



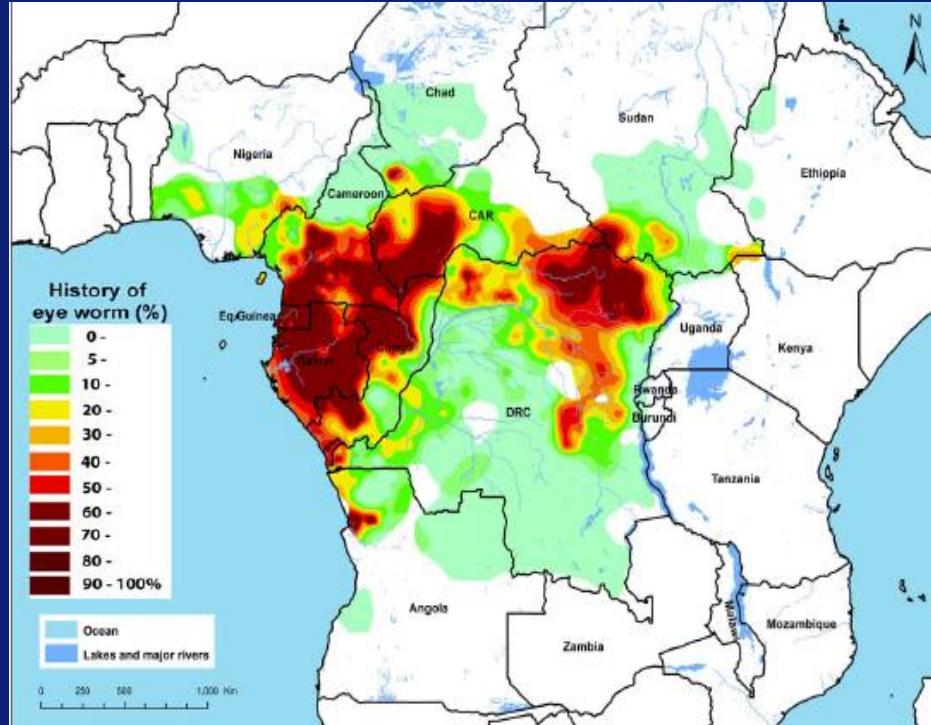
Projected number of people with onchocerciasis- loiasis co-infection in Africa, 1995-2025

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Coffeng, Sébastien DS Pion, Honorat GM Zouré, Belén
Pedrique, Michel Boussinesq, Samuel Wanji, Jan Remme,
Wilma A Stolk**

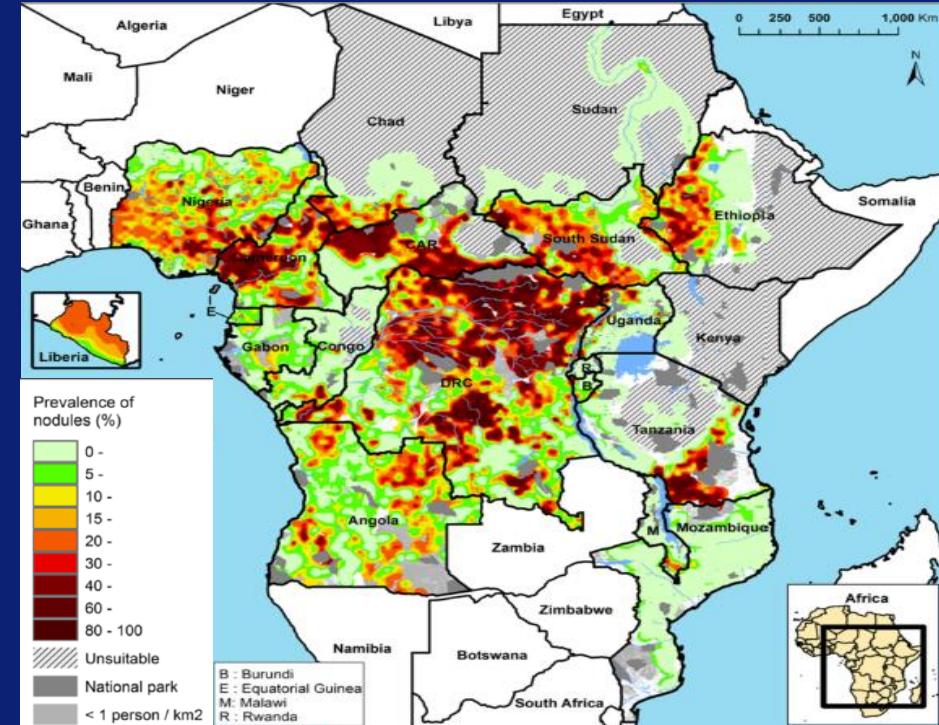
Natalie Vinkeles Melchers, MSc. MPH.

What is the problem?

Loa loa: prevalence of history of African eye worm



Onchocerciasis: prevalence of palpable nodules

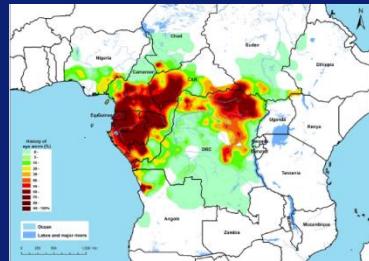


Study aim

To estimate the number of individuals with onchocerciasis and *Loa loa* co-infections in Africa in 2015 and 2025, who are at risk for serious adverse events after treatment with ivermectin.

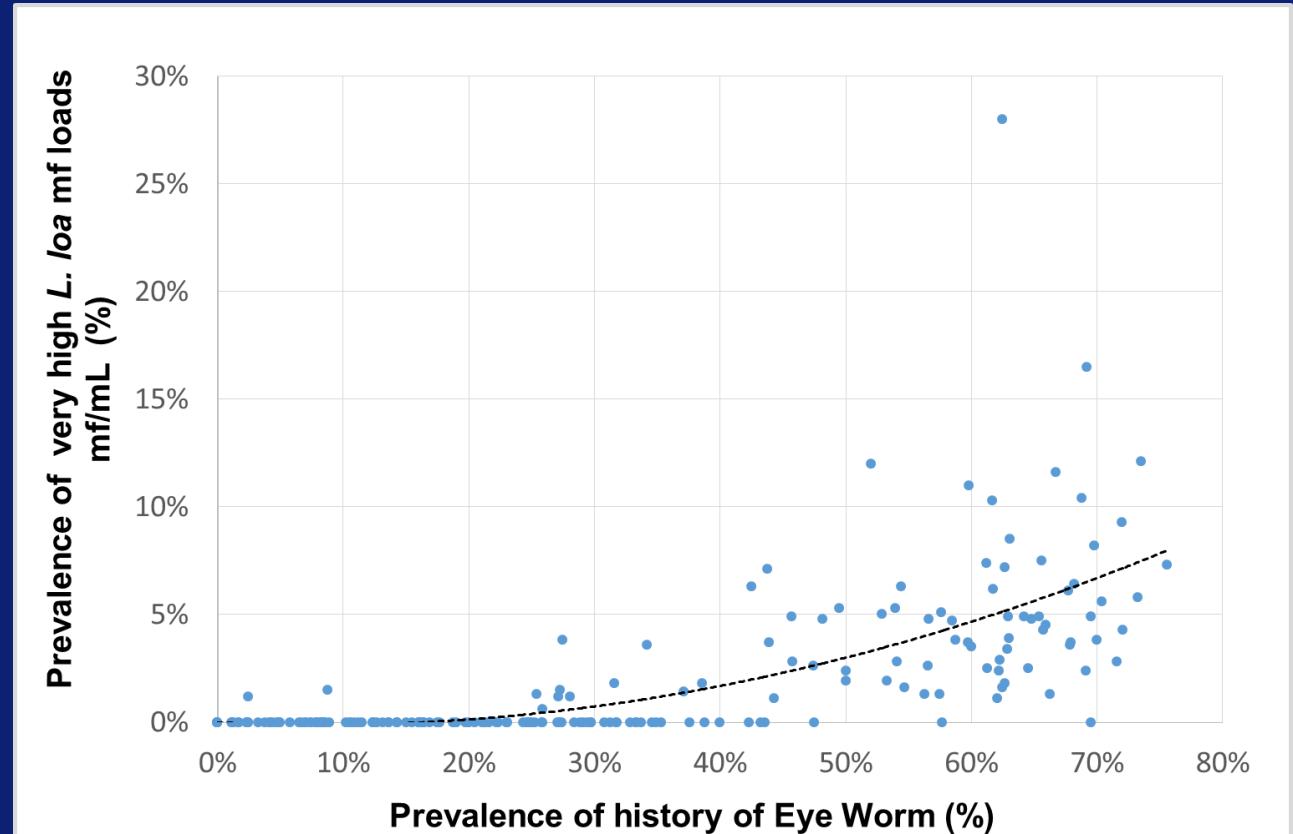
At risk-for serious adverse events: threshold of $\geq 20,000$ Loa microfilariae/mL

Loa loa : estimate prevalence of high-intensity loiasis infection



Based on:
Wanji 2001 UNDP

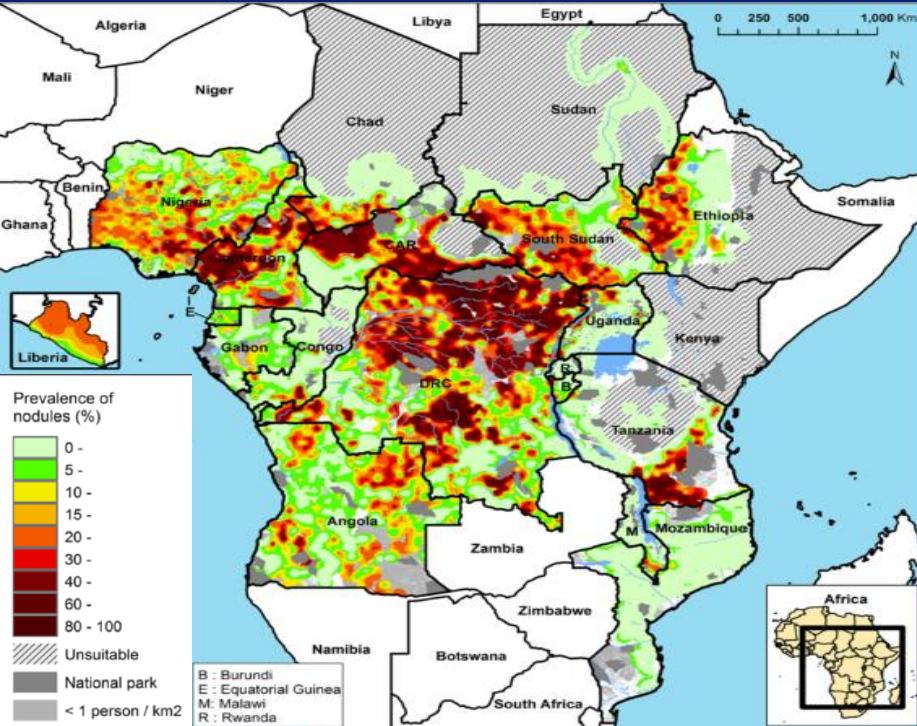
Takougang et al
Bull WHO 2002



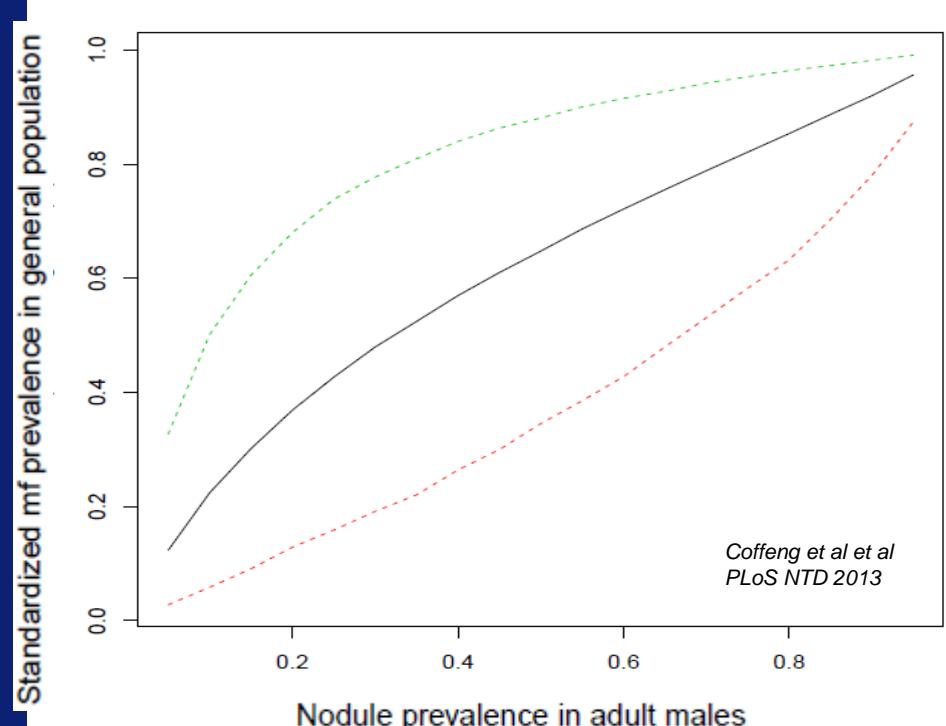
Onchocerciasis: estimate *O. volvulus* mf prevalence

Erasmus MC

Ezafus

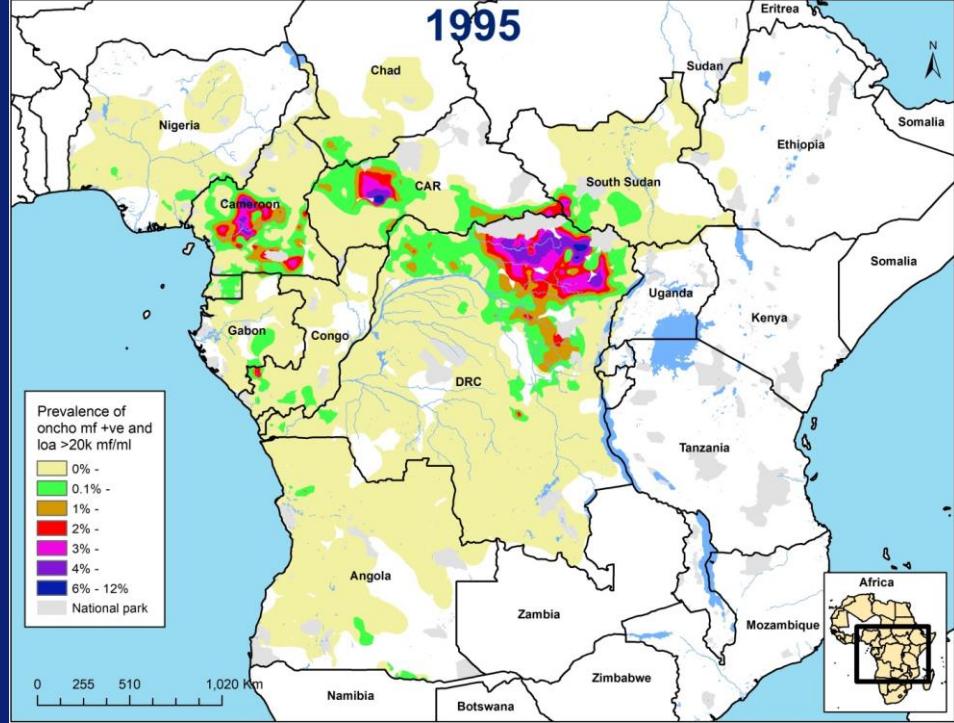
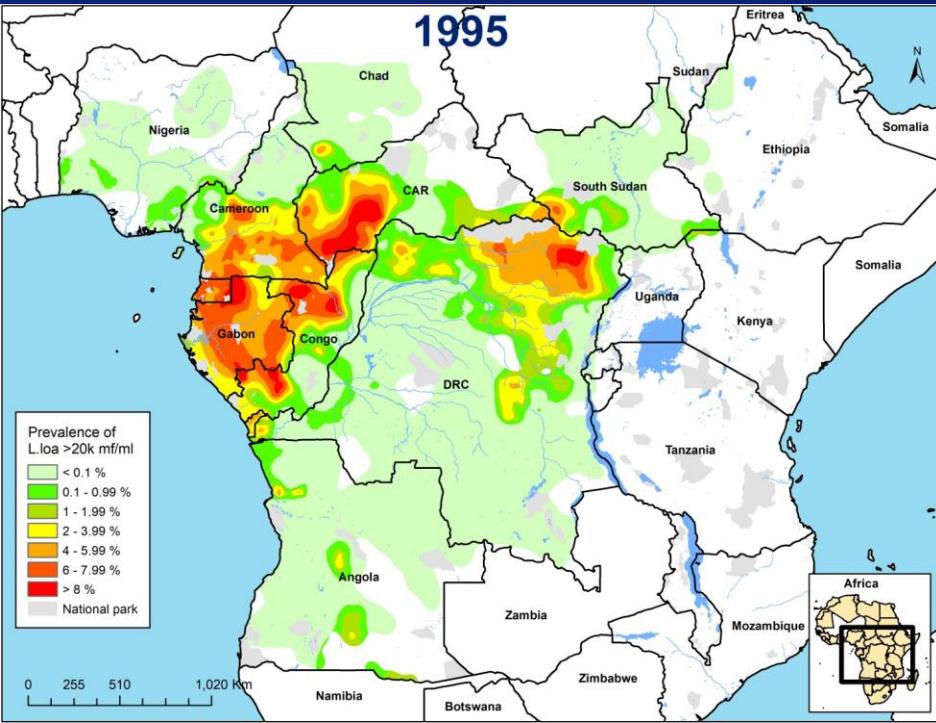


Pre-control prevalence of palpable nodule:
model-based geostatistical analysis at 1x1 km
resolution



Conversion of nodule prevalence in adult
males+20 yrs to mf prevalence in population

Estimating pre-control prevalence of microfilaremic *Loa* infected and co-infected persons



Loa loa: impact of ivermectin on *Loa loa* infection

Marked decrease in *Loa loa* microfilaraemia six and twelve months after a single dose of ivermectin

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TRANSACTIONS OF THE ROYAL SOCIETY OF TROPICAL MEDICINE AND HYGIENE (1997) 91, 593-594

Baseline assumption:
 Ivermectin reduces loiasis prevalence and intensity with first treatment round only

Mf intensity levels pre-treatment	Fraction of population by mf intensity category, one year post-treatment						
	0	1-100	>100-500	>500-2,000	>2,000-10,000	>10,000-30,000	>30,000
0	0.978	0.022	0.000	0.000	0.000	0.000	0.000
1-100	0.857	0.131	0.012	0.000	0.000	0.000	0.000
>100-500	0.500	0.306	0.139	0.056	0.000	0.000	0.000
>500-2,000	0.365	0.192	0.365	0.077	0.000	0.000	0.000
>2,000-10,000	0.120	0.084	0.169	0.434	0.193	0.000	0.000
>10,000-30,000	0.060	0.024	0.071	0.167	0.595	0.083	0.000
>30,000	0.000	0.000	0.029	0.059	0.485	0.382	0.044

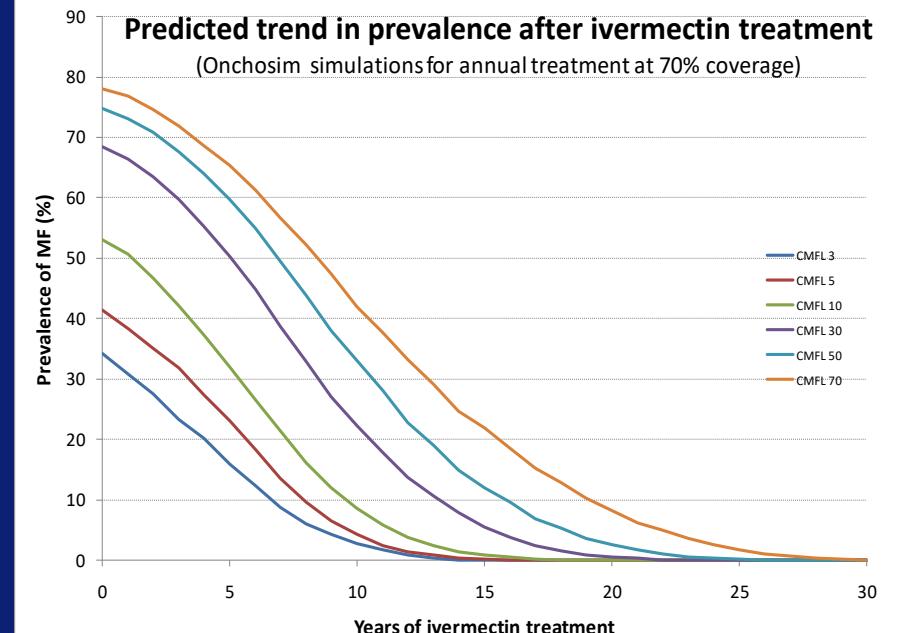
Onchocerciasis: impact of ivermectin on *O. volvulus* infection

Treatment history

Country	Project	APOC/ former OCP	CDTi start year ³	CDTi frequency per annum ⁴	Treatment coverage ⁵
CAR ⁸	CAR combined project	APOC	2003	1	80%
CAR	P20CAR	APOC	2016	1	80%
CAR	P5CAR	APOC	2020	1	80%
Chad	Chad	APOC	2001	1	81%
Congo	Congo 1	APOC	2007	1	81%
Congo	P20Congo	APOC	2014	1	81%
Congo	P5Congo	APOC	2014	1	81%
Côte d'Ivoire	Bandama	former OCP	1990s	1	73%
Côte d'Ivoire	CI Comoé	former OCP	1990s	1	73%
Côte d'Ivoire	CI Lower Sassandra	former OCP	2014	1	73%
Côte d'Ivoire	CI Upper Sassandra	former OCP	1990s	1	73%
DRC ⁹	Bandundu	APOC	2005	1	82%

Kim et al (2015) PLoS NTD 9 (4)

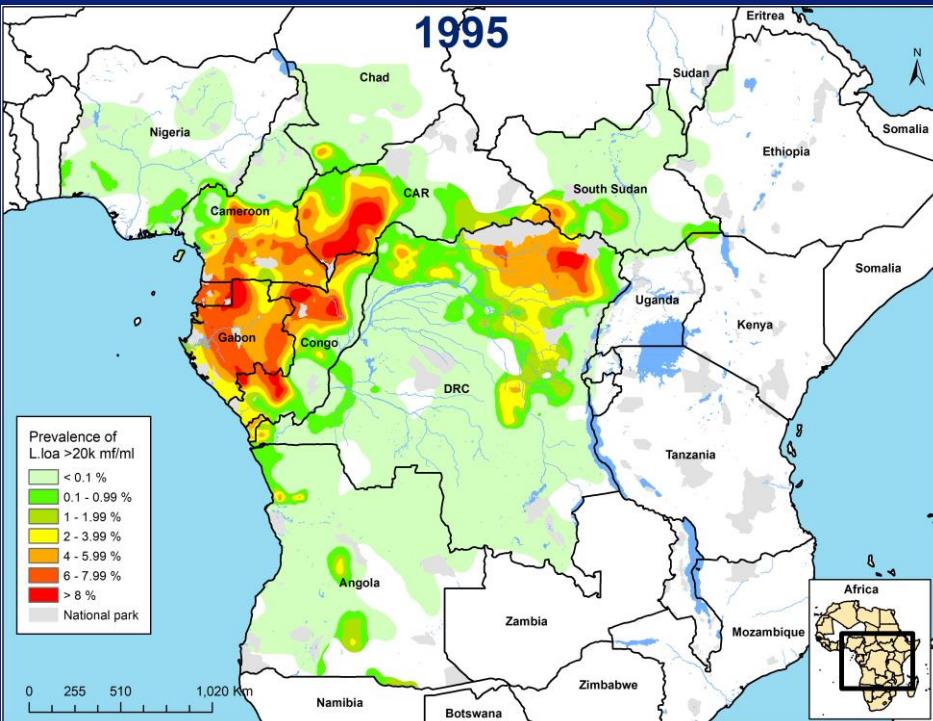
ONCHOSIM



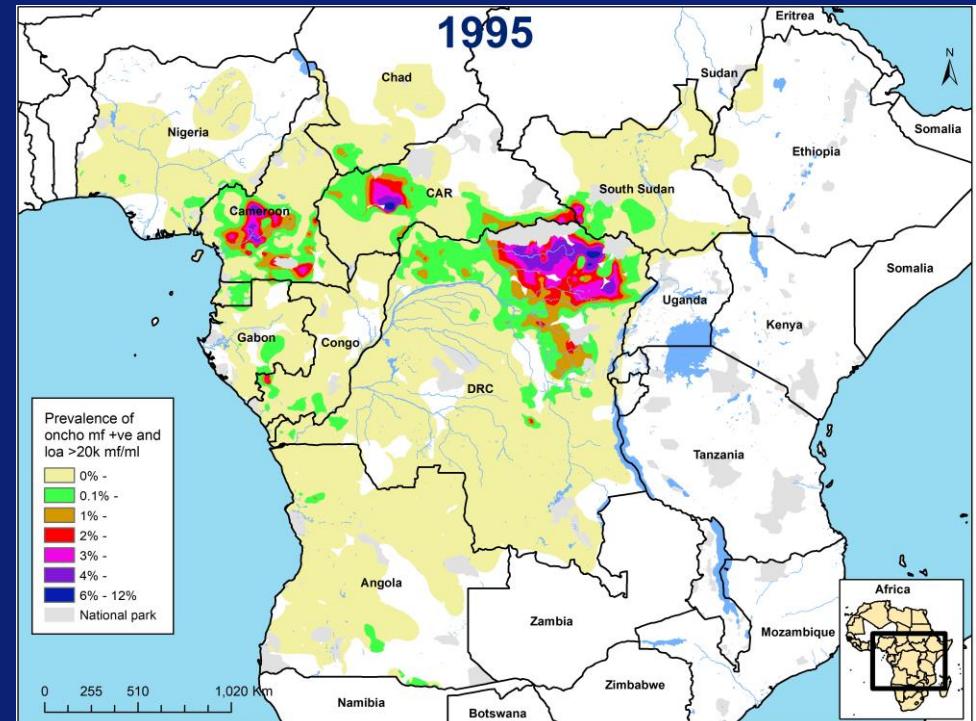
Tekle et al (2016) Inf. Dis. Poverty 5 (66)

Estimating pre-control prevalence (1995) of infected cases

L. loa $\geq 20,000$ mf/mL

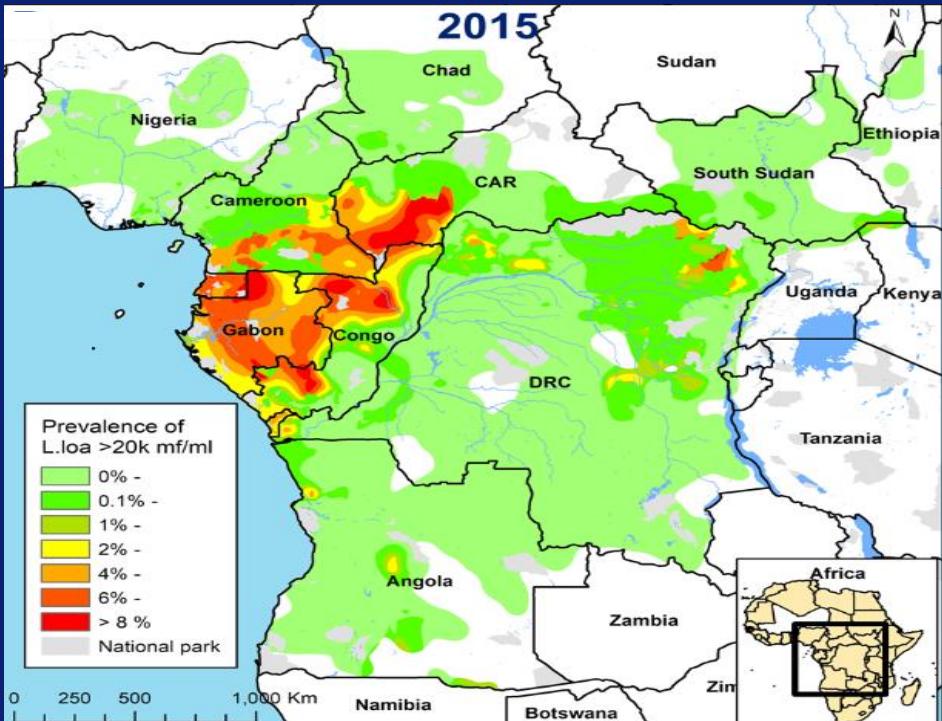


Onchocerciasis - *L. loa* $\geq 20,000$ mf/mL

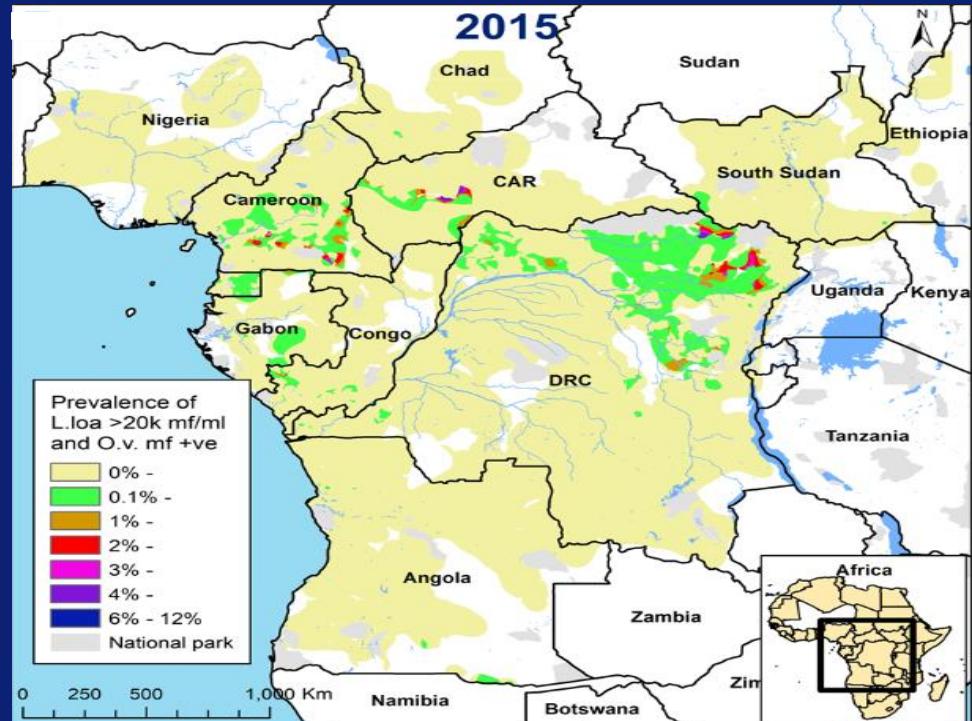


Estimating the current situation (2015) of infected cases

L. loa $\geq 20,000$ mf/mL

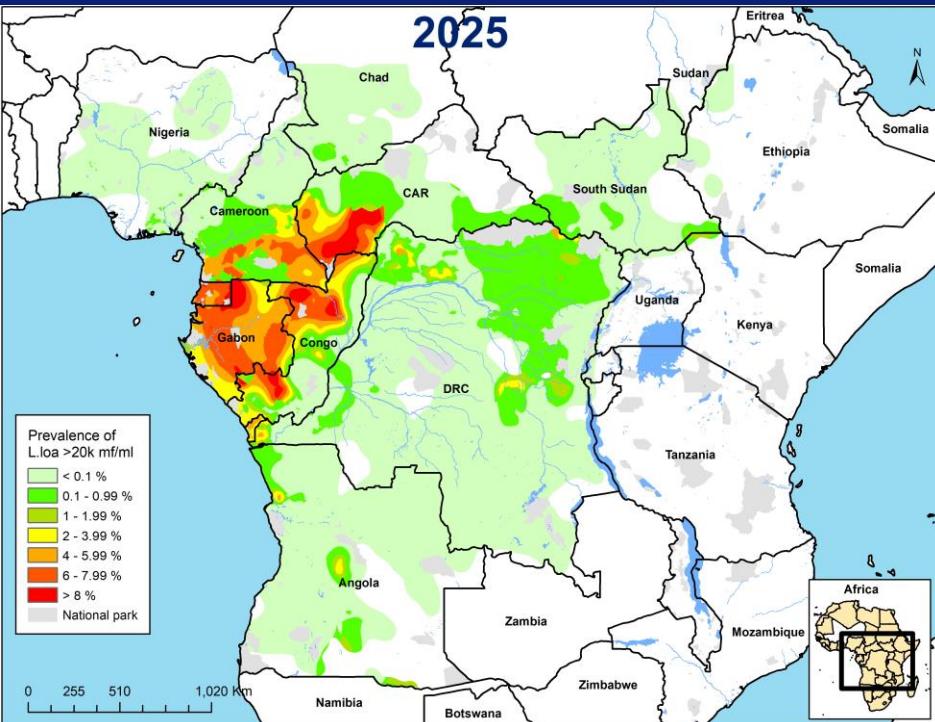


Onchocerciasis - *L. loa* $\geq 20,000$ mf/mL

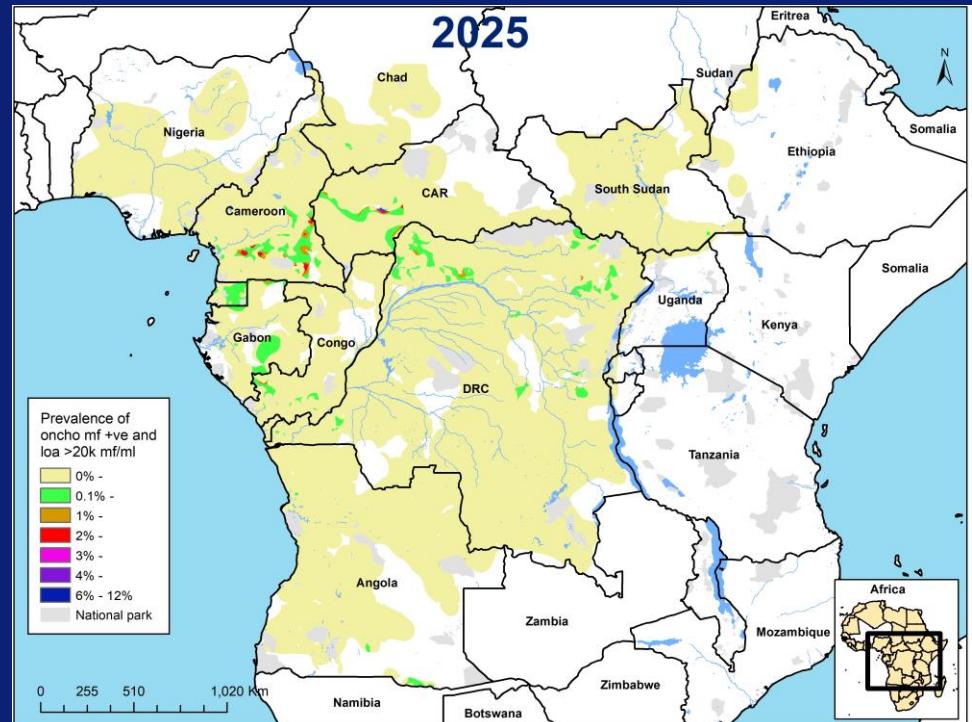


Estimating the future situation (2025) of infected cases

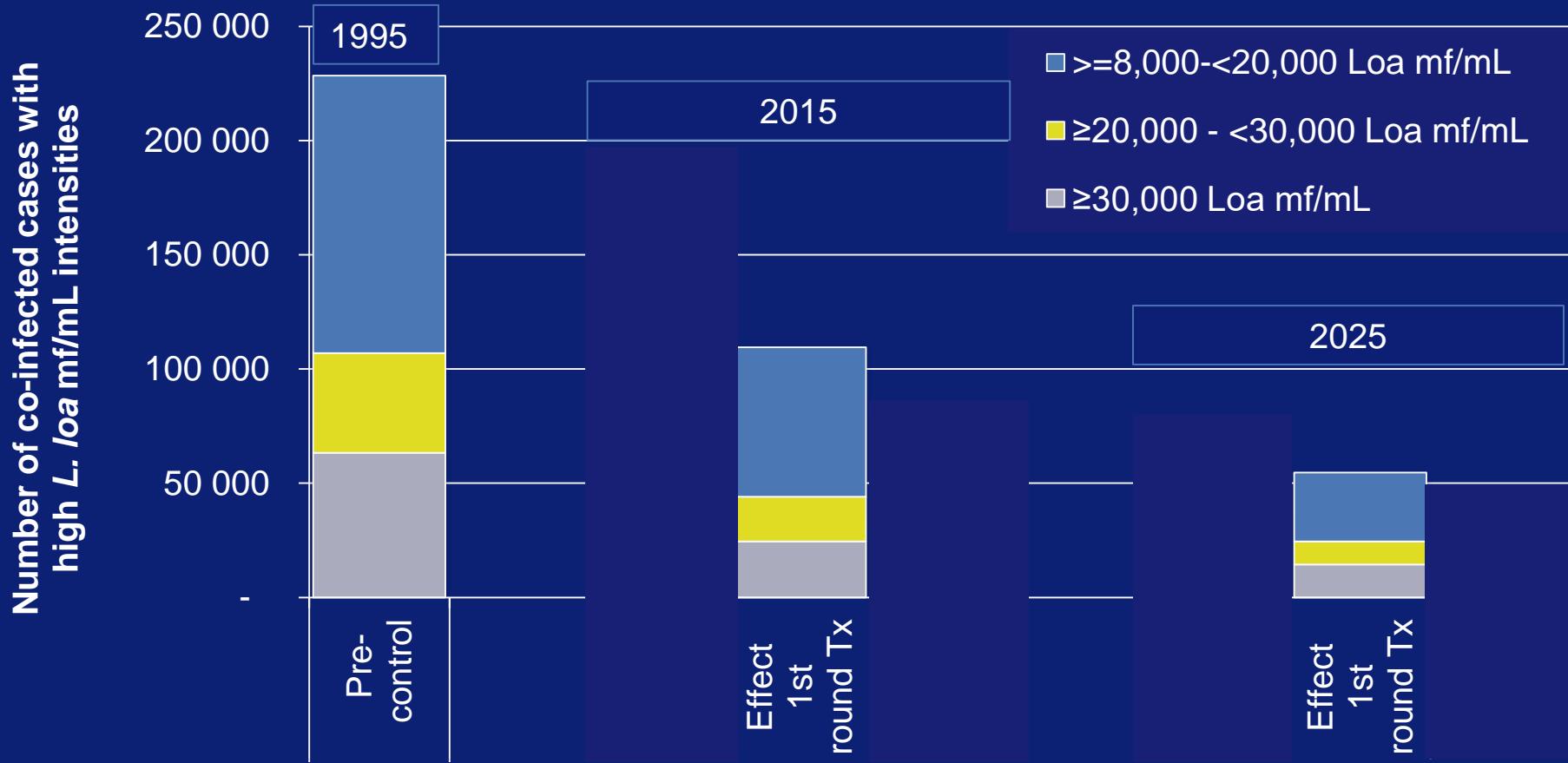
L. loa $\geq 20,000$ mf/mL



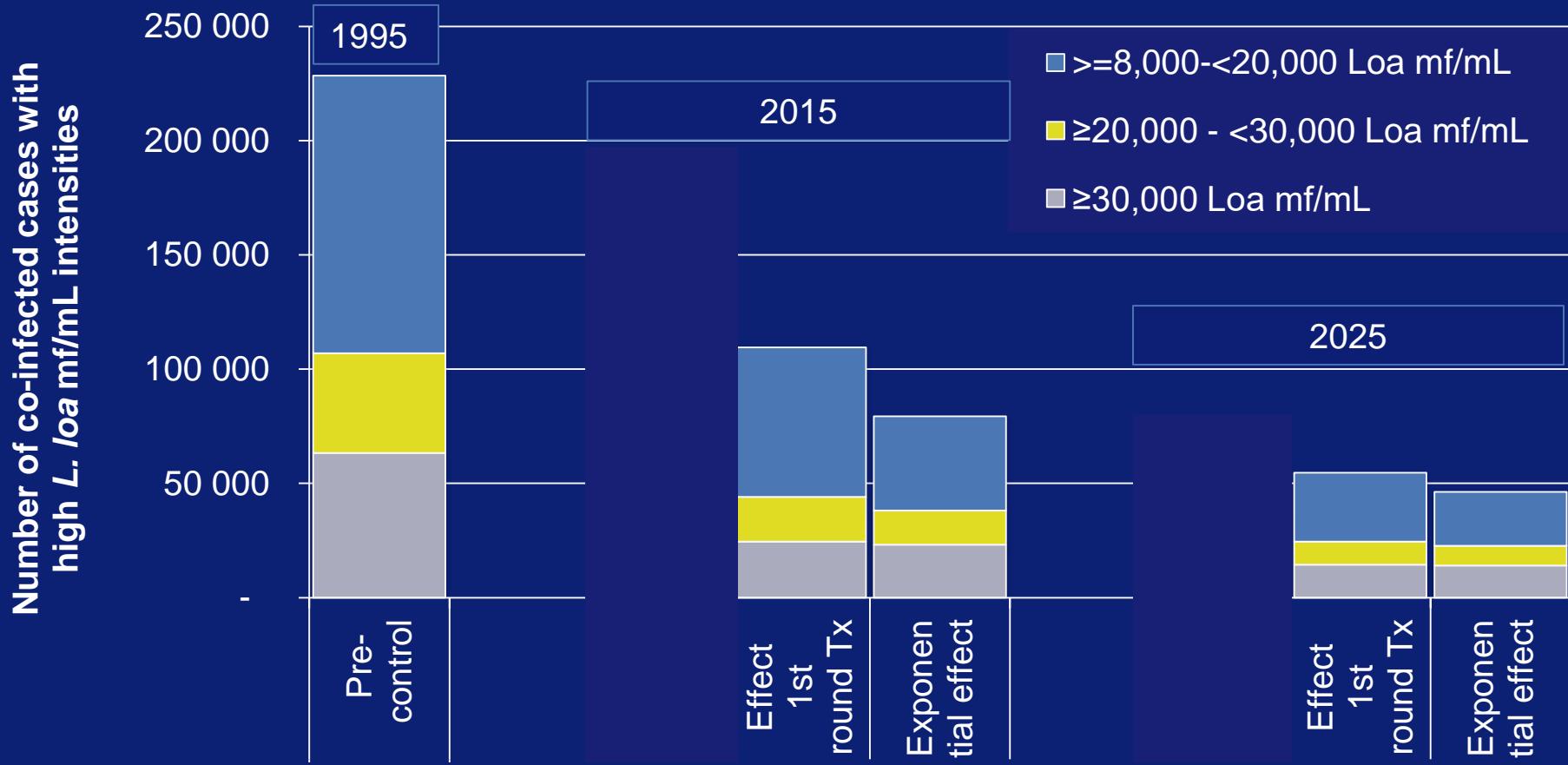
Onchocerciasis - *L. loa* $\geq 20,000$ mf/mL



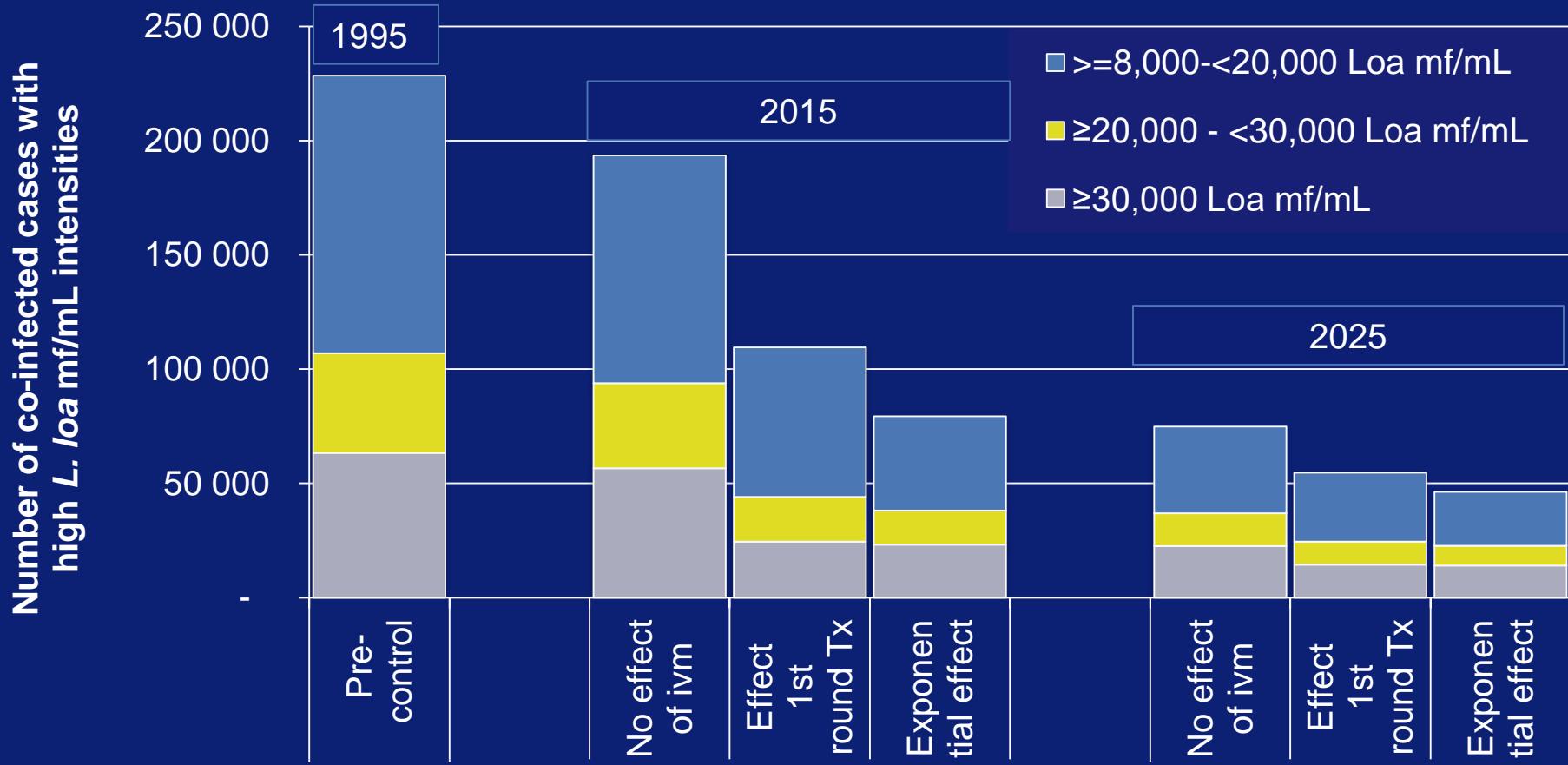
Sensitivity analysis



Sensitivity analysis



Sensitivity analysis



Conclusion

In 2025:

- *Loa+* cases $\geq 20,000$ mf/mL : 203,900
- Co-infected cases (*Loa* $\geq 20,000$ mf/mL) : 24,600
- % of all co-infected cases in onchocerciasis hypoendemic area: 89.5%
- At-risk population living in areas where MDA with ivermectin is contraindicated : ~10 million

Discussion

Strategies for areas that are low endemic for onchocerciasis and co-endemic for *L. loa* (and were MDA in contraindicated)

- New drugs (e.g. macrofilaricides)
- Test-and-(not)-Treat
- Vector control

Strategic implications

- R&D: absolute number of individuals
- Policy makers: relative proportion at risk

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