Purpose: To evaluate correlates of menstrual recovery in adolescents with anorexia nervosa.

Methods: 37 adolescents with anorexia nervosa and amenorrhea randomized to the placebo arm of a double-blind treatment trial, of whom 29 completed the 18-month follow-up visit, were included in the analysis. Anthropometrics, body composition by dual-energy X-ray absorptiometry (DXA), hormonal studies, and responses to the Beck Depression Inventory-I and the 26-item Eating Attitudes Test were compared between those subjects with menstrual recovery and those without. Logistic regressions fit via generalized estimating equations to account for repeated measurement over time were used to test the association of each factor and return of menses over the 18-month study.

Results: Subjects were aged 18 ± 2.8 years (mean ± SD), and self-identified primarily as white (86%). Sixty-five percent (n=24) had recovery of menses during the study. Length of illness (19 ± 26 months) was similar between those subjects with menstrual recovery and those without, as was the duration of amenorrhea (20 ± 12 months) at baseline. Subjects exercised 7 ± 3 hours/week. Percentage body fat by DXA was associated with menstrual recovery [OR 1.19 (1.06, 1.33), p<0.01], as were BMI [OR 1.48 (1.13, 1.95), p<0.01] and percent median body weight [OR 1.09 (1.03, 1.16), p=0.004]. Estradiol =30ng/mL, alone, was not associated (p=0.08), but when coupled with percent mean body weight it was an important predictor of menstrual recovery [OR 2.49 (1.09, 5.65), p=0.03]. Changes in leptin levels were not associated with return of menses, but the sample size was small (n=11). Serum cortisol levels and scores on both mental health screens were, similarly, not associated with return of menses.

Conclusions: While weight gain is an important goal of treatment in adolescents with anorexia nervosa, percentage body fat may be a useful clinical measure to follow to inform menstrual recovery and can be obtained at the same time as bone density measures.

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Girl Talk: Relational Aggression by Peers as an Antecedent to Eating Disorders Among Girls and Women
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The Renfrew Center

Purpose: In spite of recent attention to bullying in childhood as a risk factor for later psychopathology, little research has explored how this relates to the development and maintenance of an eating disorder. Research by Groleau, et al. (2012) supports a relationship between childhood victimization by bullying and eating disorder development among women with bulimia. However, this relationship has not been examined among women with other eating disorders. In an effort to replicate and expand the findings by Groleau et al (2012), these researchers developed the present study. This poster presents results from a completed investigation of the relationship between childhood bullying (relational aggression) and the development and maintenance of eating disorders.

Methods: Two hundred and sixty-one adolescent girls and women (N=261) who were receiving inpatient treatment at The Renfrew Center of Philadelphia or Coconut Creek consented to research, and completed self-report questionnaires about childhood histories of victimization by peer bullying, eating disorder symptoms, affective lability and self-esteem. Of these participants, 66 (25.3%) met DSM-IV criteria for Anorexia Nervosa, Restricting subtype, 32 (12.3%) for Anorexia Nervosa, Purging subtype, 92 (35.2%) for Bulimia Nervosa and 71 (27.2%) for Eating Disorder NOS. Chi-squared tests were used to compare childhood bullying frequencies between eating disorder diagnoses. Multiple regression analyses, following the guidelines of Baron and Kenny (1986), examined low self-esteem and affective lability as potential mediating factors between this history and the development and maintenance of an eating disorder.

Results: A history of childhood bullying in the form of verbal, physical, social, relational, and/or cyber-aggression was reported by 92% of participants. Frequency of childhood bullying between diagnostic groups was not significant. The proposed mediators of low self-esteem and affective lability were tested to determine whether they were predictive. Correlations revealed that childhood victimization by peer bullying was significantly related to affective lability, low self-esteem and eating symptoms. Multiple regression analyses revealed that eating symptoms were significantly predicted by the influences of affective lability and low self-esteem.

Conclusions: These findings demonstrate that histories of victimization by peer bullying are prevalent among women with eating disorders, beyond the scope of Groleau’s (2012) population. This supports the importance of including questions about peer-initiated childhood bullying as an integral part of the assessment and treatment of eating disorders. While additional research can clarify the relative importance of factors such as bullying frequency, intensity and/or duration in accurately and adequately assessing the impact of being bullied on eating disorder development and maintenance, information about self-esteem and affective lability should also be included. Future research might also explore...
antecedents to low self-esteem and affective lability in family constellations, with a view to implementing effective interventions.


145.

Examining the Use of Meal Supervision in Adolescents and Young Adults with Restrictive Eating Disorders During Medical Hospitalization

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**Purpose:** Weight restoration is the primary goal of medical hospitalization for patients with restrictive eating disorders; however, there is little evidence on best practices to achieve adequate weight gain during this time. Patients who restore weight at or close to ideal body weight have lower incidence of relapse following discharge, and improved long- and short-term outcomes. Although meal time can cause high anxiety, interventions during meal time may increase caloric intake and promote weight gain. The authors completed a chart review in 2008-2009 examining prevalence and effect of meal supervision during 52 patient admissions during which supervision was implemented only after a patient failed to meet weight gain goals or complete meals. This showed delayed supervision of an average of four days as well as higher weights and improved overnight bradycardia for those who received supervision when compared to those who did not. The goal of this study was to standardize meal supervision beginning at admission and reexamine variables.

**Methods:** A chart review was conducted of all patients placed on the Eating Disorders Clinical Practice Guideline (CPG) for a seven month period during 2011 to achieve a comparable group size to the previous chart review cohort. All patients admitted to the CPG received standard protocol supervision by trained staff for each meal during hospitalization. The data compared 54 patients from this time frame (Phase II) to 49 patients from the 2008-2009 cohort (Phase I) for differences in weight gain, (LOS), electrolyte abnormalities, and liquid caloric supplementation.

**Results:** The mean age of participants was 17.4 years for Phase I unsupervised, 17.8 for Phase I supervised, and 14.8 for Phase II (p<.0001). Phase I supervised patients had the longest LOS with a mean of 9.8 days (p=.02). Phase I non-supervised and Phase II patients had comparable LOS at 5.9 and 6.7 days, respectively. Maximum LOS was comparable between the three groups with 23 days for Phase I supervised, 22 days for Phase I non-supervised, and 20 days for Phase II. No significant difference in liquid caloric supplementation use, rate of weight gain, rate of change for overnight heart rate, or mean percent of days in which goal weight gain was achieved or laboratory values we noted.
Conclusions: Notably, the effect of improved weight gain and overnight bradycardia seen in the Phase I chart review is not present. There is, however, a compelling difference in length of stay between those who received delayed meal supervision and either those who did not require meal supervision or who received meal supervision throughout hospitalization. Our findings suggest that meal supervision beginning at admission for all patients may shorten LOS and decrease health care costs.

Sources of Support: Boston Children’s Hospital Clinical Research Program

146.

Differences in Psychiatric Comorbidities Among Adolescents with Eating Disorders by Sexual Orientation
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Purpose: Minority sexual orientation may be associated with increased likelihood of having an eating disorder (ED) among adults, and community-based studies have demonstrated that gay and bisexual adolescent males are at increased risk of ED behaviors. Sexual minority youth (SMY) have an increased prevalence of mood disorders and substance abuse, as well as higher levels of mental health symptoms than their heterosexual counterparts. However, little is known about differences in psychiatric comorbidities between heterosexual youth and SMY among adolescents diagnosed with ED. The purpose of this study is to determine if adolescent SMY with ED have higher rates of psychiatric comorbidities such as depression, anxiety, and attentional disturbances than their heterosexual counterparts.

Methods: ED adolescents ages 12-19y (mean 16.2) were recruited for the parent study at an academic referral center. Primary variables were gender and sexual orientation (sexual minority defined as gay, lesbian, bisexual, or questioning). Outcomes were T-scores on the affective, anxiety, internalizing, somatic, and post-traumatic subscales of the Youth Self-Report (YSR), Child Behavior Checklist (CBCL), as well the total score on the Center for Epidemiologic Studies Depression Scale (CES-D). The total competence T-score, which reflects social and activities subscales as well as academic performance, was included from both the YSR and CBCL. Descriptive and ANOVA testing were performed using SPSS v20.

Results: Subjects (n=164; 21M, 143F) reported a mean of 16.1 months of disease and averaged 86% median body weight. Anorexia nervosa was diagnosed in 39% (n=64), 7% (n=12) had bulimia nervosa, and 54% (n=88) had EDNOS. Sexual minorities comprised 8.8% (n=21; 4M,10F) of the study population. No significant differences were found in affective, anxiety, internalizing, somatic, social, and post-traumatic stress problem subscales of the YSR and CBCL. SMY with ED scored higher on thought problems (64 vs 58, p=0.007), attention problems (63 vs 56, p=0.004), and rule breaking behaviors (59 vs 55, p=0.045) subscales, with significantly decreased total competence (41 vs 48, p=0.031) on the YSR.
Parent reports on the CBCL did not reflect differences between groups in these same domains. CES-D scores did not differ between groups.

**Conclusions:** In this clinical sample of youth with ED, SMY reported more problems with attention, thoughts, and rule-breaking behaviors as well as lower total competence T-scores on the YSR as compared with their heterosexual peers. Parent reports on the CBCL did not reflect these same differences. No differences were seen between heterosexual youth and SMY with ED in affective or anxiety-related subscales. These differences in mental health symptoms among SMY with ED deserve further study and may have implications for screening and treatment in this vulnerable population.

**Sources of Support:** National Scientist Development Award of the American Heart Association 147.

**Inpatient Medical Stabilization for Adolescent Eating Disorders: Patient and Parent Perspectives**  
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**Purpose:** Eating disorders, particularly anorexia nervosa, have a variety of physical health complications, some of which are severe enough to necessitate medical hospitalization. Our institution utilizes a specific protein calorie malnutrition (PCM) protocol, which includes meals monitoring by nursing staff, supplementation as needed with liquid nutrition, and continuous cardiac monitoring as well as a number of behavioral restrictions and physiologic assessments. Patients frequently resist the need for admission. A recent study of an inpatient eating disorders program revealed that, at the time of hospital admission, 33% of patients did not think they required hospitalization. After two weeks of treatment, however, almost half of these patients converted to thinking that they did need to be hospitalized. This change in perceived need for treatment has received little attention in the eating disorder literature. We are unaware of any studies examining patient or parent perception of medical stabilization.

**Methods:** Research staff contacted all patients and/or parents of patients admitted under the inpatient PCM protocol at a large urban children’s hospital between January 1, 2011 and June 30, 2013. A 20-minute telephone survey was conducted separately with the patient and a parent or guardian. Participants were asked to rank the usefulness of various components of the PCM protocol on 5-point Likert scales ranging from 1=“very unhelpful” to 5=“very helpful”; parent and patient responses were compared using t-tests. Participants were also asked a series of open ended questions about the hospitalization addressing their perceived importance of the medical admission, what was most helpful, what was least helpful, and what they thought was missing from their hospital treatment. Interview responses were transcribed in real time, and then coded into thematic categories.

**Results:** Thirteen patients and thirteen parents completed interviews. Patient Likert scales regarding the helpfulness of protocol components ranged from a high of 4.23 for “heart monitoring” to a low of 1.46
for “limiting time doing homework”. Parent Likert scales ranged from a high of 4.77 for “nursing care” to a low of 1.00 for “interacting with other patients.” Parents perceived meal planning to be more helpful than patients (4.00 vs. 1.46, p=0.040) and perceived limits on cell phone use to be more helpful than patients (3.08 vs. 1.46, p=0.045). Both patients and parents frequently mentioned that the need for hospitalization was the first time that they realized the seriousness of the eating disorder, that they did need hospitalization, and that they were concerned about cardiac complications. Parents were frequently appreciative of having a respite from meal planning and responsibility for making their children eat at home. Almost all patients and parents desired more intensive mental health services in the hospital, and patients frequently complained of being bored with nothing to do other than eat.

**Conclusions:** Following inpatient medical stabilization, most patients and parents agreed that hospitalization was necessary and important and both frequently expressed concerns about cardiac complications. Parents were especially supportive of having meal planning taken over by dietitians. Even in the medical setting, intensive mental health services are strongly desired.

**Sources of Support:** Division of Adolescent Medicine, Nationwide Children's Hospital

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148.

**Conservative Inpatient Refeeding Yields Modest Outcomes in Adolescents with Anorexia Nervosa and Eating Disorder Not Otherwise Specified**

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**Purpose:** Maximizing weight gain in hospitalized eating disordered patients has been associated with long-term weight restoration, improved cognitive and physical functioning, and decreased anorexic thinking. However, rapid weight gain can be difficult to attain as patients with anorexia nervosa become hypermetabolic during refeeding. Current recommendations of the American Dietetic Association and American Psychiatric Association support cautious oral refeeding in order to avoid refeeding syndrome, but resultant use of hypocaloric diets frequently leads to initial weight loss and prolonged length of admission. Recent studies have begun to challenge the traditional means of slow refeeding and are showing more rapid weight gain without detrimental effects. Our aim was to evaluate current refeeding practices at our institution.

**Methods:** We performed a retrospective chart review of adolescents, ages 12 to 21 years, diagnosed with either anorexia nervosa (AN) or eating disorder not otherwise specified (ED NOS) admitted for inpatient refeeding over the past three years. Power analysis, based on prior studies, determined that 21 subjects would be needed to know the average length of stay within three days range with 95% confidence. In addition to basic demographic information, we collected detailed anthropometric data, including daily weights from admission to discharge. We also documented feeding regimen, including daily calorie counts and rate and timing of increase in daily calories. Length of stay was recorded along
with any electrolyte abnormalities associated with refeeding syndrome. Descriptive statistics were performed.

**Results:** We reviewed charts of 21 adolescents, admitted from March, 2009 to May, 2012. Mean (S.D.) age was 16.2 (1.67) years, and 95% were female (n=20). The majority (81%, n=17) were diagnosed with anorexia nervosa. Mean (S.D.) length of stay was 17.3 (11.1) days, and mean weight gain during admission was 2.03 (1.94) kg. Percent ideal body weight increased from 75.4% (6.53) on admission to 79.0% (6.07) on discharge. However, 71% (n=15) of patients experienced initial weight loss after admission. Daily calorie counts increased from 1271 (536) on hospital day one to 2304 (641) on the final day of hospitalization. The dietician frequently recommended increasing intake by 200 calories every other day, although the recommendations were often not followed by the primary team, mainly due to patient complaints (e.g. nausea, abdominal pain). Three adolescents (14%) had hypophosphatemia early in their hospital course (days one through three), but none received supplementation and phosphorus values self-corrected to normal the following day. One patient (5%) had hypokalemia for three consecutive days and was started on oral potassium supplement. No patients had clinically significant refeeding syndrome.

**Conclusions:** In this retrospective chart review, conservative refeeding was employed for adolescents hospitalized with AN or ED NOS. Patients experienced initial weight loss with modest weight gain despite relatively long hospital stays. A few patients experienced brief hypophosphatemia early in admission, which self-corrected within 12 to 24 hours, arguing against true refeeding syndrome. In our next study, we hope to implement more aggressive means of refeeding in the same setting and examine rates of weight gain, length of admission, tolerance, and safety with faster refeeding practices.

**Sources of Support:** none

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149.

**Perceptions of Family Styles by Adolescents with Eating Disorders and their Parents**

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**Purpose:** The traditional view has been that there is a great deal of rigidity and enmeshment in the families of adolescents with eating disorders, with poor communication and satisfaction among family members. We used the Family Adaptability and Cohesion Scales (FACES-IV) to study whether this traditional view remains true, or whether family styles among those with eating disorders have changed over time to include a wider range of families.

**Methods:** Forty-four patients (ages 14-18 years, mean 15.4 years, 38 females, 6 males) being seen for treatment of an eating disorder in a Division of Adolescent Medicine completed the FACES-IV questionnaire, along with the Beck depression Inventory (BDI). Patients had DSM-IV diagnoses of Anorexia Nervosa (38.6%), Eating Disorders not Otherwise Specified (59.5%) and Bulimia Nervosa (2.3%)
and a mean BMI of 19.6 at the time of questionnaire completion, which was an average of 175 days from first visit. Parents (38 mothers, 6 fathers) completed the FACES-IV and the BDI at the same visit without conferring with their children.

**Results:** A great majority of patients and parents reported their families as being connected/very connected (93% of patients, 98% of parents), and flexible/very flexible (80%, 93%), with low/very low enmeshment (89%, 89%), moderate/low/very low rigidity (77%, 95%), low/very low chaos (84%, 86%) and moderate/high/very high communication (85%, 50%). Despite these scores, all well within the normal range for families with teenagers, 70% of patients and 64% of parents reported low/very low satisfaction with their families, well below the normal range. Depression scores were moderate/severe for 44% of patients and 14% of parents. T tests and ANOVA showed no differences between FACES-IV scores and age, gender, ethnicity, diagnosis and time from first visit for patients, while patients and parents who were more depressed were each more likely (p<.05) to report greater dissatisfaction with their families.

**Conclusions:** A great majority of patients with eating disorders, and their parents, reported their family styles to be in the healthy range, yet many patients and parents, especially those with depression, expressed dissatisfaction with their families. These data demonstrate that older concepts of the families of adolescents with eating disorders need to be reconsidered.

**Sources of Support:** There are no sources of support

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**Range of the QTc Interval at Presentation in Adolescents and Young Adults with Eating Disorders**

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**Purpose:** Adolescents with eating disorders (ED) may be at risk for cardiac complications due to prolongation of the corrected QT interval. Current evidence for QTc prolongation is conflicting and prone to multiple confounding factors.

**Methods:** We retrospectively reviewed electrocardiographic (ECG) and clinical data for 200 ED patients at initial presentation between March 2008 and March 2013, along with 200 controls of similar age and gender. Each ECG was interpreted in a blinded fashion by two expert readers, with the QT interval measured and corrected according to the Bazett formula.

**Results:** ED patients were 89.5% female, with a mean age of 16.4 years and mean Body Mass Index (BMI) of 18.9 kg/m\(^2\). At initial presentation, 9% required hospitalization. ED patients were significantly more likely than controls to be bradycardic. The corrected QT interval was significantly shorter in ED patients (399.6 vs 413.4 msec, p < 0.001). Neither group had an individual QTc interval greater than 470 msec. Within the ED population, there was no significant association identified between QTc interval
and medication, BMI, or hospitalization at presentation; however, sodium and magnesium were negatively correlated with Qtc interval.

**Conclusions:** In a large study of adolescents and young adults with ED who had an ECG at presentation, the corrected QT interval was significantly shorter than in healthy controls. There was no significant association between QTc and BMI, inpatient status, or medications. Longer QTc intervals were associated with lower sodium and magnesium levels in ED patients. Clinicians need to recognize and correct electrolyte abnormalities in adolescents with eating disorders that may be risk factors for prolonged QTc in this population.

**Sources of Support:** No external or internal funding supported this project.

151.

**Does Rate of Weight Gain During Hospitalization Predict Readmission in Adolescents With Eating Disorders?**

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**Purpose:** Readmission after hospital discharge is a fairly common outcome in adolescents with eating disorders with various studies reporting rates of 20 – 41%. There are conflicting reports of the association between rapidity of weight gain and readmission. With a recent impetus towards rapid weight gain, the effect of this strategy on readmission rates is vital to learn. The purpose of this hypothesis generating project was to identify if rate of weight gain predicts medically necessitated readmissions.

**Methods:** The medical records of 307 patients with an eating disorder diagnosis, who presented to the adolescent medicine service during a 5-year study period (2004-2008), were screened. Hospitalized patients who achieved weight restoration to > 84% ideal body weight, with at least one follow-up visit and a diagnosis of anorexia nervosa, bulimia nervosa or eating disorder NOS (DSM 4) were included. Charts were independently reviewed by at least 2 researchers to reach agreement on values for all variables. Multiple logistic regression analysis was used to evaluate for significance. An interaction between the presence of a psychiatric comorbidity and rate of weight gain was tested.

**Results:** Of the eighty-two patients who were eligible, 20.5% required readmission. The median rate of weight gain was 118.6 grams/day (IQR = 91.83-150.84). There was a 1.8 times (95% CI=0.91 – 3.59, p=0.087) greater odds of readmission with each increase in weight gain quartile after adjusting for the presence of another psychiatric co-diagnosis, type of eating disorder, percentage of ideal body weight at admission, duration of illness prior to presentation, and presence of bradycardia, hypotension and hypothermia. With the lowest 25% as referent, patients whose rate of weight gain was in the 2nd quartile had an odds of readmission of 1.5 (p= 0.71), the 3rd quartile 2.7 (p= 0.3) and the highest quartile 5.7 (p=0.11). A simulation analysis showed that the power of this study (n=82) to detect the
effect size observed was 72.2\% (two-sided alpha= 0.05). The overall interaction term between rate of weight gain and presence of a psychiatric co-morbidity was not significant. However a trend was observed with patients in the lowest weight gain quartile and no psychiatric co-morbidity having a predicted probability of readmission of 21.8\% (SE = 19.2), while those patients with a psychiatric comorbidity and in the highest quartile of rate of weight gain had a probability of readmission of 48.4\% (SE = 17.3).

**Conclusions:** This study was not sufficiently powered to detect the effect of rate of weight gain on readmission. However the observed trend of increased readmissions with rapid weight gain strongly indicates that further study is indicated. Future studies should aim to be powered to detect interactions with psychiatric co-morbidity and rate of weight gain.

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