



## Eating Disorders in Children and Adolescents: An Update

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### Declaration of Conflict of Interest

In the past 12 months, I have no relevant financial relationships with the manufacturer(s) of any commercial product(s) and/or provider (s) of commercial services discussed in this CME activity.

## Objectives

1. Epidemiology and Course of Illness
2. Current perspective on assessment and diagnosis
3. Current evidence base in treatment of eating disorders in children and adolescents

## Epidemiology and Course of Illness

## Incidence in Eating Disorders

- In anorexia nervosa
  - Mean age of onset is early adolescence at approximately 14 years of age
- In bulimia nervosa
  - Mean age of onset is late adolescence-approximately 17-18 years of age
- Eating disorders are the 2nd most common chronic illness in adolescent girls

## Child and Adolescent Eating Disorders

- Most primary care physicians do not regularly screen for eating disorders (Maradiegue, 1996)
- 33% pediatricians and 2% primary care physicians considered AN in the differential diagnosis in children (Bryant-Waugh, 1992)

## Child and Adolescent Eating Disorders

- The incident rate of restrictive eating disorders in Children under 12 years of age is twice that of the incident rate of type II Diabetes in all children under the age of 18

(Morris et al, 2005, Ahmed et al, 2010)

- Type II diabetes is an “epidemic” in Children and eating disorders are “rare disorders”

## Diagnostic Challenges

- >50% of children and adolescents do not meet full criteria
- Young children are affected
- Young boys and adolescent males are affected
- All ethnicities and socio economic groups affected

## Diagnostic Challenges

- Concerning when children maintain/lose a small amount of weight
- Children and young adolescent do not experience their body in same way adults do
- Younger children and adolescents may not have reached menarche

## Child and Adolescent Eating Disorders

- Delay in appropriate treatment results in
  - Associated with numerous med/psych/social complications
  - These may not be completely reversible
  - Long-lasting implications on development
- Longer the ED persists, the harder it is to treat

## Mortality in Eating Disorders

- In anorexia nervosa
  - Mortality roughly 10%
  - Standardized mortality ratio ranges from 6.2- 9.7
  - patients were at increased risk of death from:
    - cancer (SMR=1.9), endocrine causes (SMR= 7.9), cardiovascular (SMR=2.3), respiratory (SMR=11.5), gastro-intestinal (SMR= 5.4), urogenital (SMR=10.8), autoimmune (SMR=8.8), psychoactive substance use (SMR=18.9), suicide (SMR=13.6) and undefined causes (SMR=10.9).
- In chronic anorexia nervosa
  - Reduces life expectancy by 15-25 years

## Mortality in Eating Disorders

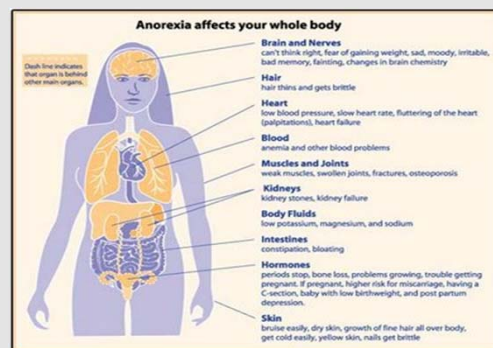
- In bulimia nervosa
  - The all cause death risk is 9 times that expected
  - Causes of death are less well reported:
    - suicide, motor vehicle accidents, malnutrition, acute gastric dilation and pancreatitis.
- In eating disorder not otherwise specified (EDnos)
  - despite being most common ED diagnosis, is rarely studied.
    - Statistically significantly elevated SMRs for EDnos of 1.81 and 2.47 were reported recently

## Course of the illness

- The majority of pts do not come to treatment
- Mean time to in AN recovery: 7-8 years
  - Recovery occurs at two points:
    - First 2 years
    - 6-12 years duration of illness
- Treatment in adolescence results in about 70% full recovery rate in anorexia nervosa
- There is **no** effective evidence based treatment for anorexia nervosa in adults
- In Bulimia there are effective treatments for adolescents and adults

## Effects of starvation in children and younger adolescents

- Leads to serious physical and psychological complications
- Every organ system in the body is affected



## Cardiovascular Complications

- Acute
  - Presents in early stages of the disorder in adolescents
  - Functional and structural cardiac abnormalities
  - Electrocardiographic
    - Sinus bradycardia:
      - 35% to 95% adolescents
    - Decreased voltage
    - Prolonged QTc
    - Ventricular arrhythmias
  - Orthostatic hypotension
- Chronic
  - Mitral valve prolapse
    - 35% of adolescents
  - Silent pericardial effusion
  - Ipecac poisoning

## Cardiovascular Complications

- Reversible with early identification and treatment
  - Slow gradual weight restoration
  - Cardiac monitoring
- Current recommendations (JAH, 2003)
  - Severe sinus bradcardia
    - Heart rate <50 bpm during the day or <45 bpm at night
  - Orthostatic pulse
    - Orthostatic changes in pulse (>20 beats per minute)
- Treatment:
  - Admit to hospital
  - Close cardiac monitoring
  - Monitor medical changes
  - Gradual weight gain
  - 3 weeks of nutritional rehabilitation
  - 80% of their ideal body weight



## Gastrointestinal Problems

- GI symptoms frequent in eating disorders
- 80 % report one or more severe GI complaints
  - delayed gastric emptying
  - constipation
  - superior mesenteric artery syndrome
  - elevated liver enzymes
  - acute pancreatitis
  - complications of vomiting
    - gastric rupture
    - Mallory-Weiss tears/esophageal and or gastric bleeding
    - Increased amylase
    - Parotid swelling
    - erosion of dental enamel

## Metabolic Complications

- Refeeding syndrome
  - Shifts in fluid and electrolytes from extracellular to intracellular spaces
  - Consists of cardiovascular, neurologic, and hematologic complications
  - Hypophosphatemia (*Ornstein, 2003*)
    - 27.5% of adolescents with AN
    - Nadir usually in the first week of refeeding
    - Correlates with BMI
  - Cardiac sequelae occur early (*Kohn, 1997*)
  - Delirium during or after the second week of refeeding
  - Treatment recommendations
    - Gradual increase in prescribed nutrition
    - Closely monitor electrolyte and cardiac status
    - May administer supplemental phosphorus

## Interruption of Puberty

- Eating disorders have variable impact on puberty
- Prepubertal onset
  - Absence of pubertal development and failure of growth
- Premenarchal onset
  - Causes arrest of pubertal development, which is most severe if weight loss occurs during the early stages of puberty
  - Menarche may be delayed beyond the normal age
- Postpubertal
  - Amenorrhea/irregular menstrual function

## Osteoporosis

- A serious, frequent, and early consequence of AN
- May impose life-long limitations
- Associated with considerable morbidity
  - Commonly a “silent” condition in adolescence
  - 7-fold increase in the risk of nonspinal fractures

## Body Weight and BMD in AN

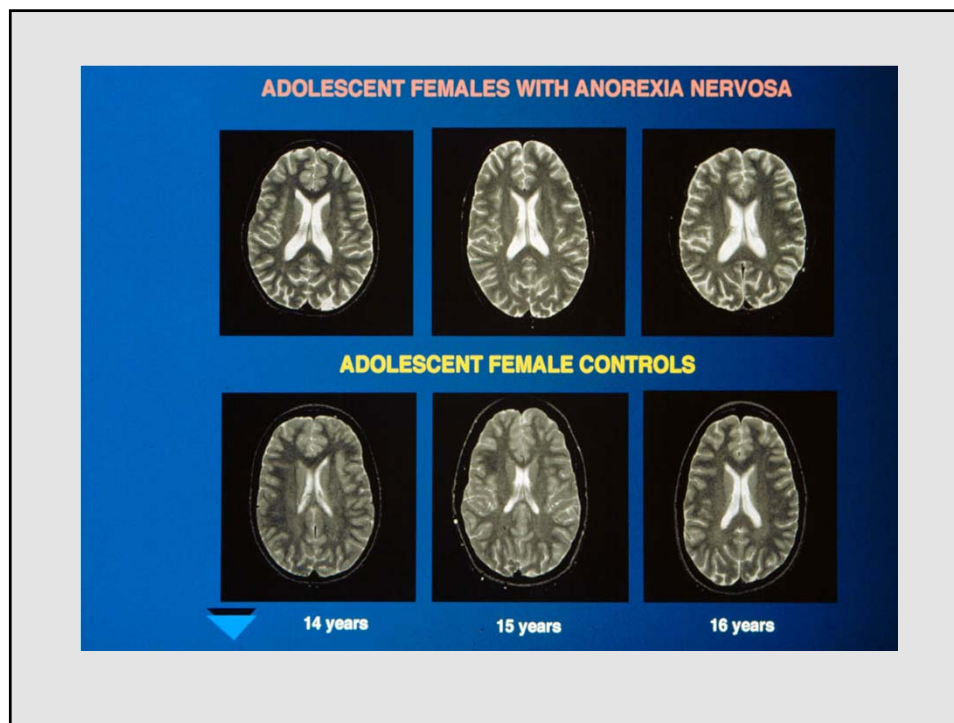
- Weight restoration
  - Body weight is the most important determinant of BMD in AN
  - Especially lean mass
  - Weight gain is associated with increase BMD
- Calcium intake of 1500 mg/d
- Vitamin D 400 IU/d
- Moderate weight-bearing exercise
  - Weight-restored adolescents
  - In those achieving weight restoration and medically stable
  - Monitor closely and recommend with caution
- HRT does not prevent or treat low BMD in AN

## Impact of AN on Growth

- Children and adolescents with AN presents
  - Growth failure or short stature
- Dramatic alteration in the GH-IGF axis
  - Low serum levels of IGF-I
  - Low growth-hormone-binding protein
  - State of growth-hormone resistance
- Indices of growth-hormone normalize with weight recovery
- Studies inconsistent with respect to
  - Gain some height
  - Have complete catch-up growth
  - Fail to grow

## Structural Brain Changes in Adolescents with Anorexia Nervosa

- Adolescent females with AN
  - Have larger CSF volumes compared to healthy adolescent controls
  - Have deficit in cortical gray and white brain matter
  - Degree of gray matter and sulcal enlargement is related to the degree of starvation to the disorder?
- Cross-sectional and longitudinal MRI studies reveal
  - Persisting brain abnormalities after weight recovery
    - Larger sulcal CSF volumes
    - Smaller gray matter volumes
  - Brain abnormalities may not fully reversible



## Cognitive functioning in AN

- Deficits have been reported in almost all neuropsychological domains
  - Learning and memory
  - Attention
  - Visuospatial skills
  - Executive functioning
  - Abstraction and use of strategy

## Eating Disorders in adolescents

- Should pts with eating disorders be a priority for aggressive treatment in youth?

## Eating Disorders in adolescents

- This is an illness of adolescence
  - Mean age of onset is before or at age 18 yrs
- Eating disorders are one of the most fatal of mental health disorders
- Treatment in adolescence is often successful
  - Treatment tends to work in at least 70% of the cases
- Treatment in adulthood does not predict recovery as commonly
  - More likely to be chronic
  - Quality of life for chronic AN is similar to chronic schizophrenia
  - Patients with (chronic) eating disorders cost more to the health care system than patients with psychotic illness.

## Current perspective on diagnosis and assessment

## Criteria for Anorexia Nervosa (DSM IV)

- Refuse to maintain body weight at or above a minimally normal weight for age and height
- Intense fear of gaining weight or becoming fat, even though underweight
- Disturbance in the way in which one's body weight/shape is experienced
- Postmenarchal females, amenorrhea (the absence of three consecutive menstrual cycles)

## Criteria for Bulimia Nervosa (DSM-IV)

- Recurrent episodes of binge eating characterized by both of the following
  - eating, in a discrete period of time (e.g. within any 2-hour period), an amount of food that is larger than most people would eat during a similar period of time
  - a sense of lack of control over eating during the episode
- Recurrent inappropriate compensatory behaviors
- The binge and inappropriate compensatory behaviors both occur, on average, at least twice a week for 3 months

## Other eating disorders (DSM-IV)

- Eating disorder not otherwise specified

## DSM-5 Development

- Current Diagnoses Updated
  - Anorexia Nervosa
  - Bulimia Nervosa
- Diagnoses be reclassified from Disorders Usually First Diagnosed in Infancy, Childhood, or Adolescence to Eating Disorders:
  - Pica
  - Rumination Disorder
  - Avoidant/Restrictive Food Intake Disorder
- Diagnosis to be added to Eating disorders:
  - Binge Eating Disorder



### DSM-5 Proposed Diagnostic Criteria for: Avoidant/Restrictive Food Intake Disorder

- A. Manifested by persistent failure to meet appropriate nutritional and/or energy needs leading to one or more of the following:
  - 1. significant weight loss (or failure to gain weight or faltering growth in children);
  - 2. significant nutritional deficiency;
  - 3. dependence on enteral feeding;
  - 4. marked interference with psychosocial functioning.
- B. There is no evidence that lack of available food, an associated culturally sanctioned practice, a general medical condition, or a medication S/E sufficient to account alone for the disorder.
- C. The eating disturbance does not occur only during the course of AN/BN.
- D. If the eating disturbance occurs **in the context of a mental disorder** (e.g., MR or a PDD), it is sufficiently severe to warrant independent attention.

Text will include 3 subtypes:

- individuals who do not eat enough/show little interest in feeding
- individuals who only accept a limited diet in relation to sensory features
- individuals whose food refusal is related to aversive experience

### DSM-5 Proposed Diagnostic Criteria for: Binge Eating Disorder

- A. Recurrent episodes of binge eating characterized by both:
  - 1. eating, in a discrete period of time (e.g.,  $\leq 2$ -hours), an amount of food that is definitely larger than most people would eat under similar circumstances
  - 2. a sense of lack of control over eating during the episode
- B. These episodes are associated with 3 (or more) of the following:
  - 1. eating much more rapidly than normal
  - 2. eating until feeling uncomfortably full
  - 3. eating large amounts of food when not feeling physically hungry
  - 4. eating alone because of being embarrassed by how much one is eating
  - 5. feeling disgusted with oneself, depressed, or very guilty after overeating
- C. Marked distress regarding binge eating is present.
- D. The binge eating occurs, on average, at least **1x/wk for 3 months**.
- E. Is not associated with the recurrent use of inappropriate compensatory behavior and does not occur exclusively during the course of BN or AN.

## Assessment

- Community physicians are in a unique position to
  - Detect the onset of incipient eating disorders
  - Stop the progression at the earliest stages
  - Screen during routine annual health care
    - History including screening questions
    - Physical examination
  - Diagnose and be aware of diagnostic limitations
  - Coordinate comprehensive interdisciplinary, developmentally appropriate, evidence-based treatments

## Assessment

- Current dietary practices
  - Amounts, food groups, fluids, restrictions?
  - Calorie counting, fat gram counting?
  - Scary foods or taboo foods (foods you avoid)?
  - Any binge eating? Frequency, amounts, triggers?
  - Purging / vomiting? frequency, how, how long after meals?
  - Use of diuretics, laxatives, diet pills, ipecac, CAM?
- Weight and Shape Issues
  - Trying to lose weight
  - Fear of fat
- Exercise
  - How much, often, level of intensity? How stressed are you if you miss exercising?
- Menstrual history
  - Age at menarche? Last menstrual periods ? regular? OCPs? Sexual history?
- Family history
  - Obesity, eating disorders, mental illness?

## Examination: Signs/Symptoms of restricting

- Weight loss/failure to make appropriate gains in weight and height
- Hypothermia
- Bradycardia
- Orthostatic pulse and blood pressure
- Dull, thinning scalp hair
- Lanugo hair
- Emaciated
- Flat affect
- Cold extremities, acrocyanosis
- Primary or secondary amenorrhea

## Examination: Signs/Symptoms of binging/purging

- Large fluctuations in weight
- No apparent physical signs
- Arrhythmias
- Palatal scratches
- Menstrual irregularities
- Swelling of the parotid glands
- Frequent and unusual dental problems
- Calluses on dorsum of hand – Russell's sign

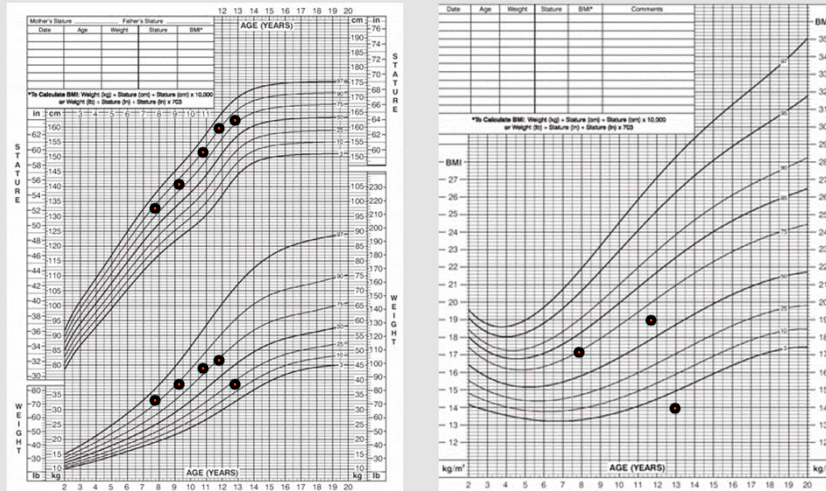
## Examination

- Provide regular monitoring of weight and height
- Determine body mass index (BMI)
  - BMI= weight in kg / height<sup>2</sup> in m<sup>2</sup>
  - Plot weight, height, and BMI on **growth curves**
  - Sexual maturity ratings
- Monitor vital signs
  - Orthostatic changes

## Determining the Target Weight

- Previous weights and heights (growth curve)
- Weight, height, BMI (weight (kilograms)/height<sup>2</sup> (m<sup>2</sup>))
- Mid-parental height
- Menstrual threshold weight
  - ROM occurs at 2 kg more than the weight at which menses was lost (*Golden, 1997*)
  - ROM occurs when weight needs to be 92% IBW

## 2 to 20 Years: Girls—Stature-for-Age, Weight-for-Age and BMI-for-Age Percentiles



[http://www.cdc.gov/nchs/about/major/nhanes/growthcharts/clinical\\_charts.htm](http://www.cdc.gov/nchs/about/major/nhanes/growthcharts/clinical_charts.htm)

## Laboratory Assessment

- CBC, electrolytes, LFTs, TSH
- Urinalysis
- BHCG
- FSH, LH, prolactin, estradiol
- ESR
- EKG
- DEXA in those amenorrheic >6 months

## Current Perspectives on Treatment of Eating Disorders: Standard of Care

### Treatment

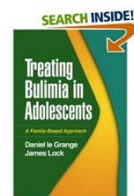
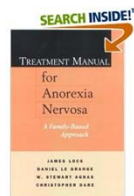
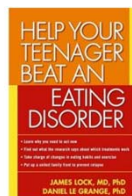
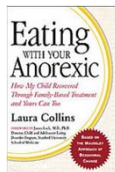
- Kids with eating disorders rarely want treatment
- Often do not think they have a problem with eating or that they need help
- Often lack insight or understanding of severity or consequences of illness
- May be delusional
- Families are the customers

## Treatment in Eating Disorders

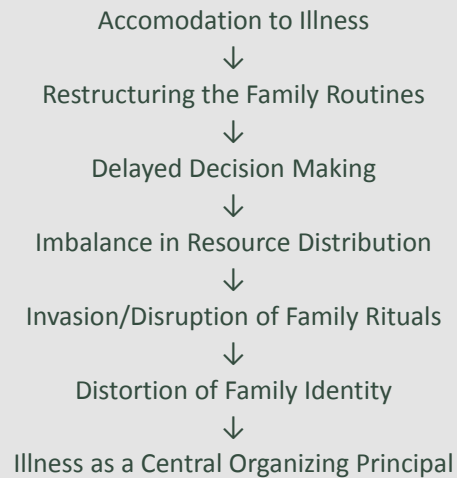
- In anorexia nervosa
  - Refeeding
  - Family therapy
  - Psychotropics: antidepressants and/or atypical antidepressants
- In bulimia
  - Family therapy
  - CBT
  - Psychotropics: antidepressants
- In Ednos:?

## Family-based Treatment

- Behavioural Family Therapy (Maudsely Method)



## The Effects of the Eating Disorder on the Family



## The Effects of the Eating Disorder on the Family

- Guilt and self blame
- Siblings feeling neglected
- Envy
- Anger and resentment
- Fear and worry
- Stretching family coping strategies



## Family-based Treatment

- Families do not cause eating disorders!
- However, parental involvement in care and in treatment is vital to the recovery of a child or adolescent with anorexia nervosa

## Family-based Treatment

- In adolescents treated with family therapy:
  - 70% of patients achieve a healthy weight by the end of treatment
  - A majority will have started or resumed menstruation
- Five years post treatment F/U:
  - 60-90% of patients are fully recovered

## Family-based Treatment

- Treatment studies demonstrate that BFT benefit adolescents with AN/BP
- Preliminary evidence supports the use of BFT for adolescent BN
- Multi family therapy for AN showing promise and may be available in your area

## Individual Therapy

- Evidence to support their use is limited or non-existent
  - Rarely indicated in younger adolescents with eating disorders
- Might consider
  - play therapy in children
  - Might consider treatments that have been developed for feeding disorders
  - In older adolescents might consider CBT for bulimic symptoms

## Psychopharmacologic Treatment for Eating Disorders

- No double blind placebo controlled trials in children or adolescents exclusively
  - Older adolescents often lumped in with adults
  - Case reports and Case Series currently what is available
  - Adult literature (also sparse) used to inform pediatric practice

## Antidepressants in AN

- There is no evidence that antidepressants work in the acute phase.
  - No adequate study that provides this info.
- Antidepressant in Relapse Prevention may work:
  - 2 RCTs in adults
    - Fluoxetine with placebo in weight-recovered adults-Kaye and colleagues, 2001:
      - Fluoxetine prevented relapse
    - Fluoxetine with placebo (& CBT) –Walsh and colleagues, 2006:
      - Fluoxetine failed to demonstrate benefit in relapse prevention
      - Suggestion may be helpful in patients with co-morbid anxiety

## Antidepressants in BN/BED

- Antidepressants reduce the urge to binge/purge in BN/BED
  - are part of the therapeutic armamentarium for the treatment of BN/BED patients.
  - Need to use higher doses (eg. prozac at 40-80mg)
  - However, their use as sole therapy does not seem sufficient to effectively treat these patients.

(Bacaltchuk et al, 2003, 2005)

## Antipsychotics in AN

- RCT olanzapine compared to Placebo in Adults
  - Blinded 10 week trial
  - 76 patients approached but 34 agreed to participate and 28 completed study
  - Olanzapine resulted in:
    - a greater rate of increase in weight ( $p=0.001$ )
    - earlier achievement of target weight ( $p=0.02$ )
    - body mass index ( $p=0.03$ )
    - greater rate of decrease in obsessive symptoms ( $p=0.003$ )
    - no differences in adverse effects were observed

(Bissada et al, 2008)

## Indications for Hospitalization (JAH, 2003)

- Impaired Growth and Development
  - Severe malnutrition
    - Weight  $\leq$ 75% average body weight for age, sex, and height
  - Arrested growth and development
- Fluid and Metabolic Abnormalities
  - Dehydration
  - Electrolyte disturbances
    - hypokalemia, hyponatremia, hypophosphatemia

## Indications for Hospitalization (JAH, 2003)

- Cardiac Abnormalities
  - Cardiac arrhythmias
  - Severe bradycardia HR <50 bpm daytime; <45 bpm at night
  - Hypotension (<80/50 mm Hg)
  - Hypothermia (body temperature <96° F)
  - Orthostatic changes in HR (>20 bpm) or BP (>10 mm Hg)
- Behaviourial
  - Acute food refusal
  - Uncontrollable bingeing and purging
  - Acute psychiatric emergencies (e.g., suicidal ideation)
  - Comorbid diagnosis

## How long should an adolescent be hospitalized?

- Medical stability (JAH, 2003) ...is that enough?
- Limited research
- Data suggests that limiting LOS may worsen outcome
- Adults with ED discharged before reaching IBW weight more likely to be rehospitalized (Baran 1995; Commerford 1997)

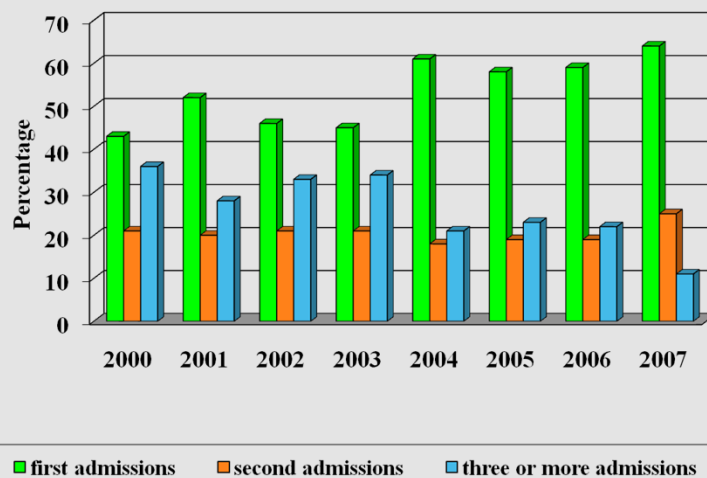
## Clinical Implications

- Higher discharge weight helps to minimize multiple re-admissions (>85% IBW)
- Children and adolescents who admitted at a significantly lower percent of IBW
  - required longer hospital stays to attain a healthy weight
  - at risk for multiple admissions

## Inpatient Refeeding at Sickkids

- An evidence-based, quality improvement intervention increased discharge weights in an inpatient program from 80% of healthy weight to 90%
  - In 2000, 35.8% of the patients had at least two previous admissions and by 2007, this had dropped to 11.5% ( $p < 0.001$ ).
  - The mean number of admissions had at time of admission dropped from 2.37 with a range of 1-7 in 2000, to 1.51 with a range of 1-4 in 2007 ( $p < 0.001$ ).
  - As a result, by 2007, the majority of admissions were first admissions (63%), up from 2000, when first admissions were the minority (44%)

**The Characteristics of Admissions on the Inpatient Unit by Year**



- Stay focused on the symptoms rather than the diagnosis
  - Restriction
    - Reason less important
    - Treatment is refeeding
    - Manage distress
    - ?body image issues
  - Bingeing
    - Treatment is to normalize eating patterns
    - Manage affect
  - Purging
    - Monitor electrolytes
    - Limit behaviours
    - Manage distress

## Clinical Tips...to keep in mind

- Food is medicine
- Families are the secret to recovery
- Patients may feel physically better once they start eating
- Patients don't feel better psychologically once they start eating
- Feeling fat goes away last!
  - Worries about body image persist in our culture well beyond ED recovery



## Clinical Tips...to keep in mind

- Children and adolescents should not “diet”
  - No evidence that it works
  - May result in higher body weight at the end of adolescents
  - May lead to an eating disorder
  
- Rates of obesity in Canada in <18 yrs is 9%

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