



Case study: Implementing Alternative Strategies for Onchocerciasis Control and Elimination in Cameroon: Ending the Neglect of Onchodermatitis

*Onchocerciasis (river blindness) is a vector-borne disease caused by the parasite *Onchocerca volvulus*. Untreated, onchocerciasis leads to progressive visual impairment and eventually irreversible blindness, as well as severe itching and a range of serious skin complaints. These skin complaints are collectively known as onchodermatitis. Onchocerciasis is common and widespread in Cameroon. Mass drug administration (MDA) has been conducted in the Southwest Province of Cameroon for 12 years in a strategy known as Community-Directed Treatment with ivermectin (CDTi), yet higher than expected prevalence and intensity of onchocerciasis persists. Early onchocerciasis research has concentrated on blindness which means that there is comparatively less data available about the incidence, severity and geographic distribution of onchodermatitis.*

COUNTDOWN is working hard to ensure that the assessment of skin disease caused by onchocerciasis is firmly embedded within the alternative onchocerciasis control strategies they are developing. The work aims to implement these alternative strategies for the control and elimination of river blindness (onchocerciasis) in Southwest Cameroon. Onchocerciasis control in Southwest Cameroon has been sub-optimal using conventional approaches (Wanji et al., 2015), and so new alternative strategies are urgently needed.

Study Design and Findings

- Twenty communities have been enrolled onto community-led test and treat with doxycycline and ground larviciding, with more than 10,000 individual participants screened.
- As well being screened for *O. volvulus* and *Loa loa* parasites, all participants were also screened for onchodermatitis, a clinical manifestation of onchocerciasis currently overlooked by control strategies.

Doxycycline is Safe, Acceptable and Deliverable at Scale in Challenging Conditions

The implementation of community-led test and treat with doxycycline has been successfully completed in Southwest Cameroon. Despite challenging conditions, the team managed to ensure all the community drug distributors (CDDs) received doxycycline supplies for each of their treatment stations, and the CDDs worked immensely hard to ensure as many people as possible completed treatment. Very few, minor side effects were reported, with no severe adverse events.

Adherence to a five-week treatment course is perceived as a barrier by policy makers to widescale implementation of doxycycline, however, the evidence from the Meme River Basin shows this is not the case, with 92.6% of those who began treatment completing the full five-week course. This intervention has reached remote, hard-to-reach communities with little access to healthcare and worked with them to deliver at scale a curative treatment against onchocerciasis to the worst affected community members.



The evidence already generated helps address a known policy need for complementary and alternative strategies to combat onchocerciasis in areas where the African eye worm *L. loa* is also found. This geographic overlap of *L. loa* and onchocerciasis poses several barriers to effective implementation of ivermectin, relating to community perceptions and acceptability of this treatment, as well as logistic and operational barriers inherent in having to screen for *L. loa* and mobilise additional resources for the detection and management of rare, but serious, adverse events. Doxycycline has no effect on *L. loa*, removing these implementation barriers.

As well as causing blindness, long-term infection with onchocerciasis causes onchodermatitis. Historically, international efforts to control onchocerciasis have centred on the prevention of blindness, meaning there is a paucity of data on about the incidence, severity and geographic spread of onchodermatitis. This lack of data means policy makers and healthcare providers are constrained in knowing where or how to combat onchodermatitis. To close this gap, the COUNTDOWN team prioritised data collection for onchodermatitis during doxycycline delivery.

Raising the Profile of Onchodermatitis in Affected Communities

Before data collection on onchodermatitis could commence, local researchers and health workers needed to be trained on how to recognize and record the different presentations of onchodermatitis. Although onchocerciasis has long been endemic in these areas, the top-level focus on blindness filters down to the local and community level; there is no formal training for onchodermatitis for health workers, or guidance on how to assess, treat and manage these conditions. Consequently, a training visit was arranged by the COUNTDOWN team for consultant dermatologist and leading expert on onchocercal skin disease, Dr Michele Murdoch, to conduct a week-long intensive programme of classroom teaching and clinical training for local nurses from endemic areas and the COUNTDOWN research team, to enable them to better recognise signs of onchodermatitis.



During the taught component of the workshop, the team learnt about the morphology and terminology of skin lesions, the clinical classification of onchodermatitis, and other common skin complaints. The collection of data on itching was explained and practiced through role play. In addition, there was opportunity for the team to practice form-filling for clinical signs using clinical slides of cases. During doxycycline distribution, the newly trained nurses were part of the survey team who assessed communities for onchocerciasis infection. As an additional benefit to collecting data on this neglected aspect of onchocerciasis, the increased knowledge and capability they gained will have a lasting impact on their capacity to correctly diagnose onchodermatitis in the future.

The pre-treatment data collected reveals a startling picture regarding the burden on onchodermatitis in these communities. Of those surveyed, 11% of individuals were suffering from one or more form of onchodermatitis, with a small subset of individuals beset with three different manifestations of onchodermatitis at once. Children as young as five were recorded as suffering from severe itching and other clinical presentations of onchodermatitis. Without these surveys taking place, the burden and impact of onchodermatitis would have gone unrecognised and unaddressed. The COUNTDOWN team are in a unique position to assess the impact of doxycycline on onchodermatitis going forward.



Advocacy at all levels

The COUNTDOWN team have been vocal in advocating for more attention to be paid to onchodermatitis, and onchocerciasis in general. A blog has been written about onchodermatitis which has been well received, and initial findings from the skin surveys have been presented at international conferences, highlighting the impact and importance of these conditions today. COUNTDOWN attended Cameroon's National Onchocerciasis and Lymphatic Filariasis Elimination Committee, which met for the first time in January 2018. COUNTDOWN research evidence was presented to the Committee, and high-level support for the implementation of test and treat with doxycycline is growing. COUNTDOWN also advocates for onchocerciasis control internationally and are members of the NGDO co-ordination group for onchocerciasis elimination, an advocacy group consisting of organisations working towards onchocerciasis elimination. The group are in the process of developing an onchocerciasis elimination "blueprint", with contributors from WHO, academia, NDGOs and members of the Mectizan donation programme.

COUNTDOWN researchers are on the core steering committee, and the technical document production committee. The involvement of key policy makers in these meetings is the beginning of the process of ensuring their engagement in the ongoing work in Cameroon and keeping open strong lines of communication and dialogue between COUNTDOWN and policy makers. In addition, the COUNTDOWN onchodermatitis work now features on the curriculum at LSTM for nurses training in tropical diseases, informing the nurses about how COUNTDOWN have advocated for incorporating onchodermatitis into control strategies. The [COUNTDOWN blog post](#) on onchodermatitis has been hailed by the course lecturers as one of the few resources available explaining onchodermatitis and why it should be measured.

Gender and Equity

Gender shapes equity, poverty and disease experience in multiple ways, yet to date there has not been adequate attention paid to gender equity in the neglected tropical disease effort, or the multiple impacts of neglected tropical diseases on women and girls and how this varies within and between contexts (Theobald et al. 2017). Equitable neglected tropical disease control is central to COUNTDOWN research, and fundamental to achieving several sustainable development goals, including to end the epidemic of neglected tropical diseases (target 3.3), but also more broadly to achieve universal health coverage (target 3.8), and universal access to safe water (target 6.1) and sanitation (target 6.2).

Onchodermatitis is disfiguring and can lead to those affected being excluded from or being unable to fully participate in community and economic activities as it has a severe impact on both mental and physical health. The social science component of this research is investigating how affected individuals, particularly those living with disabilities, are perceived and treated by other community members.

This work also aims to understand which factors influence communities and individuals to accept or refuse treatment for onchocerciasis including previous individual or communal experiences of the health system and drugs; drug distributors capacity to communicate and manage fears around testing and treatment; potential fears of unaffordable healthcare; traditional beliefs about taking skin from the body and trust issues due to political tensions. By better understanding the motivation driving individuals and communities to accept or reject doxycycline, COUNTDOWN can ensure that no one is left behind.

By generating evidence on onchodermatitis, COUNTDOWN will advocate for its inclusion in regional and national policies and guidelines and ensure that those affected get treatment, so they can be included and participate in ordinary day to day activities fully. COUNTDOWN is leading the way in implementing the well-established clinical grading scale to monitor the impact of doxycycline treatment and providing a model through which onchodermatitis can be prioritised during such treatment programmes. If successful, this approach could be easily transferred to other endemic areas and be used to monitor new drug regimens that are currently being developed. The knowledge transfer and capacity building achieved in COUNTDOWN is another important step towards increasing the profile of skin neglected tropical diseases and moving towards integrated management strategies.

Impact

It is widely accepted in the international research community that alternative strategies against onchocerciasis are urgently needed, but evidence on how and where best to implement them is lacking. This work also provides additional evidentiary support for the targeted use of doxycycline in areas where *L. loa* prevalence would normally preclude community wide approaches to combating disease. This work will improve the health and livelihoods of infected individuals living in the Meme river basin, who have been so far neglected by ivermectin-based approaches which are not feasible or acceptable in these areas. It also, for the first time, allows the realisation of the impact of onchodermatitis, a presentation of onchocerciasis frequently neglected and overlooked during MDA. Uniquely, this is the first study to assess the impact of doxycycline treatment on onchodermatitis.

Key Recommendations

- ✓ Doxycycline can be delivered at scale in challenging conditions, and adherence to a five-week course has been exceptional, well above adherence to Mectizan in these same communities.
- ✓ Assessment of onchodermatitis should be included in national onchocerciasis surveillance and elimination strategies. Despite ongoing CDTi, there is still a high burden of onchodermatitis in these communities.

References and Further Reading



Cross-talk. (2017). Ensuring Onchocerciasis Control is more than just “Skin Deep” by Ending the Neglect of Onchodermatitis. [online] Available at: <https://countdownntds.wordpress.com/2017/04/27/ensuring-onchocerciasis-control-is-more-than-just-skin-deep-by-ending-the-neglect-of-onchodermatitis/> [Accessed 5 Feb. 2018].

Cross-talk. (2018). Old dog, New Tricks? Assessing the Potential of Integrating Focal Vector Suppression with Drug Cure to Control and Eliminate River Blindness. [online] Available at: <https://countdownntds.wordpress.com/2016/08/03/old-dog-new-tricks-assessing-the-potential-of-integrating-focal-vector-suppression-with-drug-cure-to-control-and-eliminate-river-blindness/> [Accessed 5 Feb. 2018].

Hoerauf A., Specht S., Marfo-Debrekyei Y., Buttner M., Debrah A. Y., Mand S., Batsa L., Brattig N., Konadu P., Bandi C., Fimmers R., Adjei O., Buttner D. W. (2009) Efficacy of 5-week doxycycline treatment on adult *Onchocerca volvulus*. *Parasitology Research* 104: 437 – 447.

Murdoch, M., Hay, R., Mackenzie, C., Williams, J., Ghalib, H., Cousens, S., Abiose, A. and Jones, B. (1993). A clinical classification and grading system of the cutaneous changes in onchocerciasis. *British Journal of Dermatology*, 129(3), pp.260-269.

Turner, J., Tendongfor, N., Esum, M., Johnston, K., Langley, R., Ford, L., Faragher, B., Specht, S., Mand, S., Hoerauf, A., Enyong, P., Wanji, S. and Taylor, M. (2010). Macroparasitocidal Activity after Doxycycline Only Treatment of *Onchocerca volvulus* in an Area of Loa loa Co-Endemicity: A Randomized Controlled Trial. *PLoS Neglected Tropical Diseases*, 4(4), p.e660.

Walker M., Specht S., Churcher T. S., Hoerauf A., Taylor M. J., Basanez M.-G., (2015) Therapeutic efficacy and macroparasitocidal activity of doxycycline for the treatment of river blindness. *Clinical Infectious Diseases* 2015 60, 1199 – 1207

Wanji, S., Kengne-Ouafo, J., Esum, M., Chounna, P., Tendongfor, N., Adzemye, B., Eyong, J., Jato, I., Datchoua-Poutcheu, F., Kah, E., Enyong, P. and Taylor, D. (2015). Situation analysis of parasitological and entomological indices of onchocerciasis transmission in three drainage basins of the rain forest of South West Cameroon after a decade of ivermectin treatment. *Parasites & Vectors*, 8(1).

Wanji S, Tendongfor N, Nji T, Esum M, Che JN, Nkwescheu A, Alassa F, Kamnang G, Enyong PA, Taylor MJ, Hoerauf A, Taylor DW (2009) Community-directed delivery of doxycycline for the treatment of onchocerciasis in areas of co-endemicity with loiasis in Cameroon. *Parasites & Vectors*, 2(1):39.

WHO & APOC (2015) Guide for decision making and implementation of vector control as Alternative Treatment Strategies for elimination of onchocerciasis. WHO/MG/15.22, December 2015.