Clinical Observations and European Practice Guidelines for EHS

Dr. Riina Bray BASc, MSc, MD, FCFP, MHSc
Medical Director, Environmental Health Clinic, WCH
Assistant Professor, DFCM and DLSPH, University of Toronto

Environmental Health Clinic

- Women's College Hospital, Faculty of Medicine, University of Toronto
- Unique multidisciplinary clinic, and the only one of its kind in Ontario (1 of 3 in Canada)
- Established in 1996 by the Ministry of Health and Long-Term Care to be a provincial resource
- Promoting environmental health
- Improve health care for people with environmentally-linked conditions
- (CMI – Chronic Multisystem Illnesses).

Environmental Health

- The study of effects upon human beings of external physical, chemical, and biological factors in the general population.
- Public health based
- Determinant of health

Background

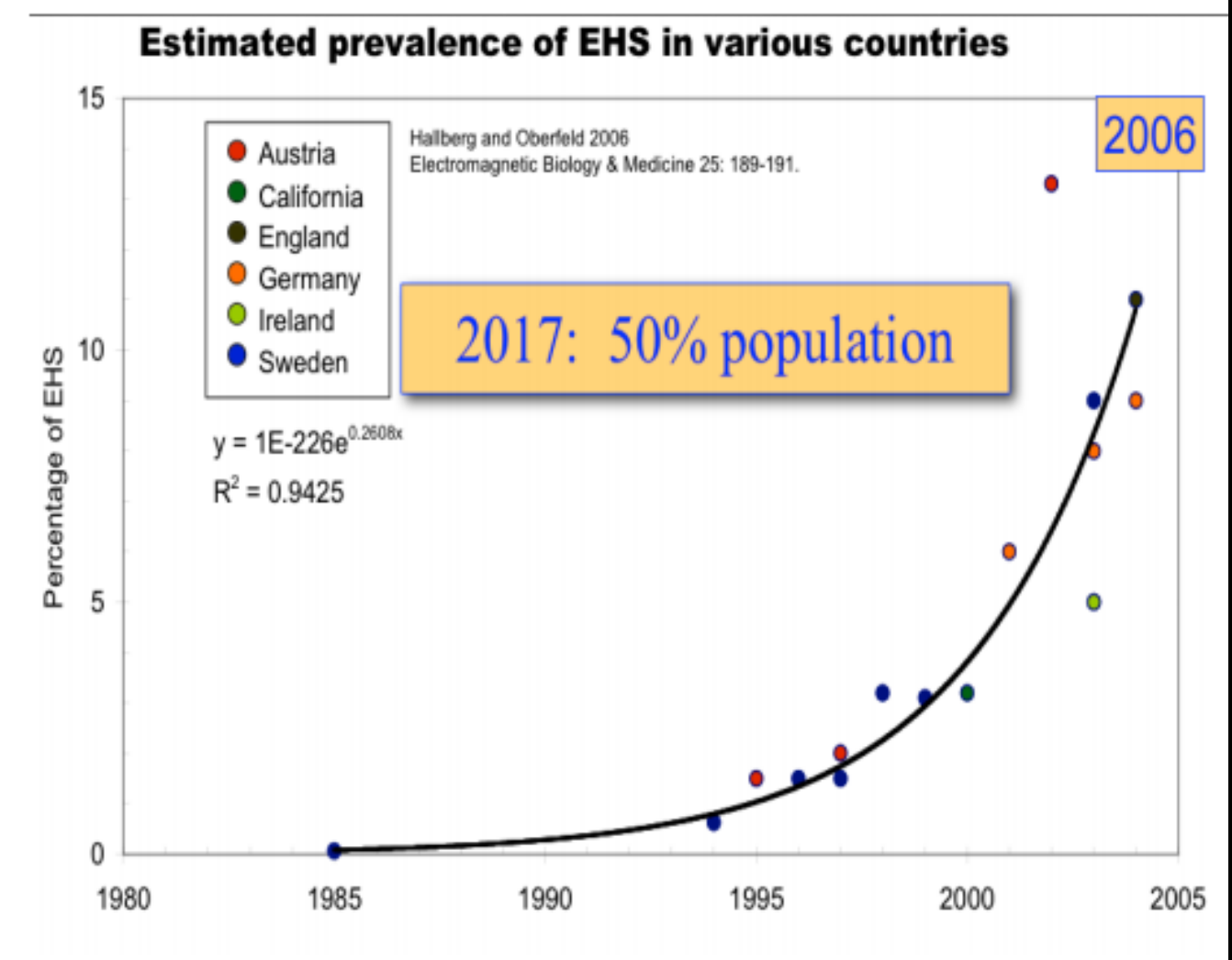
- Past 15 years - referrals increasing yearly.
- Burden on the medical system and society due to illness.
- Largely undiagnosed – self-diagnosis occurs most often.
- Gaps in knowledge and understanding in the medical community and the general public.
- Can affect all age groups and is not gender specific.
- Anecdotal evidence gathered: empirical observations and patient reports

Definition of Electromagnetic Hypersensitivity

- “Awareness and/or adverse symptomatology in response to electromagnetic fields (EMF) of multiple types”

-Dr. Mallery-Blythe

Increasingly Prevalent & Reported, & Recognized



- WHO on EHS:

  "The symptoms are certainly real and can vary widely in their severity"

http://www.who.int/peh-emf/publications/facts/fs296/en/

http://www.electronicsilentspring.com/wp-content/uploads/2014/01/Dr-Erica-Mallery-Blythe-EHS-A-Summary-Working-Draft-Version-1-Dec-2014-for-EESC-Brussels.pdf

Electromagnetic hypersensitivity

- Functional impairment
- Spectrum disorder
- Genetic polymorphisms determine degree of vulnerability
- “Total body burden” dependent
- Ample evidence in the literature that all cells and physiological systems in the body are affected
- EHS is recognized as a disability under the Canadian Human Rights Commission (Federal and Provincial).

Patients are reacting to….

- Electric fields (V/m)
- Magnetic fields (mG or nT)
- Dirty Electricity (GS)
- Radiofrequency radiation (W/m2)
- Ground Current (V)

Parameters of exposure:

F.I.N.D. (Magda Havas)

F- frequency

I - intensity

N- nearness

D- duration

Gene-Environment Interactions

Each person has a unique risk to develop disease(s), depending on the individual's:

- genetic make up and expression
- nutritional status
- the nature, dose, and timing of exposures
- allostatic load
- maximum tolerated dose for combined environmental stressors (General Adaptation Syndrome) *Selye, 1946*

EHS (Belpomme, 2015)

- These are **genuine**, somatic pathological entities
- **Now we have:** specific biomarkers
- **Genetic polymorphisms** associated with conditions
- Under the influence of EMF a cerebral **hypoperfusion/ hypoxia-related neuroinflammation** may occur
- Presents with symptoms of **inadequate regulation (decompensation)**

Radiofrequency radiation causes:

(Martin Pall; De Luca/ Herbert and Sage)

- Oxidative stress in biological systems, histamine release :**DERMATOLOGICAL**
- Peroxidation, **DNA DAMAGE**, changes to antioxidant enzymes.
- Voltage gated calcium channel dysregulation: **CARDIAC AND NERVOUS SYSTEM**
- Peroxynitrite formation which causes chronic inflammation, damage to mitochondrial function and structure, reduction of ATP. Reduced glutathione and CoQ10: **FATIGUE AND PAIN**

Adverse Biological Effects

Thermal (heat related)

Non-thermal

- Damage DNA
- Suppress immune system
- blood-brain barrier permeability increased
- Thickening of the blood – rouleaux formation
- Cardiovascular/ neurological/ endocrine system disregulation
- Electromagnetic hypersensitivity –cognitive problems/ fatigue/ tinnitus/ headaches
- Sleep EEG abnormalities (alpha wave intrusions, reduced REM)

Clinical findings are not specific

- Multi-morbid picture where various problems need to be delineated and addressed in order to overcome the symptom complex.

Basic rules to help with diagnosis and management

- Taking an exposure history is key
- Must rule out other illnesses and diseases
- Usually a physical exam will reveal neurological, dermatological or cardiac signs.
- Available blood tests are expensive and not sensitive or specific but can help guide management if deficiencies or other disease states exist that must be corrected .
- There is no gold standard for EHS diagnosis.
- “EMF sensitive” or “EMF susceptible” rather than “hyper”.
- **This is a spectrum disorder**.

Household members are the best litmus paper test

- Lack of understanding of phenomena leads to at times, serious family conflict, child custody battles, labeling and stigmatization.
- More often, spouses and children witness double blinded casual occurrences that convince them that this is not a nocebo effect
- Patients will feel anxious about potential exposures because they know how aweful they feel when exposed. This gives the impression of paranoia.

Symptoms

- Irritability, lack of appetite, memory problems, vertigo, visual, skin and vascular problems. (Gomez-Perretta et al. Subjective symptoms related to GSM radiation from mobile phone base stations, BMJ, 2014)
- Tinnitis, sleep disorders (disrupted stage 4 sleep) and therefore mood and personality changes (Bhat, Kumar and Gupta. Effects of mobile phone and mobile phone tower radiations on human health. 2013)
- Headache, weakness, pressure in the head, racing or fluttering heart. (Park and Knudson. Medically Unexplained Physical Symptoms. Statistics Canada 2007)
- Itch, pain, edema, erythema, Morgellons disease secondary to transthyretin concentrations (Johnansson O, Disturbances 2009)
- Neurasthenic and vegetative symptoms: fatigue, tiredness, concentration difficulties, dizziness, nausea, heart palpitations, and digestive disturbances (WHO, Electromagnetic Fields and Public Health, December 2005)

Symptoms

- Headaches
- Dizziness
- Sleep disturbance
- Sensory upregulation
- Palpitations

- Pain in multiple sites
- Twitching
- Fatigue or hyperactivity
- Memory disturbances
- Brain fog

- These symptoms resolve with withdrawal of the inciting electromagnetic frequency!

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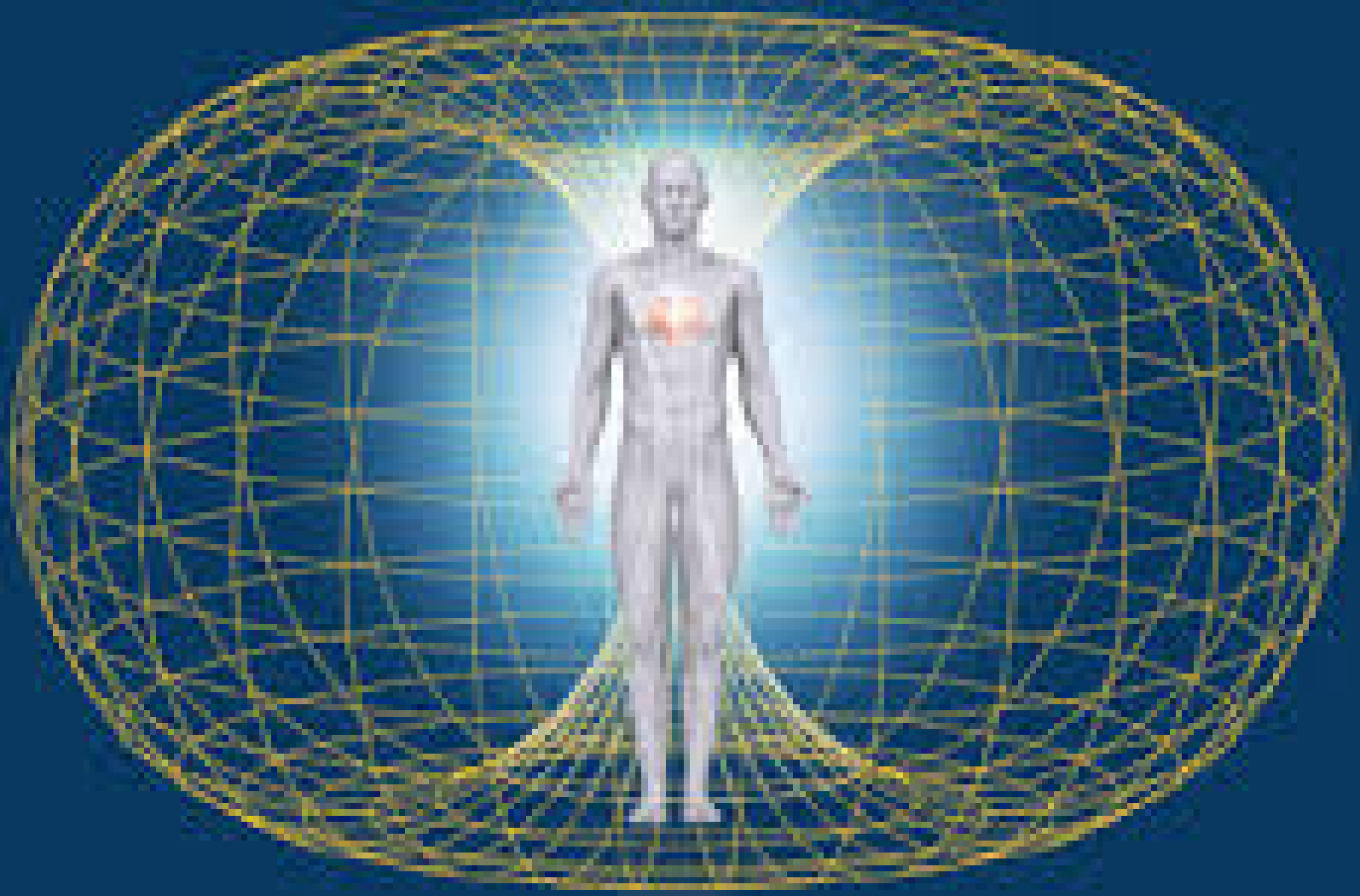


Category I – Toxic Metal Body Burden

(Griesz-Brisson M., 3rd International Conference on Neurology and Epidemiology, Neuroepidemiology 2013;41:223-316.)

- mercury, Nickle (jewelry, cookware), ?Lead, ?Cadmium and ?Arsenic (neurotoxic)
- CFIA => most fish eaten in Ontario is imported from global markets (MeHg <0.5ppm). First Nations at high risk given exposure to contaminated fish with MeHg.
- Methylmercury (organic) causes axonal demyelination (half life 27 years from brain)
- dental amalgams (elemental)
- Present with headaches (lancinating and heaviness), brainfog, fatigue, anxiety, - reacting to router/ Wi-Fi hubs.
- internal fixation devices (Herrington rods, braces, dental implants, wire meshes, pins and screws).

Category II - Lyme disease and other infections that affect the nervous system

- Central or peripheral nervous system vulnerabilities, neuroborreliosis cerebral vasculitis, polyneuropathy, chronic encephalomyelitis and cranial neuropathy (all late manifestations).
- Present with tremor, dysarthria, ataxia, extreme fatigue, headache, cognitive dysfunction, presyncope, mood disturbances

Category III
CNS Lesions/ Inflammation/ Neurodegenerative Diseases

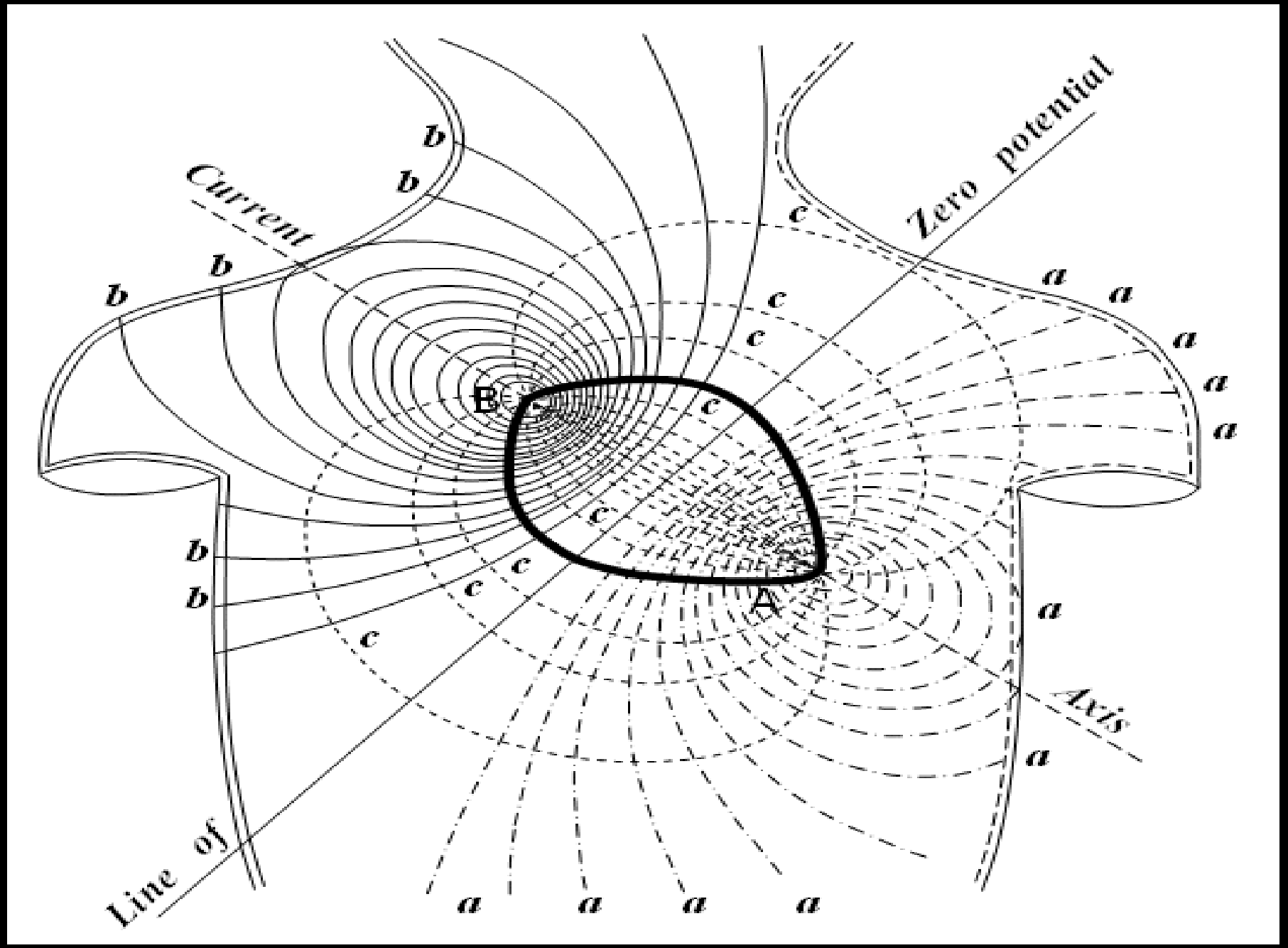
(De Luca C, Thai JC, Raskovic D, et al. Metabolic and genetic screening of electromagnetic hypersensitive subjects as a feasible tool for diagnostics and intervention. Mediators Inflamm. 2014;2014:924184. doi:10.1155/2014/924184)

- Pituitary adenomas, multiple sclerosis, neurotoxic pesticide exposures, nonspecific white matter findings/ demyelination / (simple aging and dementia??)
- headaches, brain fog, fatigue, restlessness and low mood, tinnitus(+/-)

Categories IV – Heart Rhythm Disturbances

(Havas M. Radiation from wireless technology affects the blood, the heart, and the autonomic nervous system. Rev Environ Health. 2013;28(2-3):75-84.)

- conduction problems and autonomic nervous system imbalance with increased sympathetic tone.
- presyncope, tachycardia, PVC, PAC, atrial flutter, atrial fibrillation.
- Holter monitor shows rhythm disturbances near cellphone towers and in areas with much Wi-Fi usage.
- WPW syndrome at increased risk of SCA
- Sleep disturbed – tachycardia, PVC/PAC



http://www.bem.fi/book/01/fi/0117.gif

Category V – Students and Teachers

(Gangi and Johansson. A theoretical model based upon mast cells and histamine to explain the recently proclaimed sensitivity to electric and/or magnetic fields in humans. Med Hypotheses.2000 April 54(4):663-71)

- Schools, universities and colleges.
- "FIND" – all high.
- lamps emitting RFR such as the CFL get rashes on their faces. Eyestrain (f.lux)
- Brain fog, fatigue, pressure headaches, body aches, palpitations, dizziness, transient anxious spells and low mood while exposed.
- Usually associated with nighttime exposure to RFR or electric fields/ dirty electricity.
- Anxiety/depression epidemic seen over the past 10 years at learning institutions.
- Increased use of methylphenidate

Category VI – Phobias (minority 1%)

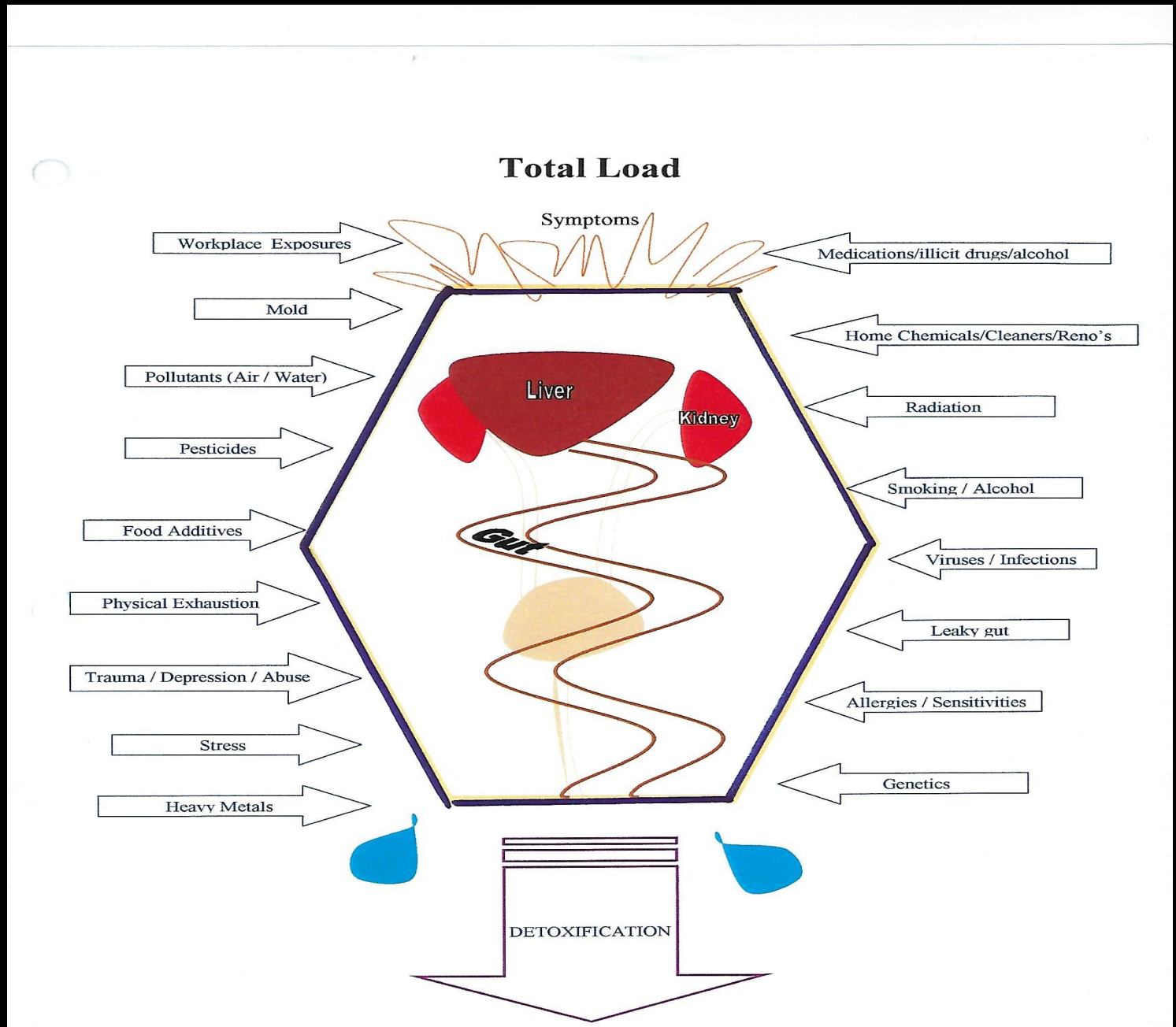
- Nocebo: inert substances or mere suggestions of substances actually bring about negative *effects*.
- Understandable given the ubiquitous nature of electrical devices in our everyday lives which is un-natural.

MANAGEMENT AND TREATMENT STRATEGIES

EUROPAEM (European Academy for Environmental Medicine) Guideline 2015 for the prevention, diagnosis and treatment of EMF-related health problems and illnesses. Belyaev I. Dean A. Eger H. Hubmann G. Jandrisovits R. et al. Rev Environ Health 2015; 30(4):337-371.

Treatment strategies – (Hagstrom et al. 2012, 2013)

- Firstly, reduce exposure.
- Home inspections recommended.
- Individual therapeutic approaches must be taken.
- **Psychotherapy is NOT HELPFUL**



Total Load

Dr. Bill Rea

CH2OPD2 – body burden (total load of xenobiotics/ EMF exposure)

- C - community
- H – home/hobbies
- O – occupation/ school
- P – personal
- D – diet/drugs

All these classifications delineate degree of exposure to various sources of EMFs

Diagnostic testing (Europaem 2015/ Oberfeld, 2016/ Belpomme, 2015)

Biomarkers **in combination** would be helpful, but largely unavailable:

- Inflammation (ESR, hsCRP, CRP, interleukins)
- Hyper-histaminemia
- Autoimmune markers (thyroid antibodies)
- Presence of infectious diseases – screen.
- Mitochondriopathy (intracellular ATP)
- Oxidative stress lipid peroxidation
- O-myelin Abs
- Nitric oxide production - nitrotyrosin
- lowered melatonin
- SPEP – effects on bone marrow
- Hypoperfusion in limbic system and thalamus (weighted MRI).

To further aid in diagnosis

(Havas, 2010)

- Biomarkers – salivary cortisol, alpha-amylase, transthyretin, blood sugar levels after provocation.
- BP and heart rhythm monitoring for 24 hours (night time changes) for heart rate variability and heart rate abnormalities Histories – anecdotal evidence and data gathering
- Questionnaires

RULES TO DETOX BY…

1. **Decrease input**

   Minimize exposure to known symptom triggers and toxins, irritants, and sensitizers revealed by CH2OPD2 exposure history

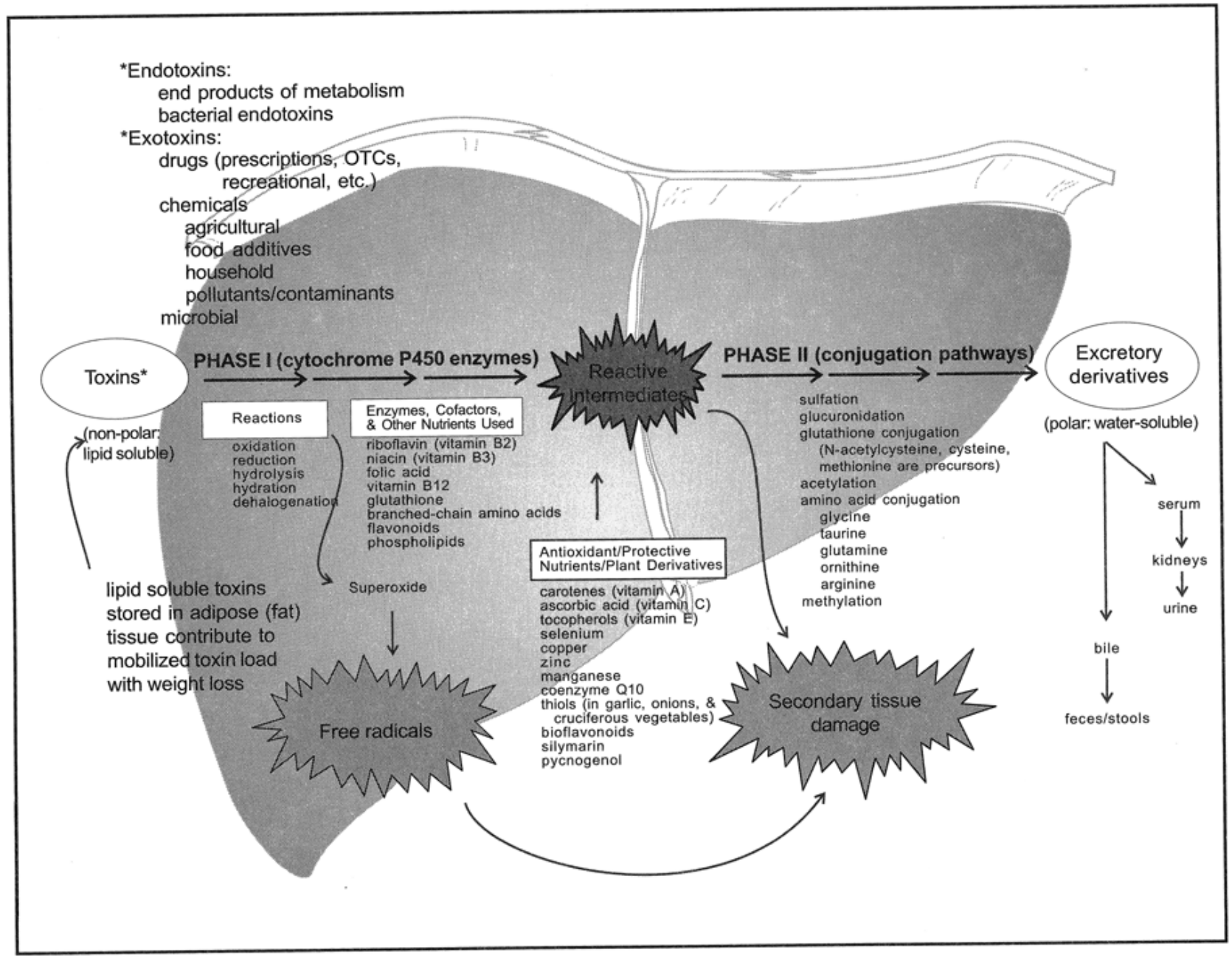
2. **Increase output**

   Induce mobilization from storage (hydration, heat)

   Increase metabolic conversion rates (enhance antioxidant reserves and mitochondrial function)

   Induce excretion of toxins (optimize bowel and renal function)

The Phases of Detoxification



Natural Methods to Detoxication

- Nutrition
- Supplements
- Sweating (sauna)
- Exercise
- Enhanced bowel elimination (soluble and insoluble fibres, choleretics)
- Breathing/Relaxation
- (Fasting)

Enhance Natural Detoxification

- Eat a diet rich in antioxidants, organic if possible.
- To decrease body burden of oxidative stress (peroxynitrite ONOO-) take antioxidants
- Selenium, Zn, Cu, Mg protect against MeHg toxicity

Reduce body burden

- Detoxification – mercury, lead, solvents (CNS) – ALA, NAC, glutathione, vit C, selenium, sauna therapies, proper hydration, exercise
- Correct any dental work with toxic or immunoreactive materials – mercury, lead oxide, gold, titanium. (zirconium dioxide is ok)
- Low copper amalgam : mercury (50%), silver (~22–32%), tin (~14%), copper (~8%)
- BEWARE OF POSSIBLE GENETIC POLYMORPHISMS

(De Luca, 2014).

Psychological support and removal of stress triggers

- CBT and MBSR are cornerstone
- Decrease sympathetic stress overdrive
- For heart arrhythmias – beta-blockers are helpful.
- Electrolytes and food sensitivities/intolerances must be addressed.
- Correct any sleep disorders
- Grounding – bare feet on mats, bodies of water such as tubs, lake or pool, special sheet at night.
- LIFE STYLE CHANGES ☺ at home, school and work.
- Support groups – C4ST, EPIC, WEEP

Thank you