



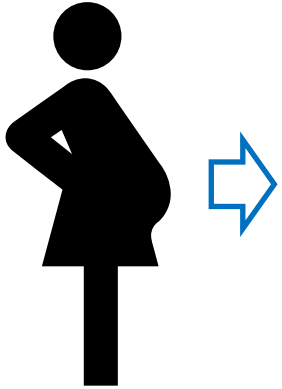
Surveillance, Monitoring, and
Evaluation
Working Group

16/10/2024

ANCmal surveillance in Mozambique

Glória Matambisso
Manhiça Health Research Centre

Antenatal care malaria surveillance: ANCmal



Malaria test



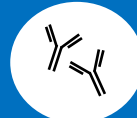
Coverage



Genetics



Serology



MiPMon

- Nov 2016 - Oct 2019
- Maputo province (Magde and Manhiça)



National Institutes of Health

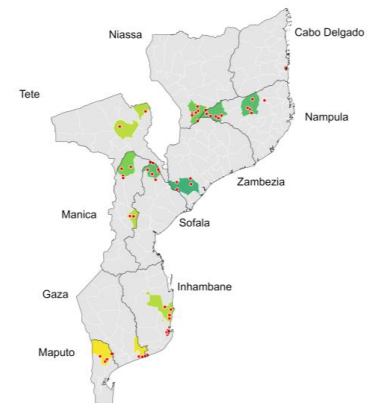
- N=10439
- 80/CNBS/16



GenMoz

- Jan 2022 – Dec 2025
- 14 districts, 10 provinces
- N=20320
- 604/CNBS/21

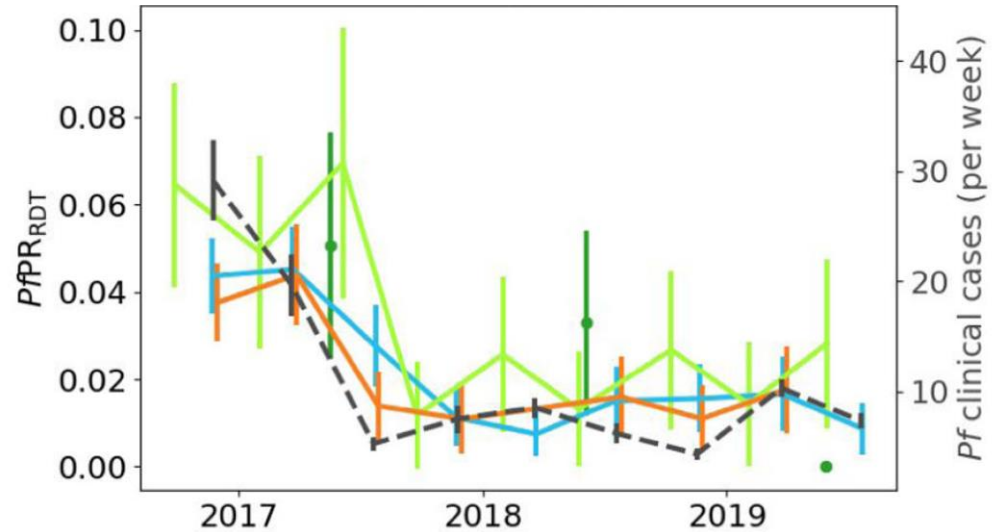
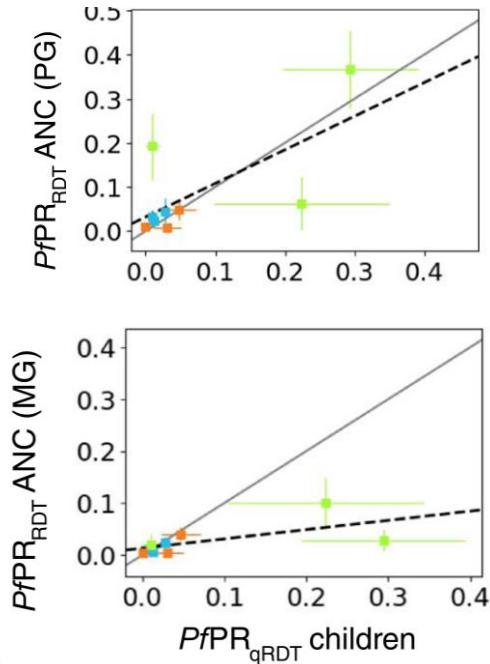
BILL &
MELINDA
GATES
foundation



MiPMon: ANCmal represents the community

1

ANC1 mRDT positivity (especially PG) mirrors malaria trends in children

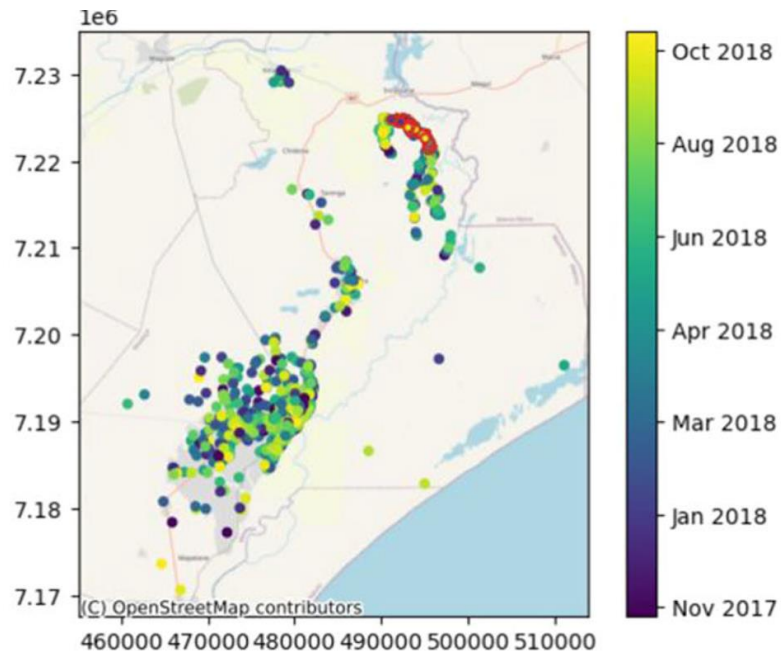


Pujol et al., 2023. Nature Comms.

MiPMon: ANCMal represents the community

2

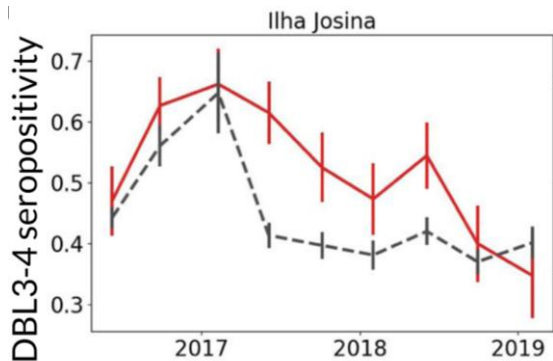
Malaria at ANC1 and children share similar spatial distribution



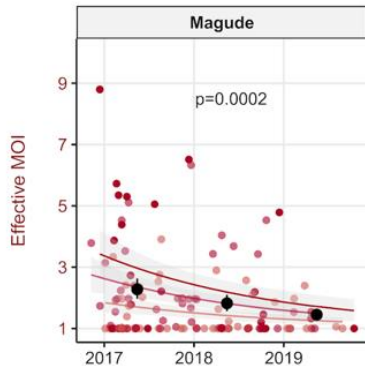
MiPMon: ANCMal represents the community

3

ANC1 biomarker tools: VAR2CSA seroprevalence & genomics



Pujol et al., 2023. Nature Comms.

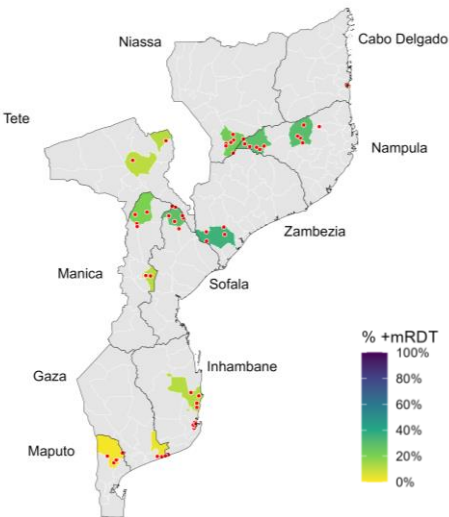


Brokhattingen et al., 2024. Nature Comms.

ANC1 HH children

<i>kelch13</i>	0% (0/260)	0% (0/83)	$p = 1.0$
<i>dhfr/dhps</i>	95.7% (179/187)	93.1% (54/58)	$p = 0.49$

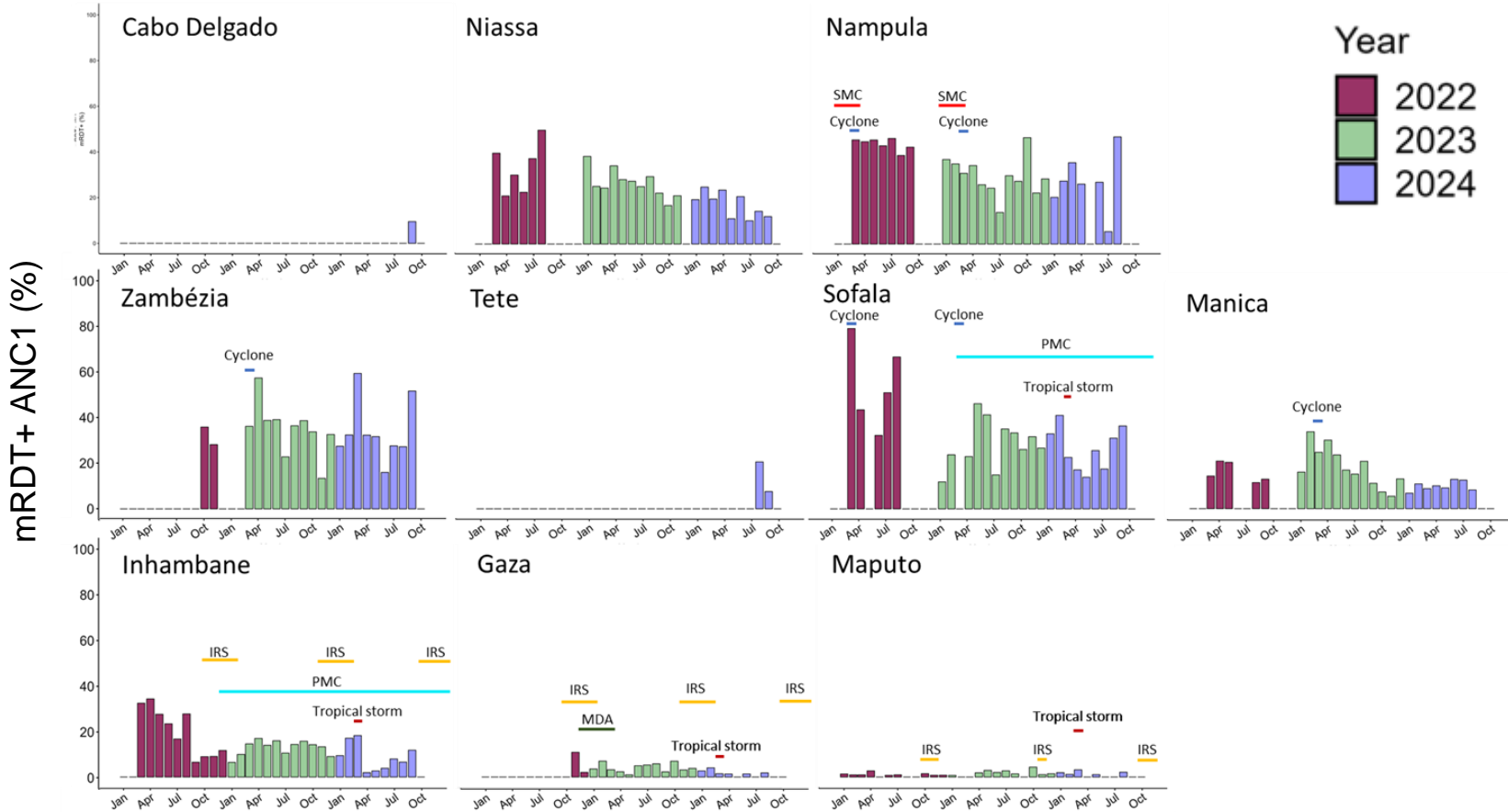
GenMoz: mRDT positivity rate



	2023; % (n/N)			2024; % (n/N)		
	Total	PG	MG	Total	PG	MG
Global	20.4 (2195/10758)	22.5 (605/2686)	19.6 (1537/7825)	13.4 (688/5122)	17.3 (208/1204)	12.3 (476/3871)
Cabo Delgado				9.2 (8/87)	19.4 (6/31)	3.7 (2/54)
Niassa	26.9 (361/1341)	32.4 (93/287)	25.4 (254/1001)	17.1 (201/1175)	23.4 (67/286)	15.2 (134/880)
Nampula	30.4 (537/1767)	47.7 (143/300)	26.9 (389/1444)	22.8 (74/324)	46.7 (7/15)	21.9 (67/306)
Zambezia	36.1 (544/1507)	38.9 (131/337)	35.4 (411/1160)	33.4 (119/356)	45.1 (23/51)	31.4 (95/303)
Tete				10.8 (17/158)	14.7 (5/34)	9.8 (12/123)
Manica	16.8 (272/1622)	20.1 (47/234)	16.3 (223/1365)	9.6 (67/700)	19.1 (18/94)	8.0 (48/601)
Sofala	29.6 (230/778)	35.5 (43/121)	28.9 (161/557)	26.3 (140/532)	38.2 (52/136)	22.0 (86/391)
Inhambane	12.9 (186/1439)	20.0 (118/591)	7.9 (65/820)	7.5 (44/583)	11.6 (23/198)	5.6 (21/375)
Gaza	4.0 (48/1186)	4.4 (22/503)	3.7 (25/674)	2.0 (11/559)	2.5 (6/241)	1.6 (5/312)
Maputo	1.5 (17/1118)	2.6 (8/313)	1.1 (9/804)	1.1 (7/648)	0.8 (1/118)	1.1 (6/526)

Higher mRDT positivity rates in central & north region

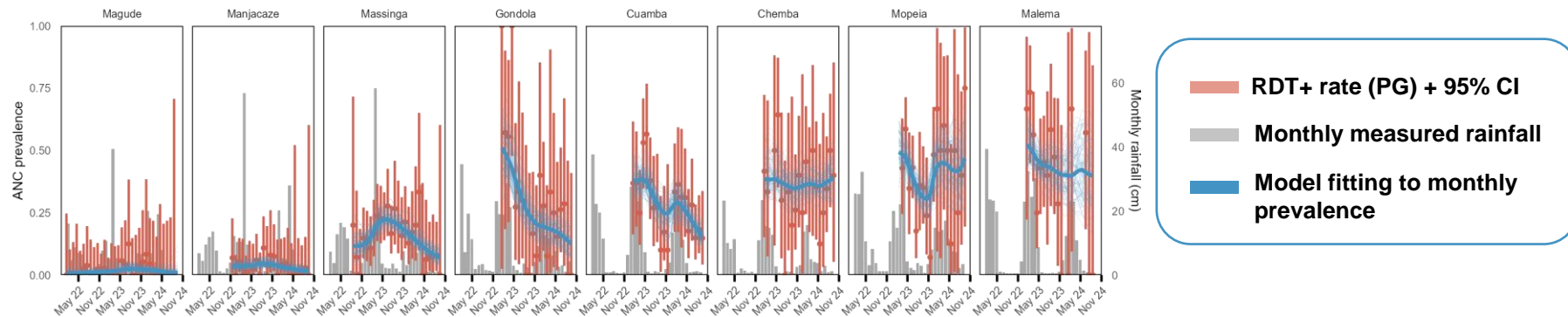
ANC1 mRDT+ temporal trends



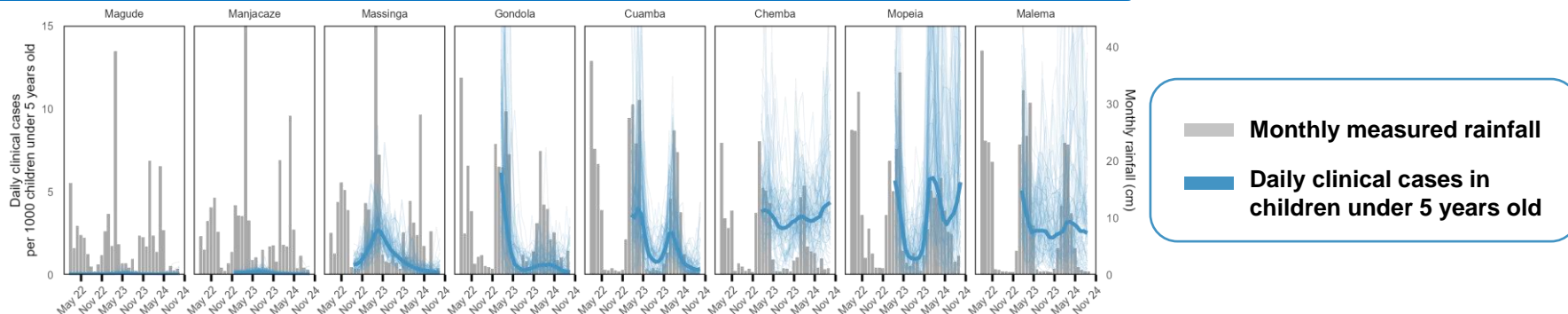
Imperial College model fitting



Monthly malaria prevalence at GenMoz sites & model fitting



Estimated clinical incidence in children < 5 years from ANC1 prevalence



mRDT positivity at first trimester

	First trimester	First trimester mRDT +
	% (n/N)	% (n/N)
Global	12.8 (2008/15717)	16.8 (337/2005)
Cabo Delgado	25.6 (21/82)	14.3 (3/21)
Niassa	10.9 (273/2505)	27.9 (76/272)
Nampula	9.5 (196/2069)	23.5 (46/196)
Zambezia	11.0 (204/1860)	30.4 (62/204)
Tete	10.3 (16/156)	12.5 (2/16)
Manica	14.8 (334/2264)	16.8 (56/334)
Sofala	13.3 (168/1261)	33.9 (57/168)
Inhambane	7.9 (160/2019)	10.7 (17/159)
Gaza	30.1 (523/1736)	3.3 (17/522)
Maputo Provincia	6.4 (113/1765)	0.9 (1/113)

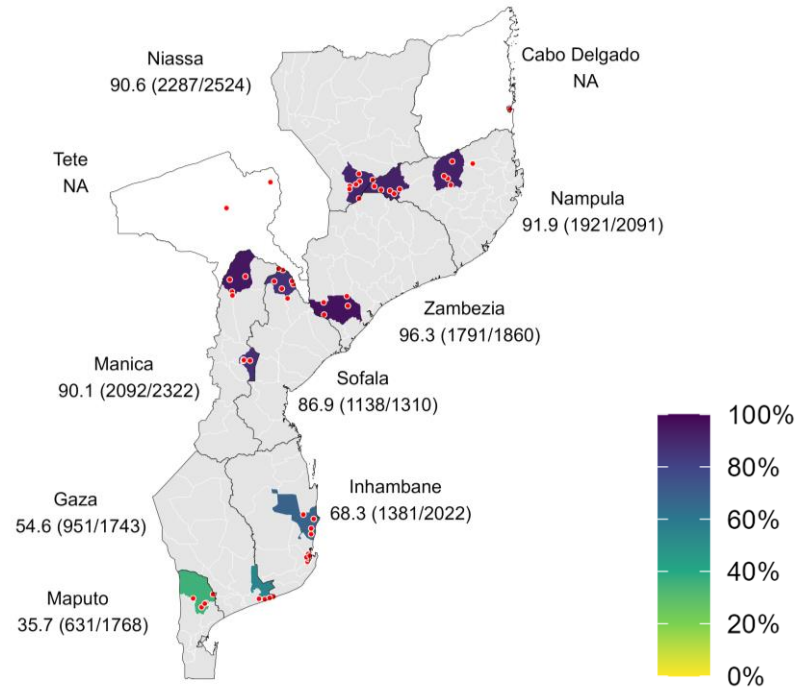
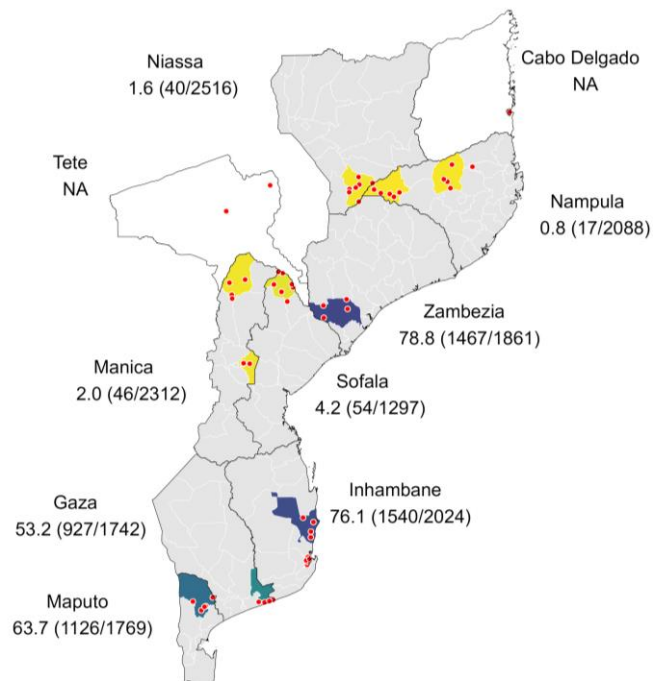
Almost 1 every 5 first trimester women tested positive for malaria

ANC1 reported vector control tools

2023
2024

IRS (%)

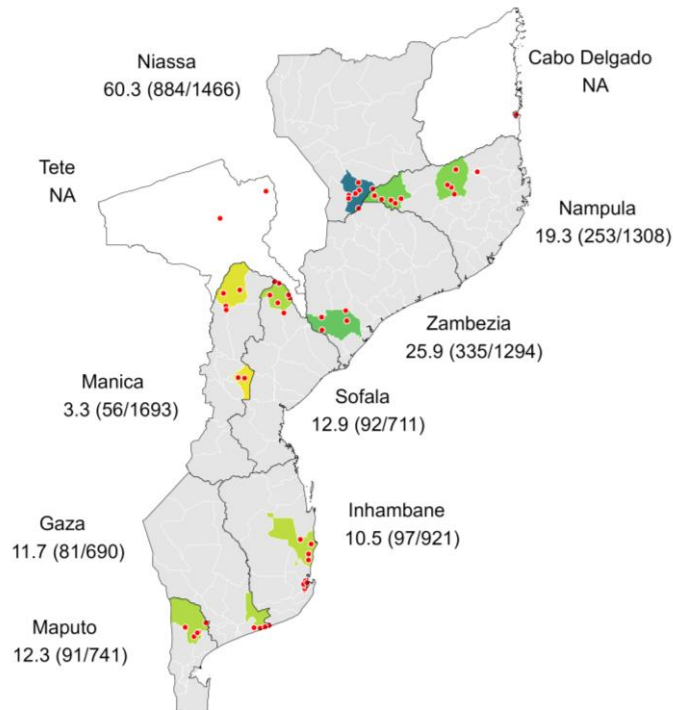
Net use (%)



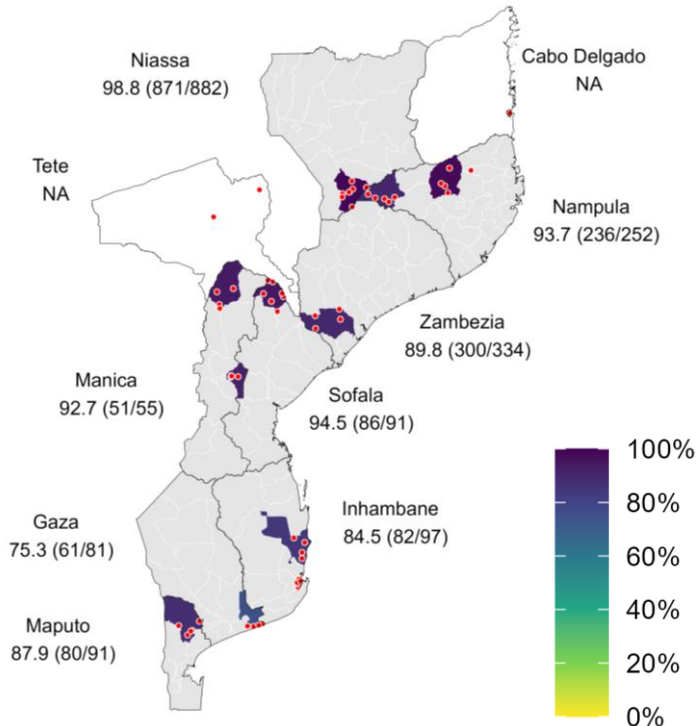
ANC1 reported health seeking behavior

2023
2024

< 5y with fever (%)



< 5y who sought treatment (%)



ANC1 HIV trends

Province	INSIDA 2021	DHS 2022-23	ANC1 2023	ANC1 2024
	% (n/N)	% (n/N)	% (n/N)	% (n/N)
Global	12.8 (1583/12331)	4.9 (907/18641)	9.7 (919/9471)	8.0 (393/4890)
Cabo Delgado	10.5 (94/891)	4.0 (39/980)		5.7 (5/88)
Niassa	8.0 (90/1126)	1.4 (17/1203)	9.7 (125/1285)	4.3 (50/1167)
Nampula	10.0 (212/2120)	1.6 (68/4330)	5.8 (100/1730)	3.2 (10/317)
Zambezia	17.1 (175/1022)	4.0 (172/4330)	13.2 (199/1502)	7.6 (27/356)
Tete	8.4 (156/1830)	3.9 (72/1827)		3.8 (6/160)
Manica	7.9 (101/1277)	4.8 (61/1256)	7.0 (56/799)	5.4 (37/686)
Sofala	13.2 (181/1374)	7.9 (85/1265)	5.7 (25/436)	3.4 (11/324)
Inhambane	12.6 (140/1109)	7.9 (57/720)	9.0 (129/1434)	11.7 (68/582)
Gaza	20.9 (199/950)	15.2 (132/868)	6.1 (72/1171)	7.9 (44/559)
Maputo provincia	15.4 (235/1523)	11.0 (204/1862)	19.1 (213/1114)	20.7 (135/651)

ANC1 can also inform about HIV trends

Challenges and lessons

Recruitment

- Design & representativity: how many ANC clinics and where (question-driven)
- Sample size (13 to 130 monthly visits/HF)
- ANC for PG < 25 years
- Costs (RDTs, supervisions)

Data quality

- Collection tools
- Protocol deviations (malaria signs/symptoms)
- Missings
- Discontinuity (resources)
- Purpose & Use

Conclusions

1

ANCmal reflects community

mRDT positivity (temporal and spatial trends): parity
and diagnostic sensitivity

Heterogeneity in ITN use and IRS (preliminar)

Genomic (antimalarial resistance & diversity)

VAR2CSA-serology (recent exposure)

Conclusions

2

Potential uses

- Malaria burden in pregnancy
- Malaria treatment at 1st trim
- Triangulation of household data
- Antimalarial resistance (genomic surveillance)
 - Seasonality
- Intervention coverage & health seeking
- Intervention(s) impact upon transmission
- Transmission hotspots (elimination)
- Beyond malaria (HIV, SARS-CoV-2...)

Kanimambo!

Mothers and children
Nurses and healthcare staff



Obrigada!