

**Hormones, Heart, Health and Hygiene:  
Women's Health Issues**

Presented by:  
Betsy Reynolds, RDH, MS

**Presenter Disclosures for Betsy Reynolds, RDH, MS**

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**Why 'women's health'???**

A little historical perspective:

For years, researchers used men in their clinical studies and the results were extrapolated to women. Besides not wanting to adversely affect pregnancy, women were also excluded from studies because researchers claimed men were easier to recruit and retain, that women were unwilling to participate, and that female hormonal cycles would skew results.

But by the early 1980's, there was a growing consensus that those perceptions had to change.

**The Birth of the Women's Health Initiative ('WHI')**

The Women's Health Initiative (WHI) is a long-term national health study that has focused on strategies for preventing heart disease, breast and colorectal cancer, and osteoporotic fractures in postmenopausal women—these chronic diseases are the major causes of death, disability, and frailty in older women of all races and socioeconomic backgrounds.

This multi-million dollar, 15-year project involves 161,808 women aged 50-79, and is one of the most definitive, far-reaching clinical trials of post-menopausal women's health ever undertaken in the U.S.

The WHI Clinical Trial and Observational Study focused on many of the inequities in women's health research and has continued to provide practical information to women and their healthcare providers about hormone therapy, dietary patterns, calcium/vitamin D supplementation, and their effects on the prevention of heart disease, cancer and osteoporotic fractures.

The Fred Hutchinson Cancer Research Center in Seattle, WA serves as the WHI Clinical Coordinating Center for data collection, management, and analysis of the WHI.

Annual updates on health outcomes were collected by mail from the participants enrolled in each Extension Study—information on study findings can be accessed at: [www.whi.org](http://www.whi.org)

The WHI had two major parts: a randomized **Clinical Trial (CT)** and an **Observational Study (OS)**

The WHI Clinical Trial and Observational Study were conducted at 40 Clinical Centers nationwide—recruitment began in September 1993 and continued until 1998.

WHI Extension Studies continued follow-up of consenting participants—the first consenting group of participants were followed for an additional five years (2005-2010) and the second consenting group of participants from the first Extension Study for were followed for an additional five years (2010-2015).

The Observational Study (OS) examined the relationship between lifestyle, health and risk factors and specific disease outcomes—this component involved tracking the medical history and health habits of 93,676 women.

Recruitment for the observational study was completed in 1998 and participants were followed for 8 to 12 years. The randomized controlled Clinical Trial (CT) enrolled 68,132 postmenopausal women between the ages of 50-79 into trials testing three prevention strategies.

Close-out of the WHI CT occurred between October 2004 and March 2005.

The components were:

- Hormone Therapy Trials ('HT')\*\*\*
- Dietary Modification Trial ('DM')
- Calcium/Vitamin D Trial ('CaD')\*\*\*

**Headliners: Calcium from Supplements or Dairy Doesn't Strengthen Bones, Study Finds; Results appearing in the British Medical Journal's online publication BMJ.com; as reported by Maggie Fox for NBC News; posted 9/30/15; accessed on 10/6/15 at: <http://www.nbcnews.com/health/diet-fitness/calcium-supplements-or-dairy-doesnt-strengthen-bones-study-finds-n435726>**

Dr. Ian Reid of the University of Auckland in New Zealand and colleagues did a meta-analysis involving all the high-quality studies they could find from around the world to see whether or not calcium supplementation had demonstrable health benefits

Most of the studies showed people over 50 got 'no benefit' at all from taking either calcium supplements or from eating calcium in food—the calcium-enriched folks were just as likely to have a fracture

Interestingly, it was also shown that taking calcium supplements is apparently not just a waste of time but it could be harmful—the extra calcium can build up in the arteries (increasing the risk for heart disease) or in the kidneys (causing kidney stones)

'Clinical trials of calcium supplements at doses of 1,000 mg/day...have reported adverse effects, including cardiovascular events, kidney stones, and hospital admissions for acute gastrointestinal symptoms.'--Dr. Ian Reid  
Dr. Karl Michaelsson of Uppsala University in Sweden, who studies osteoporosis, has led research that found people who drank the most milk had more bone fractures and were more likely to die within a certain period than people who drank less

Despite these findings, Americans love their supplements—a 2012 survey found 75% of Americans who take supplements would take them even if they are proven not to benefit health

Americans spend \$12 billion a year on supplements

**Hormone Therapy Trials (HT):** Examined the effects of combined hormones or estrogen alone on the prevention of coronary heart disease and osteoporotic fractures—and associated risk for breast cancer

Women participating in this component took hormone pills or a placebo—until the Estrogen plus Progestin and Estrogen Alone trials were stopped early in July 2002 and March 2004, respectively

In 2002, the WHI stunned doctors and patients when it showed that HRT appeared to increase the risk of heart attacks, strokes, and breast cancer—as well as other health problems

**Headliners: Hormone Use Tied to Breast Cancer; Rob Stein; reporting for The Washington Post; 4/19/07**

In April 2007, federal statistics were released that demonstrated the number of women diagnosed with breast cancer abruptly began falling after concerns emerged about the safety of HRT

Based on the findings, the researchers estimated that about 16,000 fewer cases of breast cancer are being diagnosed each year BECAUSE of the declining use of hormone therapy

'At first I didn't believe it—it was so astounding. But it really looks like it's a story that holds together.'--Donald Berry; lead researcher in the analytical study; University of Texas; results published in The New England Journal of Medicine; 4/07

The findings also helped explain why the number of breast cancer cases rose steadily for decades—increasing hormone use probably played a key role

The Good News: Breast cancer rates dropped as much as 18% from 2003 through 2006 after doctors stopped writing so many HRT prescriptions

All HT participants continued to be followed without 'intervention' until close-out

**Headliners: Study links gum disease to cancer in older women; Posted by Harvard Women's Health Watch; NOV 2017; Results appearing in Cancer Epidemiology, Biomarkers & Prevention; AUG 2017; accessed on 15 NOV 2017 at: <https://www.health.harvard.edu/womens-health/study-links-gum-disease-to-cancer-in-older-women>**

Study results from the WHI suggested a link between periodontal diseases and a higher risk for cancers of the breast, lung, and esophagus—as well as melanoma

The study authors who found the link between cancer and oral health came to their conclusions using self-reported information from questionnaires given to some 65,869 older women as part of the Women's Health Initiative Observational Study

The women in the study were asked if a dentist or dental hygienist had ever told them they had 'gum disease'—then the study authors followed these women for an average of eight years to see who went on to develop cancer  
More than 7,000 cancers occurred among the women during the study period—researchers found that women with periodontal disease[s] had a 14% higher overall cancer risk than women without gum disease (and a higher risk specifically of breast, lung, and esophageal cancers\*\*\*, and melanoma)

## Meet Porphyromonas Gingivalis

As a non-motile, Gram-negative, rod-shaped, anaerobic organism, *P. gingivalis* has surface fimbriae which allow the bacteria to adhere ('stick') to epithelial AND tooth surfaces making it a very important pathogen for periodontal diseases

The main feature of periodontal diseases is inflammation of oral tissues in response to Gram negative pathogenic bacteria such as *Porphyromonas gingivalis*—an increase in secretion of gingival crevicular fluid ('GCF') accompanies the inflammatory response

The rise in GCF raises the local pH which allows periopathic bacteria such as *P. gingivalis* to overgrow and crowd out other microbes

*P. gingivalis*, as a hemin-dependent bacteria, enjoys the hemin that is abundantly found in GCF—the increased production of GCF accompanying inflammation of periodontal tissues provides a competitive advantage to the so-called 'red-complex' bacteria (of which *P. gingivalis* is a member) over commensals

A recent investigation demonstrated that *Porphyromonas gingivalis* was present in 61% of study participants with esophageal squamous cell carcinoma (ESCC)—Source: Gao S et al: Presence of *Porphyromonas gingivalis* in esophagus and its association with the clinicopathological characteristics and survival in patients with esophageal cancer; *Infect Agent Cancer* (2016); 11: 3. Published online 2016 Jan 19; accessed on 3/14/16 at:

<http://www.ncbi.nlm.nih.gov/pmc/articles/PMC4717526/>

The researchers also found the presence of *P. gingivalis* correlated with other factors—including cancer cell differentiation, metastasis and overall survival rate

There are two likely explanations: either ESCC cells are a preferred niche for *P. gingivalis* to thrive or the infection of *P. gingivalis* facilitates the development of esophageal cancer

'These findings provide the first direct evidence that *P. gingivalis* infection could be a novel risk factor for ESCC and may also serve as a prognostic biomarker for this type of cancer. These data, if confirmed, indicate that eradication of a common oral pathogen may contribute to a reduction in the significant number of people suffering with ESCC. It would suggest that improving oral hygiene may reduce ESCC risk; screening for *P. gingivalis* in dental plaque may identify susceptible subjects; and using antibiotics or other anti-bacterial strategies may prevent ESCC progression.'—Source: Huizhi Wang; University of Louisville; School of Dentistry

Research has documented that the higher the levels of C-reactive Protein ('CRP'), the poorer the prognosis for a variety of malignancies (multiple myeloma, melanoma, lymphoma, sarcoma as well as cancer of the ovaries, kidney, pancreas and gastrointestinal system)

'A woman who shows some gum irritation and bleeding at a dental visit might be told she has 'gum disease', but what the dentist is referring to is a condition called gingivitis, which can be cleared up with a dental cleaning. Periodontitis, a more severe form of gum disease, is the type that has been linked with various body-wide health conditions.'—Source: Alessandro Villa; instructor in oral medicine, infection, and immunity; Harvard School of Dental Medicine; associate surgeon; Brigham and Women's Hospital

**Headliners: History of Gum Disease Increases Cancer Risk in Older Women; Source: David J. Hill; reporting for University at Buffalo; study results posted on 1 AUG 2017; Jean Wactawski-Wende; study senior author; results appearing in *Cancer Epidemiology, Biomarkers & Prevention*; 1 AUG 2017; accessed on 15 NOV 2017 at: <http://www.buffalo.edu/news/releases/2017/08/001.html>**

This UB-led study was the first to report an association between periodontal disease[s] and gallbladder cancer risk in women or men

According to an investigation of data involving more than 65,000 women enrolled in the WHI, researchers were able to demonstrate that postmenopausal women who had a history of 'gum disease' also had a higher risk of cancer

The study conducted by researchers at the University at Buffalo was the first national study of its kind involving U.S. women—it was also the first study to find an association between periodontal disease and gallbladder cancer risk in women or men

'Our study was sufficiently large and detailed enough to examine not just overall risk of cancer among older women with periodontal disease, but also to provide useful information on a number of cancer-specific sites.'—Source: Jean Wactawski-Wende; lead investigator; dean; UB School of Public Health and Health Professions; professor; epidemiology and environmental health

The risk associated with periodontal disease was highest for esophageal cancer—gallbladder cancer risk was high in women who reported a history of ‘gum disease’

‘Chronic inflammation has also been implicated in gallbladder cancer, but there has been no data on the association between periodontal disease and gallbladder risk. Ours is the first study to report on such an association.’--Source: Ngozi Nwizu; fellow study investigator

### **Hormones: Effects on Oral Tissues**

#### **Hormone Helper: Oral Effects of Progesterone (P) and Estrogen (E)**

##### **Microbial Effects:**

- Increased ratio anaerobe to aerobe (P/E)
- Increased levels of Prevotella intermedia (P/E)

##### **Vascular Effects:**

- Dilated gingival capillaries (P)
- Increased venule and capillary permeability (P)

##### **Cellular Effects:**

- Stimulated endothelial cells (P)
- Decreased keratinization (E)
- Increased epithelial glycogen (P/E)
- Inhibited collagen production (P)
- Increased folate metabolism (P/E)

##### **Immune Changes:**

- Decreased PMN chemotaxis and phagocytosis (P/E)
- Decreased antibody response (P/E)
- Decreased T-cell response (P/E)
- Increased prostaglandin synthesis in macrophages (P/E)

Women have an increased sensitivity to oral health problems because of the unique hormonal changes they experience

It has been suggested that women schedule any oral surgery for the week after their period due to the dip in progesterone production at the beginning of her cycle

These hormonal changes not only affect the blood supply to oral tissues but they also affect the body’s response to toxins produced by plaque bacteria

##### **In Summary:**

While hormone fluctuations do not CAUSE periodontal diseases, they do appear to modify the periodontium which may result in a decreased resistance to microbial plaque

There are **FIVE stages** in a woman’s life during which hormone fluctuations make them more susceptible to oral health problems:

- Puberty
- Monthly Menstruation Cycle
- Use of Oral Contraceptives
- Pregnancy
- Menopause

##### **Puberty**

The surge in progesterone and estrogen accompanying puberty increases the blood flow to the gingival tissues and changes the way the tissue reacts to irritants

And besides poor fashion sense, zits, and unrequited love, puberty also presents the possibility of ortho...

In addition, the subgingival microflora changes during puberty due to changes in the gingival tissues as well as the ability of some species of bacteria to capitalize on the higher levels of hormones

##### **Meet Prevotella intermedia**

The gram-negative, anaerobic Prevotella intermedia have the ability to substitute estrogen and progesterone for menadione (vitamin K) as an essential growth factor

### **Monthly Menstruation Cycle**

Gingivitis can be much more prevalent during menstruation due to an increased amount of progesterone which increases vascularity of the gingival tissues

Menstruation gingivitis usually occurs right before a woman's period and clears up once her period has started

Other oral changes that may occur during menses include swollen, tender gingival tissues; swollen salivary glands; development of aphthous ulcers; and increased bleeding

Most healthy and periodontally uncompromised women experience little significant periodontal consequences as a result of puberty or during menstruation since the periodontal condition improves spontaneously without treatment

### **Use of Oral Contraceptives**

Gingival changes with BCP use include inflammation and enlargement with increased amount of fluid flow into the tissue (edema)

The most profound gingival changes are seen in the first few months after starting oral contraceptives—sometimes different formulations may help decrease gingivitis

Most clinical studies investigating BCP use on gingival and systemic health were conducted in the 1960's

However, new research is starting to shed some light on the ramifications of BCP use

One recent report indicated that, because of the lower concentrations in the current oral contraceptive formulations, the inflammatory response of the gingiva to dental plaque was not affected in the study participants and no gingival changes were demonstrated--Preshaw PM, Knutsen MA, Mariotti A. Experimental gingivitis in women using oral contraceptives. J Dent Res 2001; 80:2011-2015

### **Headliners: The Pill's Secret Powers; Reported in Women's Health; 11/11**

This article outlined some pretty interesting facts about oral contraceptive use

A couple of myths explained:

#### **Acne solution**

- Studies show that artificial estrogen can spur the production of a protein that decreases testosterone levels
- Because testosterone increases the output of sebum—infamous 'pore clogger'—a woman's skin may appear clearer

#### **The Weight-Gain Debate**

- Extra estrogen creates bloat by signaling the kidneys to retain water
- Although weight gain remains a top concern (?) for would-be Pill takers, low dose formulations did not appear to promote weight gain in a recent University of Massachusetts study

#### **Bone Loss**

- A 2010 study found that young women on low-dose estrogen BCP's had a 6% lower spinal density than non-users
- Natural estrogen peaks can stimulate bone growth—however, the Pill keeps estrogen levels steady. What we don't know is what happens to your bones when you quit taking the Pill.
- Delia Scholes, PhD; study author and senior investigator; Group Health Research Institute (Seattle, WA)
- Newer research is clearly needed in this area

#### **Cancer Risk**

- Whether or not the artificial estrogen found in the Pill increases a woman's breast cancer risk is still debatable
- A recent Boston University study found that some BCP users had a 65% higher risk of developing estrogen receptor-negative breast cancer
- A study published in the New England Journal of Medicine found that past or current BCP use did NOT affect breast cancer risk
- Studies evaluating a BCP user's risks of developing other forms of cancer seem clear cut:
- BCP's may DECREASE the risk of developing ovarian cancer (50%) and endometrial cancer (40%+)

## **The Blood Clot Connection**

It has been demonstrated that BCP users are at risk for venous thromboembolism ('VTE')—blood clots that form in the legs

The risk apparently depends on the kind of BCP that is being used

A recent study in the British Medical Journal found that women taking BCP's containing **drospirenone** (a newer formulation of progesterone) were about THREE times more likely to develop certain types of VTE's than those females taking contraceptives containing levonorgestrel (an 'older' progesterone)

**Headliners: Newer Birth Control Drugs Tied to Blood Clots; Washington AP office; as reported in the Idaho Statesman; 10/28/11**

Federal health scientists reported that Yaz and other newer birth control treatments appear to increase the risk of dangerous blood clots more than other medications

The FDA study reviewed the medical histories of 800,000+ U.S. women taking different forms of birth control between 2001 and 2007

On average, women taking drospirenone-containing Yaz had a 75% greater chance of experiencing a blood clot than women taking older birth control drugs

One thing to keep in mind: Drospirenone can increase potassium to dangerous levels (hyperkalemia)—it is likely to be especially dangerous or fatal for patients taking other drugs that also may increase potassium levels

Examples of potassium-raising medications include ACE inhibitors, angiotensin-II receptor agonists, potassium-sparing diuretics, potassium supplementation, heparin, aldosterone antagonists, and NSAIDs\*\*\*\*

**Headliners: A Birth Control Pill That Promised Too Much; Natasha Singer; reporting for the New York Times; 2/10/09**

Bayer HealthCare Pharmaceuticals introduced a \$20 million advertising campaign for YAZ—the most popular birth control pill in the United States with 2008 sales of \$616 million or about 18% market share

Instead of promoting their product, Bayer warned that nobody should take Yaz hoping that it will also cure acne or PMS

Regulators say the original ads overstated the drug's ability to improve women's moods and clear up acne—while playing down its potential health risks

**Headliners: FDA Approves Beyaz Birth Control Pill with Added Folate Supplement; September 28, 2010; accessed at [www.drugwatch.com](http://www.drugwatch.com) on 2/23/11**

The FDA approved Beyaz (drospirenone/ethinyl estradiol/levomefolate calcium) as a new type of combination birth control pill marketed by Bayer HealthCare Pharmaceuticals—the manufacturer of Yaz and Yasmin

Beyaz (the name is coined from the marketing term 'beyond Yaz') is essentially identical to Yaz, but the new oral contraceptive also contains levomefolate, a folate and B-vitamin

Beyaz contains a combination ethinyl estradiol (used in a number of oral birth control pills) and drospirenone (the newer type of progestin that is currently only found in Yaz, Yasmin and their generic equivalents)

The new pill includes levomefolate calcium—designed to increase folate levels in women to help prevent neural tube birth defects

Bayer AG, the maker of Yasmin birth control pills, has paid approximately \$142 million to settle more than 650 lawsuits involving Yasmin and Yaz—the lawsuits alleged that the birth control pills caused such things as pulmonary embolisms and blood clots that are (or could be) fatal

A Bayer AG stockholders' newsletter included the April 2012 settlement figure regarding Yasmin and Yaz and noted that the average settlement was approximately \$218,000 per case--Source: Bloomberg News

The same company newsletter reported that Yaz is a hugely popular birth control medication (the fourth most popular oral contraceptive available!) and it helped Bayer earn more than \$1.5 billion in sales in 2010

Canadian researchers examined approximately 330,000 women taking various birth control pills and found that drospirenone-containing BCP's had increased the risk of blood clots by 65% when compared more established birth control pills--Source: The Canadian Medical Journal; 11/17/11; accessed on 10/6/15 at:

<http://lopezmchugh.com/2011/11/17/seven-studies-now-show-drospirenone-yazyasminbeyaz-increase-risk-of-clots/index.html>

In the United States, there still are approximately 11,900 lawsuits involving Yasmin and Yaz that include around 14,000 plaintiffs—the U.S. Food and Drug Administration has directed Bayer AG to change the labels on Yaz and Yasmin to include stronger warnings regarding the potential risk for blood clots

The most common form of contraception for women 40+ continues to be sterilization —a category that includes tubal ligation

Increasingly, OB-gyns are offering a ‘newer’ (approved in 2002) type of tubal ligation called ‘**Essure**’ that is non-surgical and a ‘permanent’ solution

Essure is a very ‘soft’, flexible metal spring made from a nickel-titanium alloy that are inserted into each Fallopian tube to induce a scarring barrier for eggs making arriving from the ovaries

Instead of accessing the fallopian tubes via an abdominal incision, the physician works through the cervix to implant the Essure device

Women must return three months after the procedure for a follow-up X-ray using dye to confirm that the tubes are fully blocked—once blockage has occurred, the method is considered 99.83% effective

A Facebook group of more than 18,000 women who have experienced Essure-related problems has been actively posting—the women call themselves ‘E-sisters’ and are frustrated that their doctors, the FDA and Bayer have dismissed their concerns for years

### **Do you think this procedure might cause inflammation?**

**Headliners: Bayer Reports Spike in Essure Lawsuits and Congress Questions FDA ; As reported by Jane Mundy for Lawyers and Settlements; posted 8 NOV 2017; accessed on 15 NOV 2017 at:**

**<https://www.lawyersandsettlements.com/articles/essure-side-effects/essure-lawsuit-side-effects-22698.html>**

At the beginning of 2017, Bayer Pharmaceuticals reported in its financial statement that the company was facing 3,700 Essure lawsuits—by September 2017, that number increased to 10,600 lawsuits filed by Essure victims in the U.S. alone

Litigation involving Essure is taking its toll on Bayer—in less than a year, the permanent birth control device manufacturer has seen lawsuits more than double AND it has been removed from every global market except in the U.S.

Bayer also racked up \$413 million in litigation and impairment losses—but the company still maintains that Essure is safe and is providing an effective method of birth control for ‘hundreds of thousands’ of women

Source: Modern Healthcare; 2/2017

### **Pregnancy**

With studies showing a prevalence range between 35% and 100%, pregnancy gingivitis is a common occurrence The pattern of pregnancy gingivitis seems to follow the hormonal cycle and is more evident in the 2nd or 3rd trimester

As with gingivitis associated with BCP use, gingival inflammation associated with pregnancy occurs in the presence of very little plaque

Some interesting research has demonstrated distinct hormonal influences on the immune systems of pregnant women—which may contribute significantly to the etiology of pregnancy gingivitis

Among the ‘immune tidbits’:

Lymphocytes have a decreased antigenic response (P. intermedia)

Migration of inflammatory cells and fibroblasts is hampered

Prostaglandin E2 increases in response to progesterone (important in PTLBW link to oral inflammation\*\*\*)

During pregnancy, prostaglandin levels gradually increase—reaching their peak at the time of labor

A woman’s body reacts to the infections in her mouth by producing prostaglandins—very potent inflammatory mediators

If extra prostaglandins are being produced—such as those associated with gingivitis—a woman’s body may interpret this as a sign it is time to go into labor (even though the baby is not at full term)

### **Pregnancy Granuloma**

- Occurs in less than 10% of pregnant women
- Anterior maxilla most common site
- Presents as pedunculated soft interdental tissue with a fiery red color
- The lesion undergoes rapid growth initially but is rarely larger than 2 cm

Why does it occur???

Progesterone causes not only vascular changes (accounts for fiery red color and edema) but also appears to disrupt collagen formation and degradation

In 2016, it was estimated that overall **maternal smoking rates** at any time during pregnancy was 8.4%—with 20.6% of women quitting during the third trimester--Source: National Vital Statistics Reports; 65:1; 2/10/16; 'Smoking Prevalence and Cessation Before and During Pregnancy: Data From the Birth Certificate, 2014; by Sally C. Curtin, M.A., and T.J. Mathews, M.S., Division of Vital Statistics; accessed 3/23/16 at: [http://www.cdc.gov/nchs/data/nvsr/nvsr65/nvsr65\\_01.pdf](http://www.cdc.gov/nchs/data/nvsr/nvsr65/nvsr65_01.pdf)

Currently, almost six out of 10 teenage mothers are continuing to smoke during pregnancy

Besides making it harder for a woman to get pregnant, smoking during pregnancy causes many health problems including PTLB deliveries, certain birth defects, and infant death

**The CDC Stats:** (accessed on 1/28/14 at:

<http://www.cdc.gov/Reproductivehealth/TobaccoUsePregnancy/index.htm>

- Women who smoke during pregnancy are more likely than other women to have a miscarriage
- Smoking can cause problems with the placenta—the source of the baby's food and oxygen during pregnancy
- Babies born to women who smoke are more likely to have cleft lip or cleft palate

**Headliners: Nicotine Patches Don't Help Pregnant Smokers, Study Finds; Rachael Rettner, MyHealthNewsDaily Staff Writer; 2/29/12; accessed on 10/1/13 at: <http://www.livescience.com/36176-nicotine-patch-pregnancy-quit-smoking.html>**

In this ground-breaking investigation (the largest of its kind to address the issue of patch use and smoking cessation during pregnancy), researchers found that pregnant women who used nicotine patches as a smoking cessation aid were just as likely to continue smoking until their delivery date as women who used a placebo

**Headliners: Study Casts Doubt on Nicotine Replacement; As reported by Benedict Carey for New York Times; appearing in the Idaho Statesman; 1/10/12**

A multi-year investigation followed nearly 2,000 smokers, recent quitters, and young adults to see whether nicotine replacement affected their odds of kicking the habit over time—the results found that it did not (even if the smoker received counseling in addition to nicotine replacement)

'We were hoping for a very different story. I ran a treatment program for years, and we invested some \$6 million in treatment services.'--Dr. Gregory N. Connolly; study co-author and director of the Harvard Center for Global Tobacco Control

Nicotine replacement products came under fire in 2002 when researchers from the University of California (San Diego) reported that they appeared to offer not benefit

A government-appointed panel that included nicotine replacement as part of federal guidelines for treatment also came under fire several years ago—panel members had received payments from the products' manufacturers Neonatal health-care costs attributable to maternal smoking in the U.S. have been estimated at \$366 million per year or \$740 per maternal smoker

Smoking during pregnancy accounts for 20%-30% of low-birth weight babies—up to 14% of preterm deliveries and about 10% of all infant deaths

Maternal smoking has also been linked to asthma among infants and young children—the odds of developing asthma are twice as high among children whose mothers smoke more than 10 cigarettes a day

**Reassuring TIDBIT:** A woman who quits smoking within the first three or four months of pregnancy can lower the chances of her baby being born premature or with health problems related to smoking

## **Menopause**

Numerous changes occur in the oral cavity that may be attributable to aging—altered taste, burning mouth syndrome, increased hypersensitivity, and decreased salivary flow

### **Burning Mouth Syndrome**

People have suffered from burning mouth syndrome since ancient times—historic writings have mentioned the condition, and the ancient Incas and Egyptians drew pictures depicting the syndrome

Burning mouth syndrome is the medical term for chronic or recurrent burning in the mouth without an obvious cause—the discomfort may affect the tongue, gingiva, lips, inside of the cheeks, palatal tissue or widespread areas of the whole mouth

Besides reporting oral burning, patients describe experiencing a dry, gritty feeling in the mouth, as well as alterations in taste. But because many health practitioners are not familiar with BMS and cannot see any physical

symptoms, patients often leave the doctor's office frustrated and untreated.'--Eugene Antenucci, DDS, FAGD; AGD Spokesperson

The syndrome occurs in 1%-5% of the population—and like many uncommon, nonfatal diseases, research and awareness has been relatively limited

Although BMS can affect anyone, it occurs most commonly in middle-aged or older women

Menopause seems to be a key player in this health issue—as a woman's estrogen levels drop in pre-menopause, it fades from her saliva as well

Some research suggests that burning mouth syndrome is related to problems with taste and sensory nerves of the peripheral or central nervous system

'[Although] the cause of BMS is currently unknown,...our findings support the theory that this is a neuropathic condition. For reasons unknown, it seems that the BMS patient's nerves are not sending and/or processing information correctly, there's a short circuit in the nervous system and the brain can't turn off the pain receptors.'

Source: Gary D. Klasser, DMD; speaking on behalf of the AGD

'Supertasters'—those people with a really high density of lingual taste buds—seem to be slightly more prone to BMS (possibly because all those extra taste receptors are surrounded by basket-like clusters of pain neurons that may fire up if the taste buds stop functioning—as often happens during menopause)

**Underlying problems that may be linked to burning mouth syndrome include:**

- Hormonal changes
- Xerostomia
- Nutritional deficiencies (specifically, iron, zinc, folate [vitamin B-9], thiamin [vitamin B-1], riboflavin [vitamin B-2], pyridoxine [vitamin B-6] and cobalamin [vitamin B-12])
- Acid reflux
- Dentures (stressing muscles and tissues, poor fit, or allergic reaction in surrounding tissues)
- Allergies or reactions to foods, food flavorings, food additives, fragrances, dyes or dental materials
- Anxiety and depression
- Certain medications (particularly ACE inhibitors)
- Oral candidiasis
- Lichen planus
- Geographic tongue ('migratory glossitis')
- Blood abnormalities (anemia, dyscrasias)
- Chronic infection
- Inflammatory disorders
- Tobacco use
- Oral cancer
- Oral habits, such as tongue thrusting, biting the tip of the tongue and bruxism
- Endocrine disorders (such as Type 2 diabetes or hypothyroidism)
- Excessive mouth irritation (which may result from overbrushing the tongue, using abrasive toothpastes, overusing mouthwashes or having too many acidic drinks)

Although no cure currently exists, health practitioners who have an understanding of the syndrome can help patients manage their symptoms

**Treatment Options:**

Palliative care includes:

- Sipping water or sucking on ice chips frequently
- Avoidance of irritating substances like hot, spicy foods; mouthwashes that contain alcohol; and products high in acid such as citrus fruits and juices
- Chewing sugarless gum\*\*\*
- Brushing teeth/dentures with baking soda and water
- Avoiding alcohol and tobacco products
- Nutritional supplementation

Research continues on possible beneficial therapy for BMS via **Low Level Laser Therapy (LLLT)**

**Headliners: Hot Flashes at Menopause May Be Healthy; Dr. Emily Szmuilowicz ; study co-author; Chicago's Northwestern Memorial Hospital; results appearing in Menopause 2/11; as reported by Shari Roan; Los Angeles Times; appearing in the Idaho Statesman; 2/25/11**

Researchers analyzing data from 60,000 post-menopausal women enrolled in the WHI Observational Study found that women who had hot flashes or night sweats at the start of menopause were actually at a slightly lower risk for stroke (17%), heart disease (11%) and death (11%) compared to women who never had hot flashes or night sweats. Women in the study who did not have hot flashes or night sweats at the onset of menopause but developed them later had a 32% higher risk of heart attack and a 29% higher risk of stroke.

It is not clear why hot flashes are linked to a lower risk of cardiovascular events but the researchers stated that: 'It is reassuring that these symptoms, which are experienced by so many women, do not seem to correlate with increased risk of cardiovascular disease.'

**Headliners: What Causes Hot Flashes, Anyway?; Rebecca Thurston; lead investigator; associate professor of psychiatry, psychology and epidemiology; University of Pittsburgh; results appearing in Menopause; 4/12; as reported by Jenifer Goodwin; HealthDay News; posted on 4/12/12; accessed on 10/5/15 at: <http://consumer.healthday.com/women-s-health-information-34/estrogen-news-238/what-causes-hot-flashes-anyway-663671.html>**

'About 70% of women experience hot flashes, but their underlying physiology isn't well understood.' --Rebecca Thurston, PhD; researcher; associate professor of psychiatry, psychology and epidemiology; University of Pittsburgh

One study team had 21 perimenopausal and postmenopausal women aged 40 to 60 who reported having daily hot flashes wear a heart monitor over a 24-hour period.

The heart monitor showed that during a hot flash, heart-rate variability—a measure of beat-to-beat changes in heart rate—decreased significantly indicating that the parasympathetic nervous system was not working as well as it normally should.

The parasympathetic nervous system is involved with 'rest and digest' functions and regulates the body at rest. 'There were transient decreases during the hot flash, but the good news is it does come back up.' --Thurston

Previous research endeavors had found an association between cardiovascular disease and decreased parasympathetic nervous system control of the heart—while the research team led by Thurston said it is too soon to conclude that hot flashes have a connection to heart disease, it is worth continuing to study them.

### **Heart: Cardiovascular Risk in Women**

By carefully examining vessel walls of people who have died from heart attacks, pathologists have demonstrated that most attacks occur after a plaque's fibrous cap breaks open, prompting a blood clot to develop over the break.

**Headliners: Standard Test Fails to Find Women's Heart Risk; Chicago AP Wire Service; as reported in the Idaho Statesman; 2/1/06**

According to the NIH: Up to 3 million U.S. women are at higher risk of heart attack because they have coronary artery disease that does NOT show up on standard tests.

These 'at-risk' women do not have significant blockages in major cardiac arteries—rather, cholesterol-laden plaques spread evenly throughout the arterial walls or accumulate within the microvasculature in the heart itself. The condition—called '**coronary microvascular syndrome**'—does not show up on angiograms.

Researchers at a 2011 Physiology of Cardiovascular Disease: Gender Disparities Conference emphasized the need for increased use of diagnostic tests (such as angiograms and reactivity testing) to detect small-vessel disease in women (Source: Women'sHealth Advisor; Weill Cornell Medical College)

### **Heartfelt Tidbits**

- Heart disease is the leading cause of death for women in the United States
- In 2013, 289,758 women died from heart disease—that is about 1 in every 4 female deaths
- Although heart disease is sometimes thought of as a 'man's disease', about the same number of women and men die each year of heart disease in the United States
- Despite increases in awareness over the past decade, only 54% of women recognize that heart disease is their number 1 killer
- Almost two-thirds (64%) of women who die suddenly of coronary heart disease have no previous symptoms

**Headliners: Study Suggests Women are Less Likely to get CPR from a Bystander; Source: As reported by Jacqueline Matter for ABC News; posted 15 NOV 2017; accessed on 15 NOV 2017 at: [http://www.mysuncoast.com/community/study-suggests-women-are-less-likely-to-get-cpr-from/article\\_9c98bb26-c9b3-11e7-a5d5-5fcfaaf7bfd6.html](http://www.mysuncoast.com/community/study-suggests-women-are-less-likely-to-get-cpr-from/article_9c98bb26-c9b3-11e7-a5d5-5fcfaaf7bfd6.html)**

In a study funded by The Heart Association and the National Institutes of Health, researchers reported that women are less likely than men to get CPR from a bystander and more likely to die—investigators think reluctance to touch a woman's chest might be one reason

Only 39% of the 20,000 cases of women suffering cardiac arrest in a public place were given CPR—versus 45% of men—and men were 23% more likely to survive

As the first study to examine gender differences in receiving heart help from the public versus professional responders, the results of the investigation were discussed at the American Heart Association's Scientific Sessions 2017 in Anaheim

The findings suggested that CPR training may need to be improved and that training may be subtly biased toward males—practice mannequins are usually male torsos

'All of us are going to have to take a closer look at this [gender issue]. [I have] long worried that large breasts may impede proper placement of defibrillator pads if women need a shock to restore normal heart rhythm.'--Source: Dr. Roger White; Mayo Clinic; co-director; paramedic program; Rochester, Minnesota

Cardiac arrest occurs when the heart suddenly stops pumping—more than 350,000 Americans each year suffer one in settings other than a hospital and about 90% of them die

CPR can double or triple survival odds

**Headliners: Sleep Deprivation May Increase Risk of Cardiovascular Disease in Older Women; Source: Tomas Cabeza De Baca, Ph.D., University of California (San Francisco); study leader; reported by the American Heart Association; 14 NOV 2017; accessed on 15 NOV 2017 at: [https://www.eurekalert.org/pub\\_releases/2017-11/aha-sdm110317.php](https://www.eurekalert.org/pub_releases/2017-11/aha-sdm110317.php)**

Among the ~21,500 female health professionals between ages of 60 and 84 enrolled in the study, researchers considered sleeping at least two hours more during the weekend than on the weekday as a sign of being in sleep debt

Women who were in sleep debt were more likely to be obese and have hypertension—when taking into account socioeconomic status and sources of stress, quality of sleep was still an important factor for good overall cardiovascular health

The results suggested that not getting enough sleep during the week might throw the body off and may increase risk of cardiovascular disease in older women

Heart disease affects women of all ages—for younger women, the combination of birth control pills and smoking boosts heart disease risks by 20%

**Headliners: Triglycerides & Stroke; Results of the Women's Health Initiative; as reported in Nutrition Action Newsletter; May 2012**

A primer on triglycerides:

- Triglycerides are a type of fat (lipid) found in the blood that are used for energy—when food is consumed, the body converts any calories it does not need to use right away into triglycerides that are stored in adipocytes
- Later, hormones release triglycerides for energy between meals—if more calories (especially those derived from carbohydrates and trans fats) are routinely consumed than can be used, hypertriglyceridemia results

In women, high blood levels of triglycerides may signal an increased risk of stroke—a growing number of studies are suggesting that high triglycerides are more dangerous for women than men

Researchers analyzing results from ~1500 WHI participants found that women with the highest triglyceride levels ( $\geq 192$  mg/dl) were 56% more likely to have an ischemic stroke over an 8-year period than those females with the lowest triglyceride levels ( $\leq 104$  mg/dl)

**Ischemic strokes**—which are typically caused by a blood clot that gets lodged in a partially clogged artery in the brain—are more common in the United States than strokes caused by hemorrhage

Conditions which can raise triglyceride levels:

- Obesity
- Poorly controlled diabetes
- **An underactive thyroid (hypothyroidism)\*\*\***
- Kidney disease
- Excessive alcohol consumption

### **Hypothyroidism**

Occurs when the thyroid gland does not make enough thyroid hormones (T3 and T4) to meet the body's needs. Over 10 million Americans have hypothyroidism—~2 out of 100 individuals—and many do not know they have it!

Women are more likely to have it than men and the chances for developing hypothyroidism increases with age—over 10% of Caucasian women over 60 years of age in the United States and Canada have an under-functioning thyroid gland.

The signs and symptoms associated with hypothyroidism occur because there is a deficiency of thyroid hormone secretion and all metabolic processes in the body slow down—resulting in poor appetite, intolerance to cold, dry skin, brittle hair, fatigue, constipation, muscle weakness, poor memory retention and hoarseness.

### **Oral Manifestations of Hypothyroidism:**

- Salivary gland enlargement
- Compromised periodontal health\*\*\*
- **Macroglossia\*\*\***
- Glossitis
- Dysgeusia
- Delayed eruption
- Enamel hypoplasia (especially in deciduous dentition)
- Anterior open bite
- Micrognathia
- Thick lips
- Mouth breathing
- Delayed wound healing\*\*\*

Thickening of the tongue and lips occurs due to an increase in accumulation of subcutaneous mucopolysaccharides (such as glycosaminoglycans)—these substances cannot be degraded in a hypothyroid state.

### **Certain medicines may also raise triglycerides:**

- Tamoxifen\*\*\*
- Steroids
- Beta-blockers
- Diuretics
- Estrogen\*\*\*
- Birth control pills\*\*\*

A simple blood test can identify triglyceride levels.

### **The Numbers Game:**

- Normal: Less than 150 milligrams per deciliter (mg/dL), or less than 1.7 millimoles per liter (mmol/L)
- Borderline high: 150 to 199 mg/dL (1.8 to 2.2 mmol/L)
- High: 200 to 499 mg/dL (2.3 to 5.6 mmol/L)
- Very high: 500 mg/dL or above (5.7 mmol/L or above)

**KEY: The American Heart Association recommends that a triglyceride level of 100 mg/dL (1.1 mmol/L) or lower is considered 'optimal'**

### **Headliners: Gender Gap 911; Good Housekeeping; 9/10**

Recently, it was reported that 80% of women polled would immediately call 911 if they thought someone else was having a heart attack—compared to only 53% of respondents who would call for emergency help for themselves.

### **Why Women Do Not Call 911:**

- Often, women are embarrassed, doubtful that medical professionals will listen, or concerned an ambulance will disturb neighbors

### **What Women Do Instead:**

- Women report calling a friend or their doctor, taking an aspirin and waiting to feel better, or driving themselves to the hospital

### **Headliners: NSAIDs Tied to Cardiac Risk; Study results published online 9/10/12 in Circulation; as reported by Nathan Seppa for Science News; appearing on 10/20/12**

Danish researchers strengthened the correlation between use of NSAIDs among people with a history of cardiovascular disease and increased heart attack risk

The large-scale study backed up previous findings by the American Heart Association—which released guidelines discouraging use of any NSAIDs among people with a history of cardiovascular disease in 2007

‘This is the biggest study, no question, in terms of numbers and completeness [to address the NSAID/heart risk question].’--Vibeke Strand; rheumatologist; Stanford University School of Medicine

**Ongoing stress** is a risk factor for cardiovascular disease and women are particularly vulnerable because of the multiple roles they play

Women often face higher stress loads than men—especially when considering their roles in the workplace, in the home, and in the area of caregiving for older parents or in-laws

Data from Brigham and Women’s Nurses’ Health Study demonstrated that women who are caregivers have a higher risk of death from cardiovascular disease—the risk increases if they lack support

Women become more easily addicted to nicotine and they metabolize the chemical 60-120 times more rapidly than men—making **smoking** cessation more difficult for females

### **Headliners: Smoking Hurts Teen Girls’ Bones; Nathan Seppa; reporting for Science News; 1/12/13**

A recent study reported that girls between the ages of 11 and 17 who smoke are at a higher risk for developing osteoporosis

‘This age group is when you should gain about 50% of your bone accrual. These girls are on different trajectories all the way across adolescence [compared to non-smokers]’--Lorah Dorn, PhD; lead investigator; developmental psychologist and pediatric nurse practitioner; Cincinnati Children’s hospital Medical Center

Girls who reported smoking regularly showed nearly flat rates of bone density growth in the lower vertebrae and a decline in bone density at the hips—compared to nonsmokers who demonstrated normal, steadily rising bone density in both regions--Dorn et al; study results appearing in Journal of Adolescent Health; 12/4/13

### **Headliners: Report Adds to Smoking’s Disease Tally; Liz Szabo; reporting for USA Today; 1/17/14**

A recent study from the surgeon general found that smoking causes even more physical and financial damage than previously estimated—killing 480,000 Americans annually from diseases that include diabetes, colorectal cancer and liver cancer (the report is the first to link these diseases CAUSALLY with smoking)

Further ‘causal links’ reported:

- Erectile dysfunction
- Rheumatoid arthritis
- Macular degeneration (a major cause of age-related blindness)
- Inflammation
- Impairment of immune function
- Increases death from tuberculosis
- Birth defects (cleft lip/palate)
- Ectopic pregnancy

‘Amazingly, smoking is even worse than we knew. Even after 50 years, we’re still finding new ways that smoking maims and kills people.’--Thomas Frieden; director; Centers for Disease Control and Prevention

The report raises the annual death toll from smoking by about 37,000 additional lives lost and estimates that tobacco has killed 20 million Americans since the first surgeon general’s report on smoking was released in 1964. Nearly 2.5 million of those premature deaths were in non-smokers exposed to second-hand smoke

An additional 100,000 infants who died from sudden infant death syndrome ('SIDS') or complications from prematurity and low birth weight attributable to maternal smoking were added to the list of casualties

**Headliners: Nicotine May Damage Arteries; Tina Hesman Saey; reporting for Science News; 1/25/14**

According to a recent study, smokeless cigarettes may cause damage that can lead to atherosclerosis--Chi-Ming Hai; Brown University (Providence, RI); results presented at the American Society for Cell Biology's Annual Meeting; 12/15/13

Vascular smooth muscle cells make up the outer arterial walls and are integral in controlling blood flow and pressure

Inflammation and certain chemicals (such as those in e-cigs) can stimulate arterial smooth muscle cells to morph into miniature drills that burrow through connective tissue and allow muscle cells to tunnel into blood vessels. Once inside the vessel, the cells and other debris clump into artery-clogging plaques—nicotine appears to be one chemical that assists in turning normal muscle cells into invaders.

The research team reported that when exposed to nicotine, smooth muscle cells already riled up by inflammation formed ring-like structures that started the 'invasion'

Scientists had thought other chemicals associated with cigarette smoke were responsible for most of the bodily damage—while nicotine was primarily responsible for addiction.

### **WRAP UP or 'We're Almost Finished!'**

#### **Integrating Women's Health Issues into the Practice Setting**

- Stay abreast of women's health research findings—study of the data will prove to be a veritable treasure trove of useful information

#### **Hormones**

- Hormones affect oral microbial populations, vascular and immune systems and certain cells in the body
- Remember the FIVE critical stages in a woman's life where hormonal changes heighten the risk of periodontal inflammation (puberty, monthly menses, BCP use, pregnancy and menopause)

#### **Heart**

- Cardiovascular disease is the number one killer of women in the U.S.
- Decreased Inflammation = Decreased Cardiovascular Risk
- Sonic and ultrasonic technology may just be our best weapon against biofilms—both in the office and home settings
- 'Cardiac prophylaxis' can be implemented into the practice setting—monthly
- 10-minute ultrasonic sweeps of high risk patients who demonstrate oral inflammation with bleeding

Besides clinical protocols and home care recommendations designed to minimize oral inflammation, the dental community has another very important task:

We must EDUCATE the female population about heart disease

And, while we are at it, let us all remember how important our time is with each and every patient who seeks our care

As 'inflammation specialists', we must do our best to educate our patients as to the ramifications of ALL inflammatory conditions affecting the oral cavity and their relationship to systemic disease

# **THANK YOU!**