Predicting Alzheimer's Disease Onset

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Abstract—Recently, a method for assigning the probability of disease onset to all people, those clinically ill as well as those without prevalent disease has been described and termed the Oxidative Stress Index (OSI). The OSI, as originally formatted, does not predict which disease will more likely develop, only that further disease is predicted with increased OSI. It is hypothesized here that the OSI may be used to demonstrate which parameters are more contributory to the onset of a particular disease if it is measured at the time of onset of that disease. To test this hypothesis, the OSI has been reformatted to serve in that capacity for Alzheimer's disease (AD) with the anticipation that the OSI could serve to predict not only the likelihood of onset, but also identify those parameters that are most contributory to AD.

Index Terms— Alzheimer's Disease; Oxidative Stress; Oxidative Stress Index; Predicting Disease Onset.

I. INTRODUCTION

People with chronic diseases and those who are disease free but living unhealthy lifestyles are known to be candidates for numerous non-communicative diseases, as well as more frequent and more severe bouts with infectious diseases.

Recently, a method for assigning the probability of disease onset to all people, those clinically ill as well as those without prevalent disease has been described and termed the Oxidative Stress Index (OSI). This method is a non-invasive diagnostic protocol based upon a questionnaire addressing oxidative stress (OS) elevating factors that include disease status, lifestyle and environmental exposure with the sum of the positive answers equal to the OSI [Zeliger, 2017].

The OSI, as originally formatted, does not predict which disease will more likely develop, only that further disease is predicted with increased OSI. It is hypothesized here that the OSI may be used to demonstrate which parameters are more contributory to the onset of a particular disease if it is measured at the time of onset of that disease. To test this hypothesis, the OSI has been reformatted to serve in that capacity for Alzheimer's disease (AD) with the anticipation that the OSI could serve to predict not only the likelihood of onset, but also identify those parameters that are most contributory to AD.

II. METHODS

The hypothesis proposed here is based upon a literature review of published studies on the causes of OS, parameters associated with the onset of AD, OS induced disease,

methods of measuring OS and the empirical and mechanistic associations between AD and OS.

III. RESULTS

A. Oxidative Stress

It is well known that all disease is accompanied by elevated OS, a property whose status can be measured by a number of biomarkers, including F2-Isoprostanes, lipid hydroxides and hydroperoxides, hydroxycholesterols, aldehydes and ketones [Zeliger, 2016]. Of these, the most widely used is malondialdehyde (MDA), which is stable in serum, as well as readily and accurately analyzed for [Nielsen, et al, 1997]. MDA level, however, can vary widely depending upon food eaten, environmental exposures, state of one's health or even the time of day when serum is drawn [Nielsen, et al, 1997]. The OSI questionnaire reduces such uncertainty by addressing nineteen different aspects of a person's regular life, including disease status, medications, diet, employment, environmental exposures, and stress, etc., that elevate OS.

Oxidative stress has been shown to be a crucial mechanistic component of AD onset [Liu, et al., 2015; Huang, et al., 2015; Kamat, et al., 2016; Tonnes and Trushina, 2017] and has been definitively associated with brain neuroinflammation and blood-brain barrier dysfunction that is both a cause and consequence of AD generating hyperpermeability that leads to the absorption of as well as generation of OS inducing species in the brain [Zhang & Jiang, 2015; Erickson & Banks, 2013; Najjar, et al., 2013].

It is also known that disease onset likelihood is related to total oxidative stress arising from numerous sources [Zeliger 2016 and the references contained therein]. These are listed in Appendix (Table I).

B. Dose Response Relationship

Total Oxidative Stress has been shown to be related to disease onset, whether coming from single sources or from a combination of other sources in a dose response relationship (DRR) [Zeliger, 2016]. A single source example of this effect as it applies to AD is exposure to radon [Lehrer, et al., 2017]. Multiple source examples are lifetime cigarette smoking [Mons, et al., 2013; Durazzo, et al., 2014] and simultaneous exposure to heavy metals and polynuclear aromatic hydrocarbons [Deng, et al., 2019]. DRRs for increased OS include exposures to trichloroethylene, perchloroethylene, air pollution, tobacco smoking, metals (including arsenic, cadmium and mercury), polynuclear aromatic hydrocarbons [Kuang, et al., 2013; Zeliger, 2016] and ultra violet radiation [Agarwal, et al, 1987].

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C. Parameters Known to Increase Likelihood of AD Onset

AD is characterized by deposition of amyloid-beta plaques, hyperphosphorylated tau protein and neurofibrillary tangles [Kamat et al., 2016]. It is well known that elevated oxidative stress is associated with increased likelihood of AD onset [Christen, 2000; Perry, et al., 2002; Huang, et al., 2016, Durazzo, et al., 2014, Durazzo, et al., 2014a]. The individual parameters and their references are listed in Appendix (Table II). Oxidative stress has also been shown to be a crucial mechanistic component of AD onset [Liu, et al., 2015; Huang, et al., 2015; Kamat, et al., 2016; Tonnes and Trushina, 2017].

Several parameters have been shown to increase the likelihood of AD onset. These and representative references for them are shown in Appendix (Table II).

D. Aging

Aging is not a disease. Rather, it is a natural consequence of living, but is accelerated by OS. It is widely theorized that excessive OS contained within

mitochondria damage the mitochondria which in turn leads to increases in OS. Once started, this cycle leads to further increased OS and aging, making OS both the cause the result of disruption of homeostasis which leads to aging and onset of Alzheimer's disease as well as type 2 diabetes, cardiovascular diseases and COPD [Dato, et al., 2013; Cencioni, et al., 2013; Guillaumet-Adkins, et al., 2017]. As we age, free radicals are excessively generated and overwhelm the body's natural antioxidant response, leading to increased OS [Dato, et al., 2013]. Actions that can be taken to slow down the aging process are discussed in the prevention section below.

E. Genetics and Epigenetics

Genetics and epigenetics have been shown to contribute to the onset of AD. It is well known that AD runs in families and that inheriting one copy of the APOE4 gene triples the risk of developing AD, while inheriting 2 copies of APOE4 increases the risk by 10 to 15 times [Jiang, et al., 2013; Dato, et al., 2013; Guillaumet-Adkins, et al., 2017; Cencioni, et al., 2013].

Epigenetic changes are heritable changes in gene expression that are not the result of alterations in the DNA sequence. These changes do, however, elevate OS and have been linked to the onset of cardiovascular diseases, respiratory system diseases and neurological system diseases, including AD [Cencioni, et al., 2013; Jiang, et al., 2013; Guillaumet-Adkins, et al., 2017]. The presence of AD in blood relatives has been shown to be associated with greater incidence of the disease. The likelihood of an individual falling ill with AD increases with increasing AD prevalence in parents, grandparents and siblings [National Institute of Aging, 2015].

F. Co-Morbidities

AD is co-morbid with numerous other diseases. These include hypertension, cardiovascular diseases, type 2 diabetes, ocular disorders, sleep disorders, cognitive and behavioral deficits, bladder and bowel control problems, obesity and musculoskeletal diseases [Barbagallo & Dominguez, 2014; Bannan, 2002; Duthie, et al., 2011;

Bunn, et al., 2014; Bauer, et al., 2014; Poblador-Plou, et al., 2014; Fafara, et al., 2014; Zeliger, 2014; Alford et al., 2018; Naderali, et al., 2009; Karki, et al., 2017]

Though mechanistic explanations have been offered for some of the co-morbid pairs, AD and T2D or obesity, for example [Profenno, et al., 2009; Barbagallo & Dominguez, 2014; Karki, et al., 2017], other AD co-morbidities are yet to be mechanistically tied together. However, all of the diseases that are co-morbid with AD are, like AD, known to be caused by elevated OS [Zeliger, 2016].

G. Late Onset of AD

OS caused diseases manifest themselves only after long term (years) exposure to causative agents. Examples of such diseases are cardiovascular diseases, type 2 diabetes, COPD, cancers and AD. In the case of AD, even early onset of disease, before age 65, follows many years of exposure to OS causing stimuli and in the case of persistent organic pollutants, storage in the body's adipose tissue for up to decades [Cencioni, et al., 2013; Zeliger 2013; Zeliger & Lipinski 2015].

H. Prevention

Further evidence for the relationship of AD with OS comes from a consideration of lifestyle changes known to lower AD incidence. It is estimated that as many as one half of the cases of AD are attributable to the following eight modifiable factors [Barnes and Yaffe, 2011]. These include:

Acting to prevent and manage type 2 diabetes

- Acting to prevent or treat hypertension
- Not smoking
- Maintaining physical activity
- Maintaining cognitive activity
- Treating depression, if present
- Prevent or reverse obesity
- Maintaining a diet that is low caloric, high in fruits and vegetables, whole grains, and nutritional antioxidants with reduced quantities of carbohydrates, saturated fats, red and processed meats. There are several versions of such a diet. The Mediterranean diet includes the consumption of large quantities of extra virgin olive oil and moderate quantities of red wine [Dato, et al., 2013]. Other examples include the Okinawan diet, (followed by residents of Okinawa, Japan), the Dash diet (developed to stop hypertension) and the Portfolio diet (aimed at reducing cholesterol levels) [Wilcox, et al., 2014].

It has also been reported that AD prevalence can be significantly reduced by properly treating the following conditions, which undermine immune system vitality and lead to chronic inflammation, which is known to elevate OS [Trempe & Lewis, 2018, Zeliger, 2017].

- Chronic migraines
- mood disorders
- Eye diseases
- Metabolic syndromes
- chronic viral diseases
- hormonal diseases
- autoimmune diseases

All of the AD causative factors discussed above raise OS,

while the preventative factors all lower OS. It is, therefore, reasonably hypothesized that avoiding other OS elevating factors such as chronic infections which stresses the immune system and result in chronic inflammation, as well as chronic environmental exposures to toxic chemicals and radiation, which also elevated OS can delay onset of AD by years. And that is what the OSI does.

I. Questionnaires

Questionnaires, such as the Charlson Comorbidity Index, are routinely used to solicit patient background information on prevalent diseases, symptoms and likelihood of further disease onset [Charlson et al., 1987]. The Alzheimer's Questionnaire is another example [Sabbagh, et al., 2010].

IV. DISCUSSION

As all of the AD causative factors raise OS, and all the preventative AD factors lower OS, it is, therefore, reasonably hypothesized that avoiding other OS elevating factors such as chronic infections which stresses the immune system and result in chronic inflammation, as well as chronic environmental exposures to toxic chemicals and radiation, which also elevate OS, can delay onset of AD by years.

From the results described above, it is clear that there is no single cause of AD, but that AD onset can be triggered by numerous parameters, all of which are associated with elevating OS.

It is hypothesized here that increased levels of OS is ultimately responsible for increased incidence of AD, that all parameters which contribute to OS elevation increase the likelihood of AD onset and that total OS, measured via the OSI questionnaire administered to the patient or surrogate at the time of first diagnosis of AD can shed light on, not only the patient's total OS, but also, via analysis of statistically significant patient results, on those parameters which are primary contributors to AD onset.

Accordingly, all factors known to raise OS have been incorporated into the modified OSI questionnaire shown in Appendix (Table III). This version of the OSI contains genetic and epigenetic items known to correlate to increased incidence of AD. These are:

As discussed above, exposures to numerous environmental agents have been associated with increased prevalence of AD. These have also been incorporated into the questionnaire.

A. Strengths

The OSI is non-invasive, yet predicts OS levels and offers insights into which parameters are the most contributory to AD onset. Individual items in the OSI are presented in alphabetical order and may differ widely from one item to the next. This is deliberate so that the patient or surrogate addressing the OSI is required to consider each item alone, rather than a part of a series of related questions, which could cause the responder to just check all the items in a single set.

B. Limitations

All parameters in the OSI carry equal weight. Clearly, some parameters are more detrimental to health to others,

Parkinson's disease versus the chronic sinusitis, for example. That said, more serious diseases will generally produce greater number of symptoms and require more medications than less severe ones. The large number of items in the OSI, also reduce to importance of any one item to the overall score obtained.

V. CONCLUSIONS

The hypothesis presented here is that AD is an oxidative stress induced disease, as all established causes of AD have been shown to raise OS. Accordingly, anything that raises OS is potentially a contributing cause to AD. Conversely, anything that lowers OS, or prevents raising it, potentially delays or prevents AD onset. It is anticipated that statistical analysis of data collected will shed light on those parameters that most contributory to the onset of AD.

The Oxidative Stress Index measured at time of AD onset is potentially a valuable tool that can lead to an understanding of what the primary causative agents of AD are.

APPENDIX

TABLE I: SOURCES KNOWN TO INCREASE OXIDATIVE STRESS [ZELIGER 2016].

Parameter
Toxic Chemical Exposures
Radiation Exposure
Tobacco Smoke
Alcohol & Recreational Drugs
Pharmaceutical Drugs
Brain trauma
Inflammation
Heat and Cold Exposures
Diet
Sleep Deprivation
Communicative Diseases Present
Non-communicative (environmental) Diseases
Chronic psychological Stress
Aging
Lifestyle Choices

TABLE II: PARAMETERS SHOWN TO INCREASE THE LIKELIHOOD OF AD ONSET AND REPRESENTATIVE REFERENCES FOR EACH

Parameter	References
Air pollution	Block & Calderon-Garciduenas, 2009; Moulton & Yang, 2012; Carey, et al., 2018; Kilian & Kitazawa, 2018
Pesticides	Yan, et al., 2016
Heavy metals	Adlard & Bush, 2018; Lee, et al., 2018
Radiation	Tang, 2018; Lehrer, et al., 2017
Smoking	Ott, et al., 1998; Durazzo, et al., 2014a
Brain injury	Turner, et al., 2016; Yuan & Wang, 2018, Breunig, et al., 2013
Chronic inflammation	Dunn, et al., 2005; Misiak, et al., 2012; Trempe & Lewis, 2018
Infectious diseases - viral, fungal, bacterial and parasitic	Honjo, et al., 2009; D'Aiuto, et al., 2010; Karim, et al., 2014; Sochocka, et al., 2017; Eimer, et al., 2018; Readhead, et al., 2018
Diet	Luchsinger, et al., 2002
Traumatic brain injury	YanJun, et al., 2017; Ramos-Cejudo, et al., 2018
Chronic Psychological stress	Machado, et al., 2014; Justice 2018
Obesity	Profenno, et al., 2010; Naderali et al., 2011; Alford, et al., 2018
Blood brain barrier breakdown	Lockhead, et al., 2010; Nation, et al., 2019
Aging	Dato, et al., 2013; Cencioni, at al., 2013, Guillaumet-Adkins, et al., 2017

Genetics and epigenetics	Jiang, et al., 2013; Dato, et al., 2013; Guillaumet
family history	Adkins, et al., 2017; Cencioni, et al., 2013; National Institute of Aging, 2015
AD co-morbidities	Bannon, 2011; Duthie, et al., 2011; Bunn, et al, 2014; Bauer, et al., 2014; Poblador-Plou, et al.

TABLE III: OXIDATIVE STRESS INDEX

OXIDATIVE STRESS INDEX (OSI) CHECK LIST	
GENDER	Female _____ Male _____
AGE OF ONSET _____	
FAMILY HISTORY	
_____	Mother with Alzheimer's disease
_____	Father with Alzheimer's disease
_____	Siblings with Alzheimer's disease (put one check for each sister or brother)
_____	Grandmother with Alzheimer's disease (put one check for each grandmother)
_____	Grandfather with Alzheimer's disease (put one check for each grandfather)
Total Family History Checks _____	
AGE	
Check all age boxes that apply. If, for example, you are 55 years old check the first two boxes. If you're 82, check all 5 of these boxes	
_____	40 or older
_____	50 or older
_____	60 or older
_____	70 or older
_____	80 or older
WEIGHT	
Find your healthy weight, on the weight chart (see table 2.2 on page 46). Check all the weight boxes that apply. If, for example you are 40 pounds over your recommended weight, check the first three boxes and add three checks to the total. Find your recommended weight on the weight chart at the end of the OSI checklist.	
_____	10 - 20 pounds overweight
_____	21 - 40 pounds overweight
_____	31 - 60 pounds overweight
_____	61 - 80 pounds overweight
_____	81 or more pounds overweight
Total age and weight checks _____	
ILLNESSES and CONDITIONS	
Check all illnesses or conditions that you have been diagnosed with and currently have.	
_____	Acne
_____	ADHD (Attention Deficit Hyperactivity Disorder)
_____	AIDS or HIV
_____	Alcohol addiction
_____	Allergic rhinitis (sinus inflammation)
_____	ALS (Lou Gehrig's disease)
_____	Anemia
_____	Anorexia
_____	Anxiety disorder
_____	Appetite loss
_____	Arthritis
_____	Asthma
_____	Autism and ASD
_____	Autism or autism spectrum disorder (ASD)
_____	Benign prostate hyperplasia (enlargement - BPH)
_____	Bipolar disorder
_____	Bronchitis (chronic)
_____	Bulimia
_____	Bulging or herniated disc
_____	Carpal tunnel syndrome
_____	Cancer - Check all that apply. If stage three, for example, check first three
_____	Cancer - stage 1
_____	Cancer - stage 1 or 2
_____	Cancer - stage 1, 2 or 3
_____	Cancer - stage 1, 2, 3 or 4
_____	Cardiovascular disease
_____	Chronic Fatigue Syndrome (CFS)
_____	Crohn's disease
_____	Common cold (frequent)
_____	COPD (chronic obstructive pulmonary disease)
_____	Crohn's disease

_____	Dementia
_____	Dengue fever
_____	Dental abscess (frequent)
_____	Depression
_____	Diabetes (type 1 or type 2)
_____	Diarrhea (frequent)
_____	Diverticulitis
_____	Drug addiction
_____	Eczema
_____	Emphysema
_____	Endometriosis
_____	Epilepsy
_____	Fibromyalgia (FM)
_____	Flu
_____	Frequent common colds
_____	Frequent headaches
_____	Frequent indigestion
_____	Frequent infection
_____	Frequent itching
_____	Frequent rashes
_____	Frequent sinus infections (sinusitis)
_____	Glaucoma
_____	Gout
_____	Gum disease
_____	Heart attack
_____	Heart Disease or heart problems
_____	Hemorrhoids
_____	Hepatitis B (chronic)
_____	High blood pressure (hypertension)
_____	High cholesterol
_____	Herpes
_____	Inflammatory bowel disease
_____	Irritable bowel syndrome (IBS)
_____	Kidney disease
_____	Leukemia
_____	Liver cirrhosis
_____	Liver disease
_____	Lupus
_____	Lyme disease
_____	Macular degeneration
_____	Malaria
_____	Metabolic syndrome (pre-diabetes)
_____	Middle ear infection (frequent)
_____	Migraine headaches
_____	Multiple chemical sensitivity (MCS)
_____	Multiple sclerosis
_____	Obesity
_____	Osteoarthritis
_____	Osteoporosis
_____	Parkinson's disease
_____	Periodontal disease (swollen or bleeding gums)
_____	Post-traumatic stress disorder (PTSD)
_____	Rocky Mountain spotted fever
_____	Psoriasis
_____	Rosacea
_____	Schizophrenia
_____	Seizures
_____	Sexually transmitted disease (STD)
_____	Shingles
_____	Sjogren's syndrome
_____	Sleep apnea
_____	Stroke
_____	TB (Tuberculosis)
_____	Thyroid disease
_____	Tourette syndrome
_____	Tremors
_____	Ulcers
_____	Varicose veins
_____	West Nile Fever
_____	Yellow fever
_____	Zika
_____	Write in the names of any other illnesses you have that were not listed above and check those.
_____	_____
_____	_____
_____	_____

Total Disease Checks _____

DISEASE START

How
many of

the
diseases
checked
above
started in

- ☐ The past 2 years?
☐ The past 5 years?
☐ The past 10 years?

SYMPTOMS

Check all the symptoms that you currently experience.

- ☐ Abdominal pain (frequent)
☐ Allergic reactions to chemicals
☐ Allergic reactions to any foods
☐ Allergic reactions to insects
☐ Allergic reactions to medications
☐ Allergic reactions to plants (Hay fever)
☐ Ankle pain
☐ Attention span decline
☐ Anxiety often
☐ Bleeding gums
☐ Blood in stool
☐ Blood in urine
☐ Blurred or cloudy vision
☐ Bruise easily
☐ Burning when urinating
☐ Butterflies in your stomach often
☐ Change in skin color
☐ Chest pain
☐ Constant chills
☐ Constipation
☐ Cough that is persistent
☐ Coughing or spitting up blood
☐ Decision making difficulties
☐ Decline in learning ability
☐ Decreased eye sight
☐ Decreased sex drive
☐ Diarrhea (frequent)
☐ Difficulty completing familiar tasks
☐ Difficulty concentrating
☐ Difficulty getting warm
☐ Difficulty maintaining balance
☐ Difficulty solving problems
☐ Difficulty swallowing
☐ Difficulty walking
☐ Difficulty concentrating or finding words
☐ Dizziness
☐ Drained of energy
☐ Dreams that are bizarre and recurring
☐ Excessive mucous production
☐ Excessive thirst
☐ Eye discomfort or pain
☐ Eye redness
☐ Fatigue
☐ Feel depressed a lot
☐ Feel less alert or fuzzy headed
☐ Fever
☐ Food allergies
☐ Foot pain
☐ Foot swelling
☐ Fungal infection such as athlete's foot that persists
☐ Frequent urination
☐ Graying of hair
☐ Hair loss (not due to chemotherapy)
☐ Have itchy scaly skin rashes
☐ Headaches frequently
☐ Hear voices inside you
☐ Hearing loss that comes on suddenly
☐ Heart palpitations (throbbing)
☐ Heartburn
☐ Hip pain
☐ Hoarseness
☐ Increased susceptibility to infections
☐ Indigestion (frequent)
☐ Insomnia
☐ Irregular periods
☐ Itchy hands
☐ Itchy skin other than hands
☐ Jaw pain
☐ Leg swelling
☐ Learning new things more difficult

- ☐ Light headedness
☐ Long recovery time from infections
☐ Losing track of time
☐ Loss of coordination
☐ Loss of muscle tone
☐ Loss of taste
☐ Lower back pain
☐ Memory loss
☐ Mood swings from very high to very low and vice versa
☐ Mouth sores that don't go away quickly
☐ Muscle aches that last a long time
☐ Muscle cramps
☐ Muscle spasms
☐ Nasal congestion
☐ Nausea
☐ Neck pain
☐ Nervousness
☐ Nightmares regularly
☐ Nose bleeds
☐ Knee pain
☐ Numbness or tingling in hands or feet
☐ Pain in joints
☐ Heart palpitations
☐ Pelvic pain
☐ Perspire (sweat) profusely
☐ Post nasal drip that lingers
☐ Post traumatic stress disorder (PTSD)
☐ Problems finding the words you want
☐ Rapid hair loss
☐ Rapid heartbeat
☐ Scaly skin
☐ Seizures
☐ Shortness of breath
☐ Shoulder pain that lingers
☐ Sinus pain
☐ Skin mole growth
☐ Skin rashes
☐ Sleep less than 7 hours per night
☐ Sleep more than 9 hours a night
☐ Slow to heal from cuts, bruises or other injuries
☐ Slurred speech
☐ Smaller field of vision
☐ Sore throat that doesn't heal
☐ Stressed out most or all of the time
☐ Stuffy nose
☐ Swollen eye lids
☐ Tics (involuntary movements)
☐ Tingling in the hands or feet
☐ Tire easily
☐ Tired most of the time
☐ Tooth pain
☐ Tremors
☐ Twitching
☐ Unusual vaginal bleeding or discharge
☐ Urination difficulty
☐ Urination pain
☐ Varicose veins
☐ Vomiting
☐ Wake up more than 3 times per night
☐ Weakness
☐ Weight gain
☐ Weight loss (rapid)
☐ Wheezing
☐ Wrinkling or loss of tone in skin
☐ Yawning frequently

Total Symptoms Checks

TEST RESULTS

- The following address results obtained from test doctors ordered done as part of annual examinations. Check all that apply to you.
- ☐ High or low blood sugar
☐ High or low BUN (blood urea nitrogen)
☐ High or low calcium
☐ High or low carbon dioxide (bicarbonate)
☐ High or low chloride
☐ High cholesterol
☐ High or low creatinine
☐ High glucose
☐ High or low potassium
☐ High PSA

- ___ High or low sodium
- ___ High triglycerides
- ___ Low blood oxygen
- ___ Low potassium

Total Test Results Checks

PRESCRIPTION MEDICINES REGULARLY TAKEN

Check each of the boxes that apply. If you regularly take five prescription drugs, for example, check **all** of the first 5 items, so that the total number of items checked equals the total number of prescriptions regularly taken.

- ___ 1 prescription
- ___ 2 prescriptions
- ___ 3 prescriptions
- ___ 4 prescriptions
- ___ 5 prescriptions
- ___ 6 prescriptions
- ___ 7 prescriptions
- ___ 8 prescriptions
- ___ 9 prescriptions
- ___ 10 or more prescriptions
- ___ Have a heart pacemaker

Total Prescription Medicine Checks

DIET

Check each item that applies to the foods that are part of your **regular** eat.

- ___ Alcoholic beverages (beer, wine, spirits) more than 1 drink per day
- ___ Artificial sweeteners for coffee or tea
- ___ Canned or frozen cooked foods regularly eaten (soups, pastas, meats)
- ___ Bread and pasta made primarily from white processed flour
- ___ Fast food frequently eaten
- ___ Fewer than 3 fruits or vegetables a day
- ___ Grilled, smoked or blackened meat, chicken or fish
- ___ Food high in fat (whole milk, cheeses, foods cooked with butter and animal fat)
- ___ Often eat processed foods (bacon, hot dogs, salami, sausages, deli meats)
- ___ Eat red meat more than 2 times a week
- ___ Eat foods high in sugar (sweetened drinks and desserts)
- ___ Salty food

Total Diet Checks

LIFE STYLE

These items refer to where you live, the type of work you do and chemicals you may be exposed to.

- ___ Are a farmer that regularly uses pesticides
- ___ Burn wood for heat or for cooking
- ___ Constantly use a cell phone
- ___ Drink chlorinated water
- ___ Drink more than one alcoholic drink per day
- ___ Exercise less than one half hour a week
- ___ Have mold in your home
- ___ Have new (less than 6 months old) carpet in your home
- ___ Have pets in your home that you are allergic to
- ___ Live down wind from a smoking industrial chimney
- ___ Live in a city with air quality alerts
- ___ Live or work close to a cell tower
- ___ Live or work near high voltage electrical transmission lines
- ___ Live near a heavily traveled highway or road
- ___ Live near a landfill
- ___ Live with a smoker
- ___ Regularly experience allergic reactions in your home
- ___ Regularly experience allergic reactions in your work place
- ___ Regularly use room or furniture deodorants
- ___ Regularly play contact sports
- ___ Tobacco use. Check **all** of the items that apply. For example, if you smoke one pack of cigarettes a day, check both of the first 2 items. If you smoke two packs a day, check all of the first 4 items.
- ___ Smoke 10 cigarettes or less daily (even just one)
- ___ Smoke a pack a day (20 cigarettes)
- ___ Smoke a pack and a half a day (30 cigarettes)
- ___ Smoke two packs a day (40 cigarettes)
- ___ Smoke more than two packs a day
- ___ Smoke 1-5 cigars a day
- ___ Smoke 6 or more cigars a day
- ___ Use smokeless tobacco
- ___ Work as a toll booth collector
- ___ Work in very hot or very cold conditions regularly
- ___ Work in an adhesives or coatings manufacturing plant

- ___ Work in an agricultural chemical manufacturing plant
- ___ Work as an automobile, diesel or aircraft mechanic
- ___ Work with chemicals on the job regularly
- ___ Work in a dusty environment regularly
- ___ Work in a landfill
- ___ Work in a hair or nail salon
- ___ Work in metal refinery or mill
- ___ Work as a miner
- ___ Work in a noisy environment
- ___ Work in a paint, lacquer, stain or varnish manufacturing plant
- ___ Work as a painter
- ___ Work as a pilot or flight attendant
- ___ Work as a pesticide applicator
- ___ Work in a petroleum refinery
- ___ Work in a plastics manufacturing plant
- ___ Work in a plywood or particle board manufacturing plant
- ___ Work in a polluted environment (road paver, toll booth operator, for example)
- ___ Work in a water or sewage treatment plant
- ___ Work in wood treatment plant

Total Lifestyle Checks

OSI, Total of All Checks

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