

APRIL 2016 THE LEADING MAGAZINE FOR ENDOCRINOLOGISTS

# Endocrine news



## Focal POINT

### THE ENDOCRINE SYSTEM

**Snooze Alarm:** Is not getting a good night's sleep leading to a number of potentially hazardous endocrine disorders? Research says yes.

**A Fresh Approach:** A multi-faceted look at the "new" science of metabolomics and its use in studying and treating diabetes.

**Correct Change:** Women continue to be undertreated for symptoms of menopause, and a new Endocrine Society Clinical Practice Guideline aims to help correct that.

#### GENDER BIAS:

Are women taking over endocrinology?

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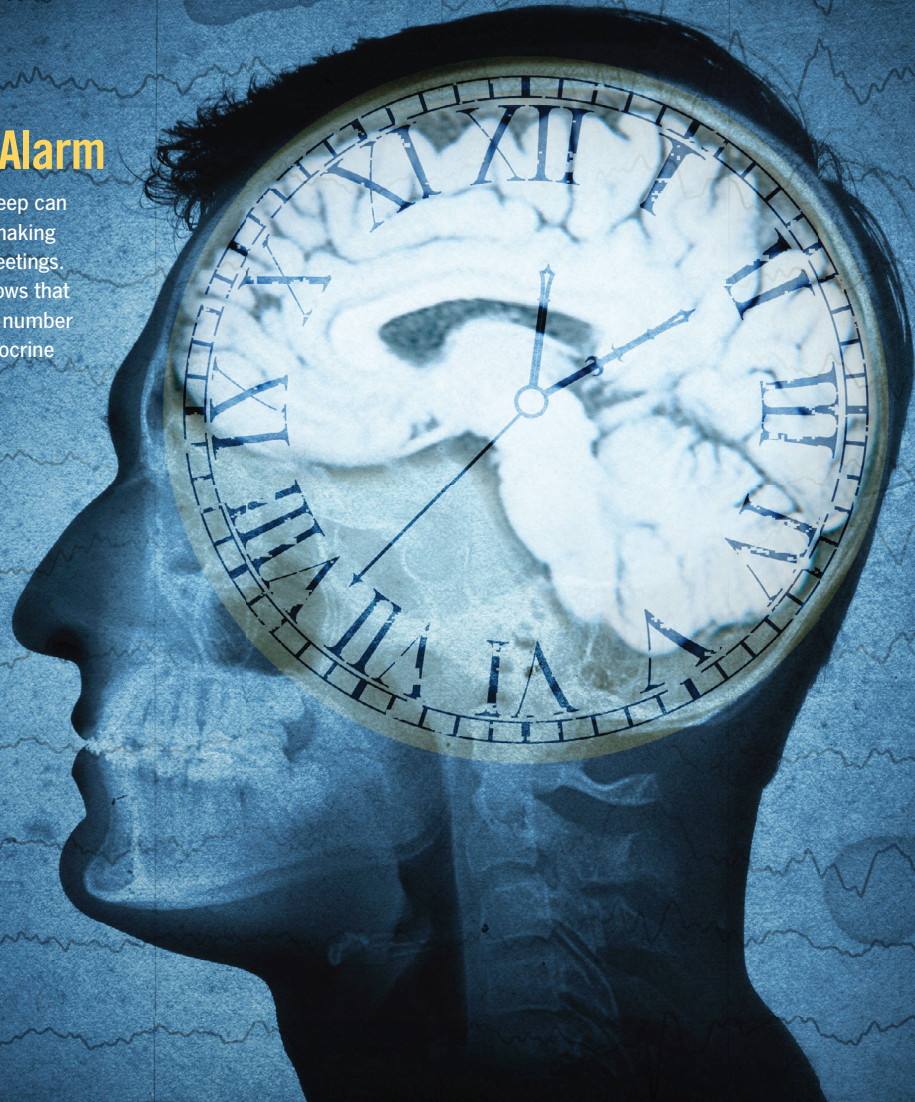
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A multi-faceted look at the "new" science of metabolomics and its use in studying and treating diabetes.

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FROM THE **EDITOR**

## ENDO2016: Celebrating the Year of Endocrinology in Boston

**Welcome to ENDO 2016 in Boston!** If you are reading this while in attendance, you are at the biggest endocrinology conference in the world. There is so much to learn and see here that there's no way you can see it all. *Endocrine News* is soliciting short testimonials and stories from attendees about what impressed you the most. Your stories will appear on our website, tweeted out, and might even make it into the May issue. Contact us at [mnewman@endocrine.org](mailto:mnewman@endocrine.org) or via Twitter at [@Endocrine\\_News](https://twitter.com/Endocrine_News). If you think it's important and exciting, others will too!

Since April has been deemed Endocrinology Month in the Year of Endocrinology, this issue of *Endocrine News* is casting a wide net with a variety of articles including the cover story on the impact sleep — or rather, not enough sleep — has on the endocrine system. In “Snooze Alarm” (p. 12), associate editor Derek Bagley sorts through a number of studies that show how a sleep deficit can affect the endocrine system. With the ongoing double epidemics of obesity and diabetes, could there be a link to being constantly “linked in” in modern life? Peter Liu, MD, PhD, at the Los Angeles Biomedical Research Institute at Harbor-UCLA Medical Center in Torrance, Calif., seems to think so. “We all know, for example, that if you don't get enough sleep, that you might be grumpy, it might affect your mood, maybe you make a few more mistakes,” he says. “But we don't realize that not getting enough [sleep] actually harms your metabolic health.”

In “Correct Change” (p. 18), Eric Seaborg delves into the recommendations of the Endocrine Society's new clinical practice guideline, *Treatment of Symptoms of the Menopause*. While it's good news for women that there are so many more options to treat menopause, deciding on which option has proven to be somewhat overwhelming for both physicians and their patients, according to JoAnn Manson, MD, DrPH, a professor at Harvard Medical School and chief of the Division of Preventive Medicine at Brigham and Women's Hospital in Boston, who reviewed the guideline. “This practice guideline culls an enormous body of research to facilitate personalized decision making, incorporating the patient's risk factor status and treatment preferences,” she says.

In “Gender Bias” (p. 24), Bagley examines a study called “Female Physicians and the Future of Endocrinology” from *The Journal of Clinical Endocrinology & Metabolism (JCEM)*, which addresses the growing number of women in the endocrinology workforce. Or, more accurately, the lack of men entering the field of endocrinology due to a variety of factors, one of which is the relatively low pay despite the extra years of training required. According to Elaine Pelley, MD, lead author of the *JCEM* study, it's a common misconception that endocrinology is attracting more women. “The problem is that applications to endocrinology fellowships are down from both genders, the decline in male applicants is just much more dramatic, leaving a higher proportion — not number — of female applicants.”

We hope you enjoy this wide array of stories this month and, more importantly, the wide array of sessions, exhibitors, and other opportunities at ENDO 2016 as we celebrate 100 years of the Endocrine Society together! 

— **Mark A. Newman**, Editor, *Endocrine News*

APRIL 2016

# Endocrine news

THE LEADING MAGAZINE FOR ENDOCRINOLOGISTS

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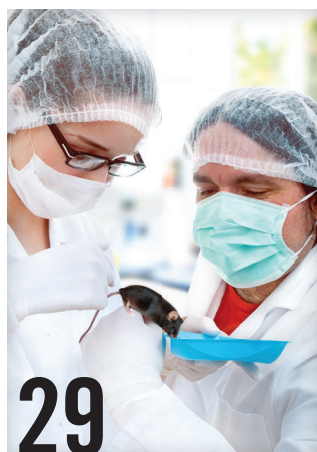
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## Reflections on a Presidential Year Full of Many Milestones

**A**S WE CELEBRATE THE ENDOCRINE SOCIETY Centennial meeting in Boston and I reach the end of my year as president, I look back with a sense of accomplishment. It has been a great honor and a remarkable experience to serve as president of the Endocrine Society, and I want to highlight a few of this year's accomplishments, while recognizing that none of these endeavors would have been possible but for the dedication of our members and the hard working staff who keep our many initiatives moving forward.

I would like to thank the Annual Meeting Steering Committee (AMSC), chaired by Carol Wysham as overall chair; Jenny Visser, Basic Science chair; Gary Hammer, Clinical Science chair; and Michael McDermott, Physician-in-Practice chair, for the outstanding scientific program at this year's Annual Meeting. The AMSC worked closely with the Centennial and ENDO task forces to incorporate their suggestions into the program.

Our advocacy efforts have greatly increased the Society's visibility and influence in the U.S. and internationally. The Society played an important role in the successful effort to increase NIH funding, helped push the long delayed repeal of Medicare SGR for physician reimbursement, and influenced policies in science and diabetes. We visited Capitol Hill last fall and have another visit scheduled later this month. We have designated the month of April as Endocrinology Month and will use this opportunity to educate policy makers about accomplishments in endocrinology and what research and clinical advances we expect in the future. This will be an excellent opportunity for

our participating members to build a relationship with their respective congressional delegations. We have also been advancing the endocrine science message globally through our role in endocrine-disrupting chemicals (EDCs). The Society's participation in several activities with the European Union has positioned us as a central player in the ongoing critical discussions about EDCs policy throughout the world.

The Hormone Health Network, our patient education arm, has done an outstanding job developing high-

quality resources to help patients have more informed discussions with their healthcare providers about hormone health, disease, and treatment. One of the recent projects is the *Journey Through the Endocrine System*, which uses technology to explain the intricacies of the endocrine system and disorders that can result. Another great resource is D.A.I.L.Y (Diabetes Awareness Information for Loved Ones and You), a new digital interactive diabetes education tool for management of diabetes.

Our vice presidents Carol Lange, Tony McCall, and Susan Mandel each led important task forces this year, focusing on Leadership Development, ENDO, and Knowledge Integration, respectively. The Leadership Development and ENDO task forces have made recommendations that are being implemented in both the

immediate and long term. The Knowledge Integration task force is ongoing and is developing a common taxonomy to allow linking content across platforms, as well as exploring innovative ways to position members to identify and prioritize new content creation.

“  
**We have designated the month of April as Endocrinology Month and will use this opportunity to educate policy makers about accomplishments in endocrinology and what research and clinical advances we expect in the future.**  
”

The Centennial Task Force, led by M. Susan Smith and Mitch Lazar, has brought to life the discoveries that are the basis for endocrine science and practice today. Please visit the Centennial website and explore throughout the year as new information will be added each month. Your suggestions are welcome!


Once again the Endocrine Self-Assessment Program In-Training Exam (ESAP™-ITE) 2016 achieved record participation numbers, with 142 training programs and 637 fellows. This year we have nearly 100% participation from accredited domestic programs. Our Clinical Endocrinology Update (CEU) broke attendance records in 2015 as did the Endocrine Board Review course held in conjunction with CEU.


We held the popular Highlights of ENDO programs in Brazil, Spain, and Malaysia in 2015. In 2016, we will have similar programs in China, Brazil, and Peru. In December, we collaborated with the Egyptian Association for Endocrinology, Diabetes, and Arthrosclerosis to hold the International Endocrine Update Program in Luxor, Egypt. Our activities in India will continue with the Endocrine Summit in Mumbai, India, which is on its seventh year, and the second Dimensions in Diabetes program also in Mumbai in July. We will continue our collaboration with the Society of Endocrinology and Metabolism of Turkey and the European Society of Endocrinology to host the fourth EndoBridge program in Antalya, Turkey, in October.

This past December, the Society held its sixth Science Writers Conference in New York — a biennial event designed to educate reporters and build relationships between key journalists and the Society. Seventeen journalists representing outlets including the *New York Times*, *Prevention*, and *Good Housekeeping* attended to hear our experts talk about emerging trends in diabetes care, the microbiome, replacement chemicals for endocrine disruptors, and transgender health.

Media coverage of the Society and its journals skyrocketed to a record high last year. There were 10,469 separate news

stories that mentioned the Society and its journals, a 26% increase in coverage from 2014.

These are just a few of our many accomplishments this past year, and I would like to thank and acknowledge our committee members, including those involved in task forces and working groups, our leadership, and our professional staff who make these activities a reality. I would also like to thank Past-President Richard Santen and President-Elect Henry Kronenberg, who with me form the presidential team and who, together with our CEO Barbara Byrd Keenan, have provided invaluable support and guidance. This is an outstanding Society, and I am so proud to preside during its Centennial celebration. Please join me in celebrating the past, the present, and the future at ENDO in Boston. 



**Lisa H. Fish, MD**  
President, Endocrine Society

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## WHY ENDOCRINOLOGY?

# “Let Passion Be Your Purpose”

**BY THOMAS LANDEFELD, PHD**, Professor of Biology,  
Pre-Health Advisor, California State University  
Dominguez Hills, Carson, Calif.

**W**hen I entered Marietta College (Ohio) on a football grant-in-aid and about to become a father, I knew that my college years were going to be most challenging. However, I loved science and chose a “comprehensive science/education” major so I could teach and coach upon graduation. My academic pursuits went well; however, during my senior year, while doing student teaching, I realized that I wanted to know more about hormones, as my biology classes never sufficiently covered those hormones involved with reproduction/sex. Thus, I enrolled in the Endocrinology-Reproductive Physiology Program at the University of Wisconsin, an interdisciplinary program dealing with reproductive issues, culminating with a PhD in reproductive endocrinology.

My specific project focused on gonadotropin biochemistry, while the courses highlighted the physiology of the reproductive system. During this time, my career goals of teaching and coaching changed to an academic research career, so I then expanded my research experience by doing a post-doc in endocrinology at Cornell Medical College in Ithaca, N.Y., followed by a post-doc at Washington University School of Medicine (St. Louis). It was during the latter position that I was exposed to molecular biology, specifically gonadotropin biosynthesis. I then accepted a position in the Reproductive Endocrinology Program (REP) at the University of Michigan Medical School (UMMS), led by Rees Midgley, MD, a most innovative endocrinologist involved in the early days of radioimmunoassays, who saw the future of molecular endocrinology.

While there, I successfully wrote an R01 grant and attained tenure while maintaining my REP involvement. In fact, perhaps going back to my early days and interest in teaching, I became the director of the National Institutes of Health (NIH) REP Training grant. Also, relating to my teaching interests, I became active in the UMMS Admissions Committee as another of my major interests was addressing the underrepresentation of ethnic minorities.

I maintained my research through R01 renewals. However, my interest in the issue of underrepresented minorities became an equal passion as I became active nationally through national conferences and scientific organizations, including the Endocrine Society. As this commitment continued to develop, combined with my knowledge of the number of endocrine-based minority health disparities, I approached Society President Susan Smith about forming a Minority Affairs Committee. She not only supported the idea but asked me to chair the committee. I agreed as long as I could identify individuals with the commitment and fortitude to stand up to the opposition as we knew that there would be some. These individuals were Frank Talamantes, Lovell Jones, Robert Harrison, and Judy Cameron. Not only did we succeed in addressing the underrepresentation through various activities but also succeeded in obtaining a grant from the NIH to offer endocrine short courses at minority institutions, many of which did not offer an endocrinology course.


To celebrate 100 years of the Endocrine Society, throughout 2016 *Endocrine News* is running a “Why Endocrinology?” column in each issue. If you’d like to share your story with our readers, contact Mark A. Newman at [mnewman@endocrine.org](mailto:mnewman@endocrine.org).



Thus, I was able to help expose and teach students about hormones and their role in reproduction/sex, while taking on another passion, addressing the underrepresentation of minorities. I recently read a quote: “Let passion be your purpose,” which really defines my life and career goals. Fortunately for me, these two goals have come together even better than I could have imagined, i.e., as many of the minority health disparities relate directly to endocrinology. To that point, I am currently a professor of biology at California State University Dominguez Hills, a minority-serving institution in Los Angeles (yes, I did make the move from cold Michigan to lovely LA!) where I teach endocrinology and minority health disparities. Also, I am the Pre-Health Advisor helping students get into the health professional schools. Based on my experience, I wrote a book entitled *Mentoring and Diversity: Tips for Students and Professionals for Developing and Maintaining a Diverse Scientific Community* and am now finishing one (still untitled) on sex as an unexplored area.

Have I come full circle? Certainly, I have been fortunate over my career to successfully interface my two areas of commitment, i.e., endocrinology and diversity/inclusion, so that I can now impart the importance of these areas to young people who are also interested in bettering not only the academy but also society, in general, through education and understanding.

This is most gratifying, especially since my two areas of commitment are ones that society naturally hesitates to address in a meaningful way, i.e., sex and race. These are controversial *but* important, and we can only effectively deal with them through discussions and education! Although due to society’s “traditions,” many will choose not to have such discussions, so it has to be those of us with that commitment and passion to make it our purpose! To quote Frederick Douglass: “Without struggle, there is no progress.”

I am most pleased that I asked that question many years ago, i.e., “what about hormones?” as it resulted in me becoming an academic reproductive endocrinologist successfully addressing very important issues facing science and society today. 



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The new *Endocrine News* website gives you the best features of an online magazine — great design with a robust, interactive, and personalized experience. Find all of the cutting-edge content you expect from *Endocrine News* online with regular updates on hot topics and the latest news in endocrinology.

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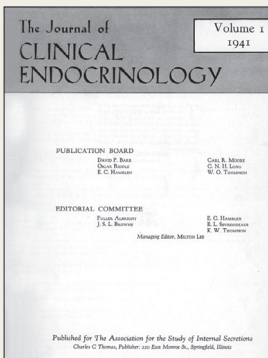
**It's good news that women now have more options for managing menopausal symptoms, but deciding among the expanded array of hormonal and nonhormonal treatments can be overwhelming for women and clinicians alike. This practice guideline culls an enormous body of research to facilitate personalized decision making, incorporating the patient's risk factor status and treatment preferences.”**

— **JOANN MANSON, MD, DRPH**, a professor at Harvard Medical School and chief of the Division of Preventive Medicine at Brigham and Women's Hospital in Boston, referring to “Treatment of Symptoms of the Menopause: An Endocrine Society Clinical Practice Guideline,” which she reviewed prior to publication. (Correct Change, p. 18)

FROM THE CENTURY OF ENDOCRINOLOGY TIMELINE

**1941:**

*Journal of Clinical Endocrinology Debuts*



In the first issue of *The Journal of Clinical Endocrinology*, the editorial committee laid out the format for the new journal: “The content...will be made up of articles of original clinical research, case studies, review articles of timely interest, and occasional special features, centering on the themes of diagnosis, therapy, assay and methods. A section of abstracts of clinical endocrine literature will be included. The field of endocrinology will be interpreted in a very broad sense but the interpretation of the term “clinical” will be rather strict. Papers dealing with the endocrine aspects of other fields of medicine will come within the scope of the *Journal*, provided these endocrine aspects are explicit and form the more significant part of the contribution.”

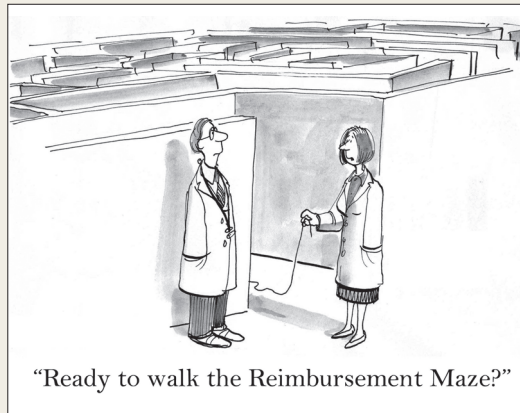
The title would later be changed to *The Journal of Clinical Endocrinology & Metabolism*.

For more about the *Century of Endocrinology*, go to: [www.ESCentennial.org/timeline](http://www.ESCentennial.org/timeline).

**700,000**

The potential number of UK cancer cases over the next two decades caused by obesity.

— SOURCE: CANCER RESEARCH UK; UK HEALTH FORUM



SHUTTERSTOCK.COM/CARTOONRESOURCE

**14%**

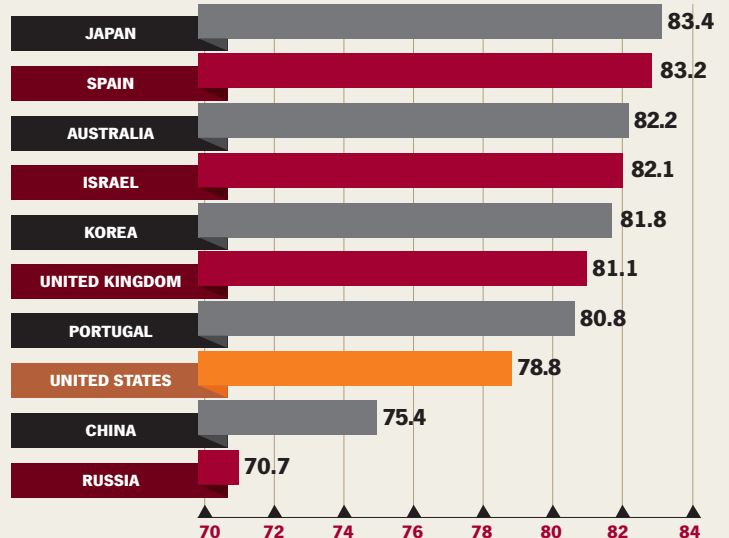
The amount that the National Institutes of Health's budget for research grants has fallen since its peak in 2004.

— SOURCE: AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE

**Life Expectancy by Country**



— SOURCE: ORGANIZATION FOR ECONOMIC COOPERATION AND DEVELOPMENT, 2013



## Diabetic Ketoacidosis a Risk after Bariatric Surgery

BY DEREK BAGLEY



**R**esearchers at the Cleveland Clinic have found that while bariatric surgery is considered a safe and effective treatment for obesity and its comorbidities, diabetic ketoacidosis (DKA) can occur in diabetic patients following weight-loss procedures. The findings were recently published in *Diabetes Care*.

The investigators, led by Ali Aminian, MD, point out that the characteristics of DKA following bariatric surgery have not been explored, so they analyzed 12 patients who, from January 2005 to December 2015, developed DKA within 90 days of surgery. Eight of these patients had type 1 diabetes (T1D), while four had type 2 diabetes (T2D), and three of them had a past history of DKA. Six patients had undergone laparoscopic Roux-en-Y gastric bypass, four underwent laparoscopic sleeve gastrectomy, and two had laparoscopic adjustable gastric banding. One patient even developed two episodes of postoperative DKA.

The authors also point out that eight of these patients had inadequate insulin therapy or were noncompliant, and three of these patients developed DKA before they were even discharged from the hospital following their weight-loss procedures, which the authors write “could be explained by the combination of undertreatment with insulin and surgical stress.” The median time between surgery and DKA was 12 days.

“Infection was a precipitating factor for the development of DKA in four (33%) patients,” the authors write. “Poor oral intake (for several days) could be a contributing factor in three (25%) patients.”

**Findings:** Aminian and his team note that this is the largest case series of this kind to date. Based on what they observed in this study, as well as the literature, they conclude that it’s not uncommon for patients with poorly controlled T1D to develop DKA following bariatric surgery, while it is uncommon for patients with T2D to develop DKA after surgery, and if they do, it’s usually mild. What’s more, stress from the surgery, inadequate treatment during the surgery, postoperative infection, and a number of other factors can be precipitating causes of DKA.

Patients must have optimal glycemic control before bariatric surgery, even the morning of the surgery, and patients must be kept on insulin during the surgery, the authors write. Candidates for bariatric surgery can benefit from a healthier diet leading up to the surgery, as well as after, and insulin dosages must be adjusted accordingly.

“Early detection and aggressive diabetes care are needed to treat this serious adverse event,” the authors conclude.

## Vitamin D May Influence Cell-Mediated Immunity



**H**igh-dose vitamin D supplementation may help ward off chronic immune-mediated diseases like type 1 diabetes (T1D), Hashimoto's thyroiditis, inflammatory bowel disease (IBD), and multiple sclerosis (MS), according to a study recently published in *The Journal of Clinical Endocrinology & Metabolism*.

Previous studies have shown that vitamin D deficiency has been linked to immune-mediated diseases. (The April 2014 issue of *Endocrine News* reported on a study that showed vitamin D deficiency was associated with compromised immune function.) However, as researchers, led by Andrew T. Chan, MD, MPH, of Massachusetts General Hospital in Boston, write, data demonstrating vitamin D's direct effects on T-cell function are lacking.

The team conducted an ancillary study of 38 individuals with vitamin D deficiency and untreated pre- or early-stage 1 hypertension. The patients were randomized to either low-dose (400 IU daily) or high-dose (4,000 IU daily) vitamin D, taken orally for six months. "We measured CD4+ T-cell activation estimated by intracellular ATP release after stimulation of whole blood with plant lectin phytohemagglutinin collected at baseline (pretreatment) and two-month follow-up," the authors write.

They found a significant difference in ATP level changes between each treatment cohort — treatment with high doses of vitamin D decreased intracellular CD4+ ATP release by 95.5 ng/ml (interquartile range, -219.5 to 105.8), while treatment with low doses decreased intracellular CD4+ ATP release by only 0.5 ng/ml (interquartile range, -69.2 to 148.5). "In a proportional odds model," Chan and his team write, "high-dose vitamin D3 was more likely than low-dose vitamin D3 to decrease CD4+ ATP release (odds ratio, 3.43; 95% confidence interval, 1.06–1.11)."

**Findings:** The researchers conclude that "high-dose vitamin D3 significantly reduced CD4+ T-cell activation compared to low-dose vitamin D3, providing human evidence that vitamin D can influence cell-mediated immunity."



## Metabolically Healthy Obese People at Risk of Developing CKD

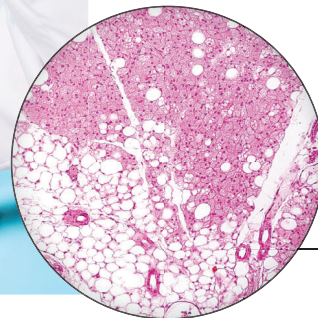
**R**esearchers in Korea have found that people who are obese and overweight, yet still considered to be metabolically healthy, have an increased risk of developing chronic kidney disease, putting yet another wrinkle in the theory of "metabolically healthy obesity." The findings were published recently in *Annals of Internal Medicine*.

The investigators, led by Yoosoo Chang, MD, PhD, of Kangbuk Samsung Hospital and Sungkyunkwan University School of Medicine in Seoul, point out that the risk for CKD in metabolically healthy obese people is "largely unexplored." So the team evaluated 62,249 metabolically healthy, young and middle-aged participants without CKD or proteinuria. During 369,088 years of follow-up, they identified 906 cases of CKD and saw that individuals who were overweight or obese exhibited more cumulative incidence of CKD.

"The multivariable-adjusted differences in five-year cumulative incidence of CKD in underweight, overweight, and obese participants compared with normal-weight participants were -4.0 (95% CI, -7.8 to -0.3), 3.5 (CI, 0.9 to 6.1), and 6.7 (CI, 3.0 to 10.4) cases per 1,000 persons, respectively," the authors write. "These associations were consistently seen in all clinically relevant subgroups."

**Findings:** The authors conclude that "metabolically healthy obesity" exists in name only. "These findings show that metabolically healthy obesity is not a harmless condition," they write, "and that the obese phenotype, regardless of metabolic abnormalities, can adversely affect renal function."

## Cardiac Natriuretic Peptides Related to Obesity, Diabetes



Adipose tissue

**A** new study recently published in *Obesity* has revealed an important relationship between proteins secreted by the heart and obesity, glucose intolerance, and insulin resistance. The findings offer a new approach to treating metabolic disorders, including type 2 diabetes (T2D), by targeting the pathway that controls the proteins' concentration in the blood.

“Our results illustrate how the regulation of cardiac natriuretic peptides (NPs) is altered in obesity, insulin resistance, and type 2 diabetes,” says study co-author Sheila Collins, PhD, a professor in the Diabetes and Obesity Research Center at Sanford Burnham Prebys (SBP) Medical Discovery Institute. “When we examined fat [adipose] tissue from patients with these metabolic conditions, we found higher levels of the receptor that clears NPs from circulation, suggesting that if we can boost NP levels and/or reduce the level of its clearance receptor, we may be able to correct some of these conditions.”

“We examined levels of NPRA and NPRC in adipose and skeletal tissue in individuals with a range of body mass index (BMI) values and insulin sensitivity,” says study co-author Richard Pratley, MD, director of the Florida Hospital Diabetes Institute and senior scientist at the Florida Hospital-SBP Translational Research Institute (TRI) for Metabolism and Diabetes. “We found that higher BMI values are associated with elevated levels of the clearance receptor in adipose tissue.

The researchers also looked at NP receptor levels in patients with T2D after taking pioglitazone and found that those patients had a significant reduction in the level of the clearance receptor in adipose tissue, further reinforcing the link between NPs, insulin resistance, and obesity.

**Findings:** Collins and her team conclude that decreased adipose tissue NPRR is associated with obesity, glucose intolerance, and insulin resistance. “Overall, our results suggest that drugs that target the pathway(s) that lead to increased NP levels may be a new way to treat metabolic disorders, including obesity, insulin resistance, and potentially type 2 diabetes,” says Collins. “Since we already have access to FDA-approved drugs to control blood sugar, and we know that these drugs impact NP levels, we may be able to redesign these drugs to specifically target other metabolic conditions including obesity. <sup>EN</sup>”



# Snooze ALARM

BY DEREK BAGLEY

Not getting a good night's sleep can do more harm than simply making you yawn during morning meetings. More and more research shows that a lack of sleep can lead to a number of potentially hazardous endocrine disorders.

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In February, the Centers for Disease Control and Prevention (CDC) released a study that concluded that **more than one-third of Americans (83.6 million adults) don't get the recommended seven hours of sleep in a 24-hour period.** A staggering number, but not all that surprising, given today's ultra-fast, plugged-in society.

**I**t's also no coincidence that the CDC's recently reported numbers on the lack of sleep correlate with the ever-rising numbers of obesity and diabetes. More than 29 million Americans have diabetes, and 35.1% of American adults are obese, according to the Endocrine Society's Endocrine Facts and Figures report. And there are many culprits on which to pin these parallel phenomena — odd work/life schedules, the light from the mobile phone on the bedside table, or simply a lack of understanding of the importance of sleep.

"I think that we as a modern 24/7 society undervalue sleep," says Peter Liu, MD, PhD, of Los Angeles Biomedical Research Institute at Harbor-UCLA Medical Center in Torrance, Calif., "because we don't really understand how important sleep really is for our overall well-being. We all know, for example, that if you don't get enough sleep, that you might be grumpy, it might affect your mood, maybe you make a few more mistakes. But we don't realize that not getting enough actually harms your metabolic health."

And although there is a lot of longitudinal and epidemiological data linking reduced sleep to the future development of both obesity and diabetes (as well as a host of other adverse health effects, from high blood pressure to frequent mental distress), analyzing just how sleep affects the endocrine system is a relatively new field of study. Researchers are looking more and more beyond the usual suspects behind obesity and diabetes — sedentary lifestyle and poor diet — to sleep quality, and even how external and environmental factors affect sleep quality.

The CDC's report also concluded that clinicians should engage in discussions of sleep health with their patients, so here we'll take a look at some of the work being done in this realm, as well as some recommendations for better sleep that hopefully lead to better metabolic health outcomes.

There are many culprits on which to pin these parallel phenomena — odd work/life schedules, the light from the tv in the bedroom, or simply a lack of understanding of the importance of sleep.



“ We all know, for example, that if you don't get enough sleep, that you might be grumpy, it might affect your mood, maybe you make a few more mistakes. **But we don't realize that not getting enough actually harms your metabolic health.**”

— PETER LIU, MD, PHD, LOS ANGELES BIOMEDICAL RESEARCH INSTITUTE AT HARBOR-UCLA MEDICAL CENTER, TORRANCE, CALIF.

## Social Jetlag

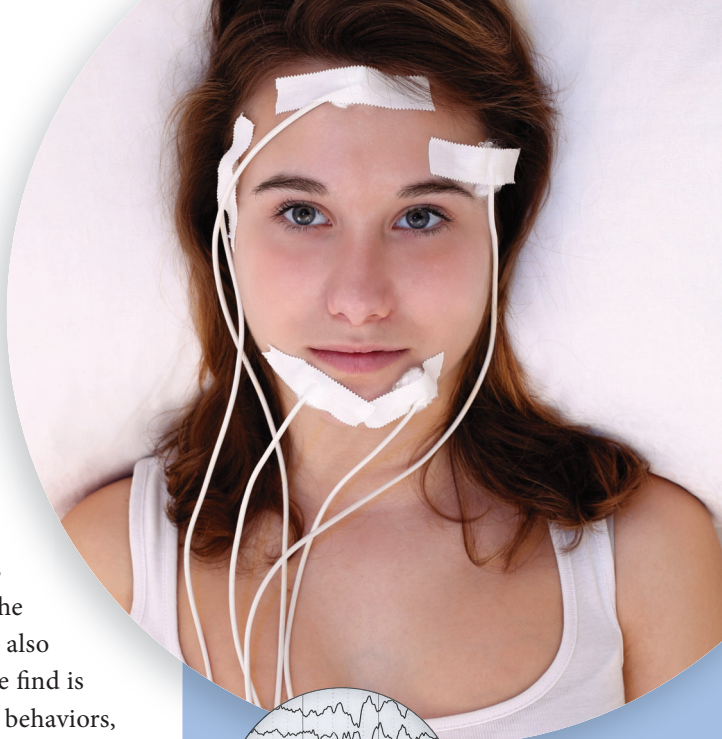
Researchers who study sleep's effects on the endocrine system also examine people's circadian rhythms, mainly what disrupts these natural oscillations between bedtime and peak alertness. Each person has a preferred wake-sleep time and recognizes specific times of day that he or she feels more alert to do work. This subjective preference is known as a person's chronotype (e.g., morning people versus night owls) and is thought to represent individual differences in circadian rhythms.

According to a study published in *The Journal of Clinical Endocrinology & Metabolism*, “Evening types are also more likely to be depressed, overweight, diabetic, and hypertensive, in comparison to morning types.” The study, led by Patricia Wong, MS, of the University of Pittsburgh, looks at “social jetlag” — habitual discrepancies between people's endogenous circadian rhythm and actual sleep times imposed by social obligations — and its effects on metabolic health.

“I was intrigued by the amount of literature showing that night and shift workers are at an increased risk for diabetes and cardiovascular disease,” Wong says. “Recently, there have been accumulating findings that when you disrupt people's circadian rhythms acutely there are physiological changes that, if prolonged, could contribute to disease.”

She says that a 2012 study by Ronneberg, et al., linking a self-reported measure of social jetlag to BMI in a large population influenced her interest in expanding the literature and to ask: Does habitual social jetlag, experienced in the community by daytime working adults, associate with cardiometabolic factors?





Wong and her team found that social jetlag does indeed associate with cardiometabolic factors; participants in the study who had the biggest discrepancies between their workday sleep schedules and their free-day sleep schedules had poorer cholesterol profiles, higher fasting insulin levels, larger waist circumference, higher body mass index, and were more resistant to insulin than those who had less social jetlag.

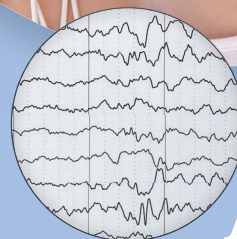
Even controlling for unhealthy habits like alcohol consumption and smoking didn't change what they observed in social jetlag. "We included these measures to try and control for other health behaviors that we know increase disease risk. We wanted to keep in mind the possibility that someone who experiences a lot of social jetlag might also engage in different or worse health behaviors," Wong says. "What we find is that after statistically controlling for individual differences in these behaviors, social jetlag still associates with the outcomes and so we interpret this to mean that there is a specific effect of social jetlag on our health that is not explained by other known risk factors."

## Night Light

And it's not just societal pressures that could be disrupting circadian rhythms; it could be a product of modern society itself, a rather ubiquitous and seemingly innocuous one: artificial light. Laura K. Fonken, PhD, of the University of Colorado, and her team published research in *Endocrine Reviews* that examined nighttime exposure to artificial light — the blue glow of the TV in bedrooms at night, streetlights peeking through windows — and how it disrupts circadian rhythms, which, again, has been implicated in contributing to the rise in obesity and diabetes rates.

"We originally came across this phenomenon serendipitously," Fonken says. "We were actually investigating how lighting environment can affect mood-related behaviors and noticed that the mice exposed to light at night were gaining more weight." She says they looked back at previous research and noted the substantial evidence that both sleep and circadian disruption are associated with metabolic disturbances, and therefore decided to pursue the correlation of increased exposure to light at night and rising numbers of obesity and metabolic disorders.

It turns out that exposure to artificial light at night creates a kind of domino effect: Light reduces sleep quality that throws off circadian regulation that throws off metabolic regulation. "What we try to highlight in the article is the reciprocal relationship between sleep loss, circadian disruption, and endocrine disturbances," Fonken says. "Light at night has the potential to affect all of these processes, and these factors can in turn lead to weight gain."



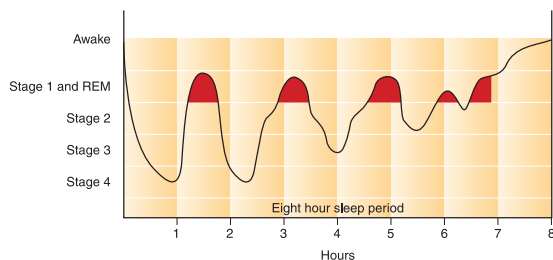
## AT A GLANCE

- ▶ People are getting less and less sleep, which correlates with the rising numbers of obesity and diabetes.
- ▶ A number of factors lead to sleeping less, from social jetlag — discrepancies between natural circadian rhythms and actual sleep times — to excessive nighttime light exposure.
- ▶ Researchers are looking at a number of ways to help people get longer and better sleep, from apps to different light fixtures to simply planning to sleep well just as you'd plan to go to the gym.



“Recently, there have been accumulating findings that when you disrupt people’s circadian rhythms acutely **there are physiological changes that, if prolonged, could contribute to disease.**”

— PATRICIA WONG, MS,  
UNIVERSITY OF PITTSBURGH, PA.



## “Catch-Up” Sleep

Most of the previous studies in this field look at what happens when you disrupt a normal sleeper’s circadian rhythm in a laboratory. But what about people whose circadian rhythms and sleep patterns are chronically erratic? Liu says that before his study that examined the effects of “catch-up sleep” on the weekends — published in *Clinical Endocrinology* — researchers recruited normal, healthy individuals who self-reported getting enough sleep and having normal bed times.

“What we did for the first time was we purposefully recruited individuals who self-reported not getting enough sleep,” Liu says. “They reported they didn’t get enough sleep Monday to Friday, and then on the weekend they caught up on their sleep. And the idea for the study came to me, because I am unfortunately one of these people.”

Liu says he and his team wanted to examine the effects of extended sleep and how it would affect insulin resistance, since past studies had shown that when a healthy individual’s sleep is restricted, his or her insulin sensitivity declines. They found that the participants who don’t get enough sleep during the week were able to improve their insulin sensitivity when they caught up on their sleep over three nights (simulating a weekend).

What’s more, the participants were able to sleep 10 hours each night in the laboratory, something they were unable to do over weekends at home, which made the authors note the possibility that their habitual attempts at “catch-up” sleep were suboptimal. “So that means that every one of us, even though we might get nine hours, maybe we need that extra hour, or an extra couple of hours,” Liu says.

## Wake-Up Call

When *NBC Nightly News* reported on the CDC’s study and its conclusion that we need to find ways to get better sleep, anchor Lester Holt editorialized, “That may be easier said than done.” Researchers who study sleep’s effects on the endocrine system have ideas and recommendations for getting better sleep, but they warn that more research needs to be done before they can offer definitive answers.

Wong, for instance, is careful to say that correlation does not equal causation, and that she and her team can’t say for certain “what is causing what.” Other studies have suggested eating at later times could contribute to weight gain, and thus individuals with social jetlag could presumably be eating at later

times and that this itself could contribute to some of the findings they observed. “We did not have data on what times people ate,” she says, “and so that is why we could not consider this possibility in our analyses.”

She says that one way to potentially test for whether social jetlag is causing the health effects is to conduct longitudinal analyses and see, if over time, social jetlag predicts more risk for the onset of diabetes or cardiovascular disease. Another method is to experimentally test whether inducing social jetlag in people will change their physiological measures compared to when they don't have social jetlag.

“I think that if more studies come out and replicate what we find,” Wong says, “we should start considering whether individuals can be protected from disease risk if they were able to work/sleep at times more ideally fit with their underlying biological rhythm.”

## Sweet Dreams

In their review, Fonken and her team point to a number of ways to prevent exposure to excessive nighttime light, such as blackout curtains or simply removing televisions and computers from bedrooms. They note that solutions are more difficult for shift workers and their employers, but they also write that there is ongoing research into blocking the blue light of the spectrum (to which our eyes are most sensitive) with specially designed goggles and light fixtures.

“That is a major issue with developing a solution for people adversely affected by nighttime light exposure,” Fonken says. “Overall, electrical lighting has benefited society in many ways; we don't mean to give the impression that we think nighttime light exposure is all bad. Trying to avoid the negative consequences of light at night can be challenging because the negatives need to be balanced with the positive effects of using electric lights.”

She goes on to say that public interest in circadian disruption seems to be growing. People are using the app f.lux — which adapts your computer screen to the time of day — as well as lamps designed to limit circadian desynchrony.

“Coming up with better lighting designs for facilities with a lot of shift workers could be a potential strategy to improve some of the negative effects of nighttime light exposure,” Fonken says.

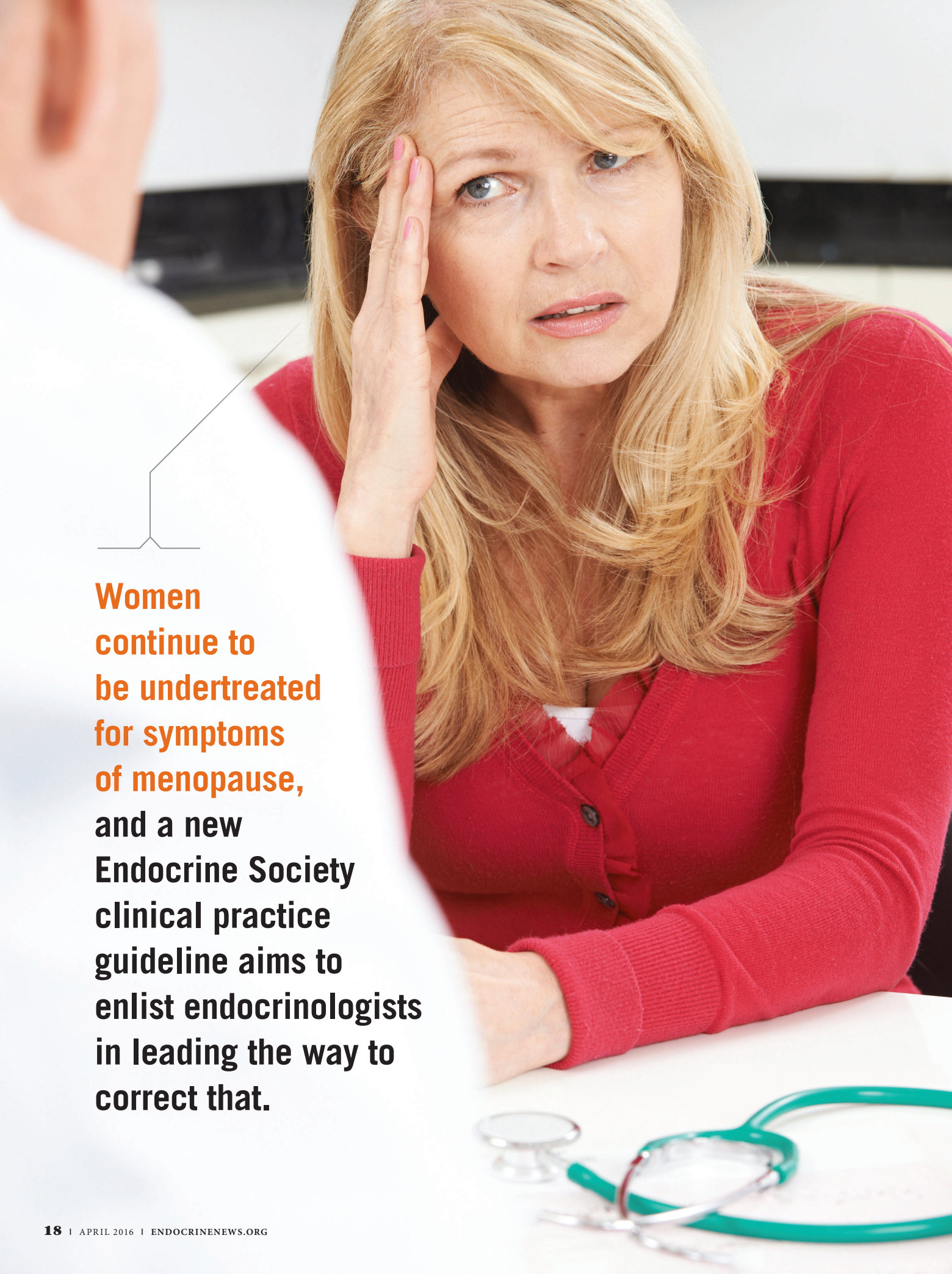
For Liu, even though his team's study concluded that catch-up sleep improved insulin sensitivity, that doesn't mean people shouldn't try to sleep well every night. “I think a good analogy would be eating well,” Liu says. “As a doctor, I tell people to eat well all the time. I don't say to them, ‘Look, if you eat well on the weekends, then during weekdays Monday to Friday, you can go and eat whatever junk food you like.’”

He stresses that people should plan to get a good night's sleep, just as someone would plan to eat a healthy meal or go to the gym that day. For now, Liu and his team are looking at the specific hormonal mechanisms by which sleep restriction causes insulin resistance as well as other metabolic and behavioral abnormalities, since, as he says, this provides the evidential basis to convince the scientific community and convince the lay community that sleep has these adverse effects.

Liu says that they're also recognizing more and more that one reason people don't sleep as well as they should is because they can't disengage from technology. “I don't know about you,” Liu says, “but the first thing I did this morning when I woke up was I switched on my phone and I checked my email, even before I got out of bed. The last thing I did before I went to bed last night was I was on the computer checking email and doing work. We as a society need to learn how to switch off and disengage from technology.” <sup>EN</sup>



BAGLEY IS THE ASSOCIATE EDITOR OF *ENDOCRINE NEWS*. HE WROTE ABOUT THE EARLY CAREER FORUM AT **ENDO 2016** IN THE MARCH ISSUE.



**Women  
continue to  
be undertreated  
for symptoms  
of menopause,  
and a new  
Endocrine Society  
clinical practice  
guideline aims to  
enlist endocrinologists  
in leading the way to  
correct that.**

# Correct CHANGE

BY ERIC SEABORG



*This practice guideline culls an enormous body of research to facilitate personalized decision making, incorporating the patient's risk factor status and treatment preferences.*

**H**ormone therapy remains the most effective treatment for the vasomotor and other symptoms of menopause, an expert panel from the Endocrine Society and allied organizations concludes in a new clinical practice guideline.

Many clinicians still seem hesitant to prescribe menopausal hormone therapy (MHT), so endocrinologists need to lead the way in ensuring that women get the treatment they need, says Cynthia A. Stuenkel, MD, clinical professor of medicine at the University of California, San Diego School of Medicine and chair of the task force that wrote the guideline, "Treatment of Symptoms of the Menopause."

A 2012 Endocrine Society survey found that 72% of women experiencing menopausal symptoms were not receiving any treatment for them, a huge shortfall considering that essentially every woman who lives long enough will pass through this phase.

The treatment was common before the initial findings of the Women's Health Initiative scared many women and physicians off the treatment. In the 13 years since then, a great deal of evidence has confirmed that MHT offers a safe option for many women to alleviate symptoms such as hot flashes, night sweats, vaginal dryness, and pain on intercourse. And there are also many alternatives for specific situations, Stuenkel says.



# HOT FLASHES AHEAD



## AT A GLANCE

- ▶ **Menopausal hormone therapy is the most effective treatment for the vasomotor and other symptoms of menopause, but many clinicians seem to be hesitant to use it.**
- ▶ **Every woman's situation is unique, and there are many therapy options, so treatment plans must be tailored carefully to the individual.**
- ▶ **Nonhormonal treatments may meet the needs of women whose risk profiles — or personal preferences — contraindicate hormone use.**

## Why Endocrinologists?

“As endocrinologists we bring a very broad and unique view to the specific conditions associated with midlife and the menopause,” Stuenkel says. “It is difficult to make broad blanket recommendations because women are incredibly different in the degree of their symptoms, in their sense of what they are willing to take to relieve these symptoms, and in their other associated health concerns, so the guideline really focuses on trying to customize their therapy.”

“It’s good news that women now have more options for managing menopausal symptoms, but deciding among the expanded array of hormonal and nonhormonal treatments can be overwhelming for women and clinicians alike,” says JoAnn Manson, MD, DrPH, a professor at Harvard Medical School and chief of the Division of Preventive Medicine at Brigham and Women’s Hospital in Boston, who was not on the committee that wrote the guideline but did review it. “This practice guideline culls an enormous body of research to facilitate personalized decision making, incorporating the patient’s risk factor status and treatment preferences.”

The guideline is designed to provide the tools for this individualized approach, describing the evidence needed to help clinicians answer questions such as when hormone therapy is appropriate and what other treatments are available when it is not. The guideline committee tried to be comprehensive enough to provide recommendations on most situations the clinician will encounter and laid out the information in discrete, easy-to-find sections, Stuenkel says.

## A Portal on the Second Half of Life

Another important reason that endocrinologists should be proactive when women present for menopausal transition is the opportunity it offers as “a portal to the second half of life” and “a critical window to reassess lifestyle,” Stuenkel says. “We wanted to remind clinicians that this is a time for overall awareness of cardiovascular risk, cancer screening and risk, bone health, smoking cessation, and alcohol use. All those areas should be considered.”

## Some Specifics on Hormones

The guideline’s recommended hormone treatment is estrogen plus progestogen for patients with a uterus and estrogen alone for those without a uterus. The guideline recommends against the use of custom-compounded hormones. But clinicians should individualize the treatment based on a woman’s risk for cardiovascular disease, venous thromboembolism, and breast cancer.

The guideline panel commissioned a meta-analysis of the literature regarding the relative risk of oral versus transdermal therapies related to thrombosis and

**“ It’s good news that women now have more options for managing menopausal symptoms, but deciding among the expanded array of hormonal and nonhormonal treatments can be overwhelming for women and clinicians alike.”**

— JOANN MANSON, MD, DRPH, PROFESSOR, HARVARD MEDICAL SCHOOL; CHIEF, DIVISION OF PREVENTIVE MEDICINE, BRIGHAM AND WOMEN’S HOSPITAL, BOSTON

Transdermal versus oral hormone treatment



stroke. The risk appeared higher with oral therapy, although the conclusion was based primarily on observational studies, Stuenkel says. For this reason, the guideline recommends transdermal delivery for women who are at moderate cardiovascular risk or increased risk of venous thromboembolism. The guideline favors nonhormonal treatment for women at high cardiovascular risk or intermediate or high breast cancer risk.

There continues to be no definitive answer to the question of how long to continue MHT. “We suggest that the decision to continue MHT be revisited at least annually, targeting the shortest total duration of MHT consistent with the treatment goals and evolving risk assessments of the individual women,” the guideline says. Similar to other guidelines, it implies that five years could be sufficient for most patients and could be continued beyond that only in special cases, such as patients with a high fracture risk who prefer MHT over other, bone-specific medications and patients whose symptoms remain so intolerable during a trial of stopping that they elect to continue after weighing the risks.

## Nonhormonal Treatments

The guideline contains a separate section for patients who have moderate-to-severe vasomotor symptoms but should be steered away from hormonal treatment based on risk factors or who shy away because of personal preferences, Stuenkel says. For these patients, the guideline recommends selective serotonin reuptake inhibitors/serotonin-norepinephrine reuptake inhibitors, gabapentin, or pregabalin (although contraindications should be considered). If these do not work, clonidine can be considered, but it has a poor side-effect profile.

The guideline recommends counseling women on the lack of evidence supporting the effectiveness of over-the-counter and complementary medicine therapies such as botanicals, black cohosh, omega-3 fatty acids, vitamin E, and more.

“For postmenopausal women with mild or less bothersome hot flashes, we suggest a series of steps that do not involve medication, such as turning down the thermostat, dressing in layers, avoiding alcohol and spicy foods, and reducing obesity and stress,” the guideline notes.

# ON POINT FROM THE ENDOCRINE SOCIETY

“Treatment of Symptoms of the Menopause: An Endocrine Society Clinical Practice Guideline” can be downloaded from <http://www.endocrine.org/education-and-practice-management/clinical-practice-guidelines>.

“It is difficult to make broad blanket recommendations because women are incredibly different in the degree of their symptoms, in their sense of what they are willing to take to relieve these symptoms, and in their other associated health concerns, so the guideline really focuses on trying to customize their therapy.”

— CYNTHIA A. STUENKEL, MD, CLINICAL PROFESSOR OF MEDICINE, UNIVERSITY OF CALIFORNIA, SAN DIEGO SCHOOL OF MEDICINE; CHAIR, “TREATMENT OF SYMPTOMS OF THE MENOPAUSE” TASK FORCE



## Genitourinary Symptom Relief

The guideline also has a separate section on treatment of genitourinary symptoms. It recommends or describes the conditions for use of: vaginal moisturizers for patients with vulvovaginal atrophy (VVA); the use of low-dose vaginal estrogen for VVA when moisturizers are insufficient; vaginal lubricants for insufficient vaginal secretions for comfortable sexual activity; and ospemifene for moderate to severe dyspareunia associated with vaginal atrophy (and the contraindications to consider).

## But Not for Prevention


Hormones are appropriate for treating symptoms, but “current evidence does not justify the use of MHT to prevent coronary heart disease, breast cancer, or dementia,” the guideline says.

“Twenty years ago we were encouraging women to take MHT for prevention,” Stuenkel says. This use had been growing through the 1980s and 1990s but was brought to a screeching halt by the initial findings of the Women’s Health Initiative.

To shed light on this issue, the guideline panel commissioned a second meta-analysis to examine whether MHT confers any mortality benefit. “This meta-analysis did not find a mortality benefit, although there are some reports that indicate there may be one, particularly in young, healthy women starting MHT close in time to menopause. This remains an area of some controversy,” Stuenkel says.

“The FDA has stated that hormone therapy can be effective for preventing bone loss associated with menopause,” Stuenkel says. But the questions of whether there is a cardiovascular or cognitive benefit “are still hotly debated, and in my view inconclusive.”

The guideline was an international effort that included the participation of the Australasian Menopause Society, British Menopause Society, European Menopause and Andropause Society, European Society of Endocrinology, and International Menopause Society. “This was really an international writing group, and we tried to make this global. We cover all the options, a number of which are not available in the U.S.,” so international readers can benefit, too, Stuenkel says.

“But our main goal was to re-enlist endocrinologists in giving the green light to use MHT in appropriate women,” she says. 

SEABORG IS A FREELANCE WRITER BASED IN CHARLOTTESVILLE, VA. HE WROTE ABOUT THE EPIGENETIC EFFECTS OF OBESITY IN THE MARCH ISSUE.



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# Gender BIAS

BY DEREK BAGLEY

A new study shows that endocrinology will become a female-dominant specialty in a few short years. Rather than reflecting heightened interest among women, it actually shows that men are choosing other options. What does this mean for the future of endocrinology?

## The top study listed on the cover of the January issue of *The Journal of Clinical Endocrinology & Metabolism* is titled “Female Physicians and the Future of Endocrinology.” The article concludes, among other things, that the subspecialty of endocrinology will soon be predominantly female.

**A**t first blush, this can read like good news; after all, STEM (science, technology, engineering, and math) fields have historically had trouble attracting women, and this study points out that nearly half of medical school graduates are now female and, in 2013, endocrinology fellows were 72% female.

If the trend continues, women will be the face of endocrinology over the next several decades. However, rather than being some sort of win for gender equality, this trend parallels and further predicts the projected shortage of endocrinologists overall.

“It’s a common misconception that endocrinology is attracting more women,” says Elaine Pelley, MD, director of Preclinical Medical Education at the University of Wisconsin School of Medicine and Public Health, Madison, and lead author of this study. “If this were true, I think it would be a less concerning pattern. The problem is that applications to endocrinology fellowships are down from both genders; the decline in male applicants is just much more dramatic, leaving a higher proportion — not number — of female applicants.”

Pelley says she noticed that for three years in a row all of their program’s fellows were women, which prompted her to explore the gender trends in endocrinology. “I was familiar with some of the work showing gender bias in medicine but saw that it was mostly explored via the lens of how the careers of female physicians were impacted,” she says. “I was curious how gender bias, if women were concentrated in a specialty, could impact that specialty as a whole.”

### “Too Much Estrogen”

The decline in interest in endocrinology is occurring while numbers of diabetes and obesity cases continue to rise, placing increasing demands on the remaining workforce.

If these increasing patient care demands lead to burnout and endocrinologists leaving the workforce, the problem will only worsen.

But again, men’s interest is waning more than women’s, and while there’s no clear reason for this, part of it may be the effect of gender segregation itself, according to Carolyn Becker, MD, an associate professor of medicine at Harvard Medical School and co-author of this study. “In other words, as a field becomes more and more identified as a ‘female dominant’ field,” she says, “men look around and feel less comfortable in that environment [just as women may not feel as comfortable in a ‘male predominant’ field].”

“I remember hearing male endocrine fellows joke about the presence of ‘too much estrogen’ in the fellows’ room or the need for ‘more testosterone’ in the room,” Becker continues. “But they may not really be joking, and this may reflect some real discomfort.”

Pelley and Becker also point out that endocrinology has the lowest average salary of any medical subspecialty. In fact, based on recent survey data, endocrinology training offers no salary advantage over general internal medicine, despite the two to three additional years of training required. This may help explain the gap between each gender’s interest in endocrinology; as with most things, just follow the money. “Research has shown that male internal medicine residents consider earning potential more highly than women do when selecting a subspecialty,” Pelley says. “Based on this, we would expect higher proportions of men in higher paid subspecialties and lower proportions of men in lower paid subspecialties, which is exactly what we see.”

Becker agrees that this could be the main reason men are abandoning endocrinology in greater numbers than women, since men tend to rank status and salary higher than women do in terms of choosing a career. “This is of

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The problem is that applications to endocrinology fellowships are down from both genders; the decline in male applicants is just much more dramatic, leaving a higher proportion—not number—of female applicants.”



— ELAINE PELLEY, MD, DIRECTOR, PRECLINICAL MEDICAL EDUCATION, UNIVERSITY OF WISCONSIN SCHOOL OF MEDICINE AND PUBLIC HEALTH, MADISON

course a very gross generalization,” she says, “but surveys have shown that men rank these job characteristics higher than women do.”

The gender wage gap in endocrinology disadvantages women (female endocrinologists earn \$38,000–\$66,000 less than males, depending on practice type) and, if the majority of endocrinologists are women, that would therefore bring down median salaries for the specialty, potentially impacting the income of both genders. Social science research confirms that workers in female-predominant occupations earn less than male-predominant occupations of similar skill level, so male endocrinologists may also earn less as the specialty becomes female-predominant. “Because male residents disproportionately select to train in specialties with higher salaries,” the study authors write, “this can create a vicious cycle. As fewer males enter the specialty, endocrinology will become more female-predominant, enhancing the effect of occupational gender segregation on salaries and further deterring male residents from choosing the specialty.”

## Mothers versus Fathers

Medicine, of course, has historically been a “men’s club.” Women are underrepresented in leadership roles and report being less satisfied with mentorship than their male counterparts. This underrepresentation of women in academic leadership could mean a lesser voice for endocrinology as a whole, according to the authors of “Female Physicians and the Future of Endocrinology.” If leaders in academic medicine continue to be drawn primarily from the male faculty pool, the likelihood of an endocrinologist in leadership will shrink as the number of males in the field decreases.

“We used to think the dearth of women in leadership roles was a ‘pipeline problem,’” Becker says, “that there simply weren’t enough qualified women to fill the pipeline and rise to leadership roles. That is no longer the case. Nevertheless, we see relatively few women heading endocrine divisions, departments of medicine, hospitals, or medical schools. So long as there is institutional, structural, and at times, personal discrimination against women, endocrinology as a ‘female-dominant’ discipline may suffer and lose influence within major academic institutions.”

Those women who do pursue endocrinology may be doing so because it affords them some flexibility in career choices and lifestyle, as well as the chance to work in women’s health spheres (many endocrine disorders affect women more than men), but they’re having a harder time climbing the proverbial ladder to leadership roles. Female physicians carry a much higher household and childcare workload than male physicians; on average, they work fewer hours than their male counterparts but perform more domestic activities. “This likely impacts the early career trajectory of many female physicians,” Pelley says. “We live in an age where it is common to hear, ‘He’s a great dad — he really helps out with the kids and around the house.’ And yet, describing a female as a great mother because she ‘helps out with the kids’ still sounds absurd.”

What’s more, female physicians get hit with what Pelley and her team call “The Motherhood Penalty,” which hurts their chances to advance. Women training in medicine and trying to establish a career are often at the age when most women start having children and raising a family. “Survey results show that female physicians delay childbearing by seven years compared with the general population and also face increased rates of infertility,” the authors write.

“Research has shown that fictional job applicants — who are otherwise equivalent — are viewed (by evaluators of both genders) as less committed, less competent, and less likely to be candidates for promotion when they are noted to be mothers than when they are childless,” Pelley says.


Suggested starting salaries are lower for fictional “mothers” than for “fathers.” “Fathers” are deemed more committed than childless males and their suggested salaries are higher. “Clearly, the impact of parenthood on a worker’s perceived value differs by gender,” Pelley says. “If the majority of endocrinologists are women — and the majority of those are mothers — this cultural bias could hinder their advancement into leadership roles.”

## Best & Brightest

In closing “Female Physicians and the Future of Endocrinology,” the authors write that this transition of endocrinology to a female-predominant subspecialty presents great challenges, as well as enormous opportunities. Chief among these challenges is the predicted increasing deficit of endocrinologists, especially as the prevalence of endocrine disorders like diabetes and obesity continues to climb. “This means that the shift to female predominance — and all of its concerning ramifications — will occur in the setting of an increasing endocrinology workforce shortage,” Pelley says.

As for opportunities, Becker says that she would like to see the Endocrine Society take this on as a major initiative — attracting more men to the field, while at the same time addressing the systemic and personal issues that hold women back from academic promotion and leadership. “We need to expand our mentoring and support for all trainees but particularly for women who have fewer role models and may not see a way forward in academia.”

However, this doesn’t mean just opening more training slots, especially if those slots go unfilled. “We need to ensure we have a thriving workforce that will attract top talent of both genders to its ranks,” Pelley says. “Since it appears this workforce will be predominantly female, advocating for change that fosters the success of female physicians will be key to achieving these goals — and, therefore, to meeting the needs of patients now and into the future.”

Becker says that she hopes others find their study not only enlightening but a call to action. “Individually, we need to work to attract the best and brightest to our field, irrespective of gender,” she says. “As a Society, we need to support changes in practice and academia that allow for greater work-life balance and address gender bias. I hope this paper can serve as a stimulus for these changes.” 

BAGLEY IS THE ASSOCIATE EDITOR OF *ENDOCRINE NEWS*. HE WROTE ABOUT THE EARLY CAREER FORUM HIGHLIGHTS AT ENDO 2016 IN THE MARCH ISSUE.



## AT A GLANCE

- ▶ **Endocrinology will become a “female-predominant” subspecialty over the next few decades, a trend that predicts the continued shortage of endocrinologists overall.**
- ▶ **Women endocrinologists make less money than their male counterparts and are often held back from advancing in their careers because of perceived gender roles, which hurts the field of endocrinology overall.**
- ▶ **This trend presents many challenges and opportunities, and we need to find ways to attract talented physicians to endocrinology, regardless of gender.**

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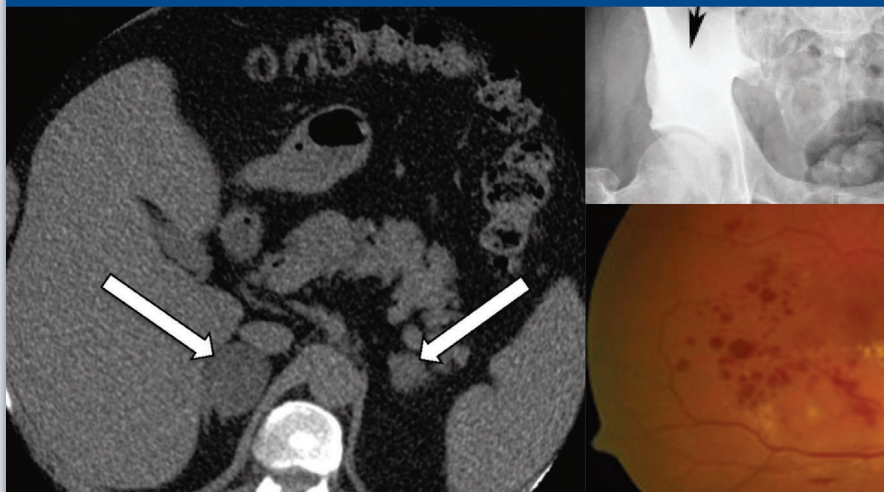
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# A Fresh Approach:

BY LEE D. ROBERTS BSC, PHD, RHONDA BENTLEY-LEWIS, MD, MBA, MMSC, AND JANE J. KIM, MD, AND KUMAR SHARMA, MD

A multi-faceted look at the “new” science of metabolomics and its use in studying and treating diabetes.



**M**etabolomics, a relatively new field of “omics” science, provides an overview of the metabolic status and biochemical events that occur within a biological system. Previous metabolomic studies in diabetes have implicated specific clusters of metabolites, particularly among the branched-chain and aromatic amino acids in the pathogenesis of type 2 diabetes.

In addition, investigations have examined the role metabolomics may play in the identification and pathophysiology of gestational diabetes mellitus. These findings point to perturbations in normal metabolism and allow the potential identification of novel pathways in the development of diabetes, thereby enriching our understanding of metabolic syndromes.

In this Tri-Point article, a basic researcher will review recent advances in the understanding of the impact of environmental and lifestyle factors on type 2 diabetes, made using metabolomics; a clinical researcher will provide an overview of the use of metabolomic technologies in predicting and identifying clinically useful biomarkers in diabetes; and two clinical practitioners will discuss the implications of this emerging technology on clinical practice.

## A Basic Researcher's Perspective

— LEE D. ROBERTS BSC, PHD



**Lee D. Roberts, BSc, PhD,** Elsie Widdowson Fellow, Medical Research Council – Human Nutrition Research, University of Cambridge, UK

### HIGHLIGHTS

Perturbations in the concentrations of metabolites provide information on genomic regulation and environmental factors contributing to the development of diabetes.

Metabolomics has uncovered novel associations between metabolites, metabolic regulation, lifestyle factors such as diet and activity, and the diabetic state.

As the application of metabolomics to basic diabetes research matures, it is likely the approach will identify novel therapeutic targets.

The metabolome consists of all the low-molecular-weight molecules (metabolites) within a biological system, incorporating information from the genome, transcriptome, proteome, as well as the environment. The emerging field of metabolomics utilizes analytical chemistry techniques, such as mass spectrometry and nuclear magnetic resonance spectroscopy, to measure a vast range of metabolites. Type 2 diabetes is a multifactorial disease incorporating both polygenic and environmental elements. Therefore, metabolomics provides a highly pertinent tool for determining the metabolic regulatory mechanisms underlying diabetes development and elucidating contributions to disease made by the genome and the environment and how these may interact. The application of metabolomic techniques to diabetes research may lead to the discovery of novel treatments and therapeutic targets for metabolic disease.

### Metabolic Perturbations in Diabetes

Perturbations of lipid and glucose metabolism have long been associated with the pathogenesis of type 2 diabetes. However, the recent application of metabolomics to study clinical populations has revealed an orthogonal, and possibly predictive, association between branched-chain and aromatic amino acids and diabetes. Metabolomics is now proving of great worth in the elucidation of the mechanisms behind these associations. In a study comparing diets consisting of standard chow, high fat, and branched chain amino acids (BCAAs) plus high fat, Newgard and colleagues found that rats given the BCAA plus high-fat diet were equally insulin-resistant as those given high-fat diet alone, despite a lower food intake and weight gain. Metabolomic analysis identified that acylcarnitine species had accumulated in the skeletal muscle of the BCAA plus high-fat diet fed rats. This observation gave rise to the hypothesis that a rising BCAA circulating concentration increases the catabolism of the amino acids in muscle, leading to a block in tricarboxylic acid (TCA) cycle flux and build-up of incomplete oxidation products, decreasing glucose utilization and contributing to the development of insulin resistance.

### Environmental Contributions

**EXERCISE** — Beyond the study of metabolic dysregulation underpinning diabetes, metabolomics has been utilized to assess the influence of environment on disease susceptibility or resistance. Lifestyle interventions, focused on increasing exercise, demonstrate improvements in glucose homeostasis and weight loss. Mass spectrometry-

based metabolomics has revealed novel physiological signals released from exercising muscle that regulate systemic energy metabolism, with anti-diabetic effects. Metabolic profiling identified the secretion of  $\beta$ -aminoisobutyric acid (BAIBA), a BCAA catabolism product, from exercising skeletal muscle. BAIBA was found to activate fatty acid oxidation in the liver and the “browning” phenomenon in white adipose tissue, decreasing weight gain, improving glucose tolerance, reducing adiposity, and increasing energy expenditure in mice.

**DIET** — Diet has long been recognized as a modulator of type 2 diabetes risk. The application of metabolomic techniques is contributing to our understanding of the role of diets high in fat in the development of insulin resistance. For example, metabolic profiling of the skeletal muscle from rats fed a high-fat diet compared to those given standard chow identified a phenotype characterized by accumulation of acylcarnitine species, which reflect mitochondrial fatty acid  $\beta$ -oxidation and acyl-CoA metabolites. This metabolomic observation, in conjunction with additional findings within the field, has led to the postulation that high-fat feeding induces accumulation of partially oxidized fatty acid species in muscle that contribute to insulin resistance.

Conversely, metabolomics also has a role in determining how certain diets may offer protection against the development of metabolic disease. Diets rich in green leafy vegetables have been associated with a decreased risk for type 2 diabetes in multiple epidemiological studies. Recently, metabolomics was employed to characterize the effect of dietary inorganic nitrate, found in high concentrations in brassicas, on adipose tissue metabolism. This study revealed that inorganic nitrate activates the “browning” of white adipose depots, which likely contributes to the anti-diabetic effects of nitrate.

**LIFESTYLE** — The disruption of circadian rhythms, such as in night shift work, is emerging as a major risk factor for the development of type 2 diabetes. Metabolomics is uncovering novel physiological mechanisms that may link our “body clocks” to energy homeostasis. Using metabolic profiling, Liu and colleagues identified a phospholipid species secreted from the liver of mice during the dark phase of the circadian cycle. This phospholipid species was found to upregulate fatty acid catabolism in muscle and improve the metabolic phenotype of the db/db mouse model of diabetes. Importantly a high-fat diet was found to disrupt the



rhythmic secretion of this phospholipid signal, with significant inferences for dietary choices of night shift workers.

### Summary

Metabolomics has been applied to fundamental research questions across a plethora of metabolic and endocrine studies and is proving to be a highly relevant tool to identify novel metabolic associations with disease. As the approach continues to mature, the insight metabolomics will provide into the many factors that contribute to the development of type 2 diabetes, including key metabolic regulation and environmental pressures, will likely be substantial.



## A Clinical Researcher's Perspective

— RHONDA BENTLEY-LEWIS, MD, MBA, MMSC

### Metabolomic Study of Disease

Through the study of metabolic by-products and the use of advanced analytical technologies, metabolomics has the potential for a wide range of scientific applications. Clinically, metabolomics has been applied in the examination of several metabolic disorders, including hypertension and cardiovascular disease. However, the use of metabolomics is particularly compelling in the study of diabetes because the disease's combined genetic and environmental etiology involves numerous metabolites and metabolic processes that have not been fully elucidated. Moreover, while the current prevalence of diabetes in the U.S. is 9.8%, the prevalence of pre-diabetes is estimated to be 35.3%. Therefore, metabolomics could significantly limit the development of type 2 diabetes by detecting metabolites and metabolic pathways responsible for the progression to type 2 diabetes among high-risk individuals.

### Use of Metabolomic Profiling to Identify Drug Targeting Efficacy

Early studies utilized metabolomic profiling in order to examine the pharmacological effects of drugs used to treat type 2 diabetes. For example, the metabolite profiles of patients with type 2 diabetes undergoing treatment were compared to the metabolite profiles of patients in control groups. In one study, van Doorn, et al., examined rosiglitazone, a drug used to treat type 2 diabetes, and its effect on patients with type 2 diabetes treated over the course of eight weeks. Compared to patients in the control group, treated patients expressed a rapid decrease in urinary hippurate and aromatic amino acid levels in addition to an increase in plasma BCAAs and other amino acids. Similarly, a study

by Huo, et al., found that metformin hydrochloride increased amine oxide, beta hydroxy acid, and tryptophan levels along with decreased glucose and related metabolite levels. Other studies have since expanded upon metabolomic and drug-targeting research, examining drugs such as atenolol, metformin and glipizide, and fenofibrate and niacin.

### Use of Metabolomic Profiling to Identify Biomarkers in Diabetes

Metabolomic profiling in clinical research expanded beyond drug development to examine several biochemical pathways implicated in type 2 diabetes and pre-diabetes, thereby promoting the identification of biomarkers of disease risk. For instance, Newgard, et al., employed metabolomics to examine the pathogenesis of type 2 diabetes. The investigation conducted metabolomic profiling of 73 obese and 67 lean individuals with metabolites including fasting blood glucose, free fatty acids, and amino acids. The most notable difference between the two groups was an increased level of branched-chain amino acids (BCAAs) among obese participants, suggesting a potential contribution of BCAAs to the development of obesity-related disorders such as glucose intolerance and insulin resistance. With the evidence obtained from animal studies, Newgard, et al., concluded that high BCAA levels led to the activation of a metabolic pathway contributing to insulin resistance and increased BCAA catabolism produced metabolites implicated in glucose intolerance.

Wang, et al., expanded upon these findings in a study of 2,422 individuals followed for 12 years for the development of diabetes. The study identified five BCAAs significantly



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### HIGHLIGHTS

The study of metabolomics investigates metabolic by-products of cellular processes to elucidate essential physiological pathways.

Metabolomic applications have included the identification of metabolites indicative of increased type 2 diabetes risk and the metabolic effects of drugs used to treat the disease.

Metabolomics has the potential to inform identification of biomarkers for disease risk stratification and novel pharmacotherapeutic interventions.

“ Through the study of metabolic by-products and the use of advanced analytical technologies, metabolomics has the potential for a wide range of scientific applications.”



associated with future diabetes: isoleucine, leucine, valine, tyrosine, and phenylalanine. A combination of only three of these amino acids could predict disease development, with individuals in the top quartile facing more than a fivefold higher risk. A subsequent study by this group examined participants from the Framingham Heart Study, an ongoing longitudinal study currently on its third generation of participants. A product of amino acid degradation, 2-amino adipic acid (2-AAA), was identified as a biomarker for diabetes risk as patients in the top quartile of plasma 2-AAA concentration were four times more likely to develop diabetes than those in the lowest quartile. Again, animal studies provided supportive evidence revealing that 2-AAA levels were associated with high-fat diets and had a reducing effect on blood glucose levels.

More recently, Padberg, et al., found that glyoxylate, a metabolite involved in the conversion of lipids to carbohydrates, existed in higher concentrations among study participants more likely to develop diabetes in the future. Glyoxylate levels were also significantly higher among a subgroup of subjects, indicating potential detection for clinical subgroups among patients diagnosed with diabetes. Nikiforova, et al., extended Padberg's findings in a retrospective study of plasma samples gathered from 243 subjects categorized according to diabetes status. Samples collected up to six years prior to the subject's diabetes diagnosis revealed that while both glyoxylate and glucose levels were elevated, the increase in glyoxylate levels developed earlier. Consequently, glyoxylate also serves as a putative biomarker for diabetes.

### Use of Metabolomic Profiling to Identify Biomarkers in Pre-Diabetes

Metabolomics has also been used to identify biomarkers in populations with pre-diabetes. Menni, et al., identified 14 metabolites associated with impaired fasting glucose, in addition to 42 metabolites associated with type 2 diabetes. Wang-Sattler, et al., examined three other metabolites, glycine, lysophosphatidylcholine, and acetylcarnitine, found in significantly different levels among patients with impaired glucose tolerance. Glycine and lysophosphatidylcholine also served as predictors of type 2 diabetes. Metabolomic profiling has been used to facilitate early gestational diabetes (GDM) diagnosis as well as improve fetal and maternal health outcomes

in pregnancies complicated by GDM. A systematic review of these studies identified several metabolite groups, including BCAAs, aromatic amino acids, sulfur-containing amino acids, asymmetric dimethylarginine, and nonesterified fatty acids.

Metabolomic research specific to GDM could also potentially identify individuals at increased risk for subsequent type 2 diabetes. In a study conducted by Anderson, et al., phospholipid, acylcarnitine, short- and long-chain fatty acid, and diglyceride concentrations differed significantly between women with histories of GDM or gestational dysglycemia who were at risk for type 2 diabetes compared with women who had normal glucose tolerance during pregnancy. Furthermore, because GDM is a significant predictor of type 2 diabetes, certain metabolic markers used to predict type 2 diabetes could be similarly predictive for GDM. We have studied metabolic markers previously identified as predictive of type 2 diabetes, specifically BCAAs, in a nested case-control study of women with and without a history of GDM. Interestingly, despite the pathophysiological similarities between type 2 diabetes and GDM, we did not observe that BCAAs predictive of GDM. Other studies have examined potential markers specific to GDM with asymmetric dimethylarginine and nonesterified fatty acids being the metabolites most consistently associated with GDM. However, further research is needed to confirm these findings and elucidate possible similarities with type 2 diabetes biomarkers.

### Future implications of Metabolomic Research in Diabetes

As metabolomic research continues to shed light on the pathogenesis and treatment of diabetes, current studies in the field have the potential to inform modern preventative and therapeutic diabetes interventions. Enhanced understanding of the metabolic mechanisms underlying diabetes may serve to identify critical biochemical pathways that can be targeted by novel pharmacotherapeutic interventions. Additionally, biomarker identification will enable earlier and more accurate assessment of diabetes risk, thereby facilitating the intensification of lifestyle behavior modifications prior to disease progression. Moreover, with the incorporation of other -omic technologies, the possibilities are endless.

# Clinical Practitioners' Perspective

— JANE J. KIM, MD, AND KUMAR SHARMA, MD



In 2014, there were about 387 million individuals with diabetes worldwide. An estimated 57.9% of subjects with diagnosed diabetes are affected by one or more macro- or microvascular complications, which highlights the need for early screening markers to monitor the development and progression of disease.

Historically, most individuals affected by type 2 diabetes have been adults. However, obesity in adolescents has quadrupled in the past 30 years, and the incidence of type 2 diabetes is increasing more rapidly in adolescents and young adults than in any other age group, particularly in highly susceptible racial and ethnic groups. At present, the clinical management of diabetic children is largely based on current therapies used in adults. However, we cannot assume that the basic pathophysiology of type 2 diabetes is similar in pediatric and adult populations. Recent studies show that type 2 diabetes may have a more aggressive course in youth. For example, the destruction of pancreatic  $\beta$  cells occurs at a rate almost four times higher than in adults.

Complications such as hypertension, nephropathy, and retinopathy may appear faster in children than in adults. Moreover, it was recently shown that a much higher proportion of adolescents fail to respond to metformin when compared to adults. We need clinical biomarkers for diabetes progression that reliably identify subsets of those with type 2 diabetes at the highest risk for complications and premature death.

## Metabolomics in Type 2 Diabetes


Studies have shown that increased concentrations of circulating branched-chain amino acids (leucine, isoleucine and valine), phenylalanine, and tyrosine are positively correlated with an increased risk of type 2 diabetes and insulin resistance. This observation has been consistently shown in both cross-sectional and prospective human studies, including those of obese children and adolescents. Metabolomics-based technologies may be able to identify other biomarkers of diabetes progression prior to the development of complications in order to prevent morbidity and early death.

## Metabolomic Approaches to Predict Diabetic Kidney Disease

Patients with type 2 diabetes have essentially the same risk for cardiovascular disease and overall mortality as the general age-matched population unless they have evidence of chronic kidney disease (CKD). In adolescents with type 2 diabetes, initial signs of CKD, detected by microalbuminuria, almost tripled in a four-year period following diagnosis, rising from 6.3% to 17.0%. In the current clinical setting, the presence of urine albumin is used to screen for the development of renal complications and eventual end-stage renal disease. This screening tool assumes that patients with diabetic nephropathy progress along a linear path from microalbuminuria to frank proteinuria. However, recent clinical trials have shown that this paradigm may be incorrect. The glomerular filtration rate (GFR) may decline before proteinuria develops demonstrating an earlier phase of detectable kidney damage that may be targeted with interventions. Moreover, kidney damage can progress despite regression of microalbuminuria.

Recently, we reported a novel urine metabolomic signature for diabetic complications that implicated mitochondrial dysfunction as a cause for diabetic kidney disease. Using a metabolomics-based approach, we were able to identify a robust set of urinary metabolites that distinguished diabetic patients with CKD from diabetic patients without CKD and healthy controls. Analysis of bioinformatics data indicated that most of the differentially expressed metabolites were linked to mitochondrial metabolism, and subsequent analysis of human diabetic kidney tissues showed evidence of reduced mitochondrial biogenesis in support of this hypothesis. Studies in animal models have also indicated mitochondrial dysfunction underlying diabetic kidney disease and diabetic neuropathy.

## Summary

Recent studies indicate that signs of serious complications may appear just a few years after diagnosis in children with type 2 diabetes. In addition to its potential diagnostic applications, metabolomics approaches may provide important biological insight into why diabetic children differ from adults. Metabolomics may also provide a direct window into the biochemical pathways that cause diabetes in youth to guide the development of more effective therapies. Future studies will examine metabolite markers of mitochondrial dysfunction that could be used for drug targeting of diabetic complications. 



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## HIGHLIGHTS

There is a need for more reliable biomarkers for diabetes progression, particularly in groups that may be at higher risk for complications, including youth with type 2 diabetes.

Metabolomic-based approaches may identify novel predictive biomarkers of diabetes progression in order to prevent morbidity and early death.

Metabolomic profiling studies in diabetic subjects can yield novel insight into molecular mechanisms that underlie disease, such as mitochondrial dysfunction in the pathophysiology of diabetic nephropathy.

# Making THE Grade

BY ERIC SEABORG

With Medicare reimbursement now tied to consumer ratings, many institutions are focusing on the patient experience — and patient-physician communication in particular.

patient  
satisfaction



Can you afford  
an additional  
**132 seconds** to  
provide better care?

**M**ost patients can convey their relevant clinical information in 150 seconds. Yet studies have shown that physicians interrupt their patients after 18 seconds or so.

“One hundred fifty seconds is not a whole lot of time [to wait] to get the kind of information that will help you work with your patient to provide the best care,” says Lisa Allen, PhD, the chief patient experience officer at Johns Hopkins Medicine, Baltimore, Md.

Waiting those extra seconds could not only improve patient care but improve your hospital's bottom line now that Medicare reimbursement policies encourage better patient-physician communication. In 2012, Medicare began withholding up to 1% of total Medicare payments from hospitals that did not meet quality measurement standards, but with bonuses paid for high scores. The potential penalty will increase to 2% in 2017.

A large portion of that quality measurement is based on a hospital's scores on Hospital Consumer Assessment of Healthcare Providers and Systems (HCAHPS) surveys given to a random sample of patients to rate their experiences. That provision has many institutions paying much more attention to their scores and creating new positions to represent patients and families at top decision-making levels. Johns Hopkins Medicine brought Allen on as its first chief patient experience officer in September 2014.

For physicians and nurses, the focus on patient experience means more attention to a key component of the HCAHPS score — how well they communicate with patients.

Pinnacle Health System in Harrisburg, Pa., instituted a communication training program for physicians in response to low ratings of doctor-patient communication, and over two years increased their patient satisfaction scores by a remarkable 40 percentile points.

### Free the Hopkins FIVE

That skill is also a consideration at Johns Hopkins. “We are working with our physicians on improving their communication,” Allen says. “Many of our physicians are fantastic communicators, but for those that are struggling or that are new to medicine, [we are] helping them understand the key components to interacting with patients [and] what patients need.”

Allen's team is developing a program called the Hopkins FIVE:

- F:** Familiarizing yourself with the patient, saying hello and introducing yourself so the patient understands who you are, what your role is, and who any team members with you are.
- I:** Interacting or connecting with the patient as a real person in the bed, for example, talking at the patient's eye level if you can.
- V:** Voice refers to hearing the patient's voice — encouraging a discussion to take place that engages the patient to set an agenda.
- E:** Exit plan, making sure the patient understands the treatment plan and shares your expectations, followed by a thank you and a good bye.

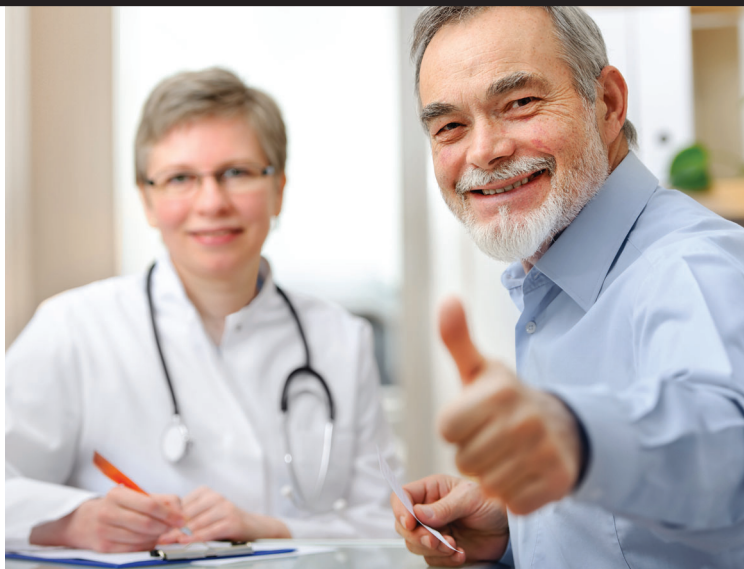


**“ One hundred fifty seconds is not a whole lot of time [to wait] to get the kind of information that will help you work with your patient to provide the best care.”**

— LISA ALLEN, PHD, CHIEF PATIENT EXPERIENCE OFFICER, JOHNS HOPKINS MEDICINE

**“ If you can develop that relationship with the patient [and] understand what is important in their lives, you will have higher compliance with diet, exercise, and medications. When patients feel valued as partners, they are much more willing participants.”**

— LISA ALLEN, PHD, CHIEF PATIENT EXPERIENCE OFFICER,  
JOHNS HOPKINS MEDICINE



### Do Ask, Do Tell

Allen suggests an “ask, tell, ask” model for this last step, which is a well-known technique for entering serious conversations with patients, and an approach also encouraged by James A. Tulsky, MD, chair of the department of psychosocial oncology and palliative care at the Dana-Farber Cancer Institute, Boston, and a pioneer researcher in clinical empathy and communication.

The first “ask” is meant to establish how well the patient understands the situation. “You always need to ask a patient their understanding before giving them information,” Tulsky says. Finding out how much or how little a patient knows should affect what information you give them and how you give it.

The “tell” should be in plain English. “You then give information in short bite-size chunks. It is very important not to use jargon and not to talk too much,” Tulsky says. “Then the final ‘ask’ is to ask about their understanding of what you just explained.” This last step is aimed at making sure that the patient understands the treatment plan and that expectations are shared.


### Four Habits of Effective Communicators

Many institutions have their own versions of the Hopkins FIVE, such as the “Four Habits” model that has spread widely after originating with Kaiser Permanente:

- invest in the beginning,
- elicit the patient’s perspective,
- demonstrate empathy, and
- invest in the end.

“A lot of the physician-patient communication programs [have] a shared mental model. What we are trying to do [is to] help the patient build trust, understand what is going on, and understand what the next steps are for the plan of care,” Allen says.

She believes that endocrinologists in particular could benefit from this approach, for example, in working with diabetes patients: “If you can develop that relationship with the patient [and] understand what is important in their lives, you will have higher compliance with diet, exercise, and medications. When patients feel valued as partners, they are much more willing participants.”

Allen notes that an important byproduct of the attention to patient experience is that “it makes for a better work life” because providers find it rewarding when they talk with and understand their patients. They simply feel they are doing a better job: “I do believe it provides greater job satisfaction. It is not all about the patient. It is also about how [physicians] feel about the work they are doing.” 

SEABORG IS A FREELANCE WRITER BASED IN CHARLOTTESVILLE, VA. HE WROTE ABOUT TALKING TO PATIENTS ABOUT OBESITY IN THE MARCH ISSUE.



# The Name Game

**For researchers who find their published work getting lost among other authors with similar names, a new system called ORCID may be a solution.**

**BY MELISSA MAPES**

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**When Jun Yang, PhD, an endocrinologist at the Hudson Institute of Medical Research, does a quick search of her name in PubMed, she gets 2,212 hits. If she looks for “Yang J,” which is how she is usually credited, 28,880 results appear.**

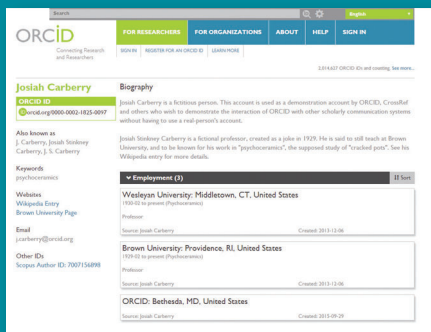
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“It is impossible to retrieve my full list of publications using the current system of name and topic searches,” Yang laments. “My true publications are well-camouflaged amongst the varied articles produced by other J Yangs!”

For ages, researchers have grappled with the frustrating issue of attribution. But now more than ever, scientists with common surnames are seeing their work buried amongst doppelgangers. Then there are those who change their last names — such as after a marriage — and risk losing recognition for past work. In a field where authorship is everything, how can scientists ensure they receive proper credit for publications?

The answer, as it turns out, is so simple that it’s hard to understand why it hasn’t been implemented sooner: a unique numerical identifier.

One particular system, known as Open Researcher Contributor Identification (ORCID), has recently gained traction. Launched in 2012, the project started as a small nonprofit initiative but quickly picked up speed. Now it is closing in on two million registrants. More and more journals are requiring ORCIDs for all submissions — indicating long-overdue progress for authorship tracking.



## THE ORCID OF JOSIAH S. CARBERRY

During demonstrations, the ORCID staffers use Professor Josiah Stinkney Carberry as a case study. Carberry is a fictitious researcher of “psychoceramics” at Brown University, who specializes in “cracked pots.”

Carberry was created as a joke in 1929 for a fake lecture that was posted around Brown’s campus. The tradition has continued with annual lectures on Friday the 13th and February 29th each year, for which Carberry fails to appear every time. He was awarded an “Ig Nobel prize” in 1991 for interdisciplinary studies and has been heralded as “the Absent-Bodied Professor” in major periodicals.

The creators of ORCID are carrying on the long-running joke with a hilarious list of made-up publications under Carberry’s name, such as “Toward a Unified Theory of High-Energy Metaphysics: Silly String Theory.” All of his fictional works and abstracts can be found at: <http://orcid.org/0000-0002-1825-0097>.

### What Is an ORCID?

An ORCID is a 16-digit number that makes sure each scientist is properly associated with his or her body of work. It is like a social security number but for researchers.

One of the unique benefits of the ORCID is that it tracks more than just scientific publications — meaning patents, media mentions, data sets, and more can all be tied back to the correct person. “This may paint a more accurate representation of any individual’s contribution to science,” says Yang.

Researchers can search and register with ORCID for free. The system operates as an open-source application program interface (API), which the nonprofit makes readily available to both individuals and institutions — spanning disciplines, research sectors, and the global scientific community.

### What Is at Stake?

There is a lot riding on the success of a new identification system. “Publications are the lifeblood of researchers and need to be 100% visible for academics, review panels, and granting bodies,” Yang explains.

Like many other scientists, she believes that having a common last name has impeded her career in some regards. “I suspect the issue of name ambiguity also affects my chances of securing research grants,” Yang says. The review panels of philanthropic organizations likely find it frustrating when searching for her body of work and thousands of other researchers pop up.

Additionally, colleagues have a hard time locating her when they are interested in her work. “At national and international conferences, fellow scientists who look me up after my presentation often find it difficult to track my research output,” she continues. Yang has received emails from such individuals who are struggling to discover her publications. She has been on the other side of the issue too, where she could not locate the work of a researcher with another common name.

A system like ORCID would also resolve issues with cultural differences in name order. For example, Yang can be either a surname or a first name. It would help with inconsistencies in name abbreviation as well, since citations can follow several different style guides. Some may include a middle name or initial, while others do not.

Female researchers face the additional dilemma of choosing whether or not to change their name if they get married. “I kept my surname when I married so that my publications would consistently feature ‘Yang J.’ It turned out to be the wrong thing to do. I should’ve taken the more unique surname,” says Yang.





Without a new identification process, vast swaths of researchers — especially women — will continue to be at a disadvantage as they work to build their careers and gain recognition. Like any impediment, the inefficiencies of the current system also affect the pace of scientific progress.

### What Are the Challenges Ahead?

The first step to implementing a unique ID is to choose a singular system. In addition to ORCID, there are tagging systems like ResearcherID by Thompson Reuters and Scopus by Elsevier.

“For any universal system, all stakeholders need to agree on a common code of conduct,” says Yang. She sees ORCID as the “perfect solution” and hopes that it continues to increase in popularity.

Fortunately, ResearchID is ORCID compliant, meaning that the two systems are able to work in unison. Scopus can also be searched by ORCID — demonstrating collaboration across platforms, despite what some may consider competing interests.

The other major obstacle involves past publications and deceased researchers. “A fair bit of work is also required of researchers, who must curate their older publications using the ORCID website,” says Yang. The system must also integrate scientists from earlier eras, who need someone to update this information on their behalf. The question of who will take this task remains to be answered.

“It would be ideal to have an automated system for assigning ORCID to authors in old papers,” Yang continues.

The publishing world is working to adopt the ORCID system, even if the backlog of past research still needs to be sorted out. “A uniform, nonprofit, world-recognized identifying system like ORCID is urgently needed,” says Yang. And it appears that much of the research community is in agreement.

For more information, visit [orcid.org](http://orcid.org). 

Representative Joseph P. Kennedy (D-MA) honored the Society's centennial in the U.S. House of Representatives. The complete text of his remarks was included in the *Congressional Record*, and it speaks to the role endocrinologists and endocrine research has had in public health breakthroughs over the past century. Representative Kennedy represents Boston, Massachusetts, the site of **ENDO 2016**. His comments are reproduced here in full.

# Congressional Record

## PROCEEDINGS AND DEBATES OF CONGRESS

### ENDOCRINE SOCIETY CELEBRATES 100 YEARS OF PUBLIC HEALTH BREAKTHROUGHS

**HON. JOSEPH P. KENNEDY III OF MASSACHUSETTS**

IN THE HOUSE OF REPRESENTATIVES

Thursday, February 25, 2016

**Mr. KENNEDY.** Mr. Speaker, I rise today to recognize and congratulate the Endocrine Society, in honor of its Centennial anniversary.

A century ago, a small group of physicians joined together to unlock the secrets of the body's hormones — the chemical signals that govern breathing, metabolism, growth, reproduction and other critical biological functions. They were endocrinologists, and from this impassioned gathering, the Endocrine Society was born. Over the next 100 years, endocrinologists would discover lifesaving treatments and provide quality care for hundreds of millions of people with diabetes, osteoporosis, thyroid conditions, infertility, sleep disorders, hormone-related cancers and many other conditions.

Today, the Society has more than 18,000 members in 122 countries and is the world's oldest and largest organization devoted to hormone research and the clinical practice of endocrinology. During its centennial year, the Endocrine Society will celebrate endocrinology's contributions to science and public health — while keeping an eye on today's promising research, which will lead to tomorrow's discoveries. It will recognize Nobel Prize winners in the field (including four Society past presidents) and historic breakthroughs such as the 1921 discovery of insulin, which transformed diabetes from a death sentence to a manageable chronic condition.

In April, I am very pleased to recognize, the Endocrine Society will conduct its Annual Meeting and Expo, in Boston, Massachusetts. **ENDO** is the world's premier event for getting the latest updates in endocrine science and medicine, drawing thousands of endocrinologists from around the globe. **ENDO 2016** will feature special programming celebrating the field's history and notable achievements.

Because hormones affect nearly every cell of the human body, the work of endocrinologists is essential to manage conditions that affect millions, including: about 415 million adults worldwide who have diabetes, according to the International Diabetes Federation; more than 36% of American adults who are obese, according to the U.S. Centers for Disease Control and Prevention; an estimated 48.5 million couples worldwide who were infertile as of 2010, according to the World Health Organization; and more than 10 million American adults who have osteoporosis, according to the Society's Endocrine Facts and Figures report.

Endocrine Society members have been at the forefront of historic accomplishments in medicine and research. I offer my warmest congratulations to the Endocrine Society on its celebration of 100 years of breakthroughs, and I look forward to what the next century brings.



Endocrine Society members meet with European Commissioner for Health and Food Safety in Brussels, Belgium to discuss impact of EDCs on human health. From left to right: Rémy Slama, PhD, Commissioner Vytenis Andriukaitis, MD, Leonardo Trasande, MD, MPP, and Jean-Pierre Bourguignon, MD.

## Society Members Meet with European Commissioner for Health and Food Safety; Provide Scientific Expertise to Inform EDC Regulations

The Endocrine Society continues its advocacy and educational efforts concerning the impact seen in patients' lives linked to exposure to endocrine-disrupting chemicals (EDCs). On February 29, Endocrine Society members Jean-Pierre Bourguignon, MD; Rémy Slama, PhD; and Leonardo Trasande, MD, MPP, met with policy makers in the European Union to provide scientific expertise, comments, and concerns regarding the European Commission process to develop criteria to identify EDCs.

The Endocrine Society's experts met with Vytenis Andriukaitis, MD, the European Commissioner for Health and Food Safety; Christel Schaldemose, Member of the European Parliament; and staff from the Directorate-General for the Environment. During these meetings, they shared highlights from the Endocrine Society's new Scientific Statement demonstrating that EDCs are an important public health threat and that governments need to design regulations to protect vulnerable populations from irreversible effects due to EDC exposures. They also emphasized the significant costs of inaction, inadequate action, or improper regulation of EDCs. Recent studies published in *The Journal of Clinical Endocrinology & Metabolism* have shown that health effects from EDC exposure cost the EU more than €157 billion each year.

Currently, the European Commission is carrying out an impact assessment to compare different options for defining criteria for the identification of endocrine disruptors. The assessment will evaluate four potential options the European Commission identified in 2014. The assessment and development of criteria for EDC identification is managed by the Directorate-General for Health and Food Safety, led by Commissioner Andriukaitis. The Endocrine Society has consistently argued that the

current regulatory apparatus is insufficient for the protection of human health from harm due to EDC exposure. The Society considers Roadmap Option 3 to be consistent with the latest endocrine science. Importantly, Option 3 does not include potency as a criterion and offers a multi-level categorization based on level of evidence. This option is similar to the logic used to identify carcinogens in the EU.

The meeting with Commissioner Andriukaitis came at a critical time as the Commission recently completed an evaluation of public comments in response to a consultation on the EDC Roadmap, and it intends to complete the impact assessment and announce criteria in June. Slama, Trasande, and Bourguignon discussed the Society's position on the Roadmap Options with Andriukaitis. They also explained why a definition for EDCs that includes the concept of potency would be inconsistent with endocrine science and is unsuitable for hazard identification.

The Endocrine Society will continue to contribute scientific expertise to the EU's efforts to ensure that the end result of EDC identification and subsequent regulatory process will effectively protect the public's health.

### For more information:

*The Endocrine Society's new Scientific Statement on Endocrine Disrupting Chemicals is available at:*

[endocrine.org/endocrine-press/scientific-statements](http://endocrine.org/endocrine-press/scientific-statements).

*Recent articles from the Endocrine Society journals on endocrine-disrupting chemicals along with links to Society position statements and comments to the European Commission are available at*

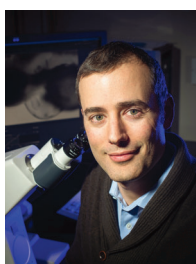
[press.endocrine.org/EDC](http://press.endocrine.org/EDC). 

The Endocrine Society works very closely with the Congressional Diabetes Caucus to support diabetes legislation, including providing Medicare coverage for continuous glucose monitors. In March, the Congressional Diabetes Caucus acknowledged retiring Co-Chair Ed Whitfield (R-KY) and recognized incoming leaders to the caucus. Pictured from left to right: Incoming Vice Co-Chair Susan Brooks (R-IN), retiring Co-Chair Ed Whitfield (R-KY) and Co-Chair Diana DeGette (D-CO). Not pictured: Vice Co-Chair Xavier Becerra (D-CA) and incoming Co-Chair Tom Reed (R-NY).



## Society Members Receive Prestigious NIEHS Early Career Awards

On March 1, the National Institute of Environmental Health Sciences (NIEHS) announced the recipients of five awards, totaling \$2.5 million, as part of the Outstanding New Environmental Scientist (ONES) Program. Endocrine Society members Daniel Gorelick, PhD, and Michele La Merrill, PhD, are among this year's recipients of these highly competitive grants.



**DANIEL GORELICK, PHD**, of the University of Alabama at Birmingham, will study how pollutants, such as dioxins, use the aryl hydrocarbon receptor protein to cause toxic effects on the heart. Gorelick received his BA in music from the University of Pennsylvania in 1997 and his PhD in Cellular and Molecular Medicine in 2005 working in the lab of Peter Agre at the Johns Hopkins University School of Medicine. He was an

NIH-NRSA postdoctoral fellow at the Carnegie Institution for Science, Department of Embryology, in the lab of Marnie Halpern. In 2008 – 2009, he worked as a science adviser in the U.S. Department of State as a AAAS Science and Technology Policy Fellow. Gorelick joined the Department of Pharmacology & Toxicology at the University of Alabama School of Medicine in 2012.

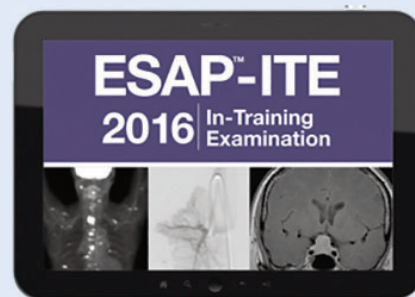


**MICHELE LA MERRILL, PHD**, of the University of California, Davis, will explore whether exposure to the pesticide DDT, during or before pregnancy, causes insulin resistance, by interfering with the production of body heat. La Merrill, an assistant professor in the Department of Environmental Toxicology, is a developmental toxicologist. She completed her PhD in toxicology at the University of North Carolina, Chapel Hill, School of Medicine. She also holds an MPH in epidemiology from Mount Sinai School of Medicine, New York. She joined UC Davis in 2013 after completing a postdoctoral fellowship in environmental pediatrics at Mt. Sinai School of Medicine.

The Endocrine Society appreciates the recognition by NIEHS of the contributions made by early career endocrine scientists to the field of environmental health science. We congratulate Gorelick and La Merrill on their well-earned success, and we look forward to the discoveries they will make that will help us understand how chemical exposures can cause harm.

The ONES Program was created to support exceptional early career scientists whose work examines how the environment influences human health.

The ONES Program was created to support exceptional early career scientists whose work examines how the environment influences human health.



## ESAP-ITE 2016 Participation Breaks Records

The Endocrine Self-Assessment Program In-Training Exam (ESAP™-ITE) 2016 achieved record participation numbers, with 142 training programs and 637 fellows participating in the exam.

This year participation increased to include 131 of the 135 ACGME-accredited training programs. Next year, the plan is to enhance the ITE in order to capture the last few domestic programs, and then, increase the program's presence around the world. The goal is for the Society's ESAP program to become the international gold standard.

The ESAP-ITE was first developed in 2009 as a joint venture with Association of Program Directors in Endocrinology, Diabetes, and Metabolism (APDEM) to be used as an educational tool for program directors to assess their fellows' learning gaps in their fellowship. Modeled after the American Board of Internal Medicine's (ABIM) certification examination, this online exam covers the spectrum of knowledge in clinical endocrinology.

The exam is available annually for one month (mid-January to mid-February) for administration by registered endocrinology training programs. This year's exam, administered by training programs worldwide, had record participation from nearly 100% of all domestic accredited fellowship training programs as well as 10 international programs.

The success of this program has allowed the Society to develop complementary education for in-training members. Last year, the Society began offering *ESAP ITE Live!* during **ENDO 2015**. This session complements the exam by allowing the program directors and fellows who have participated in the exam to engage with the exam creators and to learn from their peers.

*ESAP ITE Live!* will be offered again at **ENDO 2016** in Boston on Friday, April 1. For more information, go to: [www.endocrine.org/ite](http://www.endocrine.org/ite).

# Research Rationale Highlighted at ENDO 2016

A new program called “K/O Rounds” — aka “Why Endocrine Science Matters in 3 Minutes” — will be introduced at ENDO 2016. This pilot competition for basic science trainees will focus on presenting short, focused talks on the rationale for their science, not the outcome of the experiment.

## KNOCKOUT ROUNDS

This innovative pilot program, named in allusion to the famous genetic technique, aims to provide basic science trainees the opportunity to present and highlight the significance of their research in front of a diverse audience. K/O Rounds will be piloted during ENDO 2016, and unlike other oral presentations taking place during the meeting, it will provide the unique opportunity to focus on the rationale and “big-picture” relevance of the researcher’s work, rather than data and/or methodology. Speakers are expected to emphasize and clearly communicate the significance and potential translational value of their bench work to an audience that includes scientists and non-scientists.

During its pilot year, K/O Rounds participants will be invited based on abstract scores, with the top 15 basic science trainees across all scientific categories delivering a three-minute presentation. A panel comprised of senior researchers, media relations experts, clinicians, and others will judge each talk. In addition, the audience will also have the opportunity to vote for their favorite speaker.

All finalists will receive feedback from judges, and based on judges’ scores, the top three presenters will be interviewed and featured in *Endocrine News* and profiled on EndoTV (pending schedule and availability).

MY SCIENCE  
IS A  
K/O

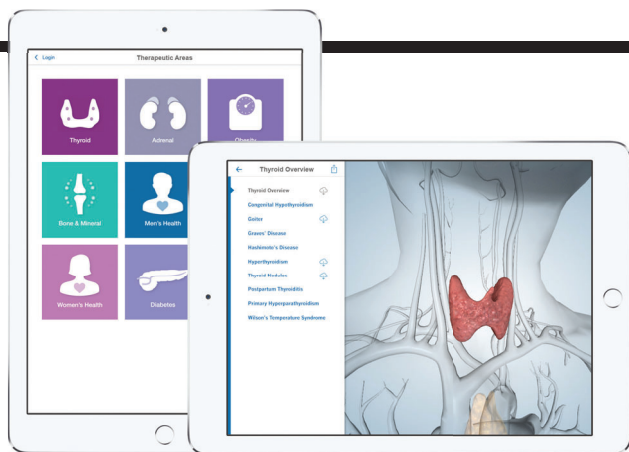


### K/O ROUNDS: Why Endocrine Science Matters in 3 Minutes

Saturday, April 2, 2016:  
10:00 AM – 11:15 AM

Room 254 (BCEC)

<https://endo.confex.com/endo/2016endo/webprogram/Session7829.html>



## HHN Launches Mobile App at ENDO 2016

The Hormone Health Network (HHN), the Endocrine Society's public education arm, has released, *Journey Through the Endocrine System* (*Journey*), the first app of its kind to provide a mobile-friendly application to enhance the understanding of the intricacies of the endocrine system and its related conditions.

The goal of the app is to help facilitate better physician-patient communication by arming clinicians with a tool that virtually travels through the glands and organs of the endocrine system. For example, clinicians can share with their patients' 3D simulations of endocrine-related diseases and disorders and show how hormones have an effect on the human body. Healthcare professionals will have the ability to dissect, highlight, and show 3D visualizations to patients and direct them to over 100 resources created by HHN.

"We believe the release of the *Journey* will enhance public understanding of the endocrine system and hormone health conditions such as diabetes, obesity, infertility, and thyroid disorders," says Cheretta A. Clerkley, MBA, CASE, CME, director, HHN. "We are looking forward to making this information accessible to broad consumer audiences through interactive, fly-through animation of a hormone's journey through the human body."

HHN was recently awarded an Innovation Exploration Grant in the amount of \$10,000 by the ASAE Foundation to further the *Journey* app. With the funds awarded from the grant, HHN has developed "Hormonal Hot Spots," which aims to integrate two initiatives of the Endocrine Society: *The Journey Through the Endocrine System* and *Endocrine Facts and Figures* in order to develop an innovative platform that highlights the latest data and trends on epidemiology and health economics for endocrine diseases. Members attending ENDO 2016 can preview "Hormonal Hot Spots" in the Network's booth (735).

*Journey through the Endocrine System* is available from the iTunes App Store today. The iPhone app is free. An Android version of the application is currently in development and slated to be available later this year. Attendees may download the app and visit the Network's booth (735) to receive a code to unlock all the features within the app. Those who download the *Journey* app and visit the booth will receive a special thank you gift for downloading the app.



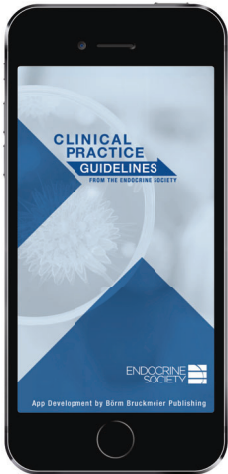
## Andrea Gore Honored by Senate of College Councils

Andrea Gore, PhD, professor of pharmacology at the University of Texas (UT) and editor in chief of *Endocrinology* has been awarded the Edith Clarke Woman of Excellence Award by the Senate of College Councils.

According to *The Daily Texan*, the UT student newspaper, Gore was selected for her experience, research, mentorship program among her lab assistants, and her involvement with the Faculty Council and Gender Equity Council. Gore also runs a mentorship program in her research lab.

"While I don't discriminate against anyone who asks for mentorship, I think the fact that I am a woman makes me more approachable by female students and faculty," Gore tells the publication. "I have also gone out of my way to mentor women in the sciences, because we need to work harder to overcome biases that women are not good at science and math. I hope that by showing them that women can be successful in the world of scientific research, they can gain the confidence to do this themselves."

The award is named for Edith Clarke, the first female electrical engineering professor in the country, who taught at UT.



## Clinical Practice Guidelines Go Mobile!

**N**ow clinicians can have the trusted information from the Society's Clinical Practice Guidelines as close as their own cell phone or tablet due to the launch of a new mobile app, which will debut at **ENDO 2016**.

The new app will provide point-of-care access to evidence-based Clinical Practice Guideline content, interactive tools (calculators, risk scores, algorithms), articles, webinars, and other educational resources for endocrinologists, primary care physicians, and other healthcare professionals caring for patients with endocrine disorders. The app currently encompasses six Clinical Practice Guidelines related to diabetes and obesity topics.

Since 2006, the Society has been publishing Clinical Practice Guidelines (CPGs) to help endocrinologists provide guidance and recommendations to patients in particular areas of practice. Currently, there are a total of 29 Guidelines that span across eight practice areas. The Guidelines are made available for free at [www.endocrine.org](http://www.endocrine.org) as downloadable PDFs.

By developing the app, the Society hopes to provide an easy, point-of-care resource for practicing physicians to diagnose and treat endocrine diseases. The app is also likely to have resources physicians can share with patients as they are discussing their care.

The new Clinical Practice Guideline app's development and launch was made possible by support from Merck, Sanofi, Novo Nordisk, Boehringer Ingelheim, and Lilly, USA.

Download the app now from the [Apple Store](#) or via [Google Play](#). Visit [endocrine.org/cpgapp](http://endocrine.org/cpgapp) to learn more.

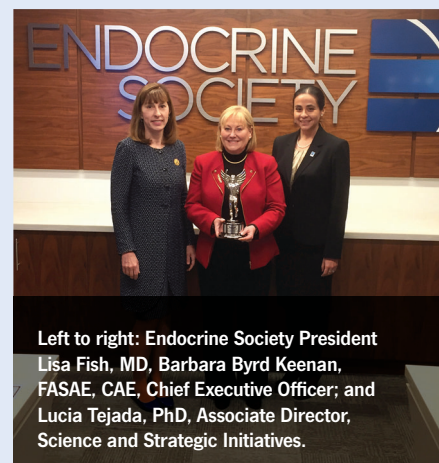


## Endocrine Facts and Figures Receives Award

**T**he Society's *Endocrine Facts and Figures* web site ([endocrinefacts.org](http://endocrinefacts.org)) recently received the 2015 Hermes Platinum Award, the highest honor, in the "Microsite" category.

[Endocrinefacts.org](http://Endocrinefacts.org) is the mobile-friendly version of *Endocrine Facts and Figures*, a compendium of epidemiology, health economics, and trends data of more than 40 endocrine-related conditions in nine therapeutic areas: adrenal, bone and mineral, cancers and neoplasias, cardiovascular and lipids, diabetes, hypothalamic-pituitary, obesity, thyroid, and reproduction and development.

The Hermes Creative Awards are presented by the Association of Marketing and Communication Professionals. The awards recognize outstanding work in the industry among contestants that range from single individuals to Fortune 500 companies around the world. **EN**



Left to right: Endocrine Society President Lisa Fish, MD, Barbara Byrd Keenan, FASAE, CAE, Chief Executive Officer; and Lucia Tejada, PhD, Associate Director, Science and Strategic Initiatives.

# Transitions of Care

## Taking a Patient from Pediatric to Adult Care Doesn't Have to be Difficult

The needs of a pediatric patient and adult patient with Type 1 Diabetes are different. Make the process of moving your patient to a new practice easier with Transitions of Care, an online resource center developed to prepare and guide you and your patients in the process of changing care teams.

Visit us online and discover how pediatric and adult endocrinologists can work together, along with their patients to provide a successful transition outcome.

Transitions of Care is provided by the Endocrine Society and a broad coalition of partnering organizations.

[endocrinetransitions.org](http://endocrinetransitions.org)



This program is supported by educational grants from Lilly USA, LLC and Medtronic Diabetes.



# POLYCYSTIC OVARY SYNDROME WHAT YOU NEED TO KNOW

The endocrine system is a network of glands and organs that produce, store, and secrete hormones. Normally, women make small amounts of “male” hormones (called androgens), but women with Polycystic Ovary Syndrome (PCOS) produce slightly higher amounts of androgens. This hormone imbalance causes an assortment of health problems, many of which are related to the reproductive system.

## WHAT IS PCOS?

A hormonal disorder that may be characterized by a constellation of symptoms that may include:

- Irregular or absent menstrual periods
- Infertility
- Weight gain (especially at the waist)
- Acne
- Excess hair on the face and body
- Thinning scalp hair
- Skin tags
- Darkening skin
- Depression or anxiety
- Poor sleep

When the body cannot use insulin properly, it secretes more insulin to make glucose available for cells. Often linked to **obesity**, many women with PCOS tend to make too much insulin. The resulting excess in insulin is thought to also boost male hormone or **androgen production** by the ovaries.

## POTENTIAL PCOS CAUSES

Although we don't know for sure what causes PCOS and none of these is a direct cause, each one is highly related to the condition.



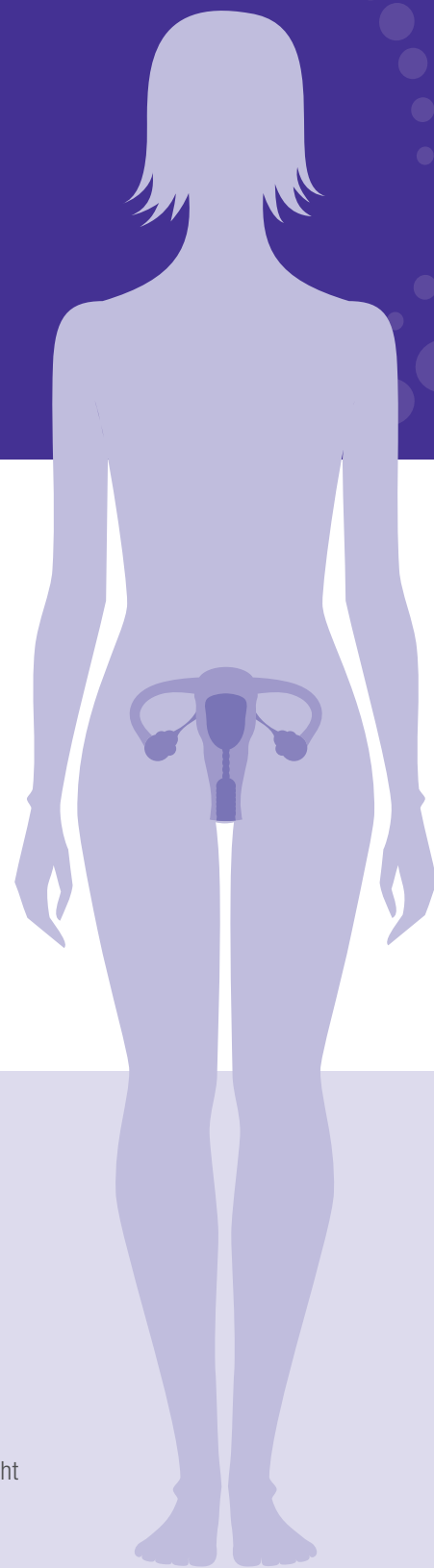
**Insulin Resistance** — some women are less sensitive to insulin than normal, which makes their ovaries produce too many male hormones.



**Genetics** — PCOS appears to run in families, so having a mother or sister with the condition makes you more likely to have it.



**Obesity** — because women and girls with PCOS are more likely to gain excess weight and women and girls who are obese are more likely to have the condition, there is a tight, but not absolute, link between the two.



Visit [hormone.org](http://hormone.org) for more information.

Additional Editing by Genevieve Neal-Perry, MD, PhD,  
*University of Washington*



Hormone Health  
NETWORK®  
*Keep your body in balance*



## PCOS CAN AFFECT A WOMAN'S:

- Menstrual cycle
- Ability to have children
- Hormones
- Heart
- Blood vessels
- Appearance
- Mental health
- Risk for cancer
- Metabolic syndrome

On ultrasound, the ovaries appear to have a multiple number of small follicles (also called cysts) that are often arranged in a ring around the ovary. Science indicates these are related to arrested egg development and failed ovulation.

## DID YOU KNOW?

Women with PCOS often have type 2 diabetes, low levels of good cholesterol (HDL), and high levels of bad cholesterol (LDL) and other blood fats, including triglycerides. These may increase the risk of heart attack or stroke.

PCOS affects 7-10% of women of childbearing age and is one of the most common causes of infertility.

In the United States, an estimated 5-6 million women have PCOS.

Sleep apnea may occur in up to 50% of women with PCOS.

Pregnant women with PCOS appear to have higher rates of:

- Miscarriage
- Diabetes during pregnancy
- Pregnancy-induced high blood pressure (preeclampsia)
- Premature delivery
- Endometrial cancer

*Source: U.S. Department of Health and Human Services and National Institutes of Health*

## TREATMENT

In addition to medications to help manage your symptoms, a healthy diet and brisk physical activity are nearly always part of a treatment plan for PCOS. Attention to blood sugar levels is also very important. Be sure to follow your treatment plan exactly as your doctor prescribes so you can control your PCOS symptoms and reduce risk factors that can change the quality of your life.

## 5 STEPS TO LIVING BETTER WITH PCOS

- Limit processed foods
- Add more whole grains
- Eat more fruits, vegetables, and lean meats
- Maintain a healthy weight
- Get moving



## Patients have questions. We have answers.

The Hormone Health Network is your trusted source for endocrine patient education. Our free, online resources are available at [hormone.org](http://hormone.org).



Hormone Health  
NETWORK®  
FROM THE ENDOCRINE SOCIETY

### Academic Internal Medicine Saint Louis University School of Medicine

Saint Louis University, a Catholic, Jesuit institution dedicated to student learning, research, healthcare, and service is seeking applicants for a full-time faculty position in the Department of Internal Medicine at the Associate Professor/Professor rank as **Division Director of Endocrinology**. Applicants must be board certified in Endocrinology. The Division Director will have opportunities to recruit both clinical and research faculty, to plan significant programmatic and facilities enhancements, and to teach fellows, residents, and medical students. The candidate should have a proven record of academic excellence as well as a commitment to excellence in patient care and medical education.

The members of the Division include five full time faculty, a nurse practitioner, and a dietician. The Division provides inpatient and outpatient consultation services to a diverse population with a wide range of endocrine disorders at the Saint Louis University Medical Center and Des Peres Hospital with potential to expand the Obesity program at Des Peres Hospital. The Division supports a two-year clinical fellowship training program, as well as elective rotations for internal medicine residents and medical students. Ongoing research in the Division includes, impact of metformin on Alzheimer's in diabetics, Vitamin D binding protein assay, inpatient insulin protocols, sleep apnea in diabetics and studies on obesity and nutrition.

Competitive salary commensurate with academic rank and other support are provided. Interested applicants should apply online at <http://jobs.slu.edu> and submit a cover letter and current curriculum vitae to: **Chad Miller, MD**, Chair, Endocrinology Search Committee, Associate Professor, Department of Internal Medicine 12-South, 1402 South Grand Boulevard, St. Louis, MO 63104. **Tel: (314) 577-6143; Fax: (314) 577-6121; Email: chadmiller@slu.edu**. Review of applications begins immediately and continues until the position is filled.

*Saint Louis University is an Affirmative Action, Equal Opportunity Employer and encourages nominations of and applications from women and minorities.*

## HIRING BC/BE ENDOCRINOLOGIST

**Kettering Health Network**, a not-for-profit network of 8 hospitals, is searching for a **BC/BE ENDOCRINOLOGIST** to join busy practice.

Employed position available at newly renovated Joslin Diabetes Center in Dayton, Ohio, offering highly competitive salary, transition payment, moving expense reimbursement, and robust benefits package. Enjoy a built-in referral pattern for both Diabetes and General Endocrinology patients.

**Interviews are being scheduled now!**

**Contact Sandy Jones**

Manager of Physician Recruitment  
(937) 558-3477 office • (937) 657-2447 cell  
[sandyjones@ketteringhealth.org](mailto:sandyjones@ketteringhealth.org)

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Health Network.  
[ketteringdocs.org](http://ketteringdocs.org)

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## Endocrinology

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Featured 8th in Money Magazine's "Best Places to Live", Ames, Iowa is recognized as an active, friendly community with plenty to do. Ames has one of the highest-rated public school systems in the nation. Having close access to several metropolitan cities means that this versatile community provides small-town serenity and charm plus big-city amenities and culture.

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**Billings Clinic**

[billingsclinic.com](http://billingsclinic.com)



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