Much has been learned in the past several decades about basic adolescent development and adolescent conditions, but much remains to be determined about the effect of biopsychosocial and environmental influences on health and disease. This new series on adolescent health and disease is timely as we learn more and impart this information to our readers. The first article illustrates the complexity, both conceptual and practical, of the issues related to male reproductive health.1

Adolescence is the stage of development marking the transition between childhood and adulthood when rapid biological, cognitive, and behavioral changes occur. Genes, the brain, and the environment largely govern the ultimate expression of growth and maturity. The timing of the profound adolescent changes in biology and behavior is independent, even though biology moderates behavior and behavior moderates biology.

We do not understand why puberty begins in any 1 individual. What we do know is that the hypothalamic-pituitary-end organ axis is activated under genetic and environmental influences2; adolescent somatic and sexual changes occur as a result of this activation.

In the behavioral/cognitive domain, most adolescents move from concrete operational thinking (focus on the here and now) to the highest levels of intellectual competence, formal operational thinking (abstract thinking). Theories of the structural brain correlates of cognitive development during adolescence are now emerging from data generated from longitudinal MRI studies. That is, theories of the biological bases of cognitive changes long observed clinically in adolescents are emerging. Some changes observed on imaging of the brain on MRI include increasing "connectivity" of areas of the brain defined functionally by connections between various parts of the brain activated together by a task.3 This connectivity is facilitated by an increase in the volume of the white matter in the brain throughout childhood and adolescence. The volume of gray matter follows a different developmental curve over time, described as an inverted U curve with an increase, then a decrease, and then an increase in its volume throughout childhood and adolescence. Prefrontal functions of the brain that govern impulse control and judgment develop later in time than does the limbic system responsible for emotional control as brain growth moves from the back to the front of the brain.5

The conditions reviewed in this timely piece provide opportunities to review the interplay of biology and behavior during adolescence. Consider the cascade of events that occur both biologically and behaviorally when the brain provides the signal for activation of the hypothalamic-pituitary-end organ system. After sexual maturation, adolescents are capable of being sexually active and reproducing.2 Neurocognitively, the limbic system (the accelerator) is activated before the prefrontal cortex (the brake) that controls judgment and impulses. Thus, adolescents, biologically capable of being sexually active in the presence of
adolescent sexual impulses and risk-taking behaviors may have untimely pregnancies and/or contract sexually transmitted illnesses. Often not prepared to think ahead, preventive measures are not used.

Another clinical example of the biological-behavioral interplay of disease during adolescence is that of the eating disorders, for which the incidence of onset is higher during adolescence than at other times of life.

One could ask why female adolescents are particularly at risk for this condition. Is there something unique to female adolescent biological and neurocognitive changes that render them susceptible? Adolescence demands a nearly relentless challenge to grow biologically, cognitively, and behaviorally. Some adolescents who have the genetic predisposition for an eating disorder may not respond well to these demands for change. They may experience a developmental arrest, often both biologically and behaviorally. The hypothalamic-pituitary-end organ axis underfunctions as a result of starvation, and thus the adolescent’s behavioral development is also affected. To develop targeted therapies for this most difficult, chronic illness, we must know more about the underlying biologic and behavioral mechanisms and vulnerabilities of this disease.

REFERENCES


TICKETS AT THE DOOR: “How much would you pay for a Beyoncé ticket?” My daughter was on a cross-country road trip with friends and in Nashville when I got her text. I texted back whether she was asking me how much in theory I would pay or how much I was willing to pay at that instant. As it turned out, she was standing next to a scalper outside Ryman Auditorium trying to decide whether to pay his asking price for two tickets to see the show that was scheduled to begin in 30 minutes. Having just been skunked getting tickets to a show that my friends and I had been planning to see for more than six months, I recommended that she pay the man. She did and an hour later I received a text: “I AM SO EXCITED”. Still, it made me wonder how the average person gets tickets. Most of the big shows sell out almost instantly. According to The Fader (Music News: March 6, 2013), remarkably few tickets for big acts like Beyoncé are actually available to the general public. Hard numbers are difficult to learn as venues are not required to release any data. Based on a news investigation, however; at least for one very popular act, fewer than 10% of the announced seats were actually available to the public. It turns out that the majority of available tickets are allotted to presales for the artist’s fan club, tour sponsors, ticket seller users, VIPs, and radio contests. The artist often reserves many of the prime seats to sell at high prices cutting out the ticket sellers. Getting on the presale list does not guarantee securing a ticket but does usually mean giving up information (such as an email address) or buying a product (such as a credit card). The organizers like presales because they learn more about who is interested. Whether such a system encourages scalping is subject to intense debate and depends on one’s perspective. Regardless of who is to blame, reselling tickets at more than face value seems to be a major part of the process these days. I am thrilled my daughter had a great time at the concert. I do wish, however, that the process for getting a ticket was a bit more fan-friendly and somewhat closer to the face value of the ticket.

Noted by WVR, MD
Pushing the Boundaries in Adolescent Health and Disease
Elizabeth R. McAnarney
Pediatrics originally published online August 12, 2013;

Updated Information & Services
including high resolution figures, can be found at:
http://pediatrics.aappublications.org/content/early/2013/08/07/peds.2013-1928.citation

Permissions & Licensing
Information about reproducing this article in parts (figures, tables) or in its entirety can be found online at:
https://shop.aap.org/licensing-permissions/

Reprints
Information about ordering reprints can be found online:
http://classic.pediatrics.aappublications.org/content/reprints
Pushing the Boundaries in Adolescent Health and Disease
Elizabeth R. McAnarney
*Pediatrics* originally published online August 12, 2013;

The online version of this article, along with updated information and services, is located on the World Wide Web at:
http://pediatrics.aappublications.org/content/early/2013/08/07/peds.2013-1928.citation