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Edgar K. Marcuse

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Reflections on US Immunization Challenges: Lady Montague, Where Are You?

Dickens' oft-quoted words describe well the opportunities and challenges of US immunization programs: "... the best of times... the worst of times... the age of wisdom... the age of foolishness..."¹ Vaccine-preventable disease rates are low, and immunization rates are high, but the broad societal consensus that supported the US immunization program has eroded.² Our new understanding of immunology, along with new technologies, has launched a renaissance in vaccine research that holds real promise of preventing more infections and their sequelae, but not all US children are yet ensured timely access to all recommended vaccines. The transfer of most immunization from public clinics to physicians' offices has resulted in the cross-subsidy of public health by primary care, which, because of the economics of vaccine administration, is unsustainable. In the world of adult medicine, the gap between what we have and what we could achieve if we fully used the vaccines now in hand is even greater. As a nation, we talk of the value of prevention, of reining in health care costs, but we fail to walk the talk. We seem to have lost sight of the interface between public health and the individual health of all the members of our communities.³ Today there is an urgent need to reexamine this interface and to articulate a vision of collaboration that will enable us to derive the full benefit of modern vaccinology to prevent disease and improve the public health.

Most histories of immunization cite the leadership of Lady Mary Montague, who in 1717, 2 years after her brother died and she herself was scarred by smallpox, observed the practice of variolation (inoculation of infectious fluid from a lesion from a mild case of smallpox to induce immunity) in Constantinople, Turkey. Recognizing its potential to both protect individuals and prevent outbreaks, she set out to introduce the practice to England. Her fierce determination and her social connections overcame formidable opposition, and in 1722 King George I inoculated his grandchildren.⁴ Just 74 years later, in 1796, the work of Benjamin Jesty and Edward Jenner culminated in the vaccination of Jamie Phipps, and the rest is history. The scourge of smallpox was declared eradicated in 1980.⁵

The 2011 childhood immunization schedule seeks to protect against 16 diseases, but none so terrible as smallpox. For each vaccine-preventable disease, the precise balance point between preserving individual freedom of choice and ensuring adequate protection of the public likely will differ depending on the vaccine's safety and efficacy and the disease's morbidity, sequelae, and potential to ignite outbreaks. Each of these issues and their associated costs to individuals and society must be considered by those who promulgate immunization policy.⁶

Because public policy must nurture synergy between primary care and public health, the vision for collaboration to achieve the individual and

AUTHOR: Edgar K. Marcuse, MD, MPH

Seattle Children's; Departments of Pediatrics and Epidemiology, Schools of Medicine and Public Health, University of Washington, Seattle, Washington

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Address correspondence to Edgar K. Marcuse, MD, MPH, Seattle Children's, 4800 Sand Point Way NE, T-0111, Seattle, WA 98105.

E-mail: edgar.marcuse@seattlechildrens.org

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community benefits of immunization must be clearly articulated to and understood by federal and state legislators, county commissioners, and city councils; this requires leadership akin to Lady Montague's. Such leadership must come from public health and primary care—both pediatric and adult. Eight articles in this issue of *Pediatrics* attest that immunization remains at the center of 21st-century pediatrics.^{7–14} Three of these articles highlight the effects of public policy on immunization rates, immunization practice, and the epidemiology of vaccine-preventable disease. Sohn et al¹² show that work requirements for mothers on welfare had a negative effect on the timely administration of childhood vaccines, probably because many mothers were paid by the hour with no provision for child health visits. Shen et al⁹ show that providers who administered combination vaccines, as is recommended by the Advisory Committee on Immunization Practices and the American Academy of Pediatrics, received substantially lower reimbursement than those who administered the component vaccines individually; their results also highlight the large discrepancy between commercial and Medicaid reimbursement for the administration of pediatric immunization. Chaves et al⁷ docu-

ment the enormous decline in the incidence of infant varicella since the implementation of the US varicella vaccination program; they also show that the proportion of infant varicella cases exposed to herpes zoster doubled, which illustrates an opportunity to protect vulnerable infants too young to be immunized by preventing zoster in their adult caretakers.

Paradoxically, just as the potential of modern vaccinology increased, our cultural awareness of the threat of vaccine-preventable disease diminished. Today's parents have far more direct experience with the threats posed by alcohol and drug abuse, obesity, violence, and environmental hazards than with the threats of vaccine-preventable disease. Indeed, even those now graduating from pediatric residency programs are unlikely to have seen a case of measles, mumps, rubella, or invasive *Haemophilus influenzae* type B disease, much less polio, tetanus, or diphtheria.

As vaccinology advances, immunization practice will almost certainly become more complex. New vaccines will benefit the elderly and pregnant women. We may gradually shift from community-based toward personalized, perhaps genetics-driven strategies based on a new understanding of

individual risks of diseases and of adverse vaccine events.¹⁵

Immunization has been and remains a core activity of both pediatrics and public health. Although its achievements are universally acknowledged, immunization has been under attack for the past decade. The long overdue retraction of the fraudulent study that first suggested an association between autism and immunization,^{16–18} coupled with the publication of the results of many studies that found no association between immunization and autism, has made clear both the importance of distinguishing between good and junk science and the utility of scientific inquiry.

Public understanding of what we can achieve and acceptance of strategies needed require more than good science and good economics; they are also driven by cultural, psychological, and political factors.¹⁹ The world of Lady Montague is long past. To realize the full potential of modern vaccinology to improve individual and public health, clinicians and scientists must patiently engage in a continuing and respectful dialogue with federal, state, and local policy-makers and the public, and be cognizant that policy is the interface between knowledge and values.

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FROM HEDERA TO SNARK: “You use too many commas,” my daughter told me after reading an article I had recently written. I have reasonably thick skin when it comes to editing, but I was a bit perplexed. While I use commas more frequently than my daughter, who mostly eschews them altogether, I use fewer than my wife. I almost never use colons and semicolons, while my daughter’s writing is littered with them. A co-editor and I have practically come to blows (not really; however I must confess that I do have a fondness for parentheses) over her love affair with the dash. The writer can choose from a large number of punctuation marks: the period, comma, hyphen, parenthesis, and the aforementioned colon and semicolon. How does one decide when each is most appropriate? According to an article in *The Wall Street Journal* (*Life & Culture*: October 22, 2011), the rules regarding punctuation change all the time. Punctuation is a relatively recent phenomenon. Early Western texts had no punctuation whatsoever! By the middle ages, more than 30 different marks were used but the application was quite uneven. Early printers played an important role in codifying the use of punctuation. Parentheses and commas were first used in the early 1500s. Both of these have stood the test of time and remain in common use—although not always in correct use. Other punctuation marks have mostly faded from the scene: the hederia (a sideways ivy leaf), pilcrow (a C with a slash through it), and the point d’ironie (a backwards question mark) are three examples. The Internet culture, however, is having a profound effect on punctuation. The greater emphasis on less formal writing (and certainly shorter and pithier missives) has de-emphasized the use of several marks including the apostrophe. Interestingly, because the intent of the writer is sometimes more difficult to decipher, several new punctuation marks have been proposed to convey emotions: examples include disbelief (interrobang), sarcasm (snark—which is really a recycled point d’ironie), and inquisitiveness (question comma). After my daughter’s comments, I re-read my article. I did not make any changes. I like my little commas and the clarity they can give a sentence (although I will from now on avoid use of semicolons).

Noted by WVR, MD

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