# Take 3 – Practical Practice Pointers© May 13, 2019 Edition

## Measles (rubeola), Energy and Weight Loss, Bicycle Safety

## From the CDC, Nightly News, and Questions from Colleagues

## 1) Brief Measles (Rubeola) Primer/Update

**Question:**
"Getting a lot of questions about measles! Help!" (okay, more of a plea than a question)

**Answer:**
Although measles was declared eliminated from the US in 2000, 764 cases have been reported from 22 states as of May 3. This highly contagious viral infection, spread via respiratory contact, has a typical presentation, and can lead to significant complications.

The incubation period for measles is 8-12 days. Clinical features include fever (up to 104), dry cough, clear rhinorrhea, pharyngitis, conjunctivitis, and Koplik's spots inside the mouth and erythematous rash which usually start at the head and spreads downward over 2-3 days (see references for pictures). Those infected are contagious from the onset of the prodrome until 48 hours after the rash appears.

The history and clinical features can make a reasonable clinical diagnosis or rule out measles well before lab test results are received. IgM antibodies begin to appear 1-3 days after rash onset. Treatment in general is supportive.

Vaccination for measles began in 1963 and the live vaccine is quite effective, with 1 dose of vaccine providing approximately 93% effectiveness and 2 doses 97%. The CDC considers those who received 2 doses of the vaccine or had the infection immune for life. All healthcare professionals should receive 2 doses of the vaccine.

Most people born after 1988 received two doses of MMR and are immune and most adults born before 1957 had the infection. For those born between about 1957 and 1988, their status is more complicated. A small percentage of those who received the vaccine between 1962-67 received the killed vaccine, which is less effective, and these patients may still be susceptible. Additionally, those vaccinated between 1968-1989 may have received only a single dose. Many schools began requiring a 2$^{nd}$ dose in the 1990's. If records are not available, IgG titers can be used to document immunity, or there is no harm in getting another dose of MMR vaccine.

For those who may have been exposed, special arrangements should be made to have them evaluated. All who come in contact with them should wear an N95 respirator mask. The MMR vaccine can be given within 72 hours of exposure as post-exposure prophylaxis. Except in healthcare settings, unvaccinated people who receive their first dose of MMR vaccine within 72 hours after exposure may return to childcare, school, or work. Immunoglobulin (IGIM) can also be given as post-exposure prophylaxis within 72 hours of exposure.

**My Comment:**
It is likely that many readers have never seen a case of measles, while others have both had it and witnessed its potentially severe consequences. For those who have never

seen a case, the pictures at the CDC website (2nd reference) provide a nice overview. The current outbreak has been almost exclusively involved persons who have never been vaccinated. The controversies regarding vaccine refusal have been discussed in previous editions of Take 3 and I covered the differences between vaccine refusal and vaccine "hesitancy" in the 4/29/19 edition. Please see the website link in the cover e-mail for access to previous editions of Take 3.

**References:**

CDC Measles (Rubeola) for Healthcare Professionals: Link
CDC Measles Pictures: Link

## From the Literature

## 2) Energy Expenditure and Weight Loss Maintenance

Changes in energy expenditure that occur with weight loss have been suggested to contribute to the propensity for weight regain after weight loss. Total daily energy expenditure (**TDEE**) declines with weight loss because of decreases in both resting energy expenditure (**REE**) and physical activity (**PA**) energy expenditure (**PAEE**) that result primarily from the reduction in body mass. Some evidence suggests that substantial weight loss may also generate additional decreases in REE and TDEE beyond that expected based on changes in body weight and/or composition alone. To prevent weight regain, a permanent behavior change that leads to either a lower energy intake (**EI**) and/or a higher level of PA must occur to compensate for the reduction in TDEE.

Although caloric restriction is effective for weight loss, current evidence indicates it is relatively ineffective as a sole strategy for long-term weight loss maintenance. The "energy gap" theory states in part that the decline in TDEE with weight loss creates an energy gap that must be filled in order to remain in energy balance (and avoid weight regain) at a reduced body weight. Because high levels of PA are consistently associated with successful long-term weight loss maintenance, it is possible that successful weight loss maintainers (**WLM**) sustain high levels of PAEE to fill this gap.

Much of the evidence demonstrating that successful WLM sustain high levels of PA is based on studies that have used self-reported measures or activity monitors. Although successful WLM sustain high levels of PA, how this impacts PAEE and TDEE is not known. The goal of this study was to measure PAEE and TDEE in a sample of successful WLM and compare these measures to two control groups: (1) normal weight controls (NC) whose BMI was similar to the current BMI of the WLM and (2) controls with overweight/obesity (**OC**) whose current BMI was similar to the pre–weight loss maximum BMI of the WLM. The global hypothesis was that WLM would sustain higher levels of PAEE compared with both control groups. Moreover, it was hypothesized that because of the high levels of PAEE, WLM would sustain a TDEE that was higher than that of normal controls but not different from that of overweight/obesity. TDEE was measured using the doubly labeled water method. Resting energy expenditure (REE) was measured using indirect calorimetry. PAEE was calculated based on these measurements.

The authors found that physical activity energy expenditure (PAEE) in successful weight loss maintainers (WLM) was significantly higher compared with that in both normal weight controls (NC) and those with overweight/obesity (OC). The differences in PAEE across the study groups were reflected in a similar pattern observed in objectively measured steps per day: WLM exhibited significantly higher steps per day (~12,100) compared with both NC (~8,900) and OC (~6,500).

**Conclusions**
The high levels of PAEE and TDEE observed in individuals maintaining a substantial weight loss (−26.2 ± 9.8 kg maintained for 9.0 ± 10.2 years) suggest that this group relies on high levels of energy expended in physical activity to remain in energy balance (and avoid weight regain) at a reduced body weight.

**My Comment:**
I found this to be a fascinating study, and I worry all the likely unfamiliar abbreviations can cause one to quickly become confused about what was found here. While an approximation, my general rule for patients is that 80% of weight loss is attributable to changes in caloric intake, while a much more substantial part of weight maintenance is attributable to physical activity. This study supports this. Exercise is also important for bringing about changes in body composition. The amount of physical activity required for these patients was in line with the higher end of the US physical activity guidelines of 150-300 minutes (2.5-5 hours) a week of moderate-intensity aerobic activity or 75-150 of vigorous intensity aerobic exercise. My personal observation is that for those who are most successful, this level of PA becomes an almost obsessive daily habit, and one which they gladly do.

**Reference:**

- Ostendorf D et al. Physical Activity Energy Expenditure and Total Daily Energy Expenditure in Successful Weight Loss Maintainers. Obesity. March 2019; 27(3): 496-504. Article


## From the Literature, National Statistics, and Good Parenting

## 3) Bicycle Safety 2019

Date indicate that emergency department visits and hospital admissions resulting from adult bicycle trauma have increased dramatically. One 2018 study looked to estimate costs associated with adult bicycle injuries in the USA from 1997–2013. The authors found that inflation-free costs per case associated with non-fatal bicycle injuries are increasing annually. The growth in costs is especially associated with rising ridership, riders 45 and older, and street/highway crashes. In 2010 dollars, estimated adult bicycle injury costs totaled $24.4 billion in 2013. According to the CDC, in 2015 over 1,000 bicyclists died and there were almost 467,000 bicycle-related injuries.

The National Highway Traffic and Safety Administration (NHTSA) data shows that bicyclists accounted for 2 percent of all traffic deaths in 2014. Bicyclist deaths occurred most often between 6 p.m. and 9 p.m. (20%) and in urban areas (71%), and with riders who were not wearing helmets (b/w 54-87%). The vast majority of bicyclists killed were male (88%) and the largest number of males injured were between 20 to 24 years old.

About one in five bicyclists (21%) killed in crashes had blood alcohol concentrations (BACs) of .08 higher.

Head injuries from bicycling accidents are of particular concern, especially in children. According to CDC estimates, < 50% of children ages 5-14 wear helmets regularly when riding a bicycle. With that in mind, some bicycle safety tips from Safe Kids Worldwide (and adults as well) include:

**The single most effective safety device available to reduce head injury and death from bicycle crashes is a helmet.**

- Make it a rule — every time you or your child ride a bike, you must wear a bicycle helmet that meets or exceeds the safety standards developed by the U.S. Consumer Product Safety Commission.
- Helmet fit is important. The helmet should be comfortable and snug, but not too tight. It should sit centered on top of your head in a level position, and it should not rock forward and backward or side to side. The helmet straps must always be buckled snugly against your chin.

**Proper bicycle fit and maintenance are also important for safety.**

- Ensure proper bike fit by bringing the child along when shopping for a bike. Buy a bicycle that is the right size for the child, not one he will grow into. When sitting on the seat, the child's feet should touch the ground.
- Make sure the reflectors are secure, the brakes work properly, gears shift smoothly and tires are tightly secured and properly inflated.

**Always model and teach proper bicyclist behavior. Learn the rules of the road, and obey all traffic laws.**

- Ride on the right side of the road, with traffic, not against.
- Use appropriate hand signals.
- Respect traffic signals, stopping at all stop signs and stop lights.

**Do not ride a bicycle when it's dark or there is low-visibility.**

- Wear clothes and accessories that incorporate retroreflective materials to improve your visibility to motorists.

**My Comment:**
Bicycling is a great source of recreation as well as exercise. Avoidable biking head injuries are always a tragedy. I've had a good friend and fellow Family Physician whose life was irreparably changed by such an injury. Let's model and educate for safe riding. And biking while intoxicated sure seems like a really bad idea ….

**References:**
Gaither TW, et al. Estimated total costs from non-fatal and fatal bicycle crashes in the USA: 1997–2013. Injury Prevention. April 2018;24(2):135-141. Article
Safe Kids Worldwide. More Safety Tips at Safety Tips
National Highway Traffic Safety Administration: Link

Feel free to forward Take 3 to your colleagues. Glad to add them to the distribution list.

*Mark*

**Carilion Clinic Department of Family and Community Medicine**