



source: Chrispin Williams, Liberia NMCP

Interceptor® G2 - Innovative second-generation insecticide treated net (ITN)

- First in class dual active ingredient. ITN providing Public Health Value
- Only dual active ingredient ITN with proven efficacy reducing malaria transmission
- Innovative active ingredient system formulated with alpha-cypermethrin and chlorfenapyr
- New mode of action provided by chlorfenapyr
- Highly effective against insecticide resistant mosquitoes
- Based on well proven BASF technology used in Interceptor® ITN
- Ready and safe to use
- Proven long lasting efficacy after 20 washes
- WHO Prequalification (PQ) listed

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Interceptor® G2 – first-in-class dual active ingredient insecticide treated net (ITN) to control insecticide resistant mosquitoes and reduce malaria transmission

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Interceptor® G2 is a second generation ITN that, unlike the first generation, provides both a pyrethroid, alpha-cypermethrin, and a new non-pyrethroid active ingredient, chlorfenapyr, that is highly effective against insecticide resistant mosquitoes.



Interceptor® G2 – combining chlorfenapyr and alpha-cypermethrin

The use of long-lasting insecticide treated bed nets (ITNs) has unequivocally been proven to be an important and successful tool for the mitigation of malaria. However, a negative consequence of the widespread use of ITNs has been the accompaniment of selection which further exacerbates well-known insecticide resistance to neurotoxic chemistries, such as pyrethroids.

Interceptor® G2 is the second-generation ITN developed by BASF with a combination of chlorfenapyr and alpha-cypermethrin to control insecticide resistant mosquitoes. Interceptor® G2 is a multifilament polyester net produced with a unique textile-finishing process developed by BASF using a proprietary polymer system. It contains 200 mg/m² chlorfenapyr and 100 mg/m² alpha-cypermethrin.

On mosquito netting, chlorfenapyr is toxic to insecticide resistant and susceptible mosquitoes but lacks the property of excito-repellency - crucial for reducing mosquito biting rates and providing personal protection to households using ITNs. In Interceptor® G2,

the pyrethroid component, alpha-cypermethrin, provides excito-repellency whilst the chlorfenapyr component restored insecticidal activity against insecticide resistant mosquitoes.

Chlorfenapyr – a new insecticide for malaria control

Chlorfenapyr, a pyrrole, was launched by the BASF Agricultural Solutions division in 1995. The active ingredient is registered in over 40 countries mainly for pest control use (e.g., US EPA approval for use in kitchens and food storage) and has a mode of action new to vector control. It is not neurotoxic but owes its toxicity to the disruption of cellular respiration and oxidative phosphorylation in mitochondria and leads to energy depletion in the mosquito. Evaluations performed on *Anopheles gambiae*, *Anopheles funestus* and *Culex quinquefasciatus* mosquitoes show no cross resistance of chlorfenapyr to mechanisms that confer resistance to standard neurotoxic insecticides, such as organochlorines, pyrethroids, organophosphates and carbamates.

Interceptor® G2 – controlling and reducing malaria in areas with insecticide resistance

This next-generation ITN required an evaluation to demonstrate its effectiveness against malaria in human populations in areas characterized by different insecticide resistance intensities and major vector species. The ability to document the reduction in malaria demonstrates a Public Health Value (i.e., impact). Randomised controlled trial (RCT) data was employed to compare the effectiveness of the dual active ingredient Interceptor® G2 against pyrethroid-only ITNs (Interceptor®, 200 mg/m² alpha-cypermethrin). Both malaria prevalence and incidence in areas of documented pyrethroid insecticide resistance were reduced.

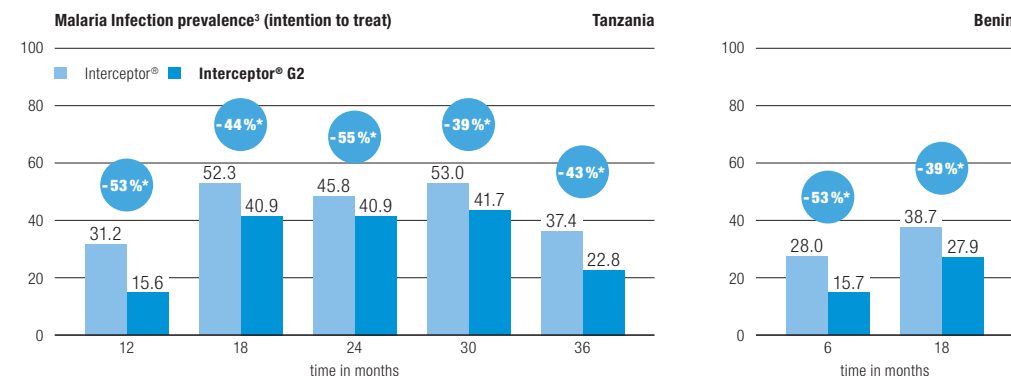
Beginning in 2019, nearly 40,000 Interceptor® G2 ITNs were distributed along with standard pyrethroid-only ITNs in Tanzania; nets were also distributed in Benin in early 2020. In Tanzania¹ Interceptor® G2 provided significantly better protection over two years than

did pyrethroid-only ITNs: Children aged six months to 14 years had 55% lower odds of having malaria two years after the Interceptor® G2 distribution, and children aged six months to 10 years had 44% lower malaria incidence over the two-year period. After three years, a reduction of 43% was observed.

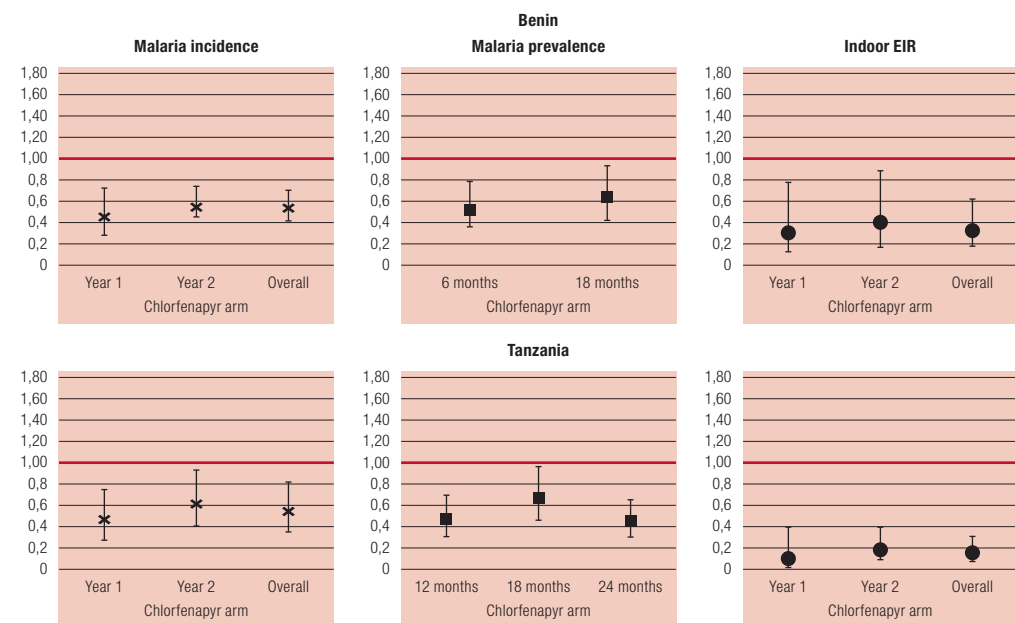
In Benin¹, a significant reduction in odds of malaria infection prevalence were detected in Interceptor® G2 compared to pyrethroid-only ITNs at six months (reduction of 53%) and 18 months (reduction of 39%) with a strong effect observed at six months. A 46% reduction of malaria incidence was observed.

The data available from both RCTs demonstrated a significant impact of Interceptor® G2 on malaria prevalence compared to a pyrethroid-only ITN and surpassed the reduction targets for which they were originally designed.

Interceptor® G2 has demonstrated evidence of significant Public Health Value based on a clear protective effect as demonstrated in two RCTs, encompassing different eco-epidemiological settings. From both public provider and donor perspectives, Interceptor® G2 is also the most cost-effective of the three dual active ingredient ITNs tested in the two RCTs.



Comparison of results from RCT in Tanzania and Benin (source: personal communication M. Accrombessi)



¹ J.F. Masha, M.A. Kulkarni, E. Lukole, N.S. Matowo, C. Pitt, L.A. Messenger, E. Mallya, M. Jumanne, T. Aziz, R. Kaaya, B.A. Shirima, G. Isaya, M. Taljaard, J. Martin, R. Hashim, C. Thickstun, A. Manjurano, I. Kleinschmidt, F.W. Masha, M. Rowland, N. Protopopoff (2022). Effectiveness and cost-effectiveness against malaria of three types of dual-active-ingredient long-lasting insecticidal nets (LLINs) compared with pyrethroid-only LLINs in Tanzania: a four-arm, cluster-randomised trial. *The Lancet*, 399: 1227–41

² Accrombessi, M., Cook, J., Dangbenon, E., Yovogan, B., Akpovi, H., Sovi, A., Adoha, C., Assongba, L., Sidick, A., Akinro, B. and Ossè, R., 2023. Efficacy of pyriproxyfen-pyrethroid long-lasting insecticidal nets (LLINs) and chlorfenapyr-pyrethroid LLINs compared with pyrethroid-only LLINs for malaria control in Benin: a cluster-randomised, superiority trial. *The Lancet*.

³ Malaria prevalence: blood samples of every enrolled child will be tested for malaria using mRDTs
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