



# Next-generation IRS project

Stakeholders Meeting  
Liverpool



# Next-generation IRS project

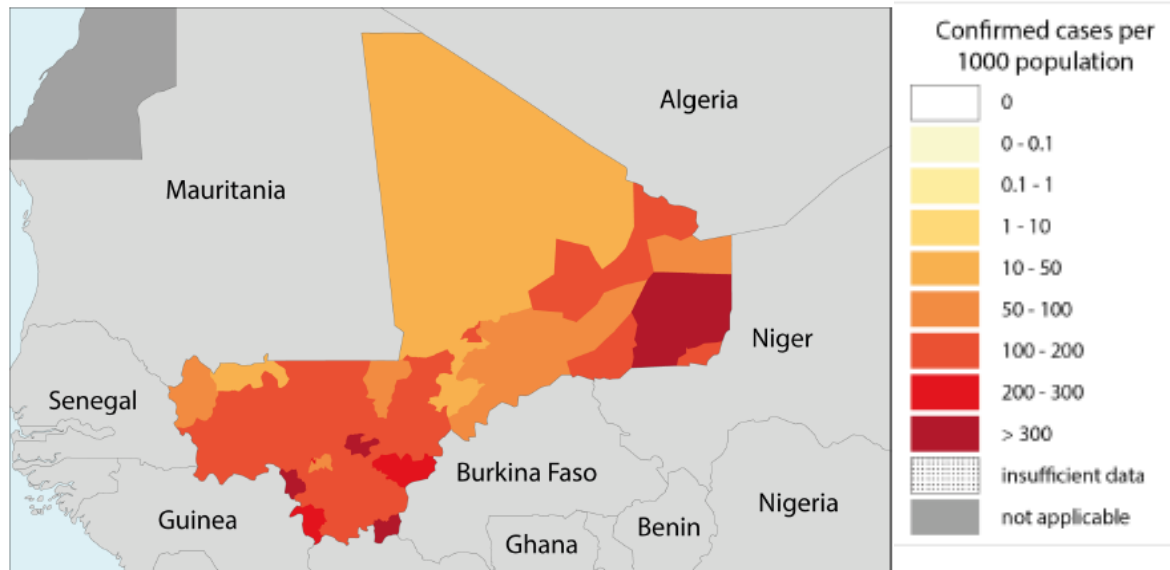
Stakeholder Forum  
September 19, 2019, Liverpool



# NgenIRS in Mali



# IRS implementation - Mali



## I. Epidemiological profile

Population (UN Population Division)	2017	%
High transmission (>1 case per 1000 population)	16.9M	91
Low transmission (0-1 case per 1000 population)	1.6M	9
Malaria free (0 cases)	0	-
Total	18.5M	

Source: World Malaria Report 2018. Geneva: World Health Organization; 2018. License: CC BY-NC-SA 3.0 IGO.

District	06	07	08	09	10	11	12	13	14	15	16	17	18
Koulikoro													
Fana													
Barouéli													
Ségou													
Bla													
Mopti													
Bandiagara													
Bankass													
Djenné													

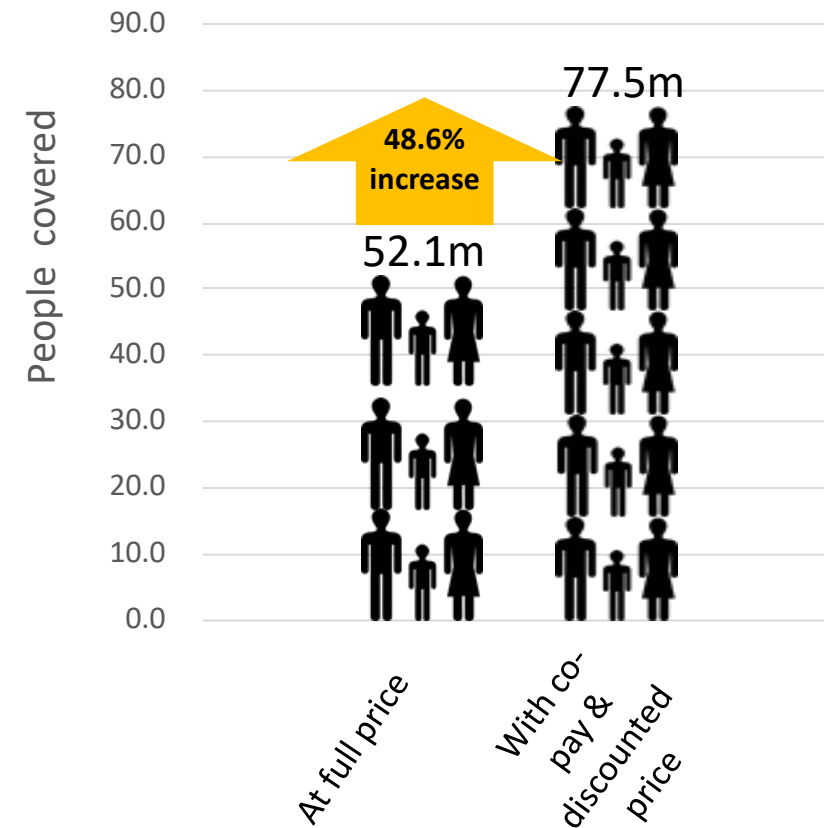
	control (no spray)
	pyrethroid
	bendiocarb
	pirimiphos-methyl

The dominant vector populations, *Anopheles gambiae*, are **highly resistant to pyrethroids**

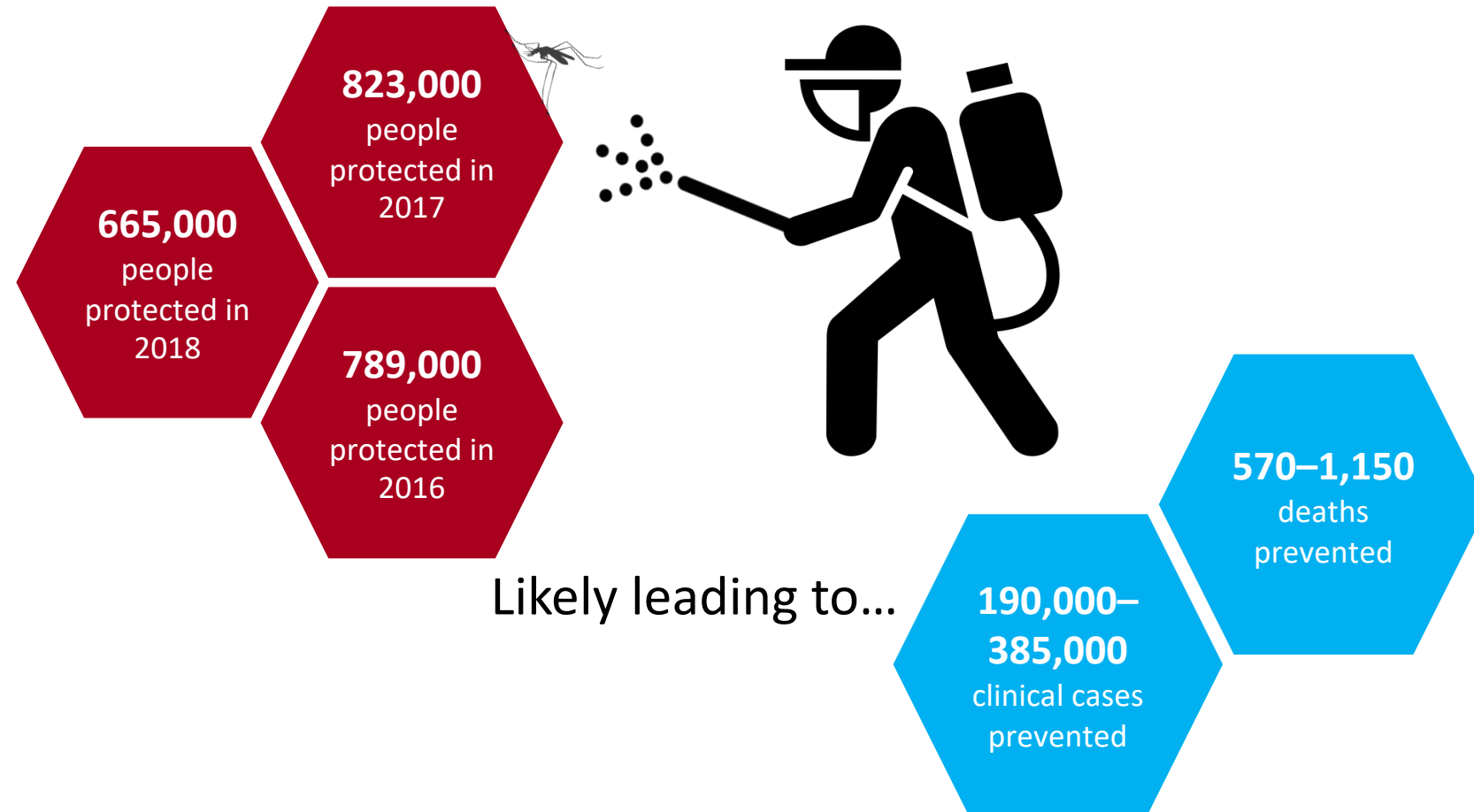


# NgenIRS copay-supported volumes - Mali

Estimated increase in the number of people protected because of NgenIRS investments (Since 2016 – Across Africa)



Mali first participated in 2016. Since then, NgenIRS investments have increased the number of people protected by third-generation IRS (3GIRS) products substantially





Observational analysis of impact of IRS (including 3GIRS) from 2011-2014 in Ségou:

**31%**

reduction in malaria cases reporting to health facilities in IRS districts vs. non-IRS districts

Shift of IRS operation in 2015 and 2017, led to an increased number of cases:

**70%**

increase in cases after removal of IRS in Bla in 2015 associated (excess of 5,600 cases)

**130%**

increase in cases after removal of IRS in Barouéli in 2017 (excess of 6,400 cases)



Introduction of IRS in 2017 in Mopti, led to a decrease in number of cases in 2017-2018:

## 40%

reduction in incidence over 4 months after introducing  
IRS in Mopti(~3,800 cases averted at health facilities)

Combining IRS and drug-based interventions leads to a greater impact than either strategy alone; all age malaria incidence rates from community health facilities in 2014:

## 33%

fewer cases reported in communities  
with IRS (491 fewer cases per 10,000  
person-months)

## 29%

fewer cases reported in  
communities with SMC (352 fewer  
cases per 10,000 person-months).

## 45%

fewer cases reported in communities  
with IRS+SMC (617 fewer cases per  
10,000 person-months).



# 3GIRS impact - Mali

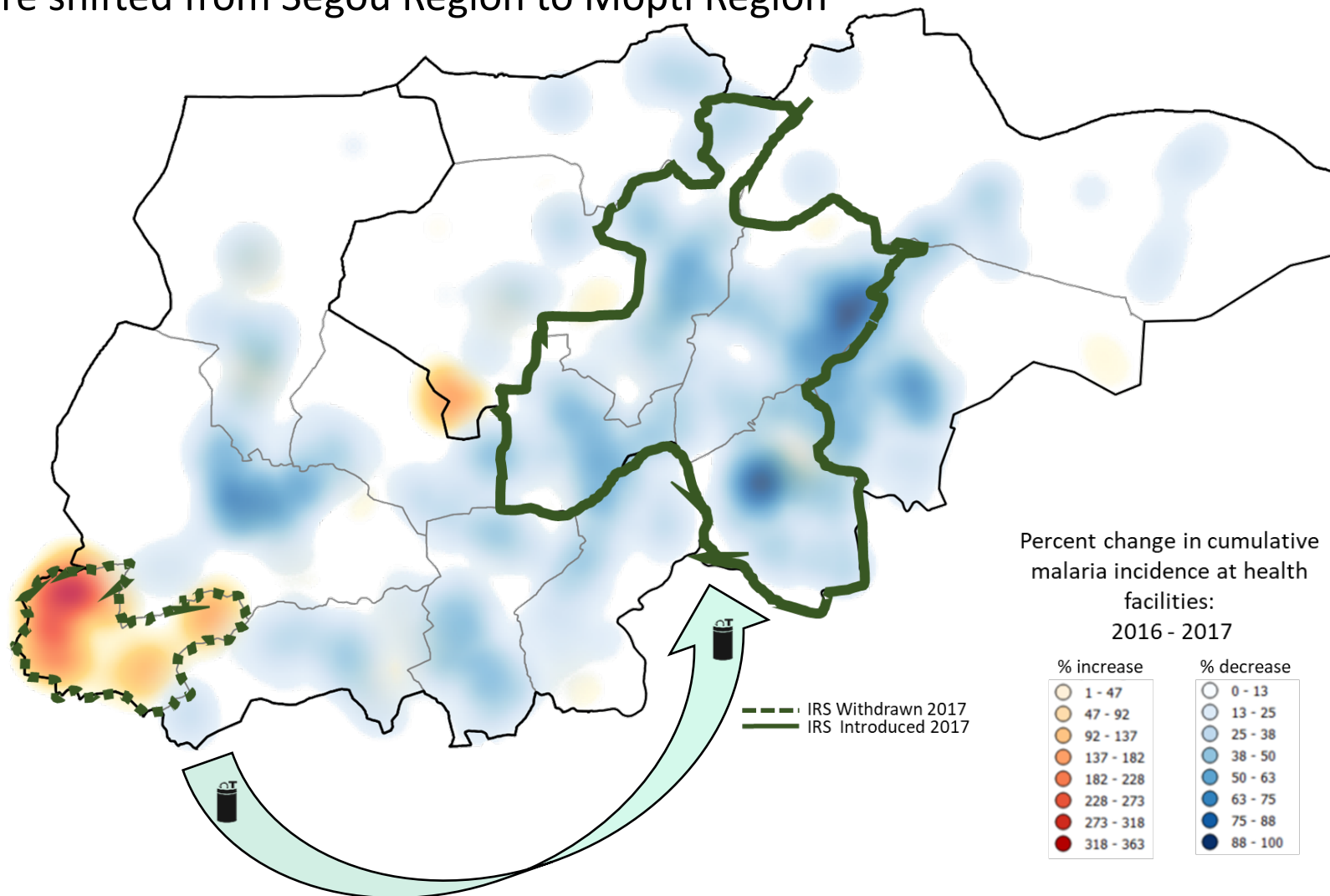
In 2017, PMI/AIRS IRS operations were shifted from Ségou Region to Mopti Region

## 130% ---

increase in incidence after  
the removal of 3GIRS from  
Ségou

## 50% —

decrease in incidence  
after the introduction of  
3GIRS in Mopti





- Update of the epidemiological profile of malaria in Mali
- Adapt the implementation of the different strategies based on the new epidemiological profile
- Continue to monitor vector susceptibility to IRS and ITN insecticides
- Continue IRS implementation in Mopti
- Pilot the introduction of IG2 ITN in some districts of Sikasso Region combined with operational research



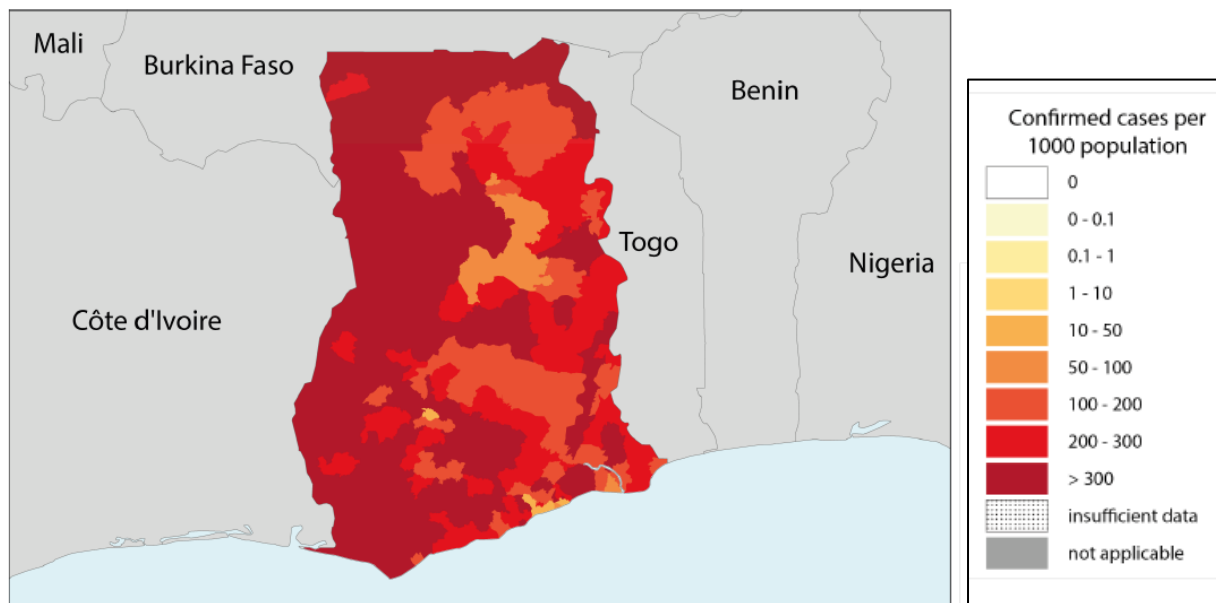
# NgenIRS in Ghana



- The AngloGold Ashanti Malaria Control Programme (AGAMal) began activities in 2006 and the PMI/AIRS program in 2008.
- IRS is now implemented in four of the ten regions in Ghana—Northern, Ashanti, Upper East and Upper West.
- Insecticide resistance concerns in Ghana prompted a switch from pyrethroids to Actellic® 300CS in 2012.



# IRS implementation in Ghana



## I. Epidemiological profile

Population (UN Population Division)	2017	%
High transmission (>1 case per 1000 population)	28.8M	100
Low transmission (0-1 case per 1000 population)	0	-
Malaria free (0 cases)	0	-
Total	28.8M	

Source: World Malaria Report 2018. Geneva: World Health Organization; 2018. License: CC BY-NC-SA 3.0 IGO.

Region	District	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
UPPER WEST	Wa West											
	Wa Municipal											
	Wa East											
	Sissala West											
	Nadowli											
	Jirapa - Lambussie											
	Lawra											
	Sissala East											
UPPER EAST	Builsa (North and South)											
	Bolgatanga											
	Kassena Nankana *											
	Talensi Nabdam											
	Bawku West											
	Bongo											
	Bawku Municipal											
	Garu Tempene											
	Obuasi Municipal											
ASHANTI	Amansie Central											
	Adansi South											
	Adansi North											
	Chereponi											
NORTHERN	Saboba											
	Gushiegu											
	Karaga											
	Savelugu Nanton											
	Bunkpurugu-Yunyoo											
	East Mamprusi											
	Kumbungu-Tolon											
	West Mamprusi											
	Mamprugu Moaduri											

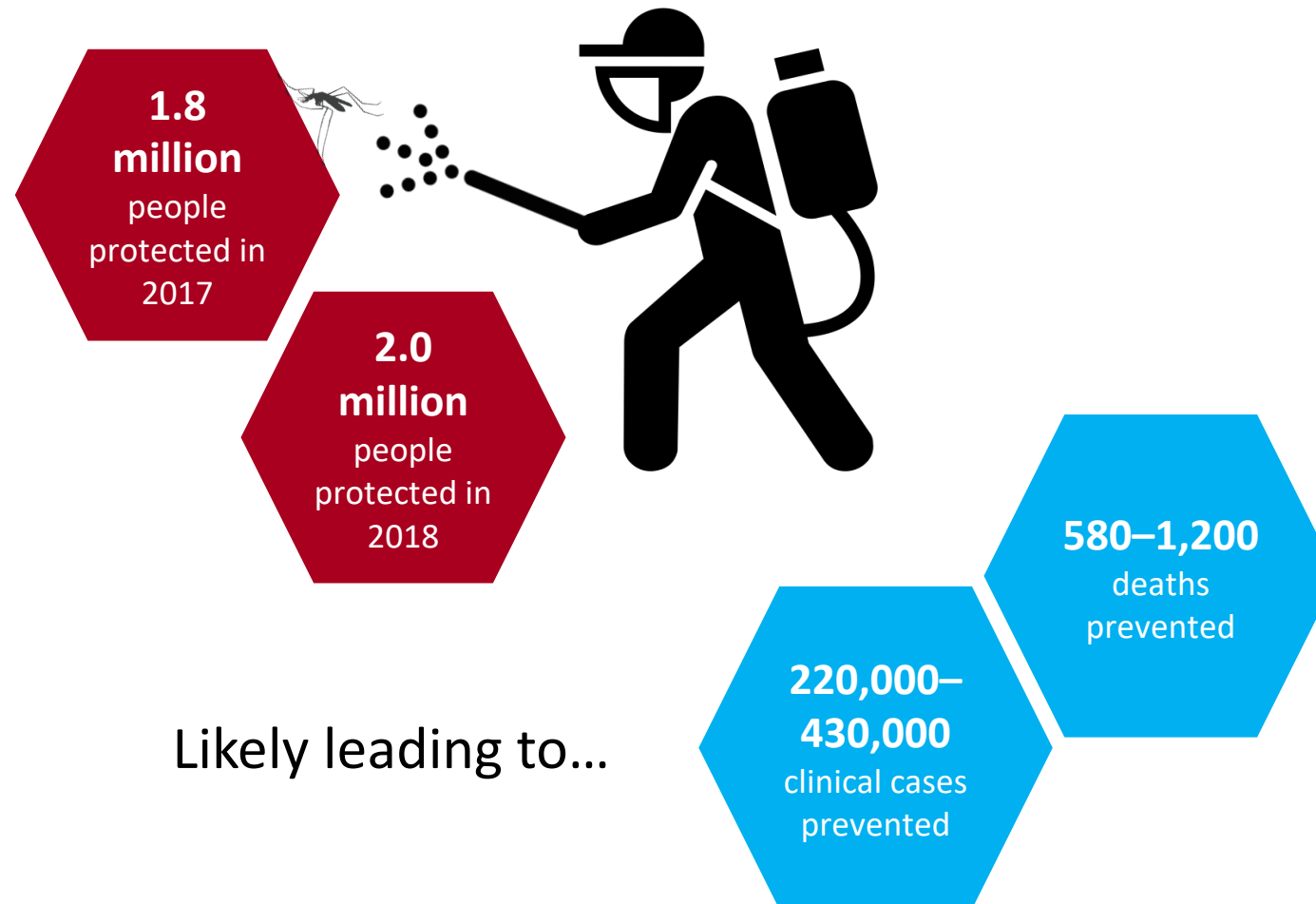
	carbamate
	neonicotinoid
	organophosphate
	pyrethroid

The dominant vector populations, *Anopheles gambiae*, are highly resistant to pyrethroids



# NgenIRS copay-supported volumes - Ghana

Ghana first participated in 2017. Since then, NgenIRS investments have increased the number of people protected by third-generation IRS (3GIRS) products substantially





IRS with organophosphate is still effective in northern Ghana:

## 46%

reduction in malaria cases reporting to health facilities in IRS vs. non-IRS districts of the Northern Region from 2015–2017  
(140,000 cases averted)

In Upper East Region, the suspension of IRS in 2014, led to an increased number of cases in 2015; and reintroduction in 2017 led to a reduction:

## 115%

minimum increase in malaria cases across all districts in Upper East Region when 3GIRS was suspended in 2015

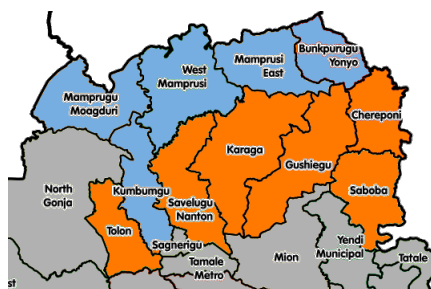
## 33%

reduction of cases in July and August compared to 2016 after the reintroduction of IRS in Builsa and Kassena districts of Upper East Region in 2017

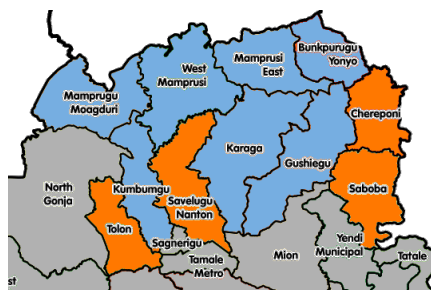


# 3GIRS impact - Ghana

- 46% protective effect of 3GIRS from 2015–2017 (June–September)
- ~ 140,000 fewer cases

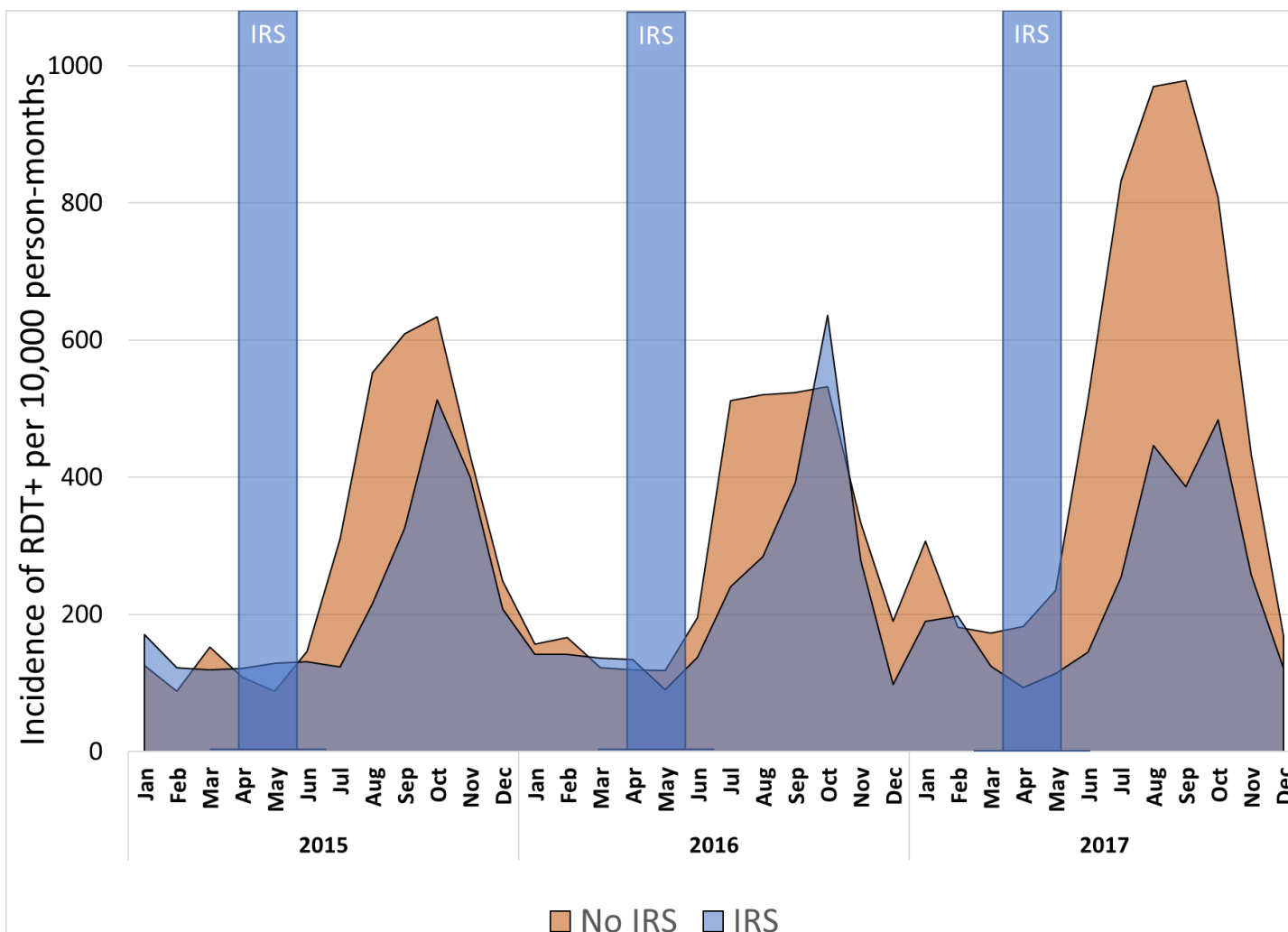


2015–2016



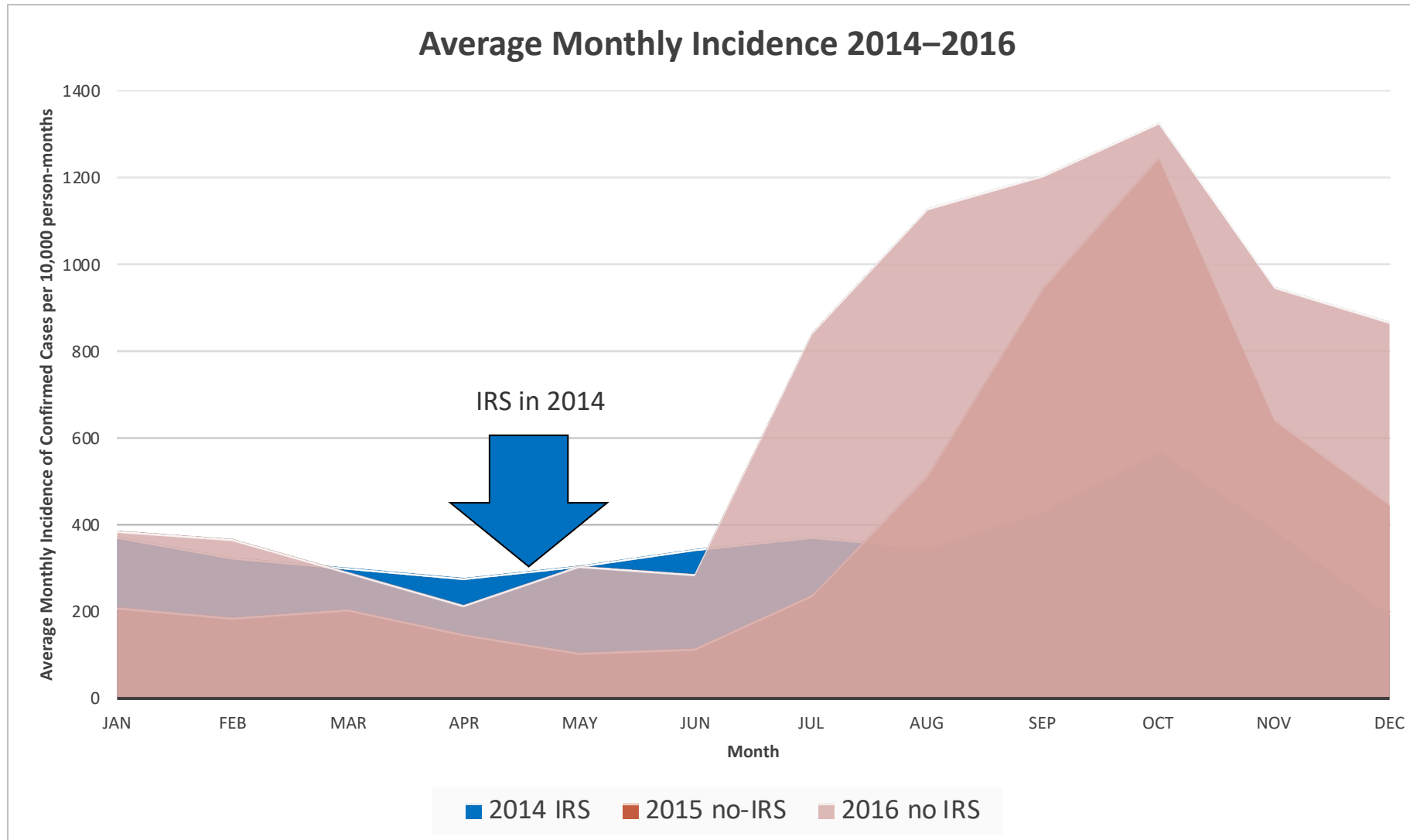
2017

Protective effect = percentage reduction in incidence in IRS vs. non-IRS districts





# IRS removal impact - Ghana



In 2015, IRS operations were suspended in the Upper East Region.



The prices attained from the NgenIRS project will be stable

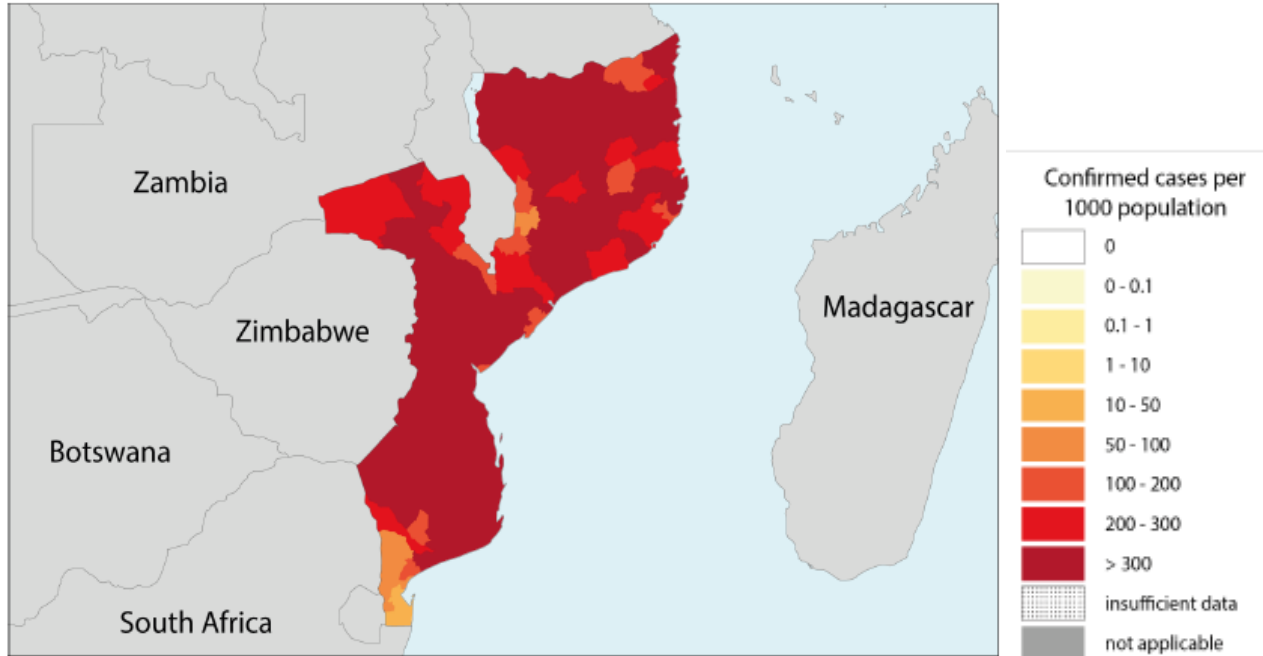
- Ghana will continue to do IRS in the areas which we are currently undertaking IRS in 2020
- Beyond 2020, we intend to request for the same resources as a minimum for our country in the FG malaria grant as well as the PMI grant
- The country will stratify the districts based on the data we have and target interventions in our new strategic plan (to be developed 1<sup>st</sup> quarter 2020)
- We will advocate for resources to cover areas where IRS is needed but we have not covered, possibly looking at domestic resources



# NgenIRS in Mozambique



# IRS implementation - Mozambique

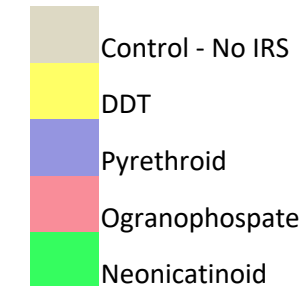


## I. Epidemiological profile

Population (UN Population Division)	2017	%
High transmission (>1 case per 1000 population)	29.7M	100
Low transmission (0-1 case per 1000 population)	0	-
Malaria free (0 cases)	0	-
Total	29.7M	

Source: World Malaria Report 2018. Geneva: World Health Organization; 2018. License: CC BY-NC-SA 3.0 IGO.

District	09	10	11	12	13	14	15	16	17	18
Quelimane										
Nicoadala										
Namacurra										
Mocuba										
Morrumbala/Derre										
Milange/Molumbo										
Maganja da Costa										
Mopeia										

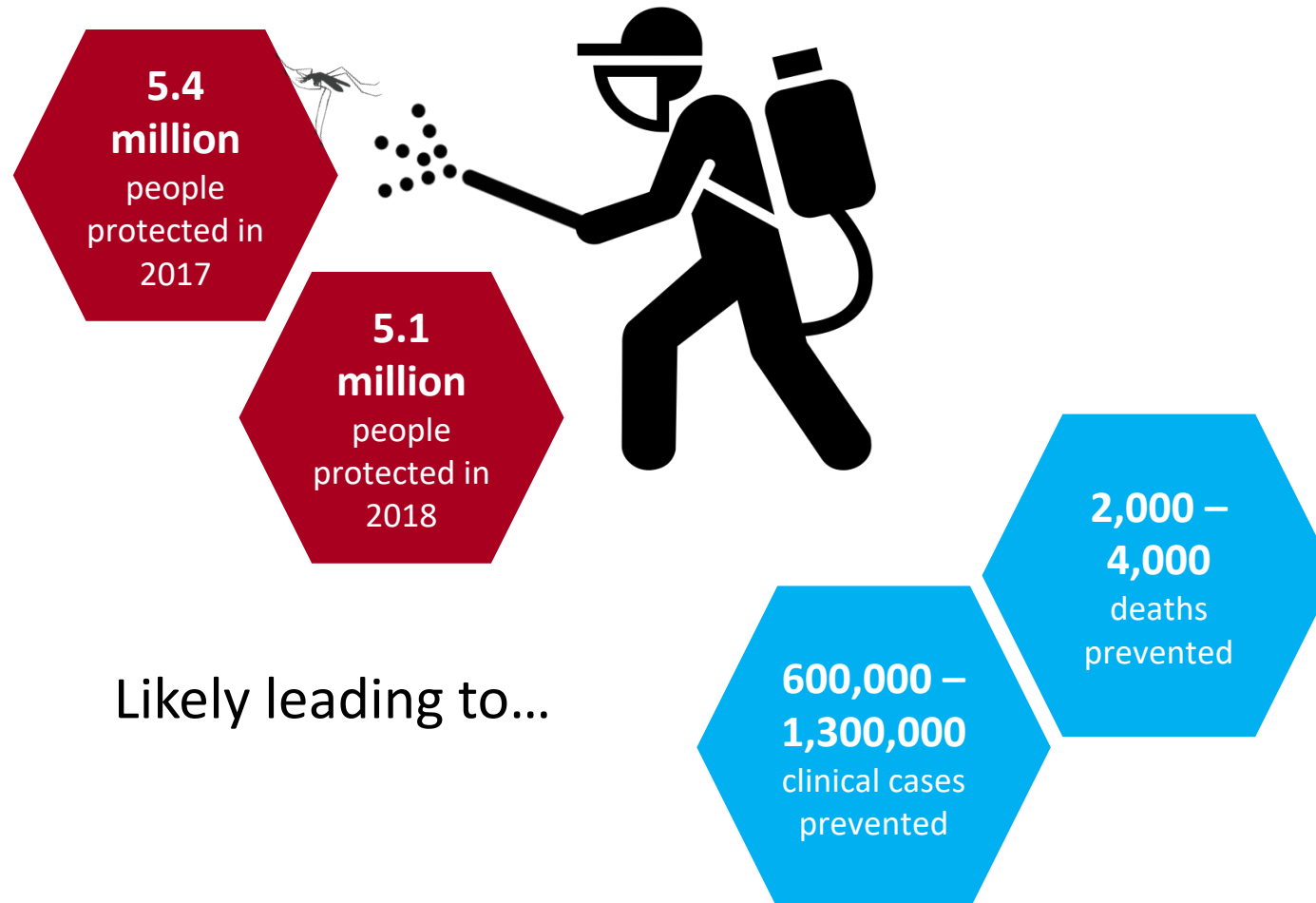


The dominant vector populations show **emerging resistance to pyrethroids**



# NgenIRS copay-supported volumes - Mozambique

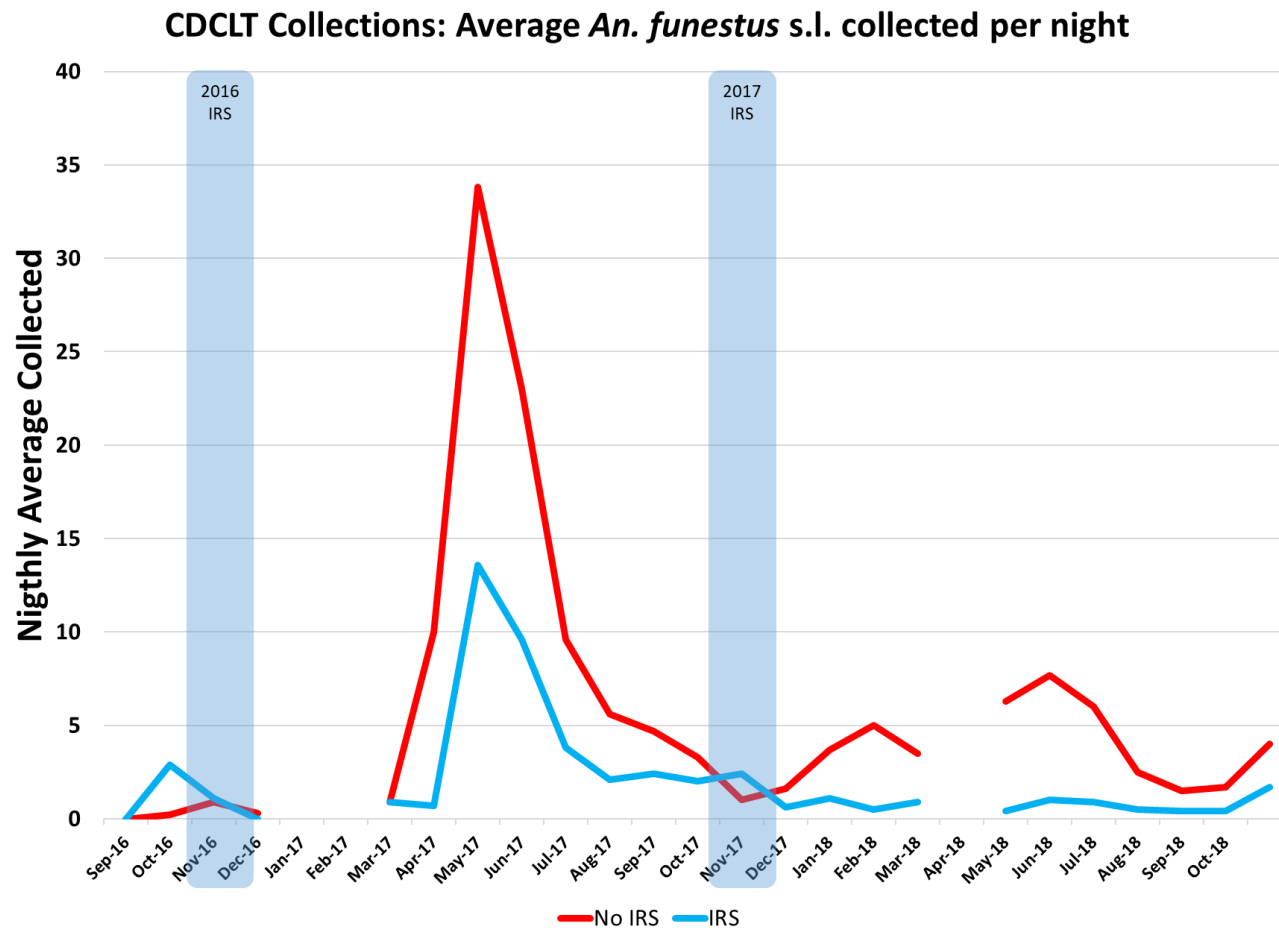
Mozambique first participated in 2017. Since then, NgenIRS investments have kept the number of people protected by third-generation IRS (3GIRS) products substantially





# IRS impact - Mozambique

## Cluster randomized trial in Mozambique: The impact of 3GIRS in addition to standard LLINs



63%–85%

reduction in total *An. funestus* densities in IRS clusters



Photo: Kenissony Varela



## Cluster randomized trial in Mozambique: The impact of 3GIRS in addition to standard LLINs

20%

reduction in cohort incidence of new malaria cases in IRS clusters

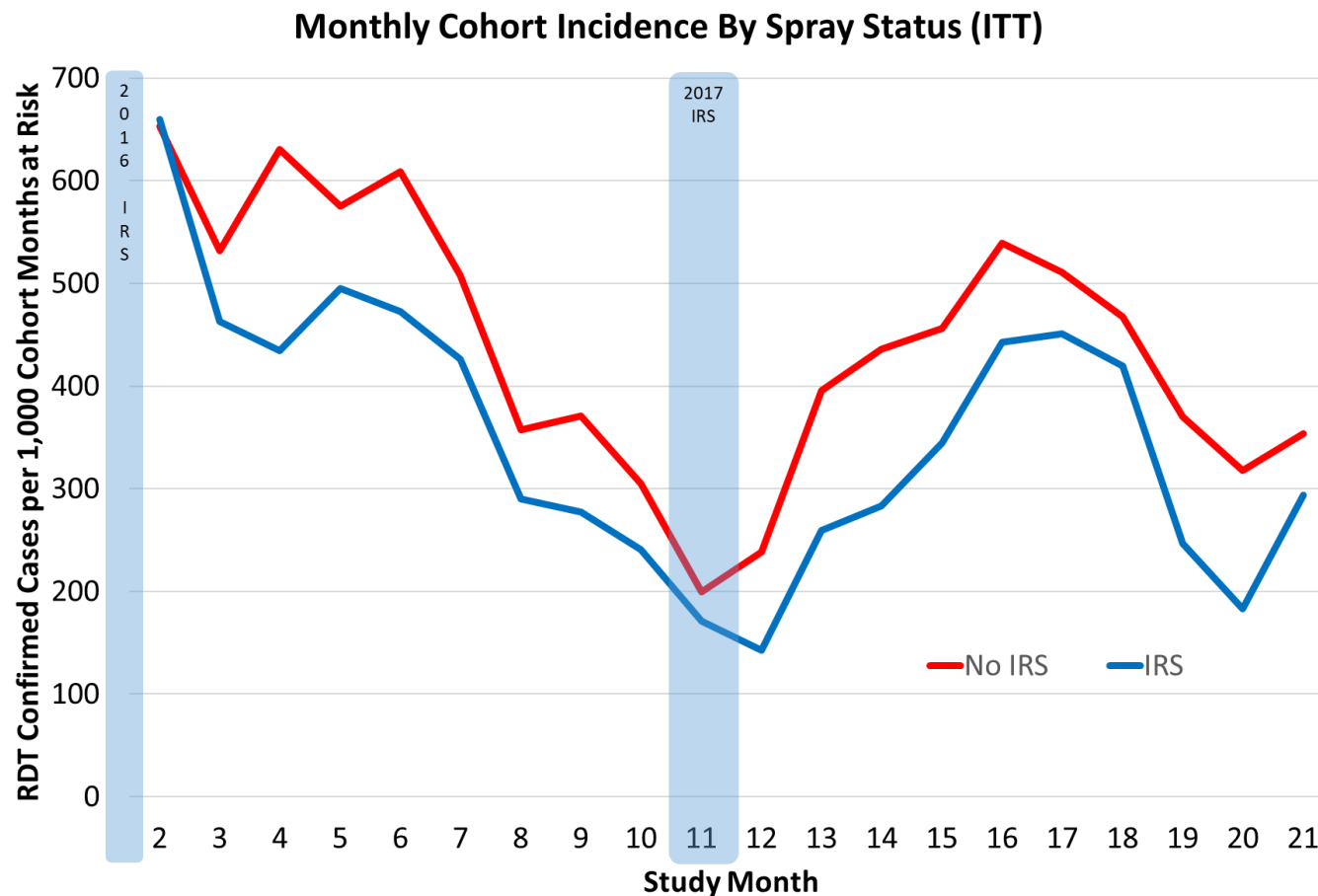
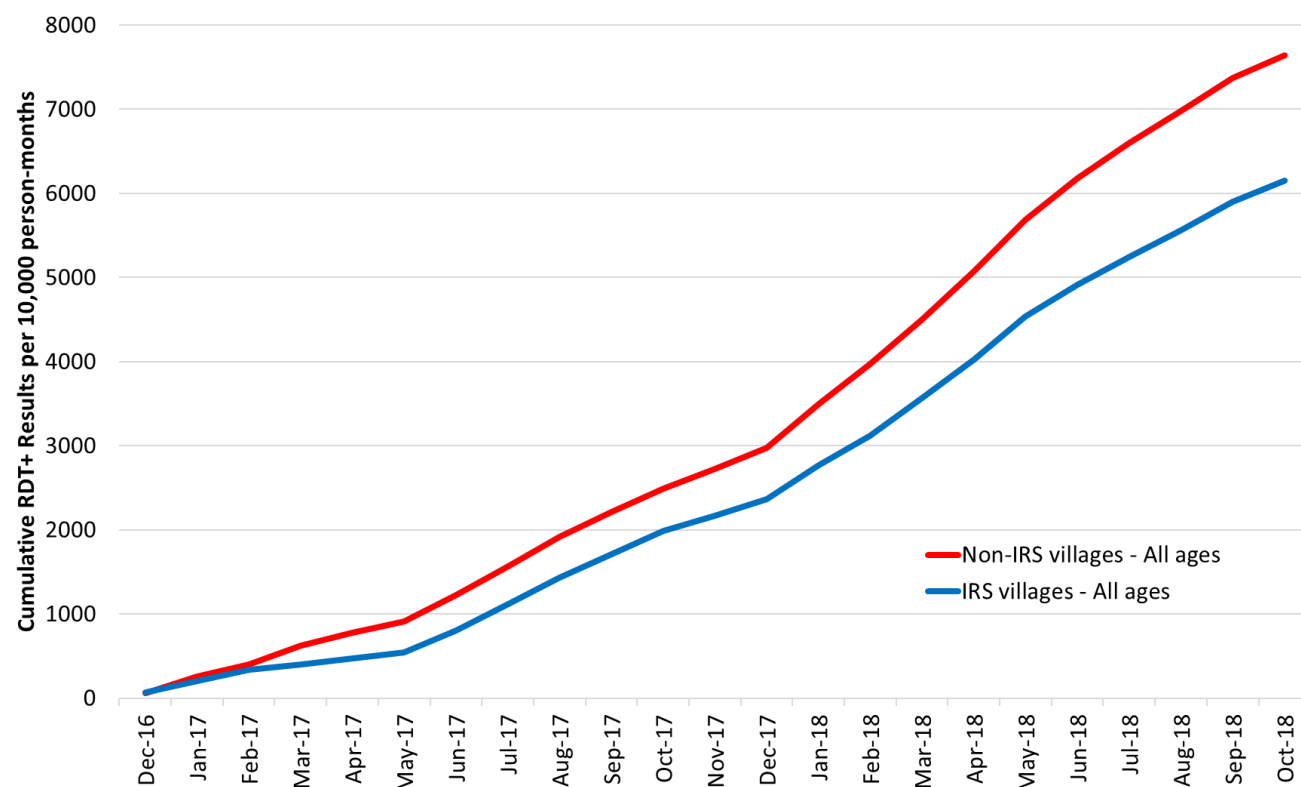


Photo: CISM



## Passive case detection during the RCT

### Enhanced Passive Case Detection: RDT+ Incident Cases by Village Spray Status



Approximately **20,000 all-ages cases averted** at health facilities in 22 months

Adjusted for a health care utilization rate of 56%<sup>1</sup> = estimated  
**35,000 total cases averted**

1. According to the 2015 MIS, in Zambezia 56.9% of all febrile children under 5 sought care at a formal health facility



# Next Steps for IRS - Mozambique

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- Finalize the analysis and prepare the following:
  - IRS costing
  - IRS cost-effectiveness
  - Epidemiological IRS impact
  - Entomological IRS impact
- Other secondary analyses
- Cross-sectional studies based on ANC prevalence