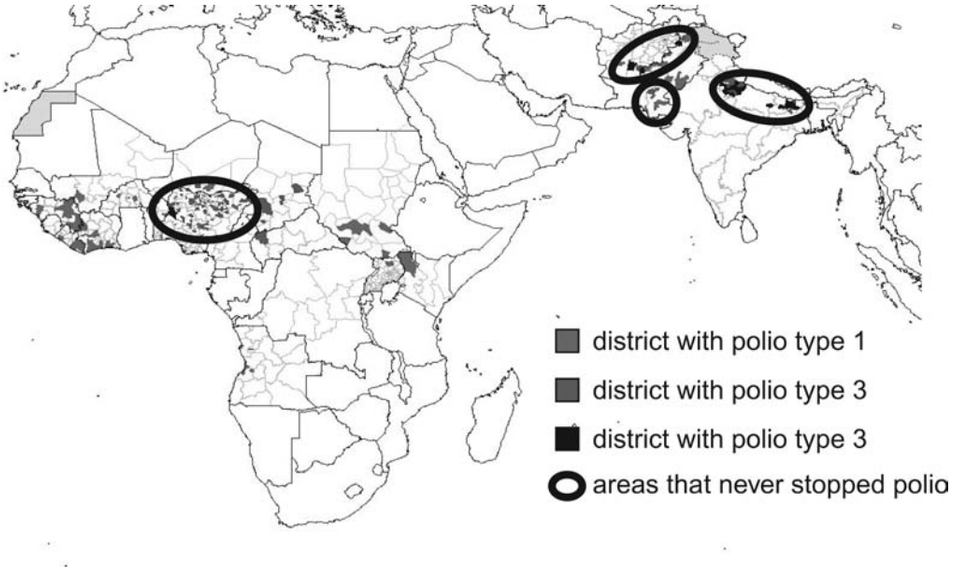

Figure 9 Districts in which wild poliovirus transmission was detected between March 30th, 2009 and September 29th, 2009.

associated risks. Although universal childhood immunization with IPV has been proposed to address the risks associated with OPV cessation, IPV would only partially reduce the already small risk of cVDPV emergence in most countries (75) and would not substantially mitigate the consequences of a reintroduction in countries with low coverage, such as much of sub-Saharan Africa (84). Consequently, policy makers must balance their national willingness to pay to maintain polio immunity against the financial, programmatic, and opportunity costs of introducing IPV, the true extent of which may not be immediately apparent, particularly for resource-poor areas (81). In financial terms alone, UNICEF currently procures IPV at five times the estimated ''breakeven'' price for replacing OPV (85). Even if a marginal reduction in the unit price of IPV for low-income countries materializes, the opportunity costs associated with the use of scarce health resources for that vaccine (e.g., rather than to combat HIV, malaria, tuberculosis, measles, pneumococcal, and rotavirus infections) would strongly influence decision making. Some low income countries have already decided that the advantages of stopping all polio immunization currently outweigh the short-term risk of cVDPVs and longer-term risks of poliovirus reintroduction (86). In contrast, some middle-income countries are introducing one or more doses of IPV into their routine immunization schedules to eliminate VAPP and as a potential transition strategy between OPV cessation and verification of the absence of cVDPVs.

POLIO ERADICATION: THE UNFINISHED AGENDA

Since the GPEI's launch in 1988, knowledge as to the nature of circulating polioviruses and the challenges to their interruption has increased tremendously, particularly during the period 2000 to 2006. By mid-2009, however, indigenous wild polioviruses had been interrupted from all but four countries in the world though 16 reinfected countries still had circulation of an imported virus (Fig. 9). Recent progress reflects the rapid development and large-scale application of new tools (e.g., mOPVs) to improve the impact of the traditional strategies, coupled with new tactics and new political commitments to ensure that every child is vaccinated. The proof of concept in mid-2009 of a bivalent OPV (serotypes 1 and 3), with per dose seroconversion rates that are almost equivalent to those for the respective type-specific mOPV, promises to further enhance the impact of SIAs and potentially accelerate eradication in the remaining infected areas. Although the prospects of eventual success for the GPEI are high, research must continue to further evaluate and enhance the strategies, particularly in northern India where additional refinements may be required to boost immunity to the levels needed to stop transmission.

Similarly, while the long-term risks of polio are much better understood than when the GPEI started, continued research is needed to optimize the strategies for their management. For example, the frequency, magnitude, and consequences of iVDPVs must be determined in low- and middle-income countries. The effectiveness and cost/benefit of IPV cost-reduction strategies (i.e., 2-dose schedules and fractional dosing) must be evaluated for low-income countries. New, rapid diagnostics should be pursued as well as antiviral compounds to clear iVDPVs. mOPV campaigns in low-coverage areas are being studied to explore whether mOPV use in a post-OPV era might give rise to new cVDPVs. Finally, insights into whether cVDPVs can be stopped with an IPV response would help to inform outbreak response strategies for a post-OPV era.

At mid-2009, the primary challenges to a world without polio are ensuring that local leaders in each remaining polio-infected district guarantee the full vaccination of their children, and that national and international leaders ensure the financing needed to implement fully the eradication strategies (Fig. 10).