nature publishing group

Award Address | Special Article

American Pediatric Society's 2013 John Howland acceptance lecture: the road less traveled

Elizabeth R. McAnarney[1]

This lecture was presented at the 2013 annual meeting of the Pediatric Academic Societies, Washington, DC.

President Stoll, members of the Pediatric Academic Societies, family, and friends:

Thank you, Barbara, for the award. When you called to tell me of the Howland Award on a dreary December, Friday afternoon, I was stunned and was not sure that I had heard you correctly. The receipt of the 2013 John Howland Award is a singular honor that I shall treasure.

Nina, I thank you for your introduction and for your support during your 7 years of being chair in Rochester. Sten, congratulations on your award. Happy birthday to the American Pediatric Society on our 125th anniversary.

The title of my presentation is taken from Robert Frost's 1916 poem titled, "The Road Not Taken": "Two roads diverged in a wood, and I, I took the one less traveled by…" (1).

My road "less traveled by" was that of a pediatrician developing adolescent pregnancy services, evaluating those services, and modifying services and policy on the basis of these data. The reason I am presenting these data now is that we will be required by the federal government to evaluate the outcome of our medical services and to improve the quality and effectiveness of those services based on outcome evaluations. In a recent paper on the new health-care initiatives, it was noted that clinical design and improvement depend on clinical leadership (2).

On my "road less traveled," I would like to recognize and thank my outstanding guides, three of whom received the John Howland Award. Dr Robert J. Haggerty (**Figure 1a**) received the 1998 John Howland Award and, as the third chair of the Department of Pediatrics at the University of Rochester (Rochester, NY), in 1968 recruited me as a fellow to the University, where I have remained ever since. Dr Gilbert B. Forbes (**Figure 1b**), the recipient of the 1992 John Howland Award, spent 50 y on our pediatric faculty and nurtured our intellects selflessly. Dr Julius B. Richmond (**Figure 1c**) received the 1990 John Howland Award and was chair of the Department of Pediatrics and dean of the State University of New York Upstate Medical Center (Syracuse, NY) while I was in Syracuse. He served as surgeon general in President Jimmy Carter's administration and was cofounder of Project Head Start. My first experience in an adolescent maternity project was with Dr Richmond's team in Syracuse.

Figure 2 is a picture of the four Rochester chairs of Pediatrics from 1964 to 2006. In this picture are two of my other mentors. Dr David H. Smith, the fourth chair of Rochester's Department of Pediatrics, who with Dr Porter Anderson received the 1996 Lasker Award in Clinical Medical Research for the creation of the *Haemophilus influenzae*, type b vaccine that has saved thousands of children's lives throughout the world. Dr Smith, as chair, liked to say that "ideas are free." Dr Robert A. Hoekelman, a beloved figure in Rochester, the fifth chair of our department, is best known nationally for his leadership in general academic pediatrics. In addition, my Rochester fellowship director, Dr Stanford B. Friedman, was the best fellowship director that I have ever met. I thank my family, my administrator of 37 y, Carole Berger, and many colleagues and trainees locally and nationally who have provided decades of counsel, help, and support.

There were 1 million adolescent pregnancies annually in the United States from the 1960s to the 1980s. Adolescent mothers and their children were known to be at psychosocial risk, mostly due to their young ages, low educational levels, and impoverished environments. It was generally believed that young mothers, and their newborns also, were at biologic risk because of the mothers' young age. This belief of the biologic risk to mother and child from maternal "immaturity" was suspect, however, as by the time that adolescents bear children they have had nearly all of their adolescent growth; women of young age have borne children for years.

When we began our work in the late 1960s, there were few services for adolescents and, more specifically, pregnant adolescents. We did not know whether these young mothers' or their children's outcomes could be improved through prenatal intervention. Adolescent pregnancy was seen solely as an obstetric problem. Furthermore, there was skepticism that prenatal care for adolescents could modify maternal–infant outcome, as it was unclear from the adult literature that prenatal care changed maternal–infant outcome in adults. It was thought generally that pediatric involvement should start at the time the infant was born and did not include our

[1]Department of Pediatrics, University of Rochester School of Medicine and Dentistry, Rochester, New York. Correspondence: Elizabeth R. McAnarney (elizabeth_mcanarney@urmc.rochester.edu)

Advance online publication 4 September 2013. doi:10.1038/pr.2013.129

Figure 1. Mentors and John Howland Awardees. (**a**) Robert J. Haggerty, MD (1998); (**b**) Gilbert B. Forbes, MD (1992); and (**c**) Julius B. Richmond, MD (1990).

Figure 2. Rochester Pediatric chairs (1964–2006). First row (left to right): Robert J. Haggerty, MD; David H. Smith, MD. Second row (left to right): Robert A. Hoekelman, MD; Elizabeth R. McAnarney, MD.

perceived responsibility for the care of adolescents as well. We believed that adolescents were developing persons who happened to be pregnant at a young age, which meant that their and their infants' development might be limited unless prenatal intervention occurred. As a result of these myths and ensuing debates, we decided to create novel programs based in the academic medical center to generate data that had the potential of modifying the clinical services and possibly changing national policy.

By way of illustration, data from three clinical outcome studies demonstrate how we (i) modified prenatal care for adolescents through developing novel interdisciplinary clinical services and (ii) developed data from the clinical program that helped to modify clinical policy.

Our first study compared the obstetric, neonatal, and psychosocial outcomes of adolescents cared for in the newly created Rochester Adolescent Maternity Project (RAMP) with those of adolescents in a hospital obstetric clinic (HOC), a traditional obstetric clinic. What was novel about RAMP? RAMP was a comprehensive, interdisciplinary prenatal clinic with expanded psychosocial services. HOC was a traditional prenatal program run by obstetric–gynecology residents with faculty supervision. Both clinical programs occurred at the Strong Memorial Hospital of the University of Rochester Medical Center.

Study RAMP and HOC adolescents were matched for age at delivery, ethnicity, and percentage receiving financial assistance. Most of these young women were in their midteens and were African Americans; the majority were on public financial assistance.

Surprisingly, the obstetric and neonatal outcomes were excellent. RAMP adolescents had more prenatal visits kept than did the adolescents in the HOC (13.6 ± 0.7 vs. 9.7 ± 0.5, respectively, $P = 0.001$) and fewer procedures (RAMP 20% and HOC 52%, $P = 0.05$). The major obstetric outcomes were similar for adolescents in the two sites, that is, they were no different whether the mother received prenatal services in RAMP or in the HOC.

The neonatal outcomes were impressive for both groups (RAMP vs. HOC), all the more so as this was in the early to mid-1970s. The mean birth weights of the two groups were 3.080 ± 6.7 vs. 3.010 ± 0.6 g, respectively. In addition, the percentage of low birth weight infants (8 vs. 11%, respectively) was similar for neonates cared for in either setting.

Two years postpartum, the psychosocial outcomes of adolescents in the two programs were strikingly different. RAMP adolescents had better psychosocial outcomes than did the HOC adolescents. Approximately one-half as many RAMP adolescents had repeat pregnancies than did the HOC patients (24 vs. 43%, respectively; $P = 0.05$). Forty percent of RAMP adolescents and 65% of HOC patients received any public financial assistance at 2 y postpartum, with 64% of RAMP adolescents and 68% of HOC adolescents receiving any public assistance at the time of delivery (3).

We learned that optimal obstetric and neonatal outcomes could be achieved for adolescent mothers and their infants if adolescents received comprehensive prenatal care. From these data, we questioned the premise that adolescents by virtue of young age are at risk of major adverse biologic outcomes. A recent study with much larger numbers of mothers and children affirms our findings about the average birth weight of infants born to young mothers (4). The psychosocial outcomes for RAMP mothers were markedly improved, likely due to the enhanced prenatal psychosocial services. Prevention of

immediate repeat adolescent pregnancy allows the mother to delay the likelihood of an immediate repeat pregnancy with an increase in preterm birth.

RAMP's clinical practice has been modified based on these data so that RAMP's adolescents are cared for by nurse midwives who provide prenatal, perinatal, and postpartum care to the adolescents. If adolescents need perinatology consultation, they are referred immediately. Thus, a relatively simple intervention had many positive effects for young mothers, their children, and society.

The second outcome study is an adolescent consumer evaluation of RAMP services at 3 mo postpartum. Patient feedback to providers is becoming an important component of modern health-care evaluation. In an effort to improve clinical care, a research assistant not providing clinical care visited RAMP adolescents' homes and asked the adolescents about their perceptions of the care they received in RAMP. The patient population was similar demographically to the adolescents in the first study.

Adolescents freely shared their perceptions of the quality of RAMP services. Eighty-three percent of the adolescents were positive about the services and liked the individual attention received from staff and the classes in which they learned about anatomy and physiology of human reproduction, prenatal care, and caring for an infant. One adolescent said, "I got confidence there." Ninety-seven percent would recommend RAMP to others for gynecologic care (5). Their feedback changed RAMP's care. For example, both the adolescents and their parents preferred a late-afternoon clinic, rather than an evening clinic. Clinic times were changed from early evening to late afternoon. Adolescents did not like the prenatal group sessions, as they were uncomfortable sharing their ideas with peers. These groups met less frequently. Nurse home visits replaced social work visits, as the families perceived that the social workers might withdraw public assistance from the family (which was not possible as our social workers had no county fiscal responsibility).

The last study illustrates data that helped to modify national policy. It focuses on the relationship between gestational weight gain (GWG), or pregnancy weight gain, and postpartum weight in RAMP adolescents. The definition of GWG is the difference between maternal prepregnancy weight and maternal weight at delivery. (We studied the rate of GWG in kilograms per week to correct for length of gestation.)

The 1990 GWG guidelines of the Institute of Medicine suggested that young adolescents and black women should strive for weight gains at the upper end of the newly recommended BMI ranges desirable for GWG for women with similar prepregnancy BMIs and heights (6). This suggestion may have come from the belief that young adolescents were immature biologically and they compete with their fetuses for nutrients; thus, young adolescents needed more nutrients (weight gain), than did older mothers.

We questioned this Institute of Medicine GWG recommendation, as it seemed extreme from what we then knew about adolescent growth and pregnancy outcomes for adolescents who received prenatal care. Furthermore, we were concerned that excessive GWG in young adolescents might contribute to postpartum obesity in these young mothers. Therefore, this study focused on the relationship between adolescent GWG and postpartum weight retention and obesity.

We measured the BMIs of 30 RAMP adolescents on average 3.3 y postpartum. Mothers who had rapid GWG (defined as kilograms per week) had a greater change in BMI (prepregnancy to postpartum follow-up) than did those with slow weight gain (**Figure 3**). That is, mothers who had gained >0.4 kg/wk had a BMI change of 20%, and those mothers with a slow weight gain, defined as <0.23 kg/week, had a 3.4% change in BMI ($P < 0.05$, two-tailed t-test). The adolescents with high BMIs prepregnancy were morbidly obese on follow-up, with an average weight of 91.1 kg. Therefore, we concluded that more rapid GWG was associated with a greater increase in BMI than was slow GWG (7). The potential benefits for the infant of increasing birth weight by increasing GWG may be a potential hazard to the young mother.

The 2009 Institute of Medicine revised guidelines for GWG for adolescents suggested that those adolescents <2 y postmenarche should be advised to stay within the Institute of Medicine-recommended BMI-specific weight gain for all women (8). The data are still limited on the relationship of adolescent GWG and postpartum weight/obesity. Clinical data can modify national policy.

Data from one "road less traveled" and others' data have dispelled myths that were raised earlier. Obstetric, neonatal, and psychosocial prenatal care are essential to improve the young mothers' and their infants' biologic outcomes and the mother's psychosocial outcome.

The new health-care legislation will demand renewed effort in outcomes research. As academic pediatricians, we should be leading these outcome efforts in collaboration with social and economic scientists. Data on outcomes can influence clinical care and policy. That is, data do speak.

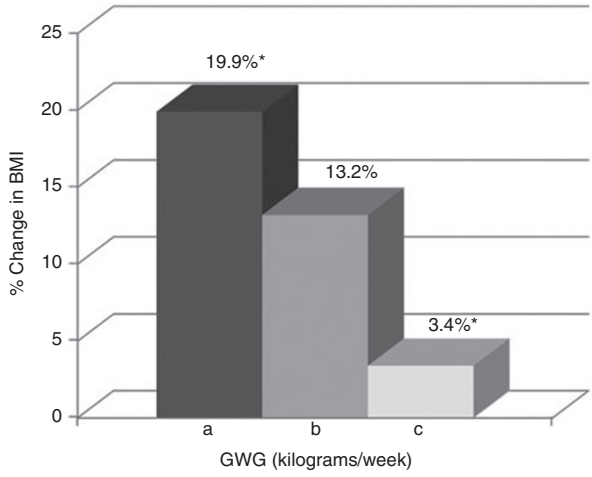

Figure 3. Gestational weight gain (GWG) and BMI 3.3 y postpartum. a: Rapid GWG (>0.40 kg/wk); b: average GWG (0.23–0.40 kg/wk); c: slow GWG (<0.23 kg/wk). *P = 0.05, two-tailed. From ref. 7.

ACKNOWLEDGMENTS

I thank all the trainees and colleagues locally and nationally who have provided creativity and support for our work, especially Richard E. Kreipe, Thomas K. McInerny, Ruth A. Lawrence, Peter G. Szilagyi, Jill S. Halterman, and the late Catherine Stevens-Simon. Special acknowledgment is given to Brenda Peat and Donna Treat for all their help in preparing for the activities related to the 2013 John Howland Award.

REFERENCES

1. Frost R. The road not taken. 1916. From the Poetry Foundation, 11 June 2013. (http://www.poetryfoundation.org/poem/173536).
2. Bohmer RM. Leading clinicians and clinicians leading. N Engl J Med 2013;368:1468–70.
3. McAnarney ER, Roghmann KJ, Adams BN, et al. Obstetric, neonatal, and psychosocial outcome of pregnant adolescents. Pediatrics 1978;61:199–205.
4. Harville EW, Madkour AS, Xie Y. Predictors of birth weight and gestational age among adolescents. Am J Epidemiol 2012;176:Suppl 7: S150–63.
5. McAnarney ER, Hagen MA, Adams BH, Friedman SB. Teen-agers evaluate their own health care. Pediatrics 1975;55:290–2.
6. Institute of Medicine, Subcommittee on Nutritional Status and Weight Gain During Pregnancy. Nutrition During Pregnancy. Washington, DC: National Academy Press, 1990:10.
7. Segel JS, McAnarney ER. Adolescent pregnancy and subsequent obesity in African-American girls. J Adolesc Health 1994;15:491–4.
8. Rasmussen KM, Yaktine AL. Weight Gain During Pregnancy: Reexamining the Guidelines. Institute of Medicine, Committee to Reexamine IOM Pregnancy Weight Guidelines. Washington, DC: National Academies Press, 2009.