

The ABCs of Nutrition: Implementation of the Red, Yellow, Green System (RYG) of Weight Management

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Origins of Red, Yellow, Green:

The Red, Yellow, Green System was originally developed in 1972 by Leonard Epstein for obesity management in pre-teens. He found it to be successful in teaching nutrition and an effective weight management tool. Dietitians at the Children's Institute (Pittsburgh) adapted the system for Prader-Willi Syndrome as a way to put necessary limits and structure in place suitable for the needs of patients. Karen Balko, Registered Dietitian at North York General Hospital, re-designed and expanded the RYG System, in conjunction with the Ontario Prader-Willi Syndrome Association.

RYG is an effective tool

RYG is effective for the prevention and treatment of obesity in Prader-Willi Syndrome. Practice based research indicates that it can not only reverse the obesity associated with PWS, but also prevent and reduce its severity.

In addition, the RYG System reduces behaviours around food. In their study, *Impact of RYG on the weight and behaviour of subjects with PWS*. 2006 (North York General Hospital), Dr. Glenn Berall, Karen Balko and other researchers found that parents who implemented the RYG System reported significant reduction in their child's requests for food and temper tantrums concerning food.

Without proper nutrition intervention for individuals with PWS, obesity is inevitable because of the combination of the lack of a "full signal" and the lower metabolic rate. Obesity brings major medical risks, with long term effects, including:

- Sleep apnea
- Heart Disease/Stroke/Heart failure
- Circulatory Disorders
- Cellulitis
- Diabetes
- Mobility Problems
- Fatty Liver

Even the short term risks associated with PWS and obesity can present serious issues, including sleep apnea, or respiratory arrest or failure, which can lead to right sided heart failure, a fatal condition. There have been deaths associated with binge eating episodes, leading to necrosis of the stomach. The risk of choking is much higher in these individuals as well.

An individual with PWS has lower calorie needs. As a result, rapid weight gain is possible, even with small amounts of extra calories. An individual with PWS needs only about 60% of normal energy requirements. As an example,

- A 20 year old female without PWS needs 2200 calories

- A 20 year female with PWS needs 1300 calories for weight maintenance, and only 1000 –1200 calories for weight loss

If the individual with PWS takes in an extra 500 calories a day, it can result in a weight gain of 48 pounds in a year.

When PWS is diagnosed early in a child's life, the North York General Hospital Clinic does not view obesity as inevitable. Depending on the circumstances, obesity can be prevented, treated, and reversed. In short, the obesity usually associated with PWS can be minimized.

Caregiver's Role in Treating and Preventing Obesity in PWS

The first step for a caregiver living or working with an individual with PWS is to learn about and understand the syndrome. Even with solid knowledge about PWS, the caregiver must take a second step of emotional acceptance of the need for the low calorie diet, as a life-long condition.

Next, use that knowledge and acceptance in setting up an environment to prevent access to food. This includes preventative interventions, such as locks on food storage areas,

On an on-going basis, the caregiver must act as a "private eye" to uncover gaps in the barriers to access food. Watch for obvious behaviours of the individual who is finding ingenious ways to covertly obtain food. Then address those gaps by making necessary changes to your system.

Plan menus that are varied, but structured by the RYG System. Accept limited input from the individual in meal plan design.

Caregivers are at the front line; they are the most important people in implementing the diet, dealing with behaviours, and preventing access to food. This is a very challenging position, but with a structured system in place, this role becomes much smoother and easier to manage. The RYG System has been proven to achieve these outcomes in many group home settings.

Why does Red, Yellow, Green work for PWS?

The RYG System is effective because it is:

- Structured
- Easy to understand, written on a primary school level
- A concrete approach, which reduces the chance for arguing about quantities of food

The individual knows exactly what and how much he or she is allowed to eat. The RYG System teaches that, in the absence of a satiety signal, "fullness" is signaled by finishing the food on the plate, based on RYG meal plan. The large volume of low calorie fillers on the plate gives the illusion of lots of food, even though it is low calorie.

RYG is not just a diet, it is an entire approach!

- Calories are controlled

- Individual with PWS is taught what to expect in terms of foods and amounts, for meals and snacks
- RYG makes the diet fun and provides the individual with ownership of diet
- Environment is secured from ability to access foods, and individuals are supervised

Some simple steps help to make the RYG System more successful:

- Menus must be displayed for both the caregiver and individual.
- The diet plan must be displayed for both the caregiver and individual so there is no confusion or manipulation about what is allowed and how much.
- Organize special events in advance
- Teach the RYG approach to everyone who comes in contact with the individual, to make manipulation less likely
- Minimize exposure to food in the environment
- Limit access to food in the broader environment with constant supervision
- Ensure the dietitian/clinic who monitors the individual's diet and weight is knowledgeable about PWS and the RYG System, to ensure consistency

What are the results of the RYG System?

When the complete RYG System is understood and implemented consistently, there will usually be a complete transformation of the individual's behaviour within a short period.

This can be explained by the Food Security Equation of Dr. Gourash and Dr. Forster:

No Doubt + No Hope = No Disappointment

No Doubt:	No Hope:	No Disappointment
<ul style="list-style-type: none"> • Set menu • Set Schedule • Plan ahead 	<ul style="list-style-type: none"> • No access to food • Supervision 24/7 • No grocery store trips • No unplanned treats • No giving in • No food preparation 	<ul style="list-style-type: none"> • In getting food • Less anxiety about food

Food Security creates Less Anxiety

What is the Red Yellow Green System for Weight Control?

The Red Yellow Green System is also called "stoplight or traffic light diet" because it uses the universally understood symbol of the traffic light. The RYG System outlines an eating plan based on the four food groups, but the foods are categorized into high, medium and low calorie foods:

- Red is high calorie foods (stop)
- Yellow includes five food groups, with measured portions (careful – watch the amounts)
- Green is low calorie foods, 25 calories or less (go, extras of green foods are ok)

Green Foods

Green are “go” foods, with low calories. Since RYG allows second portions of “green” foods, the volume of the meal can be increased, which raises the level of satisfaction. The meal also last longer, which adds to emotional satisfaction.

Examples of “green” foods are one cup of carrots, asparagus, dill pickle, tossed salad, tomatoes, squash, coffee, tea, diet drinks. Calorie-free products are also encouraged, though a limit should be set for beverages as well. There should be no such thing as unlimited foods/beverages, even if calorie free. The term “unlimited” creates anxiety and can cause the person to obsess about these items, such as diet beverages. A reasonable amount of low calorie beverages is one for each meal and one for each snack. Limit carbonated diet beverages as they deplete the body of calcium. Diet pop and sugar-free gum may be used, within limits, as rewards for exercise or good behaviour, such as one per day at the end of the day.

Even though people with Prader Willi Syndrome generally dislike water, they can learn to drink water every day by making it more attractive or interesting. Get excited when they drink water!

- special bottle or straw
- nice and cold
- add lemon/lime juice
- herbal teas
- soda water with lemon

Red foods

Red are “stop” foods because of their high calories. Examples of “red” foods are meats such as fried chicken and bacon; dairy products, such as ice cream or regular yogurt with fruit; and many sweets and snacks, such as cake, donuts, chips, candy bars.

Consumption of red foods is based on the individual’s calorie limits, but is usually no more than four times per month. The serving size should be approximately 350 calories, however the calorie levels within the red foods can vary. For example one donut may only be 250 calories, but an order of small fries has 350 calories. Therefore focus on the serving size, not the calories as long as one serving does not go over approximately 400 calories. The red food should be planned ahead for an exact day, and the individual can be given a choice when to have the red foods, as well as a choice of red food, within a limited range of options. Planning ahead allows the red foods to be part of special occasions, such as birthdays or special outings.

Yellow foods

Yellow are “caution” foods. They include foods from all five food groups that are eaten every day. However, the serving sizes must be carefully monitored, to control the calories per serving.

- MEAT – 75 cal/serving
- BREAD – 70 cal/serving
- FRUIT – 80 cal/serving
- MILK – 100 cal/serving
- FAT – 50 cal/serving

Implementing the RYG Diet

The Red Yellow Green System for Weight Management (available from OPWSA, www.opwsa.org) provides detailed information about how to use the RYG System. It illustrates how a sample daily meal plan is constructed to ensure that all nutrients are included. Ideally, a dietitian should help with the menu planning to ensure the diet includes the appropriate percentages of fat, protein and nutrients.

The best way to determine the calorie needs of an individual is to have calorimetry testing done by a specialist. If this is not available, the book includes a formula for estimating calorie needs.

Because of the low calorie intake in the RYG System, a multivitamin supplement with iron is recommended. Extra calcium and vitamin D are usually recommended, due to the risk of lower bone density associated with PWS. Other supplements may include essential fatty acids, which are believed to be beneficial for brain development and maintenance of healthy heart and nervous systems. Keep in mind that essential fatty acids, such as fish oils, are a source of fat and calories, and must be counted as part of the meal plan.

The Caregiver's Role

As the caregiver of an individual with PWS, you have an essential role in establishing and maintaining health. Keeping individuals safe from extra food is a necessary component of treatment and care. This is a challenging task, but don't give in to the challenges. If you can maintain consistency, the boundaries around food will create more peace and security, both for you and for the individual.

Policy Statement: Adults with PWS and Decisions Re: Right to Eat (PWS Association – USA www.pwsausa.org)

..... physiologically driven eating behavior is no more under cognitive control, nor amenable to cognitive remediation, than is the failure of the pancreas to produce insulin in diabetes. Further, there are, to date, no medical, pharmacologic, or behavioral treatments that fix or cure this biological malfunction. Bioethicists dictate that informed consent requires the capacity to consider, and fully understand, the pros and cons of both sides of an issue prior to making a decision. Since by their own physiology, persons with Prader-Willi syndrome cannot decide "not to eat," therefore they cannot responsibly decide the converse: "to eat, or not to diet." Thus, to allow such decisions under the guise of "restriction of rights" is both medically and ethically unsound. Failure of the care-giving environment to maintain a rigidly managed diet or to supervise food access leads to the previously described rapid weight gain and can easily result in cardiopulmonary compromise and death.