

bruising mirror what many of us in the field know and teach, but provide a more concise foundation. Sugar and colleagues⁴ article in 1999 is often quoted in the field when looking at bruising and developmental level. Maguire warns physicians to interpret bruises within the context of a complete history and physical examination, and to remain conservative on the stand when testifying about what a particular bruise means in regards to child abuse.

In their second paper, Maguire and colleagues⁵ reviewed the literature about ageing of bruises. What is clear from the review is that most of the well-worn dogma in medicine about this subject has no scientific basis. After an initial 6831 papers, they found only three that met their strict inclusion criteria. They note that there was little consensus between studies about precise ageing of bruises on the basis of on colouration. Even bruises known to be of the same age can have different colours often associated with bruises of different ages. Their findings support the clinical suspicion that there is not enough solid evidence to age bruises accurately from colour alone. Schwartz and Ricci⁶ confirmed this finding in their independent review. Maguire and colleagues also note that there is variation in human colour discrimination. Again, they caution about being clear about what science supports when testifying on the stand in court. These findings are consistent with those of Bariciak and colleagues⁷—ie, that estimates by physicians of bruise ages are very inaccurate. Bariciak et al evaluated accidental bruises of a known age in children with varying levels of experience of medical professionals (physicians, residents, etc) evaluating the bruises for age. This finding is also consistent with current teaching that said “caution should be used in dating bruises”.⁸

These articles come from authors in the UK where a public and legal backlash has emerged against experts testifying in cases of alleged child abuse. The results

emphasise the urgent need for more rigorous research. The results offer both support for the theory that non-mobile infants bruise far less, and that pattern, location, and distribution of bruises in abuse differs significantly from accidental injury. A cautionary note is sounded in assessing the age of a bruise by colouration. The medical and subsequently legal determination of child abuse is ultimately based on a comprehensive clinical and developmental history, detailed physical assessment, and analysis of relevant laboratory data and a thorough knowledge of the literature. Maguire and colleagues’ two reviews provide a concise analysis of the current medical literature and support a thorough evaluation of children with bruising in relation to child maltreatment.

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- 1 Maguire S, Mann MK, Sibert J, Kemp A. Are there patterns of bruising in childhood which are diagnostic or suggestive of abuse? A systematic review. *Arch Dis Childhood* 2005; **90**: 182–86.
- 2 Jenny C. Cutaneous manifestations of child abuse. In: Child abuse medical diagnosis and management, 2nd edn. Reece R, Ludwig S, eds. Philadelphia: Lippincott Williams and Wilkins, 2001: 23–45.
- 3 Jenny C, Hymel K, Ritzen A, et al. Analysis of missed cases of abusive head trauma. *JAMA* 1999; **281**: 621–26.
- 4 Sugar N, Taylor JA, Feldman KW and the Puget Sound Pediatric Research Network. Bruises in infants and toddlers: those who don’t bruise rarely bruise. *Arch Pediatr Adolesc Med* 1999; **153**: 399–403.
- 5 Maguire S, Mann MK, Sibert J, Kemp A. Can you age bruises accurately in children? A systematic review. *Arch Dis Childhood* 2005; **90**: 187–89.
- 6 Schwartz AJ, Ricci LR. How accurately can bruises be aged in abused children? Literature review and synthesis. *Pediatrics* 1996; **97**: 254–57.
- 7 Bariciak E, Plint AC, Gaboury I, et al. Dating of bruises in children: an assessment of physician accuracy. *Pediatrics* 2003; **112**: 804–07.
- 8 Sirotnak A, Grigsby T, Sirotnak R, Krugman R. Physical abuse of children. *Pediatr Rev* 2004; **25**: 264–77.

The ghost of pandemics past

Prominent North American and European politicians convened recently for a table-top exercise designed to illustrate the international scope of bioterrorism.¹ Participants were asked to respond to a hypothetical apocalyptic incident, in which the simultaneous

release of lyophilised variola in six countries caused 74 000 cases in a single generation. Not surprisingly, such an attack, irrespective of the agent, defied easy control in the exercise. Issues about the manufacture and distribution of massive amounts of smallpox

vaccine dominated the discussion. Three false lessons were conveyed to readers of the ensuing press release, and doubtless to the lay participants: a smallpox pandemic is likely; ordinary methods of public health cannot control person-to-person infections; and vaccine stores are the key to control. Poppycock, poppycock, poppycock!

3 years ago, the Bush policy of vaccination against smallpox on a large scale^{2,3} was in part motivated by Dark Winter, a similar table-top exercise, also with questionable assumptions.⁴ Sceptics questioned the benefits of mass vaccination, and raised concerns about vaccine complications.^{5,6} Doubts about the net benefits of mass vaccination grew after reports of subsequent cardiovascular events,^{7,8} and only a few people have been vaccinated.

In the meantime, a different global pandemic attracted attention. A culinary choice in south China led to a fatal infection in Hong Kong, and subsequently to 8000 cases of severe acute respiratory syndrome (SARS), and nearly 1000 deaths in 30 countries on six continents.^{9,10} Despite rapid geographical dissemination and much economic angst, clinicians and epidemiologists proved up to the task, and SARS was controlled in all locations after about 3 months. Control was accomplished by well-informed managers¹¹ using the same basic strategy of surveillance for cases and isolation of contacts that had eradicated smallpox 25 years before,¹⁰ augmented only by high-tech record-keeping and communication.¹²

In fact, SARS presented a challenge far more difficult than smallpox. Like smallpox, SARS spread efficiently at the bedside to family members and caregivers^{5,6} by means of large droplets. Like smallpox, the coronavirus was capable of wide dissemination from only a small number of individual cases,¹³ with the help of favourable air currents and contaminated clothing or linens.

However, neither vaccine prophylaxis nor sophisticated diagnostic methods were available to combat SARS. Whereas unvaccinated people with infectious smallpox have a characteristic vesicular rash, which is likely to keep potential contacts at a distance, SARS was disseminated in material or faeces from people with early non-specific symptoms.⁹ Control of smallpox, but not SARS, was facilitated by a 2-week period between exposure and infectiousness in which to identify and isolate contacts.

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Had the outbreak been of smallpox instead of SARS, control in Toronto, for example, would have been quickly established by the old-fashioned techniques of public health: surveillance and isolation, identifying the exposed for vaccination, and avoiding mass vaccination to the extent possible politically. On the basis of the early sequence of events in this largely nosocomial outbreak,¹⁴ containment of smallpox probably would have occurred by the appearance of the third disease generation, much sooner than SARS was contained.

SARS will probably reappear, and there is a remote chance that smallpox will be introduced by a terrorist act (but not with 74000 first-generation cases). An outbreak of either disease would be costly, but experience suggests that control would again be quickly established. Of greater concern are the more virulent strains of influenza. Reconstruction of the DNA of the 1918 Spanish virus is not only possible, but also a reality,¹⁵ and we can only hope it does not escape into the population. Moreover, the number of human cases of avian influenza in Asia has been increasing.¹⁶ The first clear person-to-person transmission of influenza A (H5N1) reported from Thailand¹⁷ was even more limited to family members than

smallpox or SARS, despite the H5N1 exposure of other family members and hospital staff. As yet there is no change in the host specificity of the viral receptor's binding preference, which would probably enable more efficient human-to-human transmission, but that might be only a matter of time.¹⁶

Whatever pandemic agent next appears (and smallpox is certainly not the most likely), each community must be prepared. Vaccines will doubtlessly evolve, although avian influenza will require a constant struggle,¹⁸ prototype SARS vaccines now appear strain-specific,¹⁹ and the qualities of any new smallpox vaccine can never be evaluated.²⁰ Even so, it is easy and politically safe to budget for vaccine production, with or without plans for mass vaccination as a pre-emptive strategy or as outbreak control. However, no weapon is effective without an appropriate delivery system. It is harder to budget for field personnel in public health, and justify them to the accountants, than it is to budget for vaccines, even if these people are absolutely essential.

Identification of cases and of contacts eligible for prophylaxis requires active surveillance, and any isolation policy requires a detailed plan. Both actions will be needed to break a chain of person-to-person infection, and both require management skills that are grounded in biology, local sociology, and the medical-care system. History tells us that protection against a viral pandemic will always depend on the availability of a local cadre of skilled public-health workers. Although the return on an investment for the support of such personnel is hard to quantify, we assign it low priority at our peril.

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- 1 D'Esopo M. Exercise illuminates transatlantic leaders' reactions to bioterror attack. Center for Biosecurity, University of Pittsburgh Medical Center, 2005: http://www.upmc-biosecurity.org/pages/center/press/atlantic_storm.html (accessed March 10, 2005).
- 2 Stevenson RW, Stolberg SG. Bush lays out plan on smallpox shots; military is first. *New York Times* Dec 14, 2002: A1.
- 3 DeRugy V, Pena C. Responding to the threat of smallpox bioterrorism. *Policy Anal* 2002; **434**: 1–16.
- 4 O'Toole T, Mair M, Inglesby T. Shining light on "dark winter". *Clin Infect Dis* 2002; **34**: 972–83.
- 5 Mack T. A different view of smallpox and vaccination. *N Engl J Med* 2003; **348**: 460–63.
- 6 Lane J, Goldstein J. Evaluation of 21st-century risks of smallpox vaccination and policy options. *Ann Intern Med* 2003; **38**: 488–93.
- 7 Centers for Disease Control and Prevention. Update: Adverse events following smallpox vaccination—United States, 2003. *MMWR Morb Mortal Wkly Rep* 2003; **52**: 278–82.
- 8 Arness M, Eckart R, Love S, et al. Myoperidarditis following smallpox vaccination. *Am J Epidemiol* 2004; **160**: 642–51.
- 9 Tomlinson G, Cockram C. SARS: experience at Prince of Wales Hospital, Hong Kong. *Lancet* 2003; **361**: 1486–87.
- 10 World Health Organization. SARS: breaking the chains of transmission. 2003: <http://www.who.int/features/2003/07/en/> (accessed March 10, 2005).
- 11 Riley S, Fraser C, Donnelly C, et al. Transmission dynamics of the etiological agent of SARS in Hong Kong: impact of public health intervention. *Science* 2003; **300**: 1961–66.
- 12 Seto W, Tsang D, Yung R, et al. Effectiveness of precautions against droplets and contact in prevention of nosocomial transmission of severe acute respiratory syndrome (SARS). *Lancet* 2003; **361**: 1519–20.
- 13 Donnelly C, Ghani A, Leung G, et al. Epidemiological determinants of spread of causal agent of severe acute respiratory syndrome in Hong Kong. *Lancet* 2003; **361**: 1761–66.
- 14 Poutunen S, Low D, Henry B, et al. Identification of severe acute respiratory syndrome in Canada. *N Engl J Med* 2003; **348**: 1995–2005.
- 15 Kobasa D, Takada A, Shinya K, et al. Enhanced virulence of influenza A viruses with the haemagglutinin of the 1918 pandemic virus. *Nature* 2004; **431**: 703–07.
- 16 Monto A. The threat of an avian influenza pandemic. *N Engl J Med* 2005; **352**: 323–25.
- 17 Ungchusak K, Auewarakul P, Dowell S, et al. Probable person-to-person transmission of avian influenza A (H5N1). *N Engl J Med* 2005; **352**: 333–40.
- 18 Stohr K. Avian influenza and pandemics—research needs and opportunities. *N Engl J Med* 2005; **52**: 405–07.
- 19 Yang Z-Y, Werner H, W-P Kong, et al. Evasion of antibody neutralization in emerging severe acute respiratory syndrome coronaviruses. *Proc Natl Acad Sci USA* 2005; **102**: 797–801.
- 20 Greenberg R, Kennedy J, Clanton D, et al. Safety and immunogenicity of new cell-cultured smallpox vaccine compared with calf-lymph derived vaccine: a blind single-centre, randomised controlled trial. *Lancet* 2005; **265**: 398–409.

Should physicians' self-prescribing be restricted by law?

In Victoria, Australia, governmental regulations prohibit physicians from self-prescribing. These regulations led Margaret Kay and colleagues¹ to question recently whether legislation can reduce harm to physicians who prescribe for themselves. Their review reveals the lack of research on the effect of self-prescribing legislation on physicians' impairment. Kay also points out that

physicians have access to drugs from various sources other than self-prescription.

Addiction is often the main concern when self-prescribing is discussed. Steps taken by authorities to reduce possible impairment should ideally be based on empirical knowledge of risk factors and the course of impairment. However, because impairment is rare