Editorial & Letters

EDITORIAL

It's Not Rocket Science–But It Can Save Lives

Science normally focuses on basic research discoveries and the breaking of technological barriers that can pave the way for medical advances. However, another approach exists for combating disease that generally gets few headlines. This alternative can thwart an enormous number of illnesses and save lives by finding new ways to translate current scientific understanding into practice. The alternative is called prevention. In the developing world, there are many formidable hurdles to improving public health, beginning with the provision of sufficient quantities of safe food and water, sanitation, and basic health care. However, the fact that thousands of lives in the United States and the rest of the developed world will be lost because of the failure to recognize and implement well-known and scientifically documented principles of preventive medicine should be an embarrassment to its citizens.

AIDS prevention is only the latest example of scientifically compelling evidence ignored in favor of political expediency. Approximately a third of new AIDS cases in the United States today can be linked to contaminated hypodermic needles, either by direct use or as a result of indirect exposure of partners or children. Study after study has shown that needle-exchange programs will reduce the incidence of AIDS, a fact acknowledged by the Clinton administration. However, despite expressions of support for science and technology, the president and Congress have recently decided that the federal government will not fund such needle-exchange programs. Peter Lurie, at the University of Michigan, has estimated that with federal support, needle-exchange programs could prevent up to 17,000 infections during President Clinton's term of office. Similar shortsighted, moralistic, and psychosocial arguments as were used to block needle-exchange funding continue to interfere with more aggressive targeting of effective sex education and condoms to our adolescent population so that they can achieve safer sex practices.

As another example of preventive medicine with the potential to save many lives, the development of a new vaccine is rightfully an occasion for great celebration. However, because of missed opportunities by physicians and ineffective education, populations at risk are not getting the vaccines that are already available. A survey of physicians in Massachusetts found that most thought that 85 to 100 percent of their patients were fully vaccinated, but in reality the average was only 61 percent. Despite the existence of an effective vaccine against pneumococcus, which is the most common cause of bacterial pneumonia and middle-ear infections in the United States, implementation is inadequate. It has been estimated that only 15 to 30 percent of the targeted populations, such as the elderly, immunocompromised individuals, and individuals with pulmonary or cardiac conditions, are protected. Surveys of university students indicate similarly inadequate employment of the existing vaccine against hepatitis B.

The rates of infection and death from hospital-related (nosocomial) infection and the fact that antibiotic resistance is spreading in environments where the public expects vigilance to be at its best are further indicators that preventive medicine is underutilized. Roughly 88,000 people in the United States alone die each year as a result of complications from nosocomial infections, a third of which are estimated to be preventable. Vancomycin-resistant enterococci are spreading like wildfire through hospitals in the United States, after first being detected in 1989. There are already standards for reducing the risk of acquisition of a nosocomial infection and the spread of antibiotic resistance that include screening for carriers, isolation of patients who are culture-positive regardless of whether they show symptoms, appropriate use of antimicrobials, hand washing by health care providers before and after all patient contacts, and sterilization of equipment. These seem like no-brainers, yet concerns over discrimination against carriers, the unwillingness of hospitals to establish special isolation rooms for infected populations, and the inability of hospital personnel to maintain the levels of hand washing needed have resulted in steady increases in infections. The spread of antibiotic resistance in hospitals is part of a larger picture in which overuse and misuse of antibiotics threaten to overturn the progress of the last 50 years.

These examples are all ominous warning signs for the future. In the next millennium we must not only strive to open new avenues of scientific knowledge and insight but also to translate this knowledge into concrete results. To have invested in science, achieved understanding of the steps that need to be taken, and then failed to act on that knowledge would be folly of the highest order.

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LETTERS

Conflicts

In the wake of David Western's dismissal as director of the Kenya Wildlife Service on 21 May and subsequent reinstatement on 28 May, Western and sympathetic colleagues express their concerns about an article that appeared in *Science*'s 24 April issue. These letter writers would have liked more quotes from indigenous Kenyans, more information about the author of the article, more criticism of former director Richard Leakey, and more discussion of the science of conservation biology.

A. & M. SHAH/ANIMALS ANIMALS

Wildlife Conservation in Kenya

As Michael McRae points out in his News & Comment article of 24 April (p. 510), the rising conflict over space does indeed pose the biggest threat to wildlife in Kenya, as human populations expand around and beyond parks. However, the example he quotes of a conflict between elephants and Maasai tribesmen around Amboseli National Park arose as a result of the very success of local community involvement beginning in the 1970s. Elephants subsequently increased from some 480 to nearly 950, reducing the biodiversity of the park and spilling over onto Maasai ranches. To curtail the conflict, the Kenya Wildlife Service (KWS) is building electric fences around Maasai farms and has established a conflict resolution committee, which speedily dealt with the last elephant to kill a Maasai. The African Wildlife Foundation, which supports Cynthia Moss's work, commended KWS's action. During Joyce Poole's time as head of KWS's elephant program, her apparent reluctance to deal with elephant attacks saw human deaths rise from 9 a year to more than 40. Pragmatic controls have since reduced that figure to around 15 a year.

Protecting parks alone, as the World Bank would have KWS do, carries a high cost. My predecessor at KWS, Richard Leakey, said he intended to fence off all parks to the tune of $100 million. The exercise would have consumed most of KWS's income and written off the three-quarters of Kenya's wildlife living outside parks. Although still KWS's top priority, protected

areas cover less than 8% of the land surface and simply don't give adequate biodiversity coverage. Furthermore, few if any are ecologically viable. Difficult or not, the human-wildlife conflict must be tackled if Kenya's wealth of species and migratory herds is to be preserved.

There are valid reasons to go beyond park boundaries. First, KWS is responsible under law for wildlife countrywide. Second, this obligates KWS to address the plight of Kenyans who lose lives, crops, and livestock to wildlife. Third, democracy and title to land are awakening Kenyans to their legal rights regarding wildlife on their land. Finally, wildlife beyond parks is proving profitable for rural Kenyans through ecotourism and utilization, winning a vast new constituency for conservation.

As McRae points out, the donor-funded PAWS (Protected Area and Wildlife System) was largely devoted to rehabilitating parks, curtailing the poaching of elephants and rhinos, and building KWS's institutional capacity. This facet of the program has largely succeeded, according to a mid-term review of the project. What McRae does not mention is that the PAWS program explicitly recognized the wealth of wildlife outside parks and included an $8 million U.S. Agency for International Development (USAID) community-based conservation component. Agi Kiss of the World Bank flatly contradicts one aim of the PAWS program she directs in calling for KWS not to spend money outside parks. And, if the community program was indeed a failure, why is USAID negotiating with KWS for a further 5 years of funding? In reality, it has been one of KWS's biggest successes. More than 30 community wildlife sanctuaries have been drawn up as a result.

Contrary to the Arcadian view of PAWS that McRae portrays in the eyes of its former expatriate staff, the program created a highly centralized, top-down agency heavily subsidized by donors. A graver misstep was the financial assumption that KWS could become self-sufficient by 1996, an unrealizable goal even for high-visitation parks in the United States and South Africa. The inflated KWS recurrent budget and illusion of wealth evaporated when donor and government subventions dropped on schedule in 1996. The resulting financial crisis, made critical by a collapse of Kenya's tourist industry, is at the heart of KWS's present problems. Finally, top jobs went to expatriates, many ill qualified, a move that marginalized Kenyans and created resentment in and outside KWS.

The policy and institutional changes KWS is implementing resulted from consultation among stakeholders countrywide. This in itself introduced a democratic process into conservation still dominated in Kenya by a vociferous white and mainly expatriate minority. The outcome is a leaner, decentralized organization fully run by Kenyans. The participatory approach and delegation of authority I encouraged may well be viewed as a remote management style by those who thrived under Leakey's autocratic approach, but I am confident that delegating responsibility and applying the performance measures KWS is introducing will make for a stronger, more adaptable institution. A minimum viable conservation network designed to conserve Kenya's biodiversity in perpetuity is guiding the slimming down and tighter focus. Science and citizen participation is the guiding force behind the new focus.

Contrary to the impression given by Leakey, the donors, with the exception of the World Bank, have responded favorably to the changes. The $30 million plus in commitments over the last year and more under discussion hardly signifies a lack of confidence.

My main objection to McRae's article is that he consulted the very expatriate staff who benefited from donor largess under

Leakey and did not appear to have interviewed any of the thousands of Kenyans who run the institution today. Nor does he present the views of the tens of thousands of Kenyans who make up the National Landowner's Wildlife Forum and avidly support the community programs. That McRae could produce a 3-page article on Kenyan conservation with only one minor quote from an indigenous Kenyan is deplorable in this day and age.

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McRea's article has serious flaws. The personal, political, or economic ties between Leakey and the few individuals quoted as criticizing Western should have been revealed. McRea's relationship by marriage to Leakey's biographer, *Science* Contributing Correspondent Virginia Morrell, should also have been revealed. We should not judge Western's management style on the basis of the comments of his predecessor and the latter's close friends; Leakey's own style is well known (*1*) and contributed to the problems the Kenyans are now having to deal with. Interviews with professionals in KWS and with representatives of nongovernment organizations and international aid agencies were, for the most part, absent from the *Science* article.

The real issue in Kenyan wildlife conservation is not management style, but science; McRea and Leakey appear to be unfamiliar with the science of conservation biology. If we learn anything from the research of Wilson, MacArthur, Diamond, Raven, Gilpin, Soulé, Wilcove, Lovejoy, and many others, it is that conserving nature in small, isolated reserves will not work. What goes on around the edges of a park is at least as important as what goes on inside the sanctuary. The community-based conservation (CBC) movement that grew from this realization is the direct translation of the best science into public policy (*2*). That it favors indigenous people who live near the parks over patronizing and exploitative foreigners, that it funnels resources into impoverished local communities rather than to politicians and corrupt officials, and that international donors find it less pleasant to deal with local peasants than with powerful operatives in capitals should not surprise anyone. Western's pivotal biological contribution here was to reverse the insularization of Kenya's parks; the Leakey initiative to fence off parks would have increased the rate of faunal collapse—as recently documented in Tanzania (*3*). This is not a simple management dichotomy, as both approaches have their time and place. In our opinion, it was reprehensible not to have noted Leakey's apparent manipulation of science and scientists for what appear to be personal and political ends.

Criticism of CBC in Kenya will threaten similar ongoing efforts to apply science to biodiversity conservation and the improvement of the human condition in many other countries. Numerous leading development and conservation foundations are promoting CBC projects, having concluded that Leakey's "fence the parks and shoot all trespassers" approach is indefensible for both scientific and humanitarian reasons. CBC works because it is based on better science, even though it is often attacked by vested interests that are threatened by its encouragement of participatory democratic processes and local empowerment. McRea does not note this important paradigm shift in which Western has been a pioneer.

To begin to right the harm that has been done to global conservation, we suggest that Western be nominated for the AAAS prize for science in the public service. The AAAS should continue to champion scientists who are brave enough to go into the public arena with integrity and try to do the right things despite relentless attacks in the media. If there is any one thing that describes CBC, it is that the promoter finds himself or herself caught directly between a hopeful yet largely powerless client, and a well-entrenched centralized political and social force that gains virtually no increased fitness by encouraging CBC-based systems. If encouragement and support do not come from a broader and more global intellectual community, we are doomed to a long history of well-meaning individuals destroyed in the crossfire of specific conservation attempts in specific places. CBC requires time; Western and the Kenyans deserve our support in this difficult work.

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McRae's article raises some issues of great current importance in conservation, not just in Kenya, but throughout the world. Unfortunately, he does not tell us how what is going on in Kenya fits into what we know about conservation today. In the overall world mix, parks are crucial, but completely inadequate to ensure the survival of biodiversity overall. In most places, including Kenya, they cannot survive on their own and are not, in themselves, suitable to ensure the survival of a major proportion of the organisms that live in them. This is because parks are too small to protect biological processes and ecosystems dynamics upon which the plants (and animals) depend. Being small, they are vulnerable to the loss of species and loss of biodiversity through the effects of island biogeography and random loss.

In addition, historically, parks have taken lands away from people and created antagonistic neighbors. Ironically, many ecosystems have had people as integral parts, so that the removal of people not only creates enemies, but disrupts the central ecological dynamics. These problems have been recognized for years.

Buying back space through changing activities and attitudes of local people who live around parks and in other areas that contain important biodiversity is one promising new direction that was pioneered by Western in Amboseli National Park in Kenya in the early 1970s. This approach has won many adherents worldwide. Community-based conservation, as it is now called, is the basic philosophy of projects throughout Africa, Asia, and Latin America.

What do people in Kenya think of the new directions and current KWS management and policy? We don't know, since

McRae does not appear to have asked them. Three-quarters of the people quoted by McRae are close political allies, friends, or associates of Leakey; 11 of the 12 people quoted are white, with only one black African included in the sample. No one currently employed by KWS is quoted in the article. A balanced report on the situation would have attempted to determine this.

While visiting Kenya in 1996, I observed firsthand the effectiveness of the approach taken currently by KWS, one that is fully in accordance with modern principles of conservation biology. An example is Il Ngwesi Lodge, completely owned and run by the local group ranch and operating at full capacity during the dramatic collapse of the Kenya tourism industry. Wildlife is returning to the area after years of absence. The low poaching figures in Kenya in the past 2 years and particularly now, when there are more guns, bandits, and elephants outside of parks than ever, suggest a link. The project is part of a larger effort to make a corridor to the lowlands for Mt. Kenya elephants, reestablishing their historical migration path, buying back space, and reducing their destructive impact on their now limited range.

A similar picture, and similarly good for elephants, is seen around Shimba Hills, where there are too many elephants in the protected area. Local people have established their own "community" reserve, offering new space for elephants in exchange for benefits from tourism. The first dividends have been paid to the shareholders.

In sum, McRae does not address the crucial issues linking the debates he highlights: research, management style at KWS, and parks. He might also have asked how science can help solve conservation problems in Kenya.

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Response: *Science* commissioned McRae, a writer for *National Geographic* and other publications who has broad experience in Africa, to look into reports in the Kenya press about problems at KWS. McRae's article focused on the difficulties Western faced in carrying out his community-based conservation policies in the face of dwindling financial resources, the departure of many senior managers—who, McRae wrote, "were more loyal to Leakey than to KWS"—and "increasingly vitriolic public attacks." As Western's letter points out, and McRae made clear in his article, a major cause of KWS's financial difficulties is the projection made during Leakey's tenure that KWS would be self-sufficient in 5 years, which led to a phaseout of government and donor support. The article contained strong responses from Western himself to critics quoted in the article, but it did not fully explore the nature and intensity of the internecine struggle in Kenya over KWS, which may have been a factor in Western's dismissal as KWS director on 21 May and his reeinstatement on 28 May (News & Comment, 5 June, p. 1518).
— **Colin Norman**, *News Editor*

Letters to the Editor

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