

**SUN-LB6**

Polycystic ovary syndrome (PCOS) is a common gynecological endocrine disorder associated with menstrual irregularity and androgen excess. The worldwide prevalence of PCOS among women of reproductive age ranges from 5-20%. Mobile menstrual cycle apps, such as Flo, provide an opportunity to gather data on the characteristics of PCOS in a globally representative and medically unbiased population. The objective of this study was to report PCOS symptomatology relative to country in order to better characterize PCOS and its differing phenotypes among users around the world. A questionnaire on PCOS related symptoms and previous PCOS diagnosis was available to Flo users during one month (2019). The geographical location of the user was estimated based on the IP address. Study inclusion criteria included women aged 18-44 years seeking to track their cycle or to conceive, who were not pregnant, on active contraception, or in stabilization mode after pregnancy and had Flo app running in English. All users in the study had agreed to the use of their de-identified and aggregated data for research purposes. The highest number of Flo app users who completed the PCOS questionnaire were coming from the following top 5 countries: United States (US) (n=240,732), United Kingdom (UK) (n=67,696), India (n=40,171), the Philippines (n=35,097), and Australia (n=28,946). The percentage of self-reported PCOS in these countries was 14.4% with higher percentages in India, the Philippines, and Australia (22.6%, 20.0%, 15.9, respectively) and lower in the US and UK (12.2% and 13.71%, respectively). In the US, UK, and Australia, the most common self-reported symptoms of PCOS positive women were bloating, hirsutism, and irregular cycles. In India and the Philippines, the most common symptoms of women with PCOS were bloating, baldness, and irregular cycles. Hirsutism, high glucose and high levels of both cholesterol and glucose are the three top symptoms increasing the probability of PCOS in all studied countries. The percentage of self-reported PCOS increases 3.04 times among users that reported hirsutism compared to all users that positively responded to the PCOS self-assessment question. Probability of PCOS among users that report hirsutism increases 3.85 times for Australia and 4.24 times for India. Australia and India had higher percentages of self-reported PCOS among those who reported experiencing nearly all PCOS related symptoms. Using Flo's software, we are able to determine that geographic location has an effect on the phenotypic presentation of PCOS. Understanding the distribution of PCOS symptomatology around the world will help to better characterize PCOS and improve diagnosis and treatment on both an individual and global scale.

**Pediatric Endocrinology****PEDIATRIC OBESITY, THYROID, AND CANCER*****Tyrosine Kinase Inhibitor Induced Hypothyroidism in Pediatric and Young Adult Population: An Institutional Review***

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**MON-LB016**

**Tyrosine Kinase Inhibitor Induced Hypothyroidism in Pediatric and Young Adult Population: An institutional review**  
**Background:** Tyrosine kinase inhibitors (TKIs) are a class of molecular targeted therapies approved for the treatment of several hematological and solid tumors in pediatric population. Thyroid dysfunction, most commonly primary hypothyroidism, is a well described adverse effect in adults. There is no available data in the pediatric population regarding the risk of thyroid dysfunction with the use of TKIs.  
**Objective:** To document the incidence of hypothyroidism in the pediatric and young adult patients on TKI therapy.  
**Methods:** A retrospective chart review including patients'  $\leq 21$  years of age who had been treated with at least 1 of 10 predetermined TKIs for malignancy was performed. Demographics, TKI use and duration, thyroid hormone labs, and history of head/neck radiation were collected. We excluded patients with pre-existing thyroid disease prior to start of TKI therapy. Thyroid dysfunction was defined as TSH  $>5$ mcIU/mL during TKI therapy.  
**Results:** A total of 152 patients who were treated with TKIs for malignancy were identified. The mean age was 12.4 years (SD 6.5). About 20% of patients had therapy with multiple TKI drugs. A total of 24 patients were noted to have TSH elevation  $>5$ mcIU/ml of which 19 had a TSH  $>10$  mcIU/mL or low free T4. Fourteen patients were started on levothyroxine. Average duration of TKI therapy prior to development of thyroid dysfunction was 6.7 months but over half developed hypothyroidism within 3 months of initiation of TKI therapy. Cabozantinib and pazopanib were responsible for 70% of TKI associated cases of thyroid dysfunction.  
**Conclusion:** This is the first report of incidence of primary hypothyroidism in pediatric and young adult patients treated with TKIs. Thyroid dysfunction can develop in the first few months of therapy and often is clinically significant. Early recognition and treatment of this complication will be important for patient care especially as use of these class of drugs increase.

**Reproductive Endocrinology****HYPERANDROGENISM*****Relationship Between BMI and PCOS Symptoms Among Flo App Users in the United States***

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**SUN-LB3**

Polycystic ovary syndrome (PCOS) is known to affect 6%-12% of women of reproductive age in the United States. PCOS is a heterogeneous condition associated with menstrual cycle irregularity and androgen excess. Though many women with PCOS have a BMI classified as overweight or obese, information is limited on how specific symptoms and BMI mediate PCOS diagnoses in the general population. A questionnaire on PCOS-related symptoms and previous PCOS diagnosis was available to Flo users

during one month (2019). Women aged 18-44 years seeking to track their cycle or to conceive, who were not pregnant, on active contraception or in stabilization mode after pregnancy, and had Flo app running in English met the study inclusion criteria. Participant characteristics including age and BMI were also collected from Flo app users during the sign-up process. All users in the study had agreed to the use of their de-identified and aggregated data for research purposes. The differences in clinical manifestation of PCOS symptoms between BMI groups were analyzed. Of US users with BMI data in the whole cohort, 8,808 women reported having physician-diagnosed PCOS, 5,551 women reported not having a PCOS diagnosis, and 58,478 reported that they had not been checked for PCOS. Of women with PCOS, 19.5% were normal weight (BMI 18.5-24.9), 19.7% were overweight (BMI 25.0-29.9), 20.4% were obese (30.0-34.9), 17.8% were severely obese (BMI 35.0-39.9), and 21.0% were morbidly obese (BMI 40+). The most common symptoms among PCOS positive women were bloating (38.7%), hirsutism (38.2%), and irregular cycle (26.0%). A direct relationship exists between BMI and having PCOS, as the percentage of PCOS in obese, severely obese, and morbidly obese BMI groups was higher (1.37, 1.87, and 2.12 times, respectively) than in the whole cohort. Similarly, among women who report acne, skin hyperpigmentation, bloating, hirsutism, heavy menses, baldness, family history of PCOS, high cholesterol, irregular cycle, and inability to conceive for > 1 year, there is a direct relationship between BMI and the percentage of women with PCOS. Moreover, when identifying symptoms and findings serving as strong predictors of a positive PCOS diagnosis, hirsutism, high glucose, and high levels of both cholesterol and glucose were the top symptoms and findings for women with BMI 18.5-34.9. Hirsutism, high glucose, and inability to conceive for > 1 year were the strongest predictors of PCOS for women with BMI 35+. Among all users with hirsutism, the percentage of women with PCOS increased 3.65 times compared to the whole cohort, making it the strongest predictor of PCOS. Understanding BMI patterns as they relate to PCOS symptoms allows for better understanding the pathophysiology of PCOS. Among women with PCOS in the United States, changes in BMI are associated with variations in the many symptoms of PCOS.

## Thyroid

### HPT-AXIS AND THYROID HORMONE ACTION

#### *Biotin Depleting Procedure Does Not Impact the Reliability of TSH, LH and FSH Immunoassays*

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#### SAT-LB79

**Background:** Biotin interference has become a major problem with some laboratory immunoassays, leading to erroneous tests results and potentially harmful clinical consequences. There is therefore a clinical need to easily identify the interference and to overcome its effect to avoid harmful consequences for patients. The aim of this study was to demonstrate the VeraPrep Biotin™ procedure, a biotin depleting device, does not impact the immunoreactivity of TSH, LH and FSH immunoassays. **Materials and**

**methods:** Nine samples (4 from women and 5 from men) were tested with two-sites electrochemiluminescent immunoassays (Cobas e602, Roche diagnostics) for the measurement of three pituitary hormones, TSH, LH and FSH. The samples were first measured without any treatment (baseline) and then retested after treatment with VeraPrep Biotin™ procedure. Percent (%) difference was calculated between post-treatment and baseline to determine if the biotin depleting device impact the immunoassays immunoreactivity. **Results:** The median baseline concentrations for TSH, LH and FSH were 2.3 mIU/L (standard deviation (SD): 1.5), 4.9 IU/L (19.0) and 5.3 IU/L (17.5), respectively. The median concentrations after treatment with the VeraPrep Biotin™ procedure for TSH, LH and FSH were 2.3 mIU/L (1.5), 4.9 IU/L (18.9) and 4.9 IU/L (16.5), respectively, and were not statistically different from baseline (P = 0.976). The mean recoveries after treatment were 99.5%, 98.6% and 95.4% for TSH, LH and FSH, respectively. **Conclusions:** The concentrations of the TSH, LH and FSH assays were not impacted by the pretreatment with the VeraPrep Biotin™ procedure, confirming its ability to help clinical laboratories to overcome biotin interference.

## Diabetes Mellitus and Glucose Metabolism

### DIABETES TECHNOLOGY

#### *Diabetic Ketoacidosis With PUMP Failure: Analysis of the 2006-2016 U.S. Kid Inpatient Database*

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#### SAT-LB119

**Background:** Insulin pumps are valuable tools in diabetes management and their use has increased dramatically over the past decade. Unfortunately, insulin pump use has also been associated with diabetic ketoacidosis (DKA), relating to pump malfunctions that result in the disruption in insulin administration. Our objective was to examine the prevalence and characteristics of DKA admissions associated with pump failure among pediatric patients. **Methods:** We used the national Kids' Inpatient Database to identify pediatric admissions with a primary diagnosis of DKA in years 2006, 2009, 2012, and 2016. We defined a DKA-pump failure admission as an admission with either a primary diagnosis of DKA plus a secondary diagnosis of pump failure/complication or conversely, a primary diagnosis of pump failure/complication with a secondary diagnosis of DKA. We used descriptive statistics and logistic regression to describe the annual trends and characteristics of children admitted for DKA with or without pump failure. Lastly, logistic regression was used to assess the impact of pump failure on length of stay and severity of illness during DKA admissions. **Results:** Our dataset included 166,583 DKA admissions, of which 2,291 (1.4%) were associated with a primary or secondary diagnosis of insulin pump failure. Between 2006 and 2016, the number of total DKA admissions increased by 58%. Admissions for DKA with pump failure increased from 387 to 665 admissions during this time. Among all