

Supplemental Material

Blood and Urine Cadmium, Blood Pressure, and Hypertension: a Systematic Review and Meta-analysis.

Gallagher, CM
Meliker, JR

| | |
|---|-------|
| Table 1. Weight of evidence methods and findings. | p. 2 |
| Table 2. Articles identified from the scientific indexes using the search criteria but excluded from systematic review for reason(s) indicated. | p. 17 |
| References: | p. 18 |

Table 1. Weight of evidence methods and findings.

Coding for Individual Study Weight of Evidence (WOE) Approach: As suggested by Weed (2005), combine toxicology's quality criteria (Klimisch 1997) with epidemiology's causal criteria (Hill 1965), and describe the method specific to the research question. Assess WOE by causal interpretation domains modeled after Kundi (2006), i.e., 1.) Association, 2.) Environmental equivalence of exposed and unexposed populations, 3.) Population equivalence with regard to disease risk factors, 4.) Potential biases. Of note, codes denote WOE regarding answering the research question, and as different studies aimed to answer different research questions, do not represent overall quality of study determinations. Rationale for specific coding presented when within study codes varied or when codes less than "B" indicated.

General method for WOE coding:

a. Coding scores, below, were modeled after Categories of Reliability of toxicology data described by Klimisch (1997):

A=(reliable without restriction)

B=(reliable with restriction)

C=(not reliable)

D=(not assignable; STROBE criteria (Vandenbroucke 2007) for reporting not sufficiently met)

b. Assign points to each item in each causal interpretation domain as follows:

A=3 points; B=2 points; C=1 point; D=0 points.

Sum # points across items within each causal interpretation domain; divide by total # items within that domain and, if greater than two items within a domain, round (up from .5 or down from .4) to assign overall points; if only two items within a domain, indicate both, i.e., A/B or B/C or C/D.

Method for WOE coding by causal domain:

1. **Causal Interpretation Domain 1: Association**

a. Temporality:

- i. A=UCd measured before or concurrently with BP - AND – BCd measured concurrently with BP;
- ii. B=UCd (prospectively or concurrently with BP) -OR- BCd (concurrently with BP);
- iii. C=other timing of exposure relative to outcome;
- iv. D=not addressed or not otherwise assignable [STROBE criteria 4,7 not sufficiently met]

b. Strength of association in light of confounding:

- i. A=smoking-stratified, specifies never-smokers;
- ii. B=smoking-stratified, without specification of never-smokers; or smoking adjusted, with specification of never-smokers;
- iii. C=smoking-adjusted, without never-smoker category, or A or B with insufficient adjustment for age, sex, anti-hypertensive treatment;
- iv. D= not assignable [STROBE criteria 7, 12, 16, 17 not sufficiently met]

c. Statistics appropriate to study design

- i. A=cohort addresses loss to follow-up, or case-control specifies adequate matching method or statistical analysis, or cross-sectional study uses analytical methods to address sampling strategy;
 - ii. B=study-specific statistical method partially addressed with explanation of limitations;
 - iii. C=B without adequate explanation of limitations;
 - iv. D=study-specific methodology not addressed [STROBE criteria 12, 19 not sufficiently met]
- d. Dose-response:
- i. A=both continuous and categorical variables used for both exposure and outcome;
 - ii. B=one or the other with sufficient sample size and statistical treatment of non-detectable limits;
 - iii. C=A or B without sufficient sample size or statistical treatment of non-detectable limits;
 - iv. D=not addressed or not otherwise assignable [STROBE criteria 10, 11, 12, 13, 15 not sufficiently met]

2. Domain 2: Environmental equivalence of exposed and unexposed populations:

- a. Smoking as a source of cadmium:
- i. A=smoking-stratified, specifies never-smokers;
 - ii. B=smoking-stratified, without specification of never-smokers; or smoking adjusted, with specification of never-smokers;
 - iii. C=smoking-adjusted, without never-smoker category;
 - iv. D=not addressed or otherwise assignable [STROBE criteria 5, 6, 8, 14 not sufficiently met]
- b. Setting:
- i. A=general population-representative sample (or complete sample);
 - ii. B=other population-based sample equivalence;
 - iii. C=mixed exposure settings or not population-based
 - iv. D=not addressed or otherwise assignable [STROBE criteria 5, 6, 8, 14 not sufficiently met]

3. Domain 3: Population equivalence of disease risk factors (Chobanian et al. 2003):

- a. Smoking as a risk factor for outcome:
- i. A= smoking stratified, specifies never-smokers;
 - ii. B=smoking stratified, without specification of never-smokers; or smoking adjusted, with specification of never-smokers;
 - iii. C=smoking-adjusted, without never-smoker category;
 - iv. D=not addressed or otherwise assignable [STROBE criteria 12, 17, 19 not sufficiently met]
- b. Established disease risk factors and medical modifiers
- i. A=adequate control for age, sex, and excludes subjects on anti-hypertensive medications;
 - ii. B= control for age, sex and anti-hypertensive medications;
 - iii. C=control for age, sex without control for anti-hypertensive medications or occupational exposure;
 - iv. D=not addressed or otherwise assignable [STROBE criteria 7, 12, 17, 19 not sufficiently met]

4. Potential Biases

- a. exposure misclassification:
- i. A=24 hour urine cadmium and lab protocol described, i.e., AAS with background correction;

- ii. B=spot urine cadmium, with dilution adjustment (either direct adjustment for creatinine or specific gravity or statistical adjustment for creatinine, or other acceptable adjustment), or blood cadmium; lab protocol, i.e., AAS with background correction described
- iii. C=spot urine, not dilution-adjusted; or AAS without background correction, or otherwise not reliable
- iv. D=not addressed or otherwise assignable [STROBE criteria 8, 9 not sufficiently met]

b. outcome misclassification:

- i. A=24 hour ambulatory blood pressure;
- ii. B=conventional blood pressure, average of at least 2 readings;
- iii. C=conventional blood pressure, less than 2 measures
- iv. D=not addressed or otherwise assignable [STROBE criteria 8, 9 not sufficiently met].

c. observer bias:

- i. A=protocols for BP measure described that address AHA Hypertension measurement in humans (Pickering et al. 2005), or WHO protocol (Rose and Blackburn 1968; Luepker 2004), or details provided regarding trained staff, positioning, subject factors, e.g., recent nicotine use, anxiety, and cuff-size
- ii. B=3 protocol requirements met, including appropriate cuff size;
- iii. C=1-3 protocol requirements met, or more, but without cuff size;
- iv. D= 0 protocol requirements or not addressed or otherwise assignable [STROBE criteria 8, 9 not sufficiently met]

d. responder bias:

- i. A=Quantitatively and qualitatively address difference between responders and non-responders;
- ii. B=Address difference between responders and non-responders, with limitations, e.g, urban or rural, only;
- iii. C=Address percent non-participants with no other information;
- iv. D=not addressed or otherwise assignable [STROBE criteria 6, 9, 12, 13 not sufficiently met]

e. generalizability:

- i. A=population-representative complex probability sample, or complete population-based sample;
- ii. B=population-representative or population-based sample with limitations;
- iii. C=population-based sample, selection bias or otherwise unique sample, e.g., exposed to industrial Cd-emissions;
- iv. Not addressed or otherwise assignable [STROBE criteria 4, 6, 9, 13, 21 not sufficiently met]

| Tellez-Plaza et al. 2008 | | |
|--|---|----------|
| Causal Interpretation Domain | Rationale and/or STROBE criteria for insufficient information | WOE Code |
| 1. Association | | |
| a. temporality | | A |
| b. strength | | A |
| c. statistics-design | | A |
| d. dose-response | | A |
| Domain 1 Quality Code | | A |
| 2. Environmental Equivalence | | |
| a. smoking subset (exposure) | | A |
| b. setting | | A |
| Domain 2 Quality Code | | A |
| 3. Population Equivalence | | |
| a. smoking subset (disease risk) | | A |
| b. other disease risk factors | Adjusted but did not exclude those on Anti-hypertensive meds | B |
| Domain 3 Quality Code | | A/B |
| 4. Potential Biases | | |
| a. exposure misclassification | Spot urine samples, rather than 24 hour | B |
| b. outcome misclassification | Repeated BP measures, but not 24 hour Ambulatory blood pressure | B |
| c. observer bias | | A |
| d. responder bias | Statistical methods addressed nonresponders But not qualitatively assessed | B |
| e. generalisability/ selection bias | | A |
| Domain 4 Quality Code | | B |

| Whittemore et al. 1991 | | |
|-------------------------------------|--|----------|
| Causal Interpretation Domain | Rationale and/or STROBE criteria for insufficient information | WOE Code |
| 1. Association | | |
| a. temporality | UCd but not BCd | B |
| b. strength | | A |
| c. statistics-design | Limited # PSUs to select subjects w/ Cd Precluded unbiased variance estimates | B |
| d. dose-response | Cd detection limits not addressed | C |
| Domain 1 Quality Code | | B |
| 2. Environmental Equivalence | | |
| b. smoking subset (exposure) | | A |
| b. setting | Cd measured in subjects from 9 states, but without weights, representativeness unclear | B |
| Domain 2 Quality Code | | A/B |
| 3. Population Equivalence | | |
| b. smoking subset (disease risk) | | A |
| b. other disease risk factors | | A |
| Domain 3 Quality Code | | A |
| 4. Potential Biases | | |
| a. exposure misclassification | Spot urine samples, rather than 24 hour | B |
| b. outcome misclassification | Repeated BP measures, but not 24 hour Ambulatory blood pressure | B |
| c. observer bias | | A |
| d. responder bias | Sampling design precludes weighting for missing | C |
| e. generalisability/ selection bias | Limited due to lack of appropriate sample Weights and variance estimation | B |
| Domain 4 Quality Code | | B |

| Satarug et al. 2005 | | |
|-------------------------------------|---|----------|
| Causal Interpretation Domain | Rationale and/or STROBE criteria for insufficient information | WOE Code |
| 1. Association | | |
| a. temporality | UCd but not BCd not used in multiple Regression analysis | B |
| b. strength | | A |
| c. statistics-design | Sampling strategy not addressed STROBE 9,12 | D |
| d. dose-response | Addressed non-detectable limits but not Sample size limits | C |
| Domain 1 Quality Code | | B |
| 2. Environmental Equivalence | | |
| c. smoking subset (exposure) | | A |
| b. setting | Without randomization methods, do not know if population-based/representative | C |
| Domain 2 Quality Code | | B |
| 3. Population Equivalence | | |
| c. smoking subset (disease risk) | | A |
| b. other disease risk factors | | A |
| Domain 3 Quality Code | | A |
| 4. Potential Biases | | |
| a. exposure misclassification | 3 hour urine samples, rather than 24 hour | B |
| b. outcome misclassification | # BP readings? STROBE 8, 9 | C |
| c. observer bias | BP by sphygmomanometer by well-trained physician, but no protocol STROBE 8. 9 | C |
| d. responder bias | Insufficient information STROBE 6, 9, 12, 13 | D |
| e. generalisability/ selection bias | Insufficient information STROBE 4, 6, 9, 13, 21 | C |
| Domain 4 Quality Code | | C |

| Lin et al. 1995 | | |
|-------------------------------------|---|----------|
| Causal Interpretation Domain | Rationale and/or STROBE criteria for insufficient information | WOE Code |
| 1. Association | | |
| a. temporality | | A |
| b. strength | | A |
| c. statistics-design | Insufficient information STROBE 12 | C |
| d. dose-response | Addressed non-detectable limits but not Sample size limits | C |
| Domain 1 Quality Code | | B |
| 2. Environmental Equivalence | | |
| d. smoking subset (exposure) | | A |
| b. setting | Subjects lived near district “highly contaminated by industrial wastewater with Cd” | C |
| Domain 2 Quality Code | | B |
| 3. Population Equivalence | | |
| d. smoking subset (disease risk) | | A |
| b. other disease risk factors | | A |
| Domain 3 Quality Code | | A |
| 4. Potential Biases | | |
| a. exposure misclassification | | A |
| b. outcome misclassification | Not 24 hour blood pressure | B |
| c. observer bias | Insufficient information STROBE 8, 9 | D |
| d. responder bias | Insufficient information STROBE 6, 13 | D |
| e. generalisability/ selection bias | Industrially exposed environment | C |
| Domain 4 Quality Code | | C |

| Pizent et al. 2001 | | |
|--|--|----------|
| Causal Interpretation Domain | Rationale and/or STROBE criteria for insufficient information | WOE Code |
| 1. Association | | |
| a. temporality | BCd but not UCd assessed | B |
| b. strength | Non-smokers include former smokers So not never-smokers | B |
| c. statistics-design | Insufficient information STROBE 12, 19 | C |
| d. dose-response | Addressed non-detectable limits but not Sample size limits | C |
| Domain 1 Quality Code | | B |
| 2. Environmental Equivalence | | |
| e. smoking subset (exposure) | Non-smokers includes former smokers So not never-smokers | B |
| b. setting | Selected based upon residing in either low Calcium intake or high calcium intake area | B |
| Domain 2 Quality Code | | B |
| 3. Population Equivalence | | |
| e. smoking subset (disease risk) | | A |
| b. other disease risk factors | | A |
| Domain 3 Quality Code | | A |
| 4. Potential Biases | | |
| a. exposure misclassification | Non-smokers include former smokers So not never-smokers | B |
| b. outcome misclassification | Does not indicate # BP measurements | C |
| c. observer bias | | A |
| d. responder bias | Insufficient information STROBE 6, 9, 12, 13 | D |
| e. generalisability/ selection bias | Insufficient information STROBE 4, 6, 9, 13, 21 | D |
| Domain 4 Quality Code | | C |

| Vivoli et al. 1989 | | |
|--|--|----------|
| Causal Interpretation Domain | Rationale and/or STROBE criteria for insufficient information | WOE Code |
| 1. Association | | |
| a. temporality | | A |
| b. strength | | A |
| c. statistics-design | | A |
| d. dose-response | Sample size limitations | C |
| Domain 1 Quality Code | | A |
| 2. Environmental Equivalence | | |
| f. smoking subset (exposure) | | A |
| b. setting | Bank employees from Modena, Italy Not population-based | C |
| Domain 2 Quality Code | | B |
| 3. Population Equivalence | | |
| f. smoking subset (disease risk) | | A |
| b. other disease risk factors | | A |
| Domain 3 Quality Code | | A |
| 4. Potential Biases | | |
| a. exposure misclassification | No mention of Cd background correction | C |
| b. outcome misclassification | Not 24 hour ambulatory blood pressure | B |
| c. observer bias | Did not cite specific protocol or mention Blood pressure cuff size appropriateness | C |
| d. responder bias | Did not address non-responders STROBE 9. 13 | D |
| e. generalisability/ selection bias | Subject selection not randomized Attended epidemiologic screening | C |
| Domain 4 Quality Code | | C |

| Kurihara et al. 2004 | | |
|-------------------------------------|--|----------|
| Causal Interpretation Domain | Rationale and/or STROBE criteria for insufficient information | WOE Code |
| 1. Association | | |
| a. temporality | | A |
| b. strength | Did not adjust for hypertension treatment | C |
| c. statistics-design | Insufficient information: STROBE criteria 12, 19 | C |
| d. dose-response | Did not address non-detectable limits | C |
| Domain 1 Quality Code | | B |
| 2. Environmental Equivalence | | |
| g. smoking subset (exposure) | Non-smokers do not exclude ex-smokers | C |
| b. setting | Insufficient objective criteria to designate setting as “non-polluted”: STROBE 5,6 | D |
| Domain 2 Quality Code | | C |
| 3. Population Equivalence | | |
| g. smoking subset (disease risk) | Non-smokers do not exclude ex-smokers | C |
| b. other disease risk factors | No adjustment for antihypertensive medication use, but incorporated in outcome | B |
| Domain 3 Quality Code | | B/C |
| 4. Potential Biases | | |
| a. exposure misclassification | Spot urine not adjusted for dilution, and Zeeman correction not indicated | C |
| b. outcome misclassification | 2 blood pressure readings | B |
| c. observer bias | 2 blood pressure protocol items, but cuff size and protocol not referenced | C |
| d. responder bias | Insufficient information: STROBE criteria 6, 9, 12, 13 | D |
| e. generalisability/ selection bias | Insufficient information: STROBE criteria 4, 6, 9, 13, 21 | D |
| Domain 4 Quality Code | | C |

| Eum et al. 2008 | | |
|-------------------------------------|--|----------|
| Causal Interpretation Domain | Rationale and/or STROBE criteria for insufficient information | WOE Code |
| 1. Association | | |
| a. temporality | | B |
| b. strength | | B |
| c. statistics-design | Analyzed using statistical methods for complex survey design, but not reported | C |
| d. dose-response | | A |
| Domain 1 Quality Code | | B |
| 2. Environmental Equivalence | | |
| h. smoking subset (exposure) | | B |
| b. setting | | A |
| Domain 2 Quality Code | | A/B |
| 3. Population Equivalence | | |
| h. smoking subset (disease risk) | | B |
| b. other disease risk factors | Did not adjust for anti-hypertensive medication use | C |
| Domain 3 Quality Code | | B/C |
| 4. Potential Biases | | |
| a. exposure misclassification | | B |
| b. outcome misclassification | | B |
| c. observer bias | Insufficient information: STROBE 8,9 | C |
| d. responder bias | No information other than nonparticipation percent | C |
| e. generalisability/ selection bias | Uncertain given statistics pertinent to complex survey design not reported | B |
| Domain 4 Quality Code | | B |

| Meditto et al. 1998 | | |
|------------------------------------|---|----------|
| Causal Interpretation Domain | Rationale and/or STROBE criteria for insufficient information | WOE Code |
| 1. Association | | |
| a. temporality | Cross-sectional study limits temporal associations. | B |
| b. strength | Not smoking-stratified | B |
| c. statistics-design | | A |
| d. dose-response | Did not include categorical exposure variables | B |
| Domain 1 Quality Code | | B |
| 2. Environmental Equivalence | | |
| i. smoking subset (exposure) | Not smoking-stratified | B |
| b. setting | Not a general population-representative sample | B |
| Domain 2 Quality Code | | B |
| 3. Population Equivalence | | |
| i. smoking subset (disease risk) | Not smoking-stratified | B |
| b. other disease risk factors | | A |
| Domain 3 Quality Code | | A/B |
| 4. Potential Biases | | |
| a. exposure misclassification | Blood cadmium, only | B |
| b. outcome misclassification | Conventional blood pressure | B |
| c. observer bias | | A |
| d. responder bias | Not known how urban responders might be different from non-urban | B |
| e. generalisability/selection bias | Findings for urban residents may not be generalisable to population | B |
| Domain 4 Quality Code | | B |

| Schutte et al. 2008 | | |
|-------------------------------------|---|----------|
| Causal Interpretation Domain | Rationale and/or STROBE criteria for insufficient information | WOE Code |
| 1. Association | | |
| a. temporality | | B |
| b. strength | Adjusted for current smoking but did not differentiate never- from former smokers | C |
| c. statistics-design | | A |
| d. dose-response | Did not address non-detectable limits | C |
| Domain 1 Quality Code | | B |
| 2. Environmental Equivalence | | |
| j. smoking subset (exposure) | Adjusted for current smoking but did not differentiate never- from former smokers | C |
| b. setting | Included 26 occupationally exposed; also, 1 area exposed to industrial cadmium | C |
| Domain 2 Quality Code | | C |
| 3. Population Equivalence | | |
| j. smoking subset (disease risk) | Adjusted for current smoking but did not differentiate never- from former smokers | C |
| b. other disease risk factors | Did not adjust for occupational exposure | B |
| Domain 3 Quality Code | | B/C |
| 4. Potential Biases | | |
| a. exposure misclassification | | A |
| b. outcome misclassification | | B |
| c. observer bias | | B |
| d. responder bias | | B |
| e. generalisability/ selection bias | Limited due to inclusion of occupationally exposed men | C |
| Domain 4 Quality Code | | B |

| Staessen et al. 2000 | | |
|-------------------------------------|---|----------|
| Causal Interpretation Domain | Rationale and/or STROBE criteria for insufficient information | WOE Code |
| 1. Association | | |
| a. temporality | | A |
| b. strength | At follow-up, indicated those who took up smoking. | B |
| c. statistics-design | | A |
| d. dose-response | | A |
| Domain 1 Quality Code | | A |
| 2. Environmental Equivalence | | |
| k. smoking subset (exposure) | Adjusted for current smoking but did not differentiate never- from former smokers | C |
| b. setting | Included occupationally exposed; also, 1 area exposed to industrial cadmium | C |
| Domain 2 Quality Code | | C |
| 3. Population Equivalence | | |
| k. smoking subset (disease risk) | Adjusted for current smoking but did not differentiate never- from former smokers | C |
| b. other disease risk factors | Did not adjust for occupational exposure | B |
| Domain 3 Quality Code | | B/C |
| 4. Potential Biases | | |
| a. exposure misclassification | | A |
| b. outcome misclassification | | A |
| c. observer bias | | A |
| d. responder bias | | B |
| e. generalisability/ selection bias | Limited due to inclusion of occupationally exposed men | C |
| Domain 4 Quality Code | | B |

| Telisman et al. 2001 | | |
|-------------------------------------|---|----------|
| Causal Interpretation Domain | Rationale and/or STROBE criteria for insufficient information | WOE Code |
| 1. Association | | |
| a. temporality | | B |
| b. strength | Excluded use of anti-hypertensives but did not differentiate never- from former smokers | C |
| c. statistics-design | | B |
| d. dose-response | Did not categorize into exposure levels | C |
| Domain 1 Quality Code | | B |
| 2. Environmental Equivalence | | |
| a. smoking subset (exposure) | Did not differentiate never-from former smokers | C |
| b. setting | Not population-based | C |
| Domain 2 Quality Code | | C |
| 3. Population Equivalence | | |
| a. smoking subset (disease risk) | Did not differentiate never-from former smokers | C |
| b. other disease risk factors | | A |
| Domain 3 Quality Code | | B |
| 4. Potential Biases | | |
| a. exposure misclassification | | B |
| b. outcome misclassification | | B |
| c. observer bias | | A |
| d. responder bias | Insufficient information about how respondents differed from nonrespondents | C |
| e. generalisability/ selection bias | Infertility clinic volunteers | C |
| Domain 4 Quality Code | | B |

Table 2. Articles identified from the scientific indexes using the search criteria but excluded from systematic review for reason(s) indicated (X)

| Reference | Not exposure of interest | Not outcome of interest | Sample restricted to unique subset | Not adjusted for smoking or age/sex | Statistical reporting insufficient for systematic comparison | Not original epidemiologic study, e.g., review, duplicate |
|----------------------------|--------------------------|-------------------------|------------------------------------|-------------------------------------|--|---|
| Apinan et al. 2009 | | X | | | | |
| Afridi et al. 2008 | | | X | | | |
| Al-Saleh et al. 2006 | | | | X | | |
| Sirivarasai et al. 2004 | | | | | X | |
| Navas-Acien et al. 2004 | | X | | | | |
| Tang et al. 2003 | | | | X | X | |
| Baker et al. 2003 | X | | | | | |
| Kosanovic et al. 2002 | | | X | | | |
| Nordberg et al. 2000 | | | | X | | |
| Staessen et al. 1996 | | | | | | X |
| Luoma et al. 1995 | | | X | | | |
| Bakshi et al. 1994 | | | | X | | |
| Basun et al. 1994 | | | X | | | |
| Staessen and Lauwerys 1993 | | | | | | X |
| Korkmaz et al. 1992 | | | | X | | |
| Laudanski et al. 1991 | | X | | | | |
| Staessen et al. 1991 | | | | | | X |
| Iwata et al. 1991 | | | | X | | |
| Narang et al. 1990 | X | | | | | |
| Lauwerys et al. 1990 | | | | | | X |
| Geiger et al. 1989 | | | X | | | |

References

- Afridi HI, Kazi TG, Kazi N, Jamali MK, Arain MB, Jalbani N, et al. 2008. Evaluation of status of toxic metals in biological samples of diabetes mellitus patients. *Diabetes Res Clin Pract.* 80(2):280-288.
- Al-Saleh I, Shinwari N, Mashhour A, Mohamed GE, Ghosh MA, Shammasi Z, Al-Nasser A. 2006. Cadmium and mercury levels in Saudi women and its possible relationship with hypertension. *Biological Trace Element Research* 112:13-29.
- Apinan R, Satarug S, Ruengweerayut R, Tassaneeyakul W, Na-Bangchang K. 2009. Cadmium exposure in Thai population from central, northern and northeastern Thailand and the effects of food consumption on cadmium levels. *Southeast Asian J Trop Med Public Health* 40(1):177-186.
- Baker JR, Satarug S, Edwards RJ, Moore MR, Williams DJ, Reilly PE. 2003. Potential for early involvement of CYP isoforms in aspects of human cadmium toxicity. *Toxicol Lett.* 137(1-2):85-93.
- Bakshi SK, Chawla KP, Khandekar RN, Raghunath R. 1994. Cadmium and hypertension. *J Assoc Physicians India* 42(6):449-450.
- Basun H, Lind B, Nordberg M, Nordstrom M, Bjorksten KS, Winblad B. 1994. *Biometals* 7(2):130-134.
- Chobanian AV, Bakris GL, Black HR, Cushman WC, Green LA, Izzo JL. 2003. Seventh Report of the Joint National Committee on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure. *Hypertension* 42:1206-1252.
- Geiger H, Bahner U, Anderes S, Schaefer RM, Schaller KH. 1989. Cadmium and renal hypertension. *J Hum Hypertens* 3(1):23-27.
- Iwata K, Saito H, Moriyama M, Nakano A. 1991. Association between renal tubular dysfunction and mortality among residents in a cadmium-polluted area, Nagasaki, Japan. *Tohoku J Exp Med* 164(2):93-102.

Klimisch HJ, Andreae M, Tillmann U. 1997. A systematic approach for evaluating the quality of experimental toxicological and ecotoxicological data. *Regulatory Toxicology and Pharmacology* 25(1):1-5.

Kosanovic M, Jokanovic M, Jevremovic M, Dobric S, Bokonjic D. 2002. Maternal and fetal cadmium and selenium status in normotensive and hypertensive pregnancy. *Biol Trace Elem Res.* 89(2):97-103.

Korkmaz ME, Arik N, Oto A, Turgan C, Yasavul U, Caglar S, et al. 1992. Cadmium, hypertension and smoking. *Nephron* 60(1):116.

Laudanski T, Sipowicz M, Modzelewski P, Bolinski J, Szamatowicz J, Razniewska G, et al. 1991. Influence of high lead and cadmium soil content on human reproductive outcome. *Int J Gynaecol Obstet* 36(4):309-315.

Lauwerys R, Amery A, Bernard A, Bruaux P, Buchet JP, Claeys F, et al. 1990. Health effects of environmental exposure to cadmium: objectives, design and organization of the Cadmibel Study: a cross-sectional morbidity study carried out in Belgium from 1985-1989. *Environ Health Perspect* 87:283-289.

Luepker RV. 2004. Edition 3, *Cardiovascular Survey Methods*, WHO, Geneva.

Luoma PV, Nayha S, Pyy L, Hassi J. 1995. Association of blood cadmium to the area of residence and hypertensive disease in Arctic Finland. *Sci Total Environ* 160-161:571-575.

Narang NK, Gupta A, Goyal RK, Upadhyaya SD. 1990. A study of blood cations in untreated cases of essential hypertension. *J Assoc Physicians India* 38(12):953-954.

Nordberg M, Winblad B, Basun H. 2000. Cadmium concentration in blood in an elderly urban population. *Biometals* 13(4):311-317.

Pickering TG, Hall JE, Appel LJ, Falkner BE, Graves J, Hill MN, Jones DW, Kurtz T, Sheps SG, Roccella EJ. 2005. Recommendations for blood pressure measurement in humans and experimental

animals: Part 1: Blood pressure measurement in humans: A statement for professionals from the subcommittee of professional and public education of the American Heart Association Council on High Blood Pressure Research. *Hypertension* 45:142-161.

Rose GA, Blackburn H. *Cardiovascular Survey Methods*. 1968. WHO, Geneva.

Sirivarasai J, Kaojarern S, Wananukul W, Deechakwan W, Srisomerarn P. 2004. Non-occupational lead and cadmium exposure and blood pressure in Thai men. *Asia Pac J Public Health* 16(2):133-137.

Staessen J, Amery A, Bernard A, Bruaux P, Buchet JP, Bulpitt CJ, et al. 1991. Blood pressure, the prevalence of cardiovascular diseases, and exposure to cadmium: a population study. *Am J Epidemiol* 134(3):257-267.

Staessen J, Lauwerys R. 1993. Health effects of environmental exposure to cadmium in a population study. *J Hum Hypertens* 7(2):195-199.

Staessen JA, Buchet JP, Ginucchio G, Lauwerys RR, Lijnen P, Roels H, et al. 1996. Public health implications of environmental exposure to cadmium and lead: an overview of epidemiological studies in Belgium. Working Groups. *J Cardiovasc Risk* 3(1):26-41.

Tang YR, Zhang SQ, Xiong Y, Zhao Y, Fu H, Zhang HP, Xiong KM. 2003. Studies of five microelement contents in human serum, hair and fingernails correlated with aged hypertension and coronary heart disease. *Biol Trace Elem Res*. 92(2):97-104.

Vandenbroucke JP, von Elm E, Altman DG, Egger M, Pocock SJ, Gotsche PC. 2007. STROBE Initiative. The Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) statement: guidelines for reporting observational studies. *Lancet*. Oct 20;370(9596):1453-7. PMID 18064739.

Weed DL. 2005. Weight of evidence: A review of concept and methods. *Risk Analysis* 25(6):1545-1557.