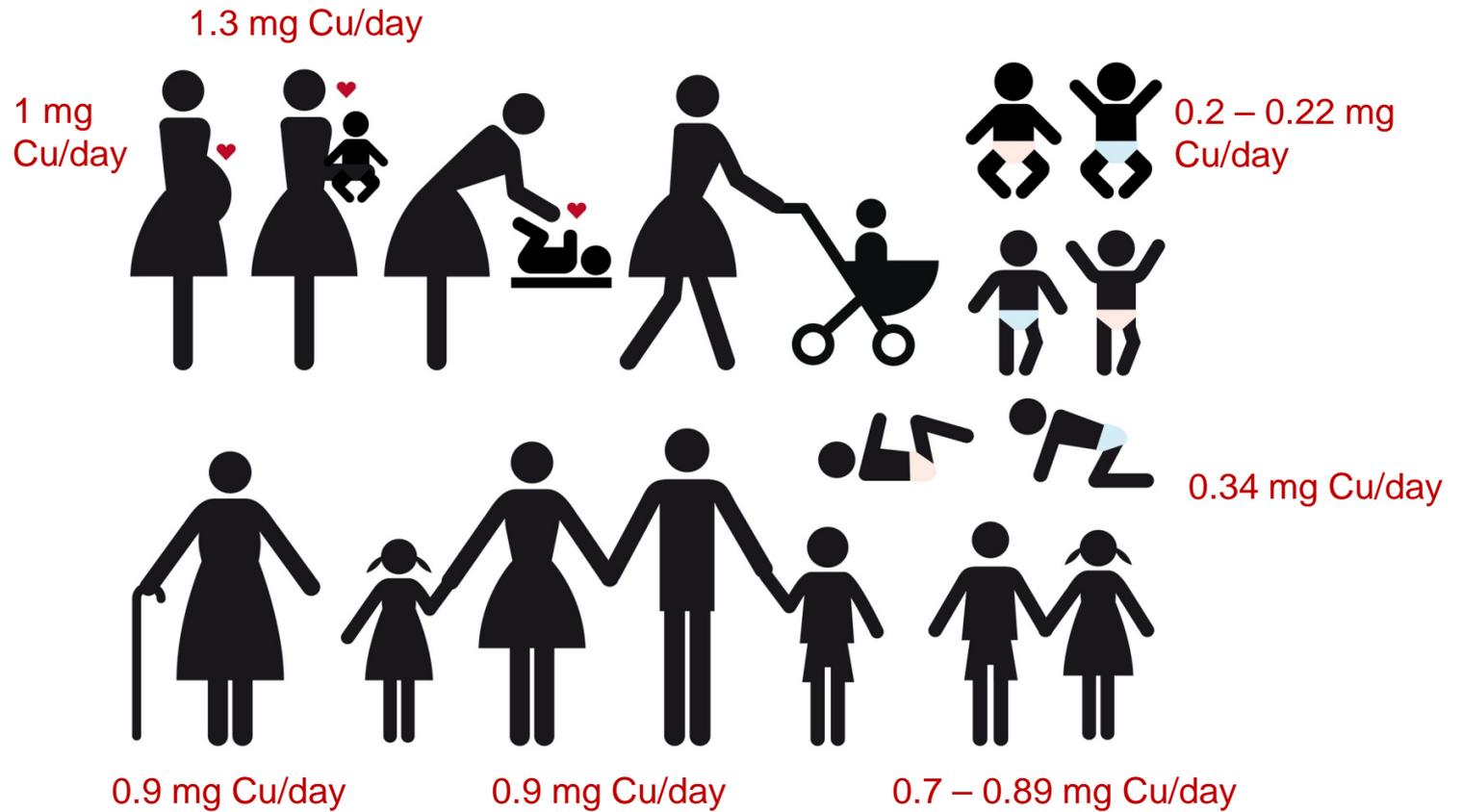
Even better ...



See also HealthAliciousness, U.N.N.D.f.S.R., Release 20. *Top Ten Food Highest in Copper*. 2012; Available from: <http://www.healthaliciousness.com/articles/high-copper-foods.php>.

How much?

Cu



National Academies, T.N. *Dietary Reference Intakes for [...] Copper, [...] 2001*; Available from: www.nap.edu.



FUTURE

PRESENT

PAST

Thank you

For more information please contact

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