Guinea worm (Dracunculiasis) eradication: update on progress and endgame challenges

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The International Commission for the Certification of Dracunculiasis Eradication (ICCDE) met in December to review progress towards eradication. The status of the programme was presented by WHO and The Carter Center, Atlanta. The Commission received reports from international certification teams that Cote d’Ivoire, Niger and Nigeria were free of transmission and should be certified, while four countries, namely Chad, Ethiopia, Mali and South Sudan, remained endemic. The Commission certified that Somalia and South Africa were free of transmission. During 2013, there was a decline of about 78% in the numbers of cases reported in South Sudan. A report of the perplexing dracunculiasis epidemiology in Chad was also discussed, where dogs have been found to be infected with \textit{Dracunculus medinensis}.

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The International Commission for the Certification of Dracunculiasis Eradication (ICCDE) is an independent body appointed by the Director-General of WHO. Formed in 1995, the Commission meets regularly to make recommendations to the Director-General on the progress of countries towards the goal of global eradication. Each country that has previously been endemic applies to be certified free of transmission and must satisfy the ICCDE that it has interrupted transmission, based on its country report and report of a national independent assessment by prominent scientists and public health authorities. An international certification team (ICT) visits the country and has the responsibility to validate the accuracy of the national report. One or more members of the ICCDE participate in the ICT and one serves as the team leader of the ICT. Countries that have never been endemic, or not endemic in the recent past (post 1980), are also certified on the basis of statements from the national health authorities or following assessments by WHO with experienced public health and tropical disease experts. All the relevant documentation is scrutinised by the ICCDE, which then transmits its recommendations to the Director-General of WHO.

When the National Guinea Worm Eradication Programs (GWEP) began implementation in the late 1980s supported by The Carter Center, Centers for Disease Control and Prevention, United Nations Development Programme, United Nations Children’s Fund, WHO and other partners, there were 20 endemic countries with an estimated 3.5 million cases. Countries that have not recorded a case for a period of at least 3 years since the last confirmed case are entitled to apply to WHO for certification of elimination of dracunculiasis. Rigorous criteria are applied by ICTs to satisfy themselves that transmission no longer takes place; in particular, that there is an adequate surveillance system in place to detect, report and investigate any indigenous cases of the disease. The ICTs must be convinced that surveillance is sufficiently sensitive to detect an imported case; that rumours of the disease are encouraged and promptly investigated; specimens of emerging worms suspected to be Guinea worm are collected for confirmation and a widely publicised reward system is in place and broadly known.

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by the populace to encourage the reporting of rumours. This entails a detailed scrutiny of the documentation, field visits to previously endemic areas as well as other areas considered to be at risk (i.e., areas bordering existing endemic countries). Visits are also made to refugee camps, nomadic and transhumance populations, itinerant and seasonal workers, areas reporting rumours and health zones/districts with inadequate reporting. In addition, ICTs evaluate the availability of access to safe water supplies of communities. Reviews by Ruiz-Tiben and Hopkins1 and Biswas et al.2 provide details of the history of the GWEP, while this commentary provides information on the deliberations of the Commission at a meeting held in Geneva in December 2013, which received reports from WHO and the Carter Center on the progress to date of the GWEP, with particular focus on reports from ICTs that had visited Cote d’Ivoire, Niger and Nigeria during 2013.

The ICCDE concluded, based on the reports from the ICTs in Cote d’Ivoire, Niger and Nigeria, that these countries satisfied the criteria that transmission had been stopped. Two other countries in Africa, Somalia and South Africa, were also certified following submission of detailed assessments of records that demonstrated that there was no history of Guinea worm disease or transmission in them. This brings the total number of countries, areas and territories certified free of transmission to 197. Countries that are in the pre-certification phase include Ghana, which has not reported cases since 2010, and Kenya, which has yet to apply for certification despite having reported the last indigenous case in 1994. Sudan, a formerly endemic country, also requires formal certification. The ICCDE were informed of three cases in a remote area of South Darfur in Sudan, close to the borders of South Sudan and the Central African Republic. These cases were investigated and in the coming year it will be necessary to evaluate if these cases have resulted in the re-establishment of transmission in Sudan. Two countries in Africa with no recent history of Guinea worm disease are the Democratic Republic of Congo (DRC) and Angola, where investigations must be undertaken to confirm that there has been no recent endemicity; while four countries remain endemic, namely Chad, Ethiopia, Mali and South Sudan (a newly recognised country by the UN in 2011). The WHO reported to the ICCDE that in 2013, until November, there had been 143 cases in these countries, of which 111 (provisional) were recorded in South Sudan.

Hence, the ICCDE considered that the GWEP was entering an ‘endgame’ situation. The WHO target that dracunculiasis transmission would be interrupted by the end of 2015 was endorsed by the ICCDE. Hence, formal certification of all countries could be achieved 3 years following the last reported case. To achieve this goal, intensification of efforts in the remaining four endemic countries will be required. Such a situation requires heightened levels of advocacy and political will from the highest levels of government and particularly by Ministers of Health. The importance of high level advocacy was demonstrated by the role of former Nigerian President General Yakubu Gowon, assisted by President Jimmy Carter, who achieved the successful elimination of transmission in the country that had the largest numbers of annual cases of over 650,000 in 1988.3 The active part played by General Gowon was critical in raising the profile throughout the country. While there has been significant success, the need for increased awareness and the maintenance of surveillance, despite certification, remains critical for the ICCDE, even in all previously endemic countries. This awareness is facilitated by the maintenance of a reward system and a rapid response by national health authorities to any rumour (within 24 hours), as well as the measurement of the level of awareness by periodic surveys. The reporting of zero cases through the national reporting system of Guinea worm disease from health facility to national level was emphasised by the ICCDE, while the value of using polio immunisation and other mobile health teams to record reporting of rumours, or the absence of Guinea worm at the household level, should be expanded, since immunisation teams frequently have access to the remotest communities. The experience of the smallpox and polio eradication programmes suggest that as part of the endgame strategy more aggressive approaches will need to be put in place.4-6 Inevitably there may be a cost implication given the need to access these most remote and least served communities. Currently the reward system is based on a national decision about the level the reward. The ICCDE advised that a reward be established in South Sudan, increases of rewards be made in other endemic countries, and an international reward for the discovery of a confirmed case could be developed and promoted by WHO as the target date of 2015 approaches.

The recently published paper by Eberhard et al.7 on the epidemiology of Guinea worm disease in Chad, where dogs have been discovered to be infected with a parasite indistinguishable from human Dracunculus medinensis, provides the authorities in Chad with a challenge and creates a new dimension in our understanding of Guinea worm transmission. There is no evidence that infections in dogs in Africa have played a role in human transmission nor are there any records of Dracunculus in mammals in Africa aside from D. medinensis. Non-human Dracunculus species do exist in carnivores in North America and there have been records of infection of D. medinensis in dogs in Uzbekistan.8,9 The ICCDE discussed the special situation in Chad in relation to the ecology of the Chari River basin where populations undertake seasonal fishing, and where the possibility that fish or other vertebrates could play a role as a paratenic host (a host that may not be necessary but may serve to maintain the life cycle) of larval D. medinensis, with dogs and humans acquiring infection through the consumption of such hosts. Such a cycle has been described in the North American species of Dracunculus.10,11 The ICCDE urged the Ministry of Public Health of Chad to aggressively address the new situation. The ICCDE also urged that the remaining endemic countries intensify their efforts and that high level advocacy is required to focus on the existing endemic areas, notwithstanding the potential problems that exist, in particular, the security situation in Mali and South Sudan that restrict access to known endemic areas. As the GWEP moves towards the endgame increased resources will be needed for identifying and containing the last remaining cases, with increased intensity and mounting rigorous national pre-certification actions and certification activities. Eradication efforts traditionally have higher unit costs per case detected at the end-stage of the programme. The last inch as opposed to the last mile will, therefore, be the most costly and require special efforts.

The success of the countries that were certified as free of transmission were important public health landmarks achieved through the sustained efforts of the staff in national programmes, from the Ministers of Health to the village volunteers, in endemic areas over a period of two decades. Nevertheless, the challenges...
and greatest risks that remain for all countries revolve around the need for increased advocacy at the highest levels internationally and nationally, where complacency, lack of commitment and the problems of security that prevent access in the areas where the last remaining cases occur must be overcome. The need for continued vigilance through all means, including active surveillance through the routine health system reporting and critical assistance by the immunisation teams recording sporadic cases or the absence of the disease, will be essential until final eradication in all countries is achieved.

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