



Progress in scale-up of SMC in the Sahel

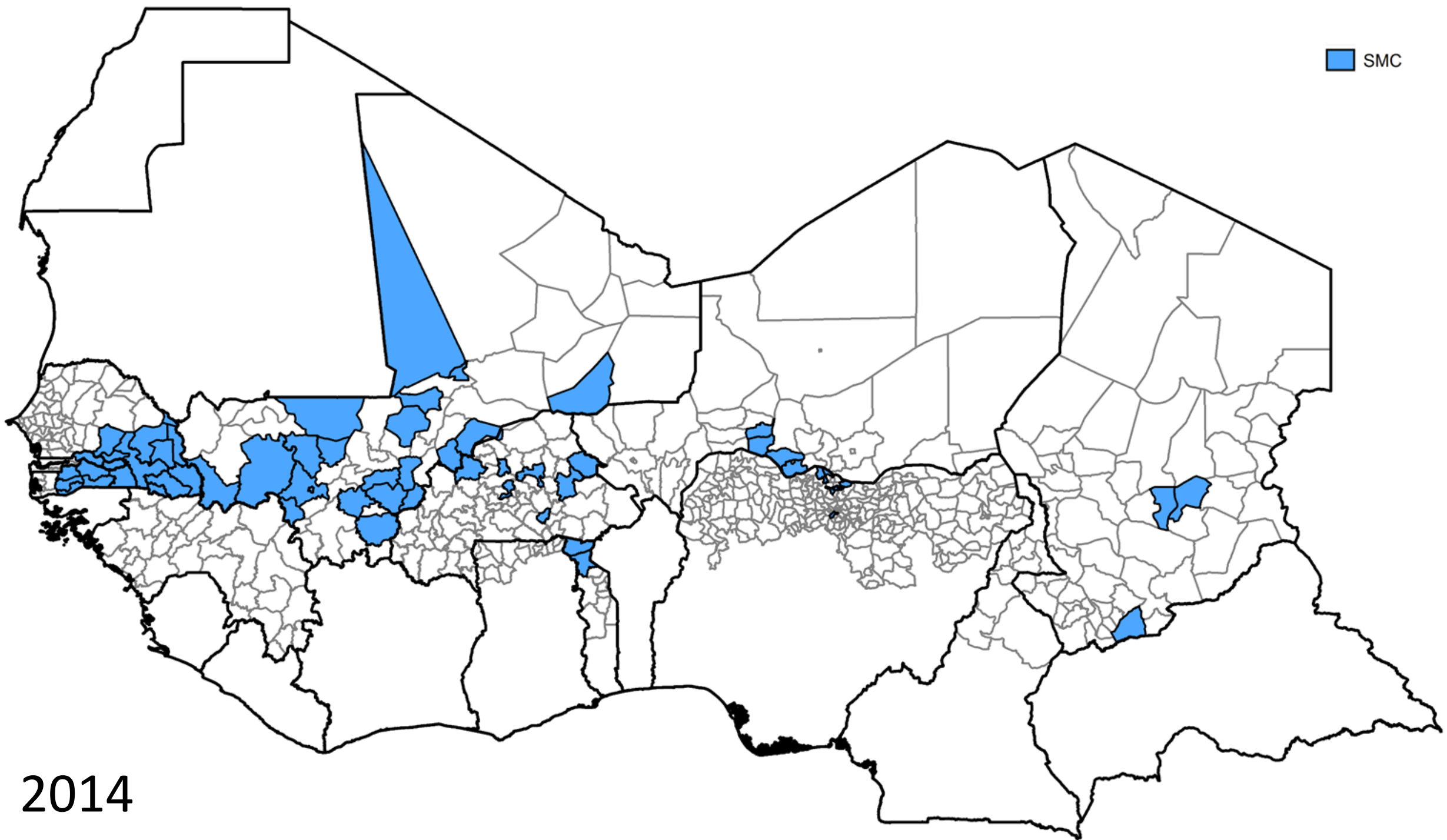
SEASONAL MALARIA
CHEMOPREVENTION
WITH SULFADOXINE-
PYRIMETHAMINE PLUS
AMODIAQUINE IN CHILDREN
A FIELD GUIDE



Issaka Sagara
MRTC Mali

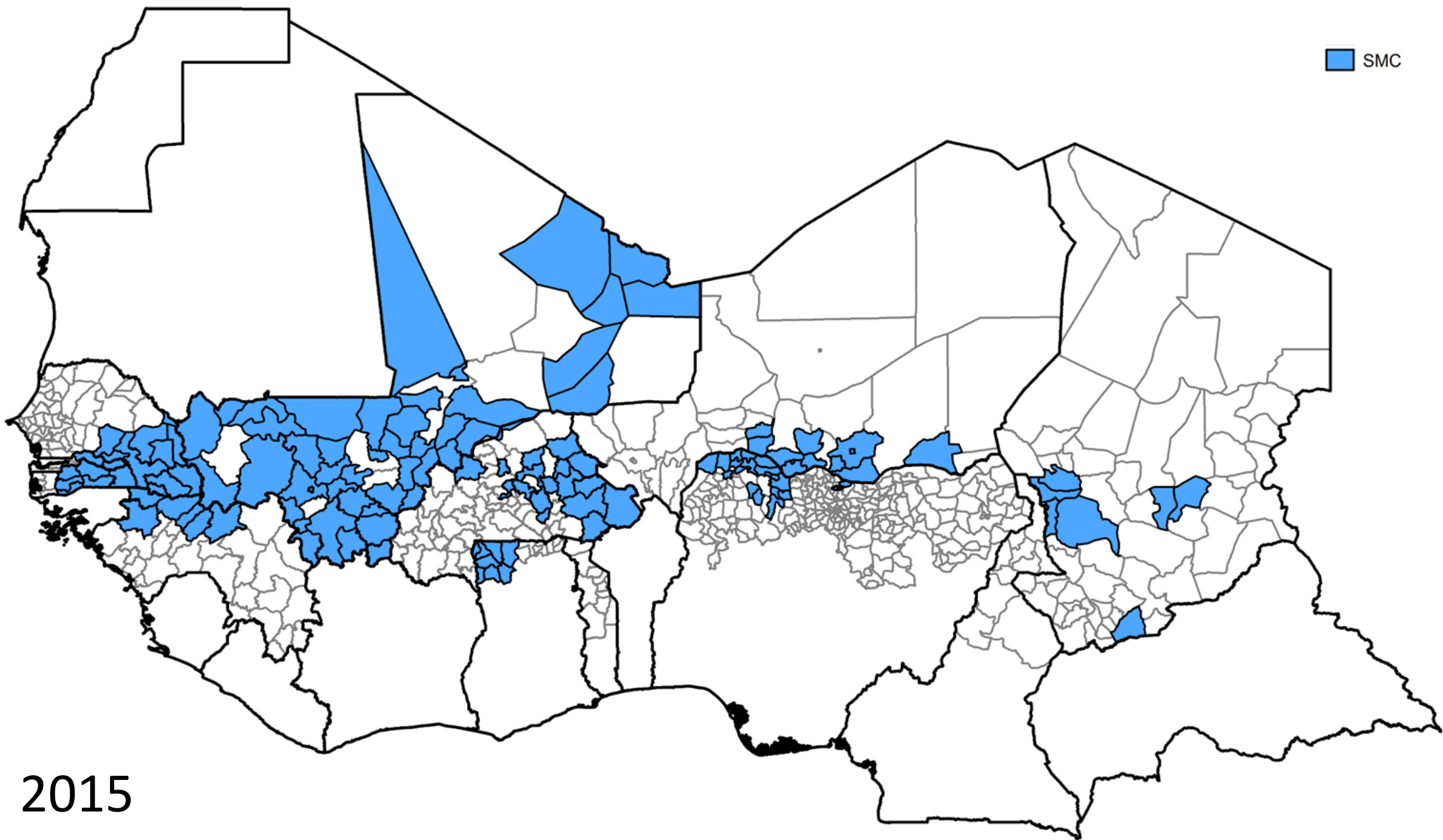
ASTMH Atlanta 2016



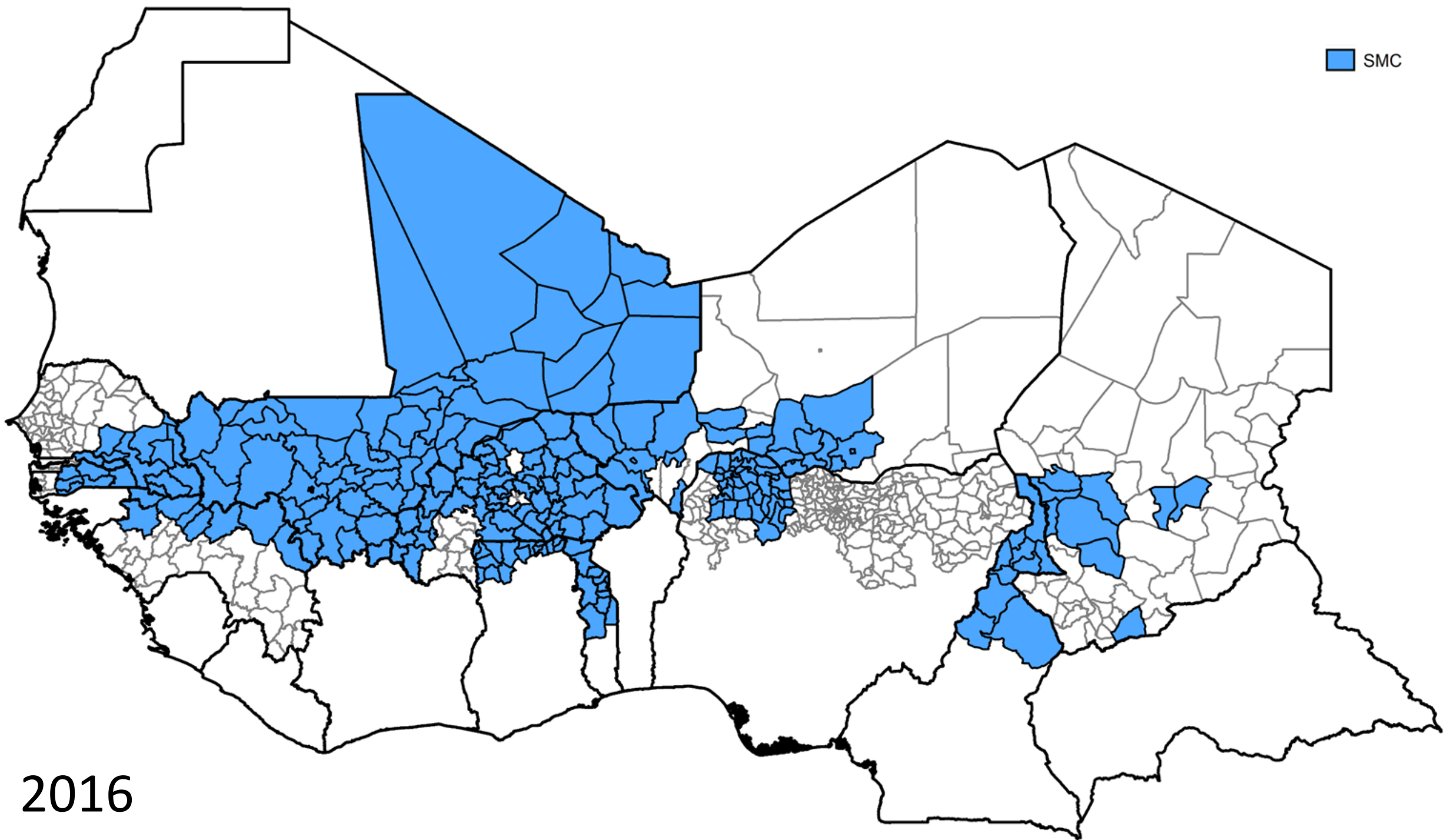


SMC

2014



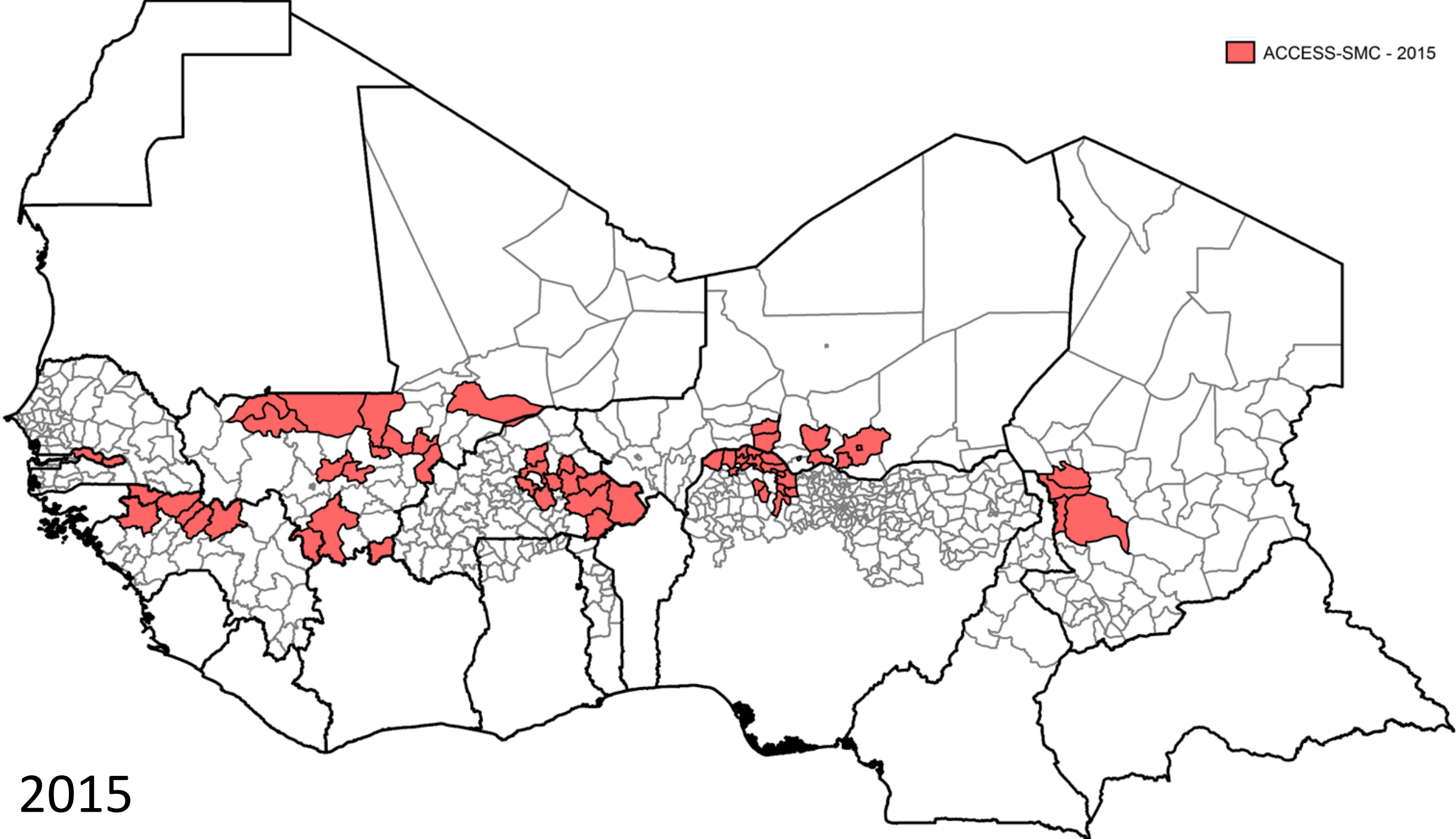
2015



2016

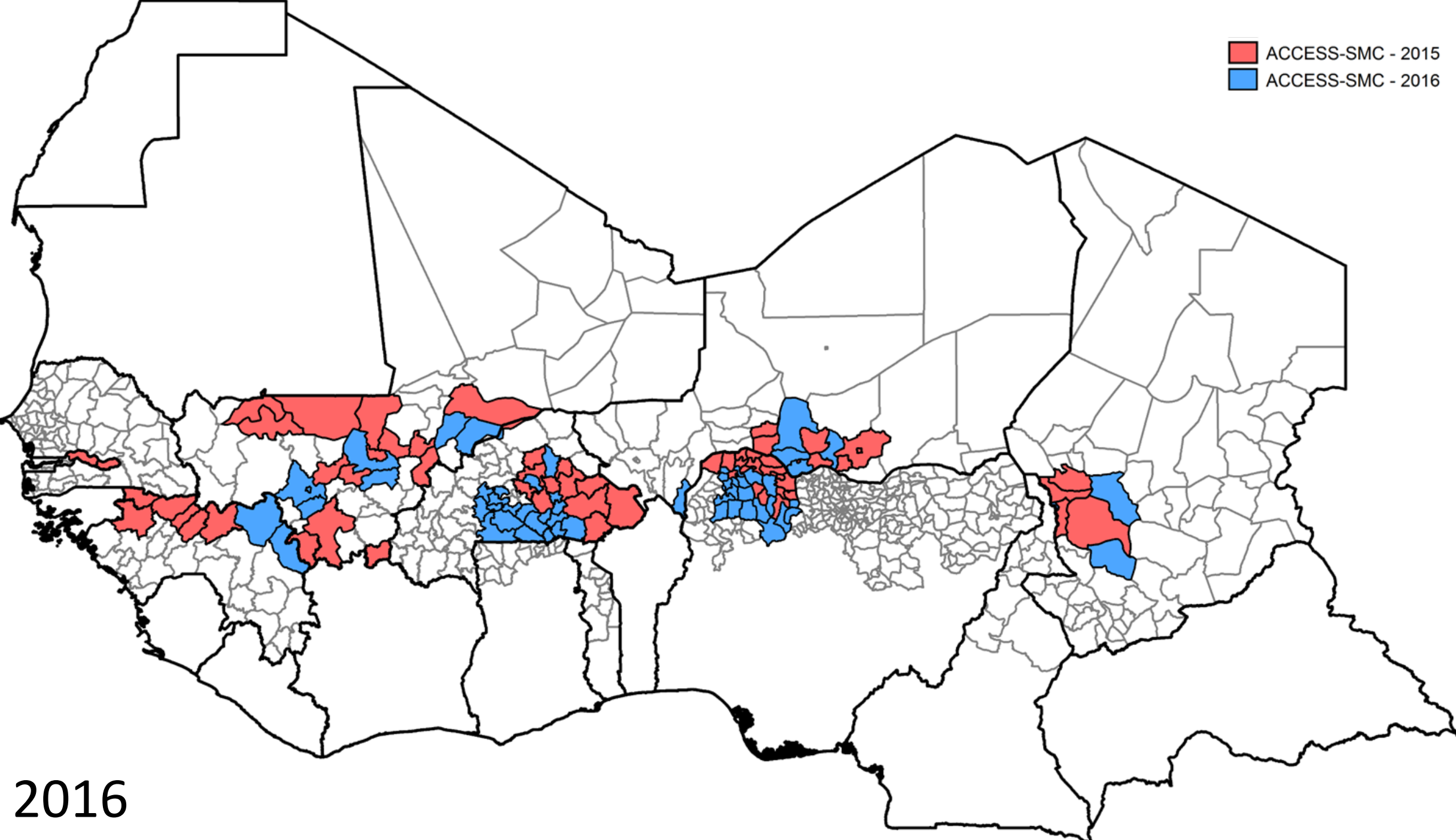
Areas covered by ACCESS-SMC

ACCESS-SMC - 2015



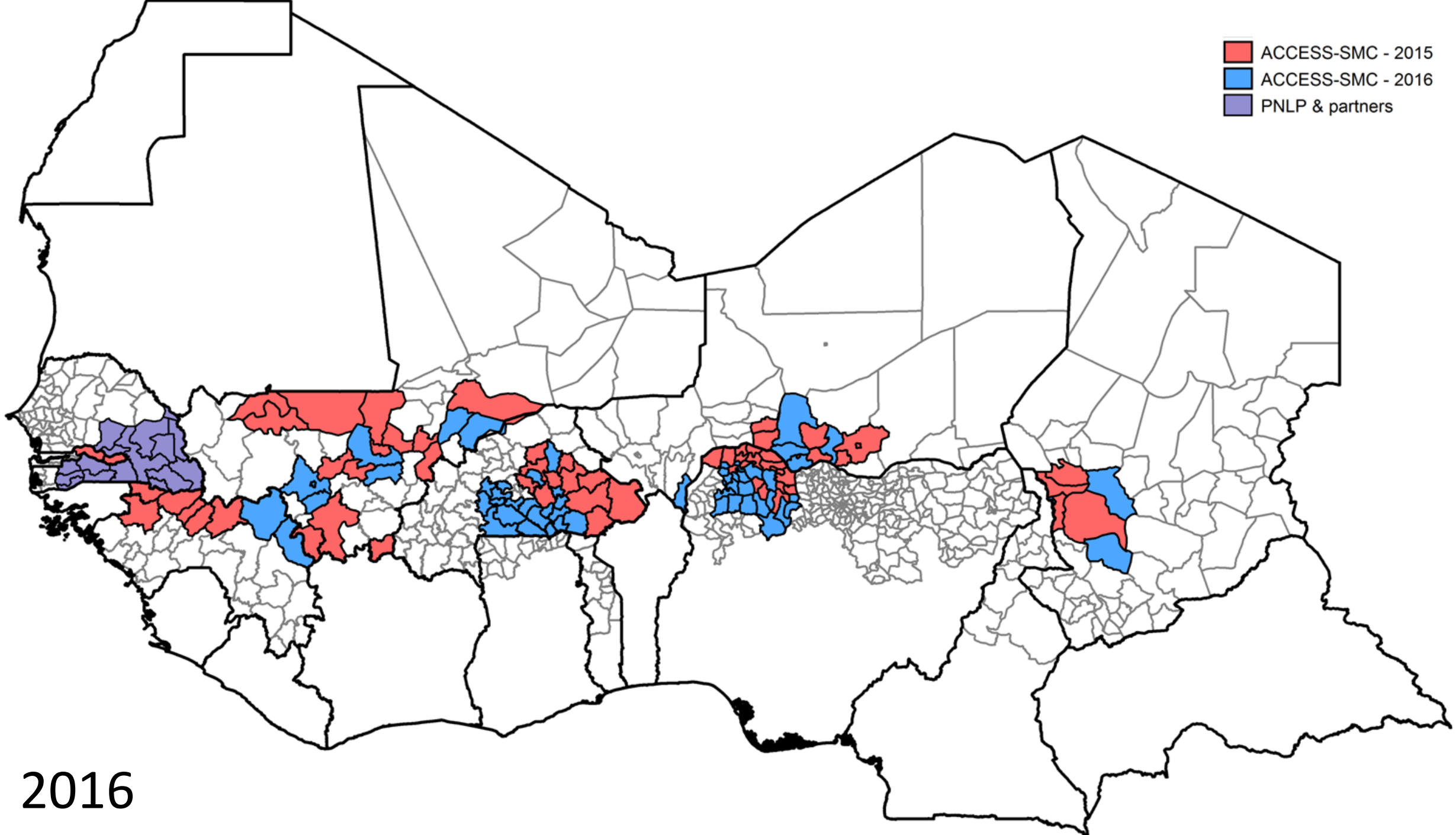
2015

ACCESS-SMC - 2015
ACCESS-SMC - 2016



2016

- ACCESS-SMC - 2015
- ACCESS-SMC - 2016
- PNLP & partners



2016

Monitoring of SMC programmes

in Burkina Faso, Chad, Gambia, Guinea, Mali, Niger, Nigeria (ACCESS-SMC), and in Senegal*

- 1) Monitoring of the process of **delivery**
- 2) Surveys to determine **coverage**
- 3) Case control studies to measure **efficacy** of monthly treatments
- 4) Sentinel surveillance for malaria and analysis of national surveillance data on reported malaria cases to assess **impact**

Safety monitoring by the National PV centre and the PNLP

Surveys to monitor the prevalence of molecular markers of resistance to SMC drugs

Assessment of provider costs of delivery

*SMC programmes in 2016 in Ghana, Cameroon, Togo - not included in this presentation

Primary methods of delivery

Country	Primary delivery method
Burkina Faso	Door-to-door
Chad	Door-to-door
Gambia	Door-to-door
Guinea	Door-to-door
Mali	Fixed point (mobile)
Niger	Fixed point*
Nigeria	Door-to-door
Senegal	Door-to-door

- Predominant delivery method was **door-to-door**
- Mobile **fixed-point** used in Mali
- **Fixed points** also used in Niger (including urban areas)

* Door-to-door in some urban areas at final SMC cycle

Delivery door to door



Burkina
Faso

or at fixed points



Niger

SMC record card and tally sheet (Chad)

malária consortium
Disease control, better health

Prévention saisonnière de paludisme
CSSI - PNLP

Carte d'enregistrement de l'enfant

Délégation Sanitaire Régionale de Chari-Bahrém
District Sanitaire de Ndéléria
Centre de santé de Malao
Nom de l'enfant : [redacted]
Date de naissance ou âge : 1 / 1 / 2010
Nom de la mère ou de la tutrice : [redacted]
Adresse : [redacted]

Année	Mois	Date d'administration des doses	Observations
2015	Mois 1 <i>juillet</i>	<u>25-07-15</u>	<u>- / -</u>
	Mois 2		
	Mois 3		
	Mois 4		

Centre de Santé: Atteya Région: Haaut-Sahel District: Flan
 Nom des ReCo: Doladéigne Botoumère Village: Mitterrise

CYCLE CPS: Cycle 1 Cycle 2 Cycle 3 Cycle 4 J1 J2 J3 J4

Nombre d'enfants ayant reçu du SP et AQ: Remplir 1 cercle par enfant		Nombre d'enfants qui ne sont PAS éligibles à la CPS: Remplir un cercle par enfant présent au point de distribution mais qui n'a pas reçu de SP ou AQ		Nombre d'enfants ayant reçu une deuxième dose Remplir un cercle pour un enfant ayant reçu une seconde AQ	
3 à <12 mois	12 à 59 mois	3 à <12 mois	12 à 59 mois	3 à <12 mois	12 à 59 mois
0	0	0	0	0	0
1	0	0	0	0	0
2	0	0	0	0	0
3	0	0	0	0	0
4	0	0	0	0	0
5	0	0	0	0	0
6	0	0	0	0	0
7	0	0	0	0	0
8	0	0	0	0	0
9	0	0	0	0	0
10	0	0	0	0	0
11	0	0	0	0	0
12	0	0	0	0	0
13	0	0	0	0	0
14	0	0	0	0	0
15	0	0	0	0	0
16	0	0	0	0	0
17	0	0	0	0	0
18	0	0	0	0	0
19	0	0	0	0	0
20	0	0	0	0	0
21	0	0	0	0	0
22	0	0	0	0	0
23	0	0	0	0	0
24	0	0	0	0	0
25	0	0	0	0	0
26	0	0	0	0	0
27	0	0	0	0	0
28	0	0	0	0	0
29	0	0	0	0	0
30	0	0	0	0	0
31	0	0	0	0	0
32	0	0	0	0	0
33	0	0	0	0	0
34	0	0	0	0	0
35	0	0	0	0	0
36	0	0	0	0	0
37	0	0	0	0	0
38	0	0	0	0	0
39	0	0	0	0	0
40	0	0	0	0	0
41	0	0	0	0	0
42	0	0	0	0	0
43	0	0	0	0	0
44	0	0	0	0	0
45	0	0	0	0	0
46	0	0	0	0	0
47	0	0	0	0	0
48	0	0	0	0	0
49	0	0	0	0	0
50	0	0	0	0	0
51	0	0	0	0	0
52	0	0	0	0	0
53	0	0	0	0	0
54	0	0	0	0	0
55	0	0	0	0	0
56	0	0	0	0	0
57	0	0	0	0	0
58	0	0	0	0	0
59	0	0	0	0	0
60	0	0	0	0	0
Total =	10	35			

Traitements individuels ADMINISTRÉS

Nombre d'enfants ayant reçu SP+AQ:	3 à <12 mois:	10	12 à 59 mois:	0
Nombre d'enfants NON éligibles:	3 à <12 mois:	0	12 à 59 mois:	0
Nombre d'enfants ayant besoin d'une seconde dose:	3 à <12 mois:	0	12 à 59 mois:	0

RECONCILIATION DES STOCKS DE MEDICAMENTS

Nombre de	Stock de départ	Quantité reçue	Quantité utilisée	Quantité perdue	Quantité retournée
	A	B	C	D	(A+B) - (C+D)
3 à <12 mois:	Plaquettes Individuels intacts	10	10	00	00
	Comprimés de SP	10	10	00	00
	Comprimés de AQ	30	30	00	00
12 à 59 mois:	Plaquettes Individuels intacts	50	30	00	15
	Comprimés de SP	50	35	00	15
	Comprimés de AQ	150	105	00	45

Nom et signature du ReCo: Doladéigne Botoumère
 Nom et signature du superviseur: [redacted]

SMC register used in Chad

CAMPAGNE DE CHIMIO PREVENTION DU PALUDISME SAISONNIER (CPS)											
REGISTRE POUR L'ADMINISTRATION DE LA SP+AQ AUX ENFANTS DE 3 A 59 MOIS											
Registre N° <u>004</u>		Dates passage 1:		Dates passage 2: <u>27/08/2015</u>		Dates passage 3:		Dates passage 4:			
DRS: <u>CB</u>		District sanitaire: <u>de Mandelio</u>		Centre de santé de: <u>Mai'lo</u>		Village de: <u>Nazda</u>					
Nom et prénom des ReCo		1. [REDACTED]		2.							
Telephone des ReCo		1.		2.							
N° d'ordre	Nom et prénom du chef de ménage	Nom et prénom de la personne en charge de l'enfant	Nom et prénom de l'enfant (3 - 59 mois)	Age en mois	Sexe (Entourez G= Garçon F= Femme)	Entourez la lettre qui correspond: T= Traité M= Malade et Référé R= Refusé E= Exclu pour d'autres raisons				Raisons de référence: Entourez la lettre qui correspond: M= Malade, F= Fièvre A= Allergie E= Effet indésirable	Date d'action prise par les agents du centre de santé
						Passage 1	Passage 2	Passage 3	Passage 4		
059			MA'DRIMOU	59	G F	TMRE	TMRE	TMRE	TMRE	M F A E	
053			FALPITTA	4mois	G F	TMRE	TMRE	TMRE	TMRE	M F A E	
054			FOULDA DAKH	36mois	G F	TMRE	TMRE	TMRE	TMRE	M F A E	
055			BANGA	18mois	G F	TMRE	TMRE	TMRE	TMRE	M F A E	
056			DIGUERA	59mois	G F	TMRE	TMRE	TMRE	TMRE	M F A E	
057			VAZDA	59mois	G F	TMRE	TMRE	TMRE	TMRE	M F A E	
058			YADIA	43mois	G F	TMRE	TMRE	TMRE	TMRE	M F A E	
059			CHIMOUAL	59mois	G F	TMRE	TMRE	TMRE	TMRE	M F A E	
60			IBSUBA	24mois	G F	TMRE	TMRE	TMRE	TMRE	M F A E	
61			CUTIAR	12mois	G F	TMRE	TMRE	TMRE	TMRE	M F A E	
62			LIDA	36mois	G F	TMRE	TMRE	TMRE	TMRE	M F A E	
63			WABA	24mois	G F	TMRE	TMRE	TMRE	TMRE	M F A E	
64			HABONGA	38mois	G F	TMRE	TMRE	TMRE	TMRE	M F A E	
65			ERJC	17mois	G F	TMRE	TMRE	TMRE	TMRE	M F A E	
66			ESINA	59mois	G F	TMRE	TMRE	TMRE	TMRE	M F A E	
67			DESSOU	48mois	G F	TMRE	TMRE	TMRE	TMRE	M F A E	
68			WASJARDI	28mois	G F	TMRE	TMRE	TMRE	TMRE	M F A E	

T treated
M unwell
R refused
E excluded

CHW referral form



Formulaire de Référence de CPS

remplir par les ReCo :

Nom de l'Enfant : _____ Age en mois : 02 - 05 - 13 Sexe : M F
 District : ITANI Village : ZAFAYA
 Date de référence : 27/08/15 Centre de santé de référence : _____
 Raisons pour lesquelles l'enfant est révoqué : Malade Fièvre Effets indésirables au passage précédent Effets indésirables après avoir pris la CPS aujourd'hui
 Nom du ReCo : _____ Signature : 

remplir par l'Agent du Centre de Santé :

Children who are unwell are referred for diagnosis and treatment. If appropriate and they do not have malaria they may then receive SMC.

Date de l'examen : 27/08/15

Enfant malade :

- L'enfant a été examiné pour déterminer la cause de la maladie : OUI NON
- Diagnostic : Paludisme
- L'enfant a été soigné : OUI NON
- Nom et dose du traitement : Artemether
- L'enfant fut mis en observation au centre de santé ou référé à l'hôpital : OUI NON

Enfant avec fièvre :

- L'enfant a été testé pour le paludisme : OUI NON
- Résultat du TDR : Positif Négatif
- L'enfant fut mis en observation au centre de santé ou référé à l'hôpital : OUI NON
- L'enfant ayant un test paludisme positif confirmé a été soigné avec ACT : OUI NON
- Nom et dose de l'ACT : _____
- L'enfant avec un TDR négatif a reçu SP et AQ au cours de ce passage : OUI NON

Enfant avec effets secondaires :

- L'enfant a été examiné pour contrôler une réaction médicamenteuse AQ : OUI NON
- Le formulaire de PV Nationale a été rempli : OUI NON
- L'enfant mis en observation au centre de santé ou référé à l'hôpital graves : OUI NON

Résultat : TDR (+)

Nom de la personne responsable : _____ Signature : _____ Date : _____



Nigeria



Photos: Malaria Consortium



The Gambia

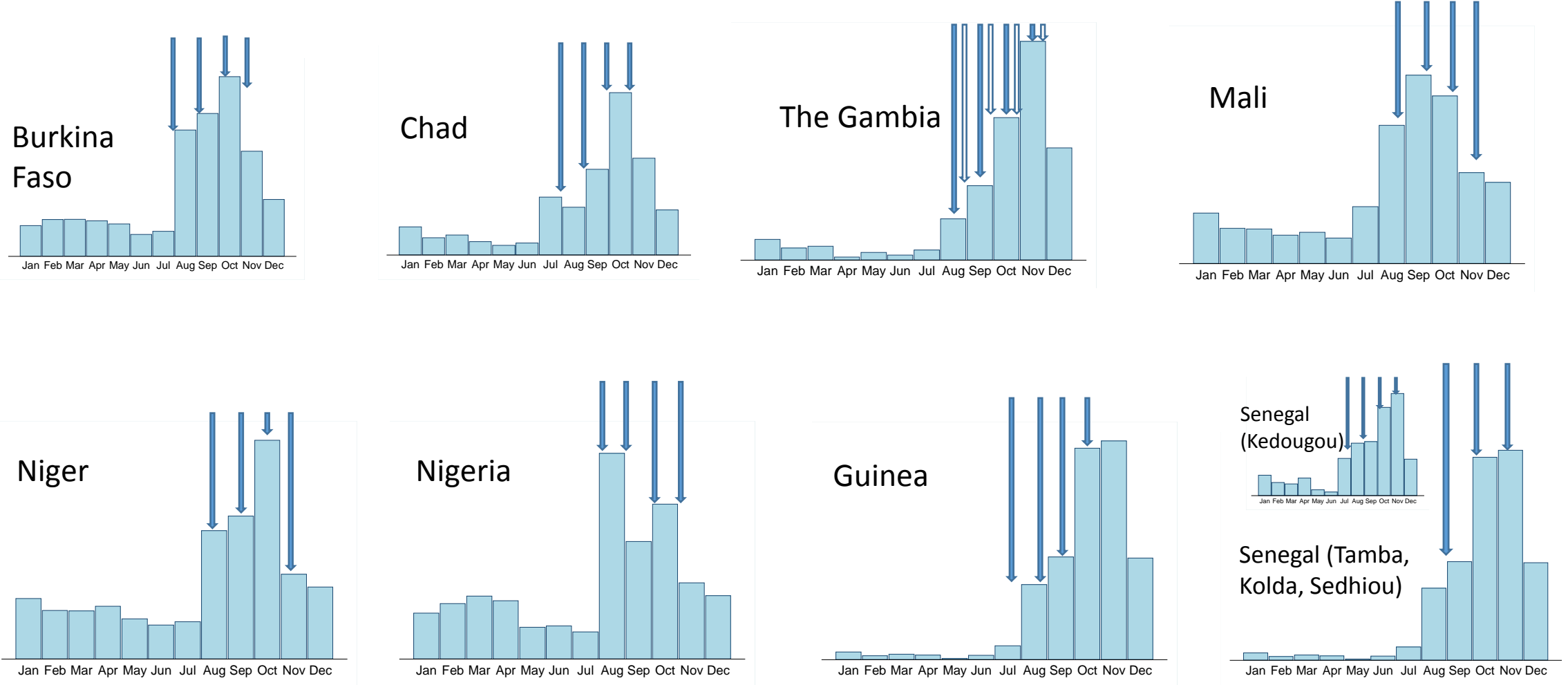


Photos: CRS

Target number of children in evaluation areas in 2015 and the average number actually treated per cycle

Country	Delivery method	Number of areas	Target	Average no. treated
Burkina Faso	Door-to-door	11 districts	649,693	680,433
Chad	Door-to-door	6 districts	275,000	265,354
Gambia	Door-to-door	2 regions (17 districts)	90,925	77,208
Guinea	Door-to-door	6 prefectures	210,047	201,283
Mali	Fixed point (mobile)	14 districts	809,638	687,838
Niger	Fixed point*	8 districts	595,901	416,973
Nigeria	Door-to-door	17 LGAs	792,133	787,467
Senegal	Door-to-door	16 districts	623,859	565,503
Total			4,047,196	3,682,059

Seasonality of malaria and timing of SMC monthly treatment cycles in 2015



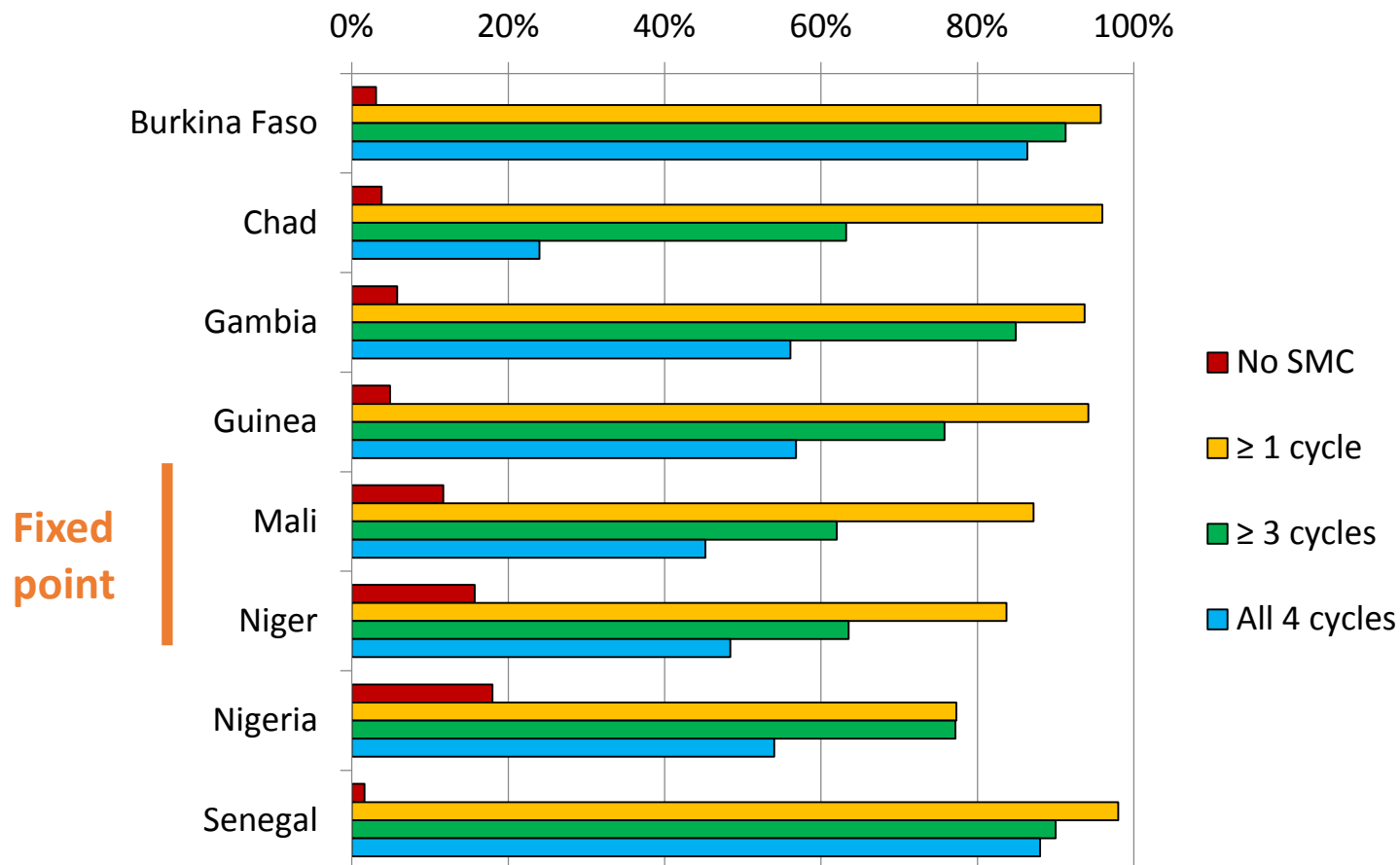
Seasonality in 2015 shown by the no. of confirmed cases in children in non-SMC areas or in older age groups in SMC areas

Coverage surveys

- Conducted at the end of the 2015 transmission season
- Representative of areas covered in 2015
- Sampling of villages with probability proportional to size
- Children up to 7yrs included

- Receipt of SMC determined from
 - SMC card (where available)
 - Caregiver's recall of SMC cycles

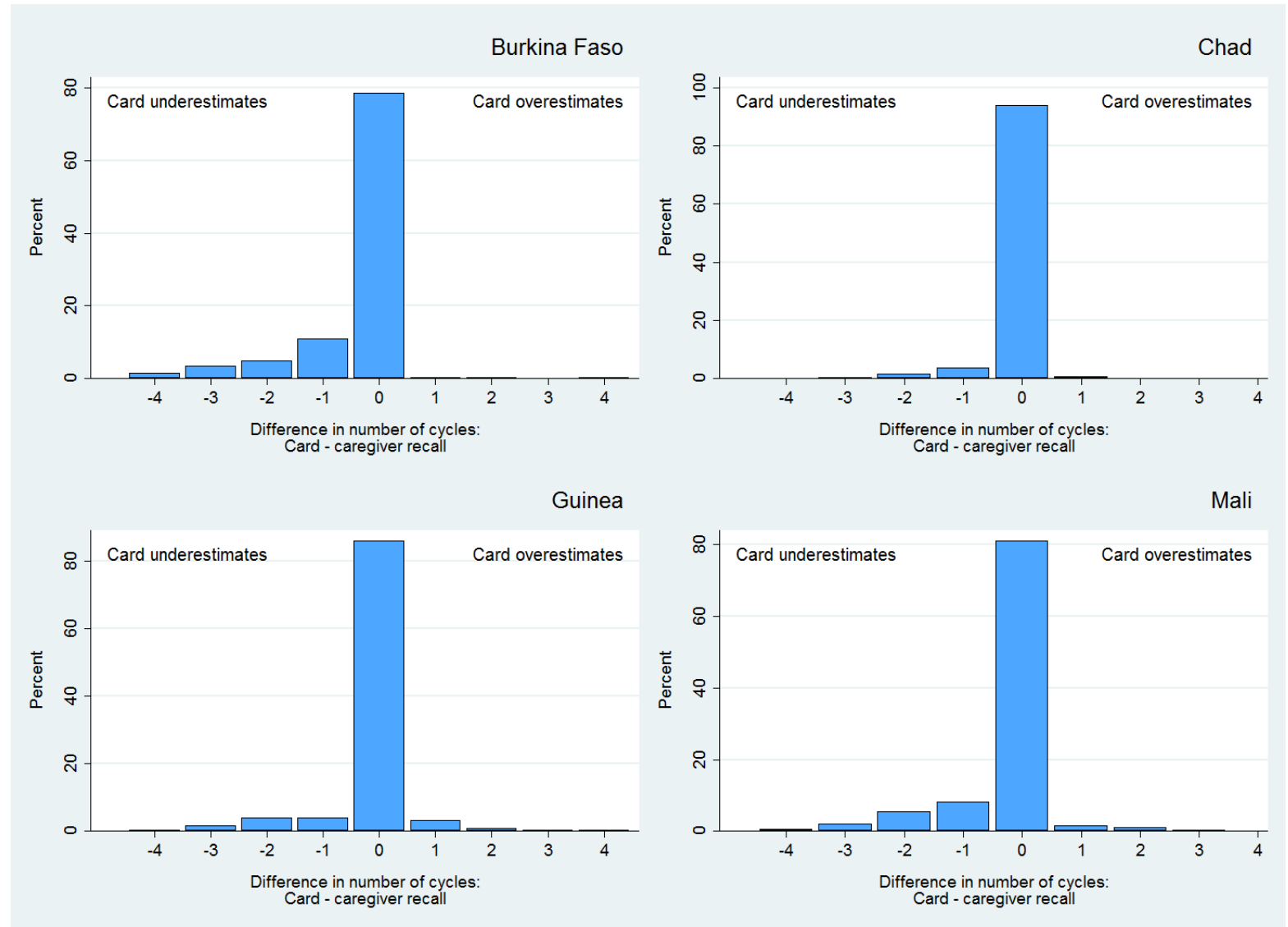
Number of SMC cycles received in 2015



- Relatively few children missed SMC altogether
- In most countries, more than 80% of children received SMC. Above 90% in 4 countries.
- Coverage of 3 cycles was >75% in 4 countries, >60% in all.
- Coverage of all 4 cycles was more variable, ranging from 85% in Burkina Faso to <25% in Chad.
- Overall (population weighted) coverage of ≥3 cycles was 73%

Agreement between SMC card and caregiver recall

Agreement between card and caregiver recall was good, but cards tend to under-estimate coverage because SMC administration is not always documented on the card



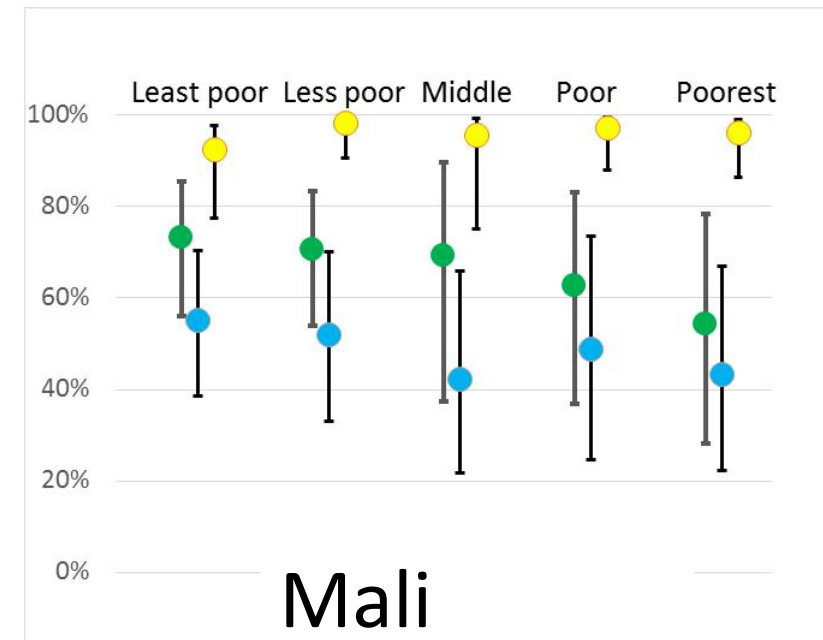
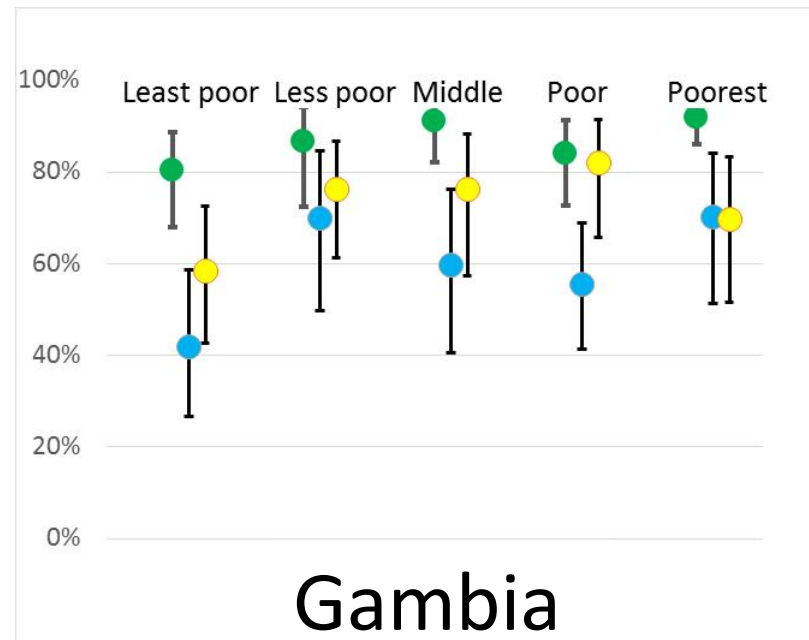
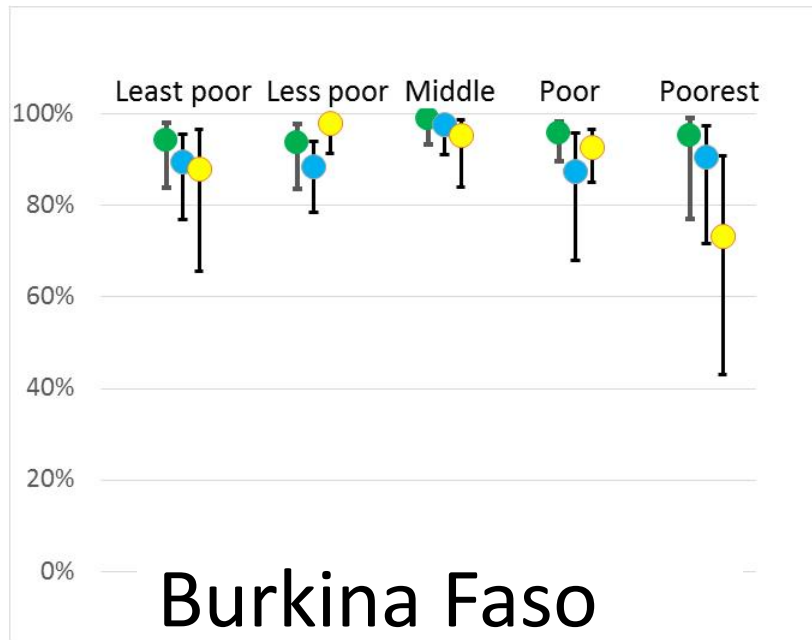
* Mothers recall of individual rounds not collected in Nigeria, only recall of blister packs collected in Gambia

- Delivery outside age range: coverage in 6 year olds

	N	Given card	At least 1	At least 3
Burkina Faso	105	77%	82%	71%
Chad	68	63%	85%	67%
Gambia	302	30%	30%	24%
Guinea	212	82%	82%	45%
Mali	151	13%	16%	11%
Niger	676	34%	34%	21%
Nigeria	75	53%	61%	49%

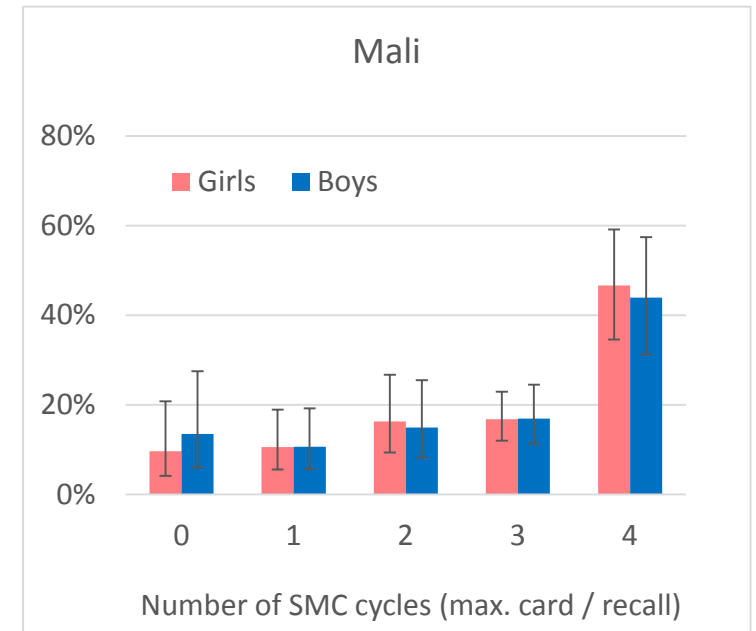
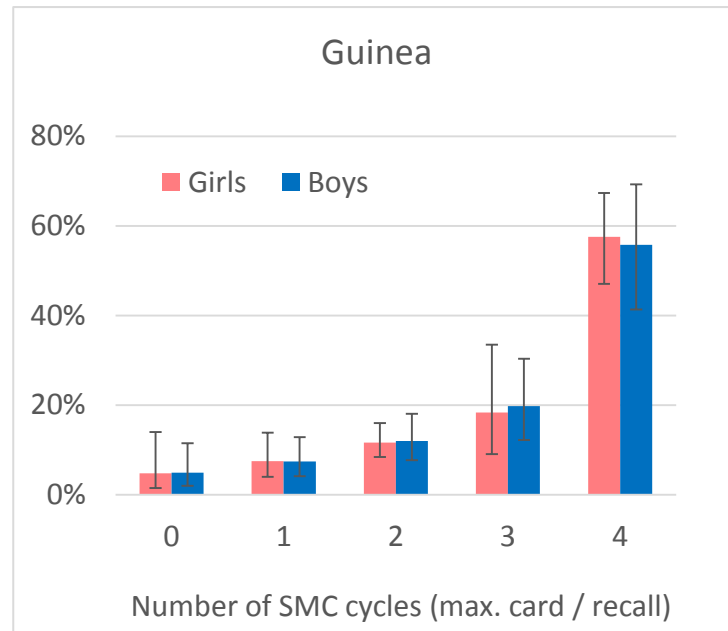
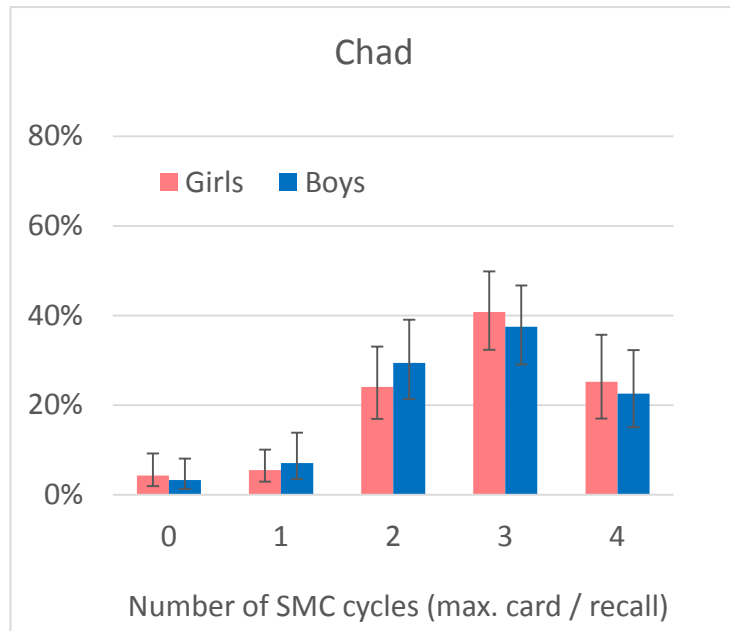
- Treatment children above the upper age limit should be kept to a minimum to avoid under-dosing
- This was less of a problem where fixed point delivery was used

Equitability of SMC coverage



- 3 or more SMC treatments
- 4 SMC treatments
- Sleeps under LLIN

Coverage by gender



Similar coverage in boys and girls

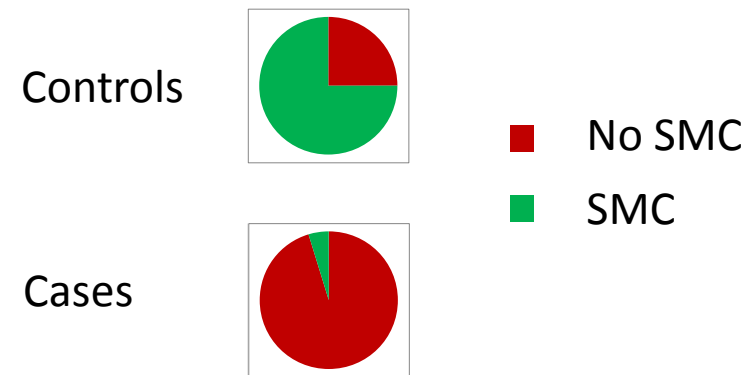
Case-control studies to estimate efficacy against malaria

- Cases – clinic attendees aged 3-59 months with slide-confirmed malaria
- Controls – 2 x healthy (or RDT negative) children aged 3-59 months from same community as cases
- History of SMC collected from card, caregiver, administration records
 - Potential confounders: age, SES, LLIN use, mothers education

Logic:

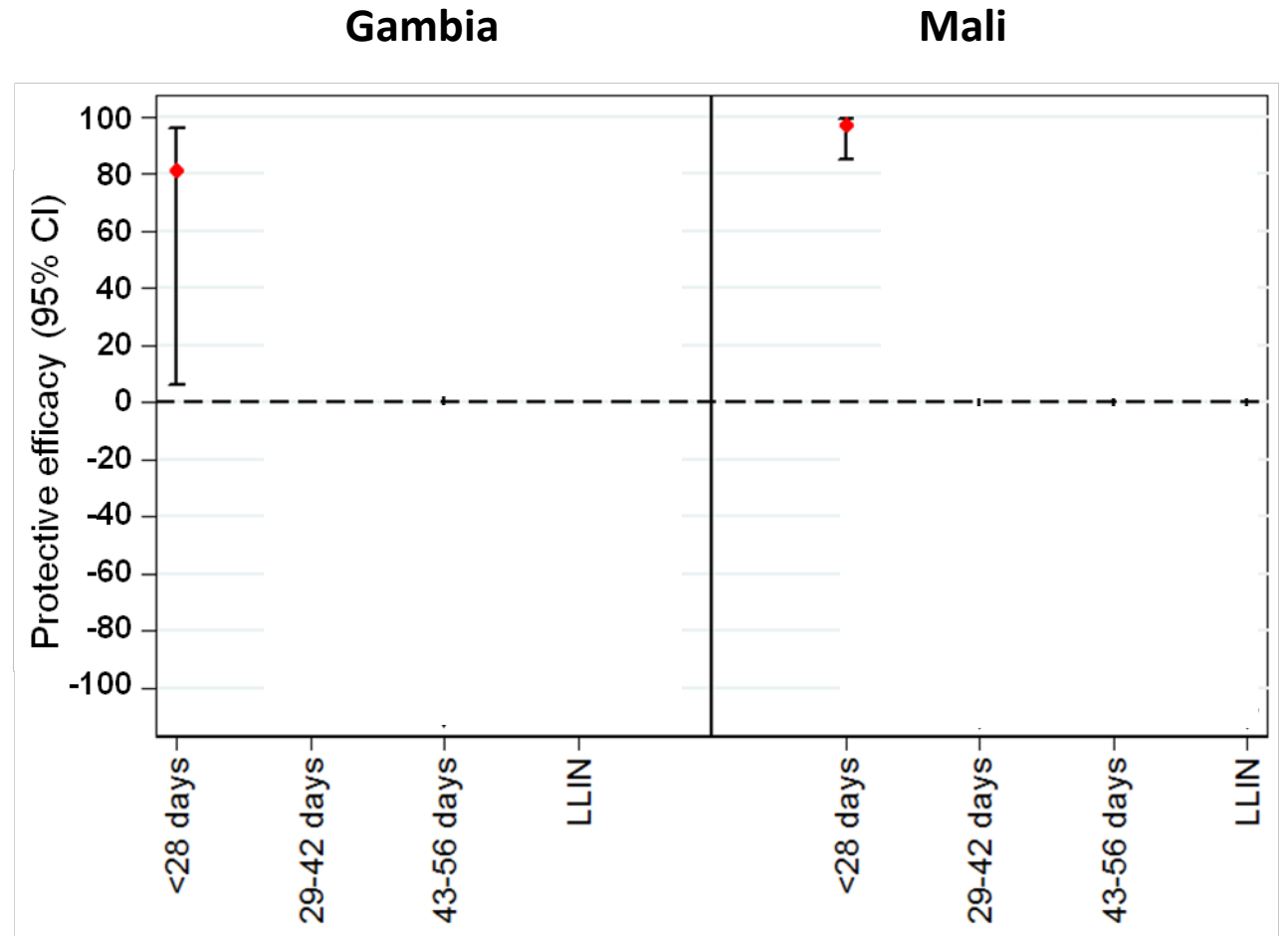
If SMC is protective, then more controls should have recent SMC than malaria cases

If SMC not protective, then SMC receipt should be similar between cases & controls



Case-control studies to estimate efficacy against malaria

- Cases – clinic attendees aged 3-59 months with slide-confirmed malaria
- Controls – 2 x healthy (or RDT negative) children aged 3-59 months from same community as cases
- History of SMC collected from card, caregiver, administration records
 - Potential confounders: age, SES, LLIN use, mothers education



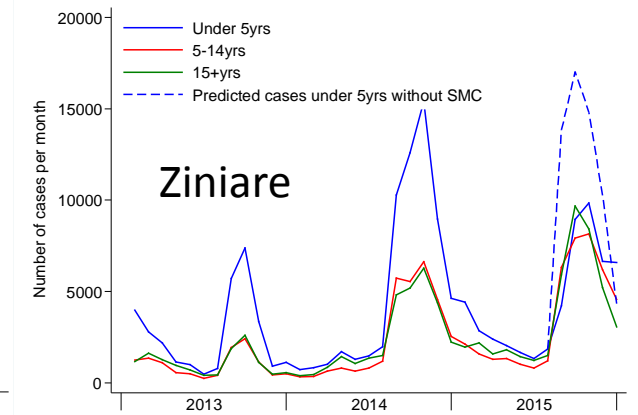
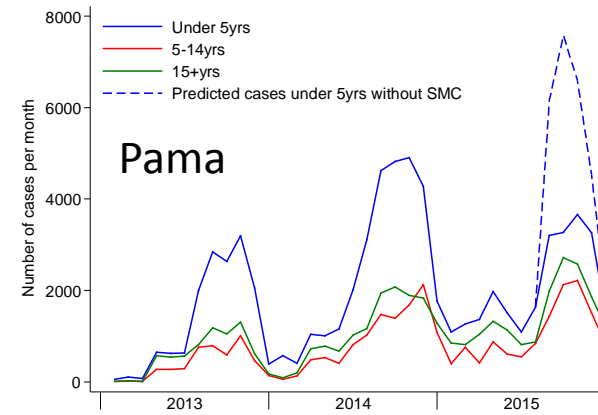
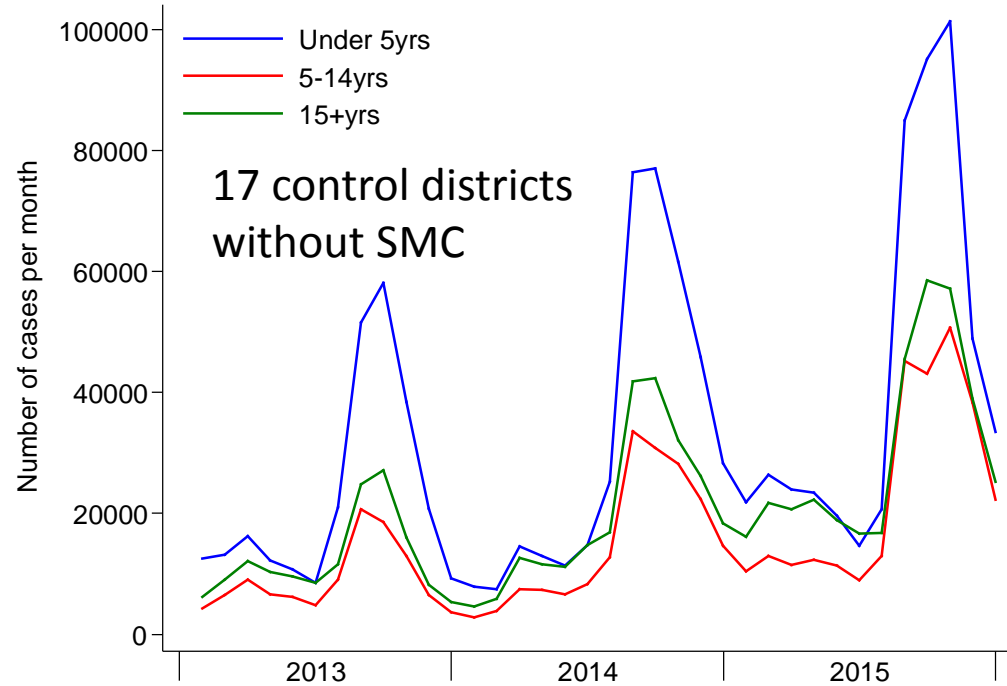
Evidence of impact from national malaria surveillance databases

- Monthly number of malaria cases in each district, in children <5yrs, and in persons above 5yrs were analysed (facilitated by now widespread use of confirmation by RDT)
- Regression model used to predict the expected number of cases without SMC on the basis of year-to-year trends in older age groups and in children in non-SMC districts
- % reduction in cases in SMC areas then estimated by comparing reported with the predicted cases
- Limitations: incompleteness, data errors, periods without confirmation, changes in diagnostic guidelines, cases from outside SMC areas, other concurrent control measures, year to year variation in malaria transmission
 - these factors tend to obscure the true impact of interventions

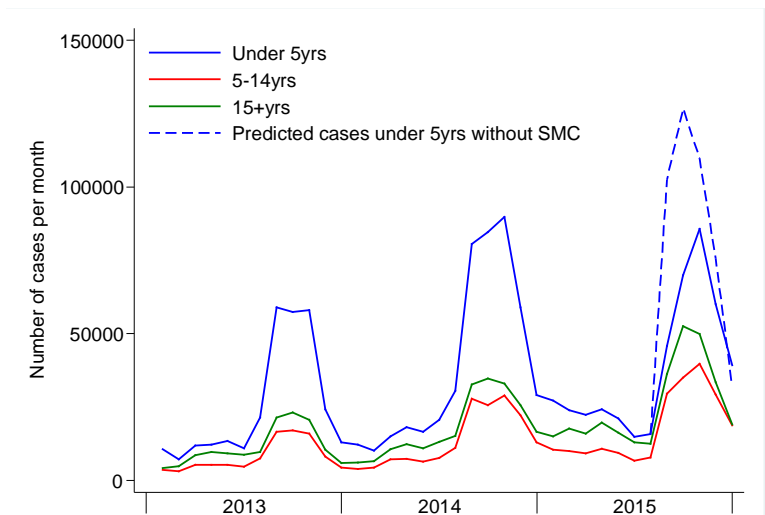
Burkina Faso

More details: JB Ouedraogo Poster 852
 Session B Nov 15th, 12pm-1:45

Examples of districts with SMC in 2015:



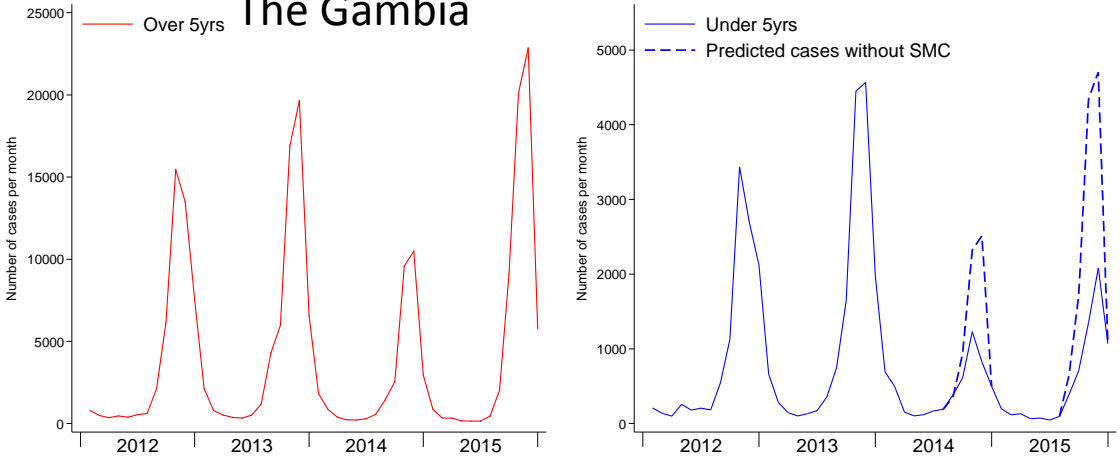
11 ACCESS-SMC districts with SMC in 2015:



45% reduction in cases <5yrs in 2015

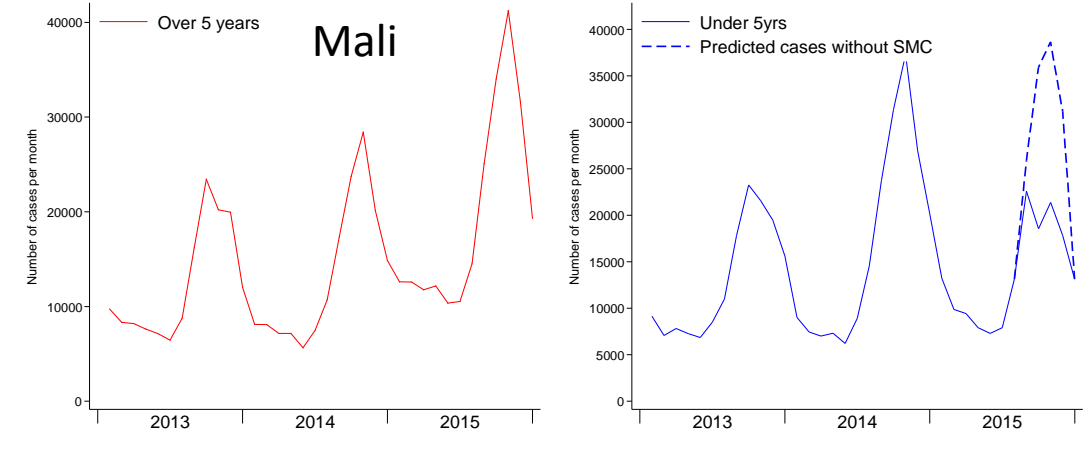
- Increase in number of confirmed cases in 2015 in non-SMC areas, and in older age groups in SMC areas
- The observed number of cases in children in SMC areas was compared with the expected number assuming the same trend would have been seen without SMC

The Gambia



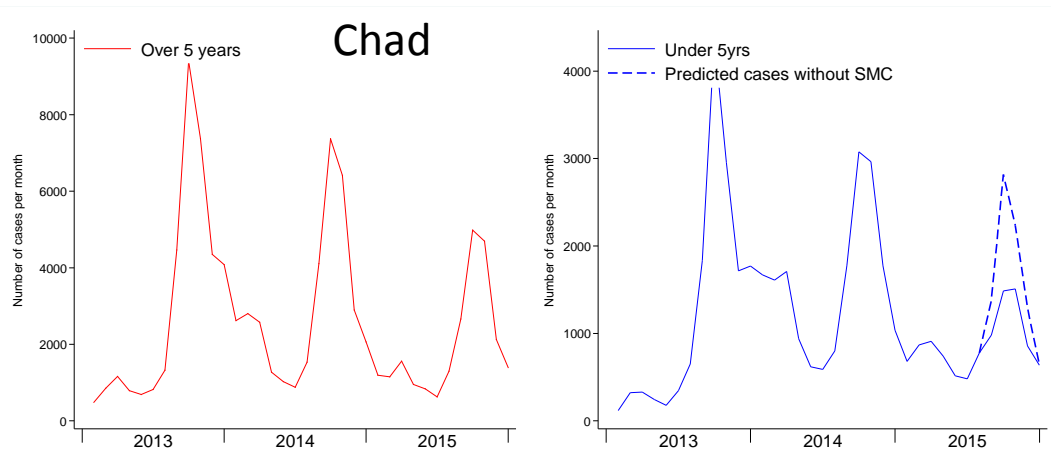
% reduction 2014: 50% 2015: 60%

Mali



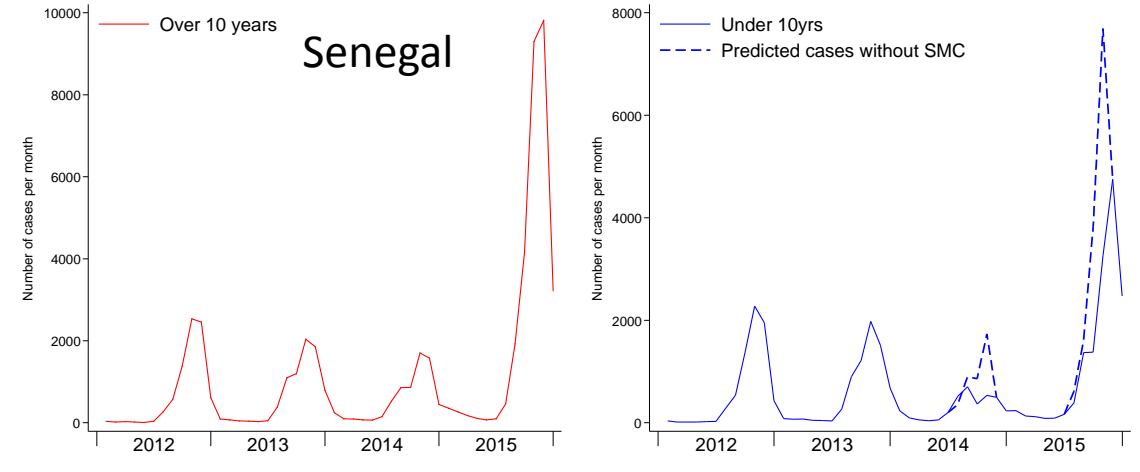
2015 49%

Chad



2015 24%

Senegal



2014: 62% 2015: 54%

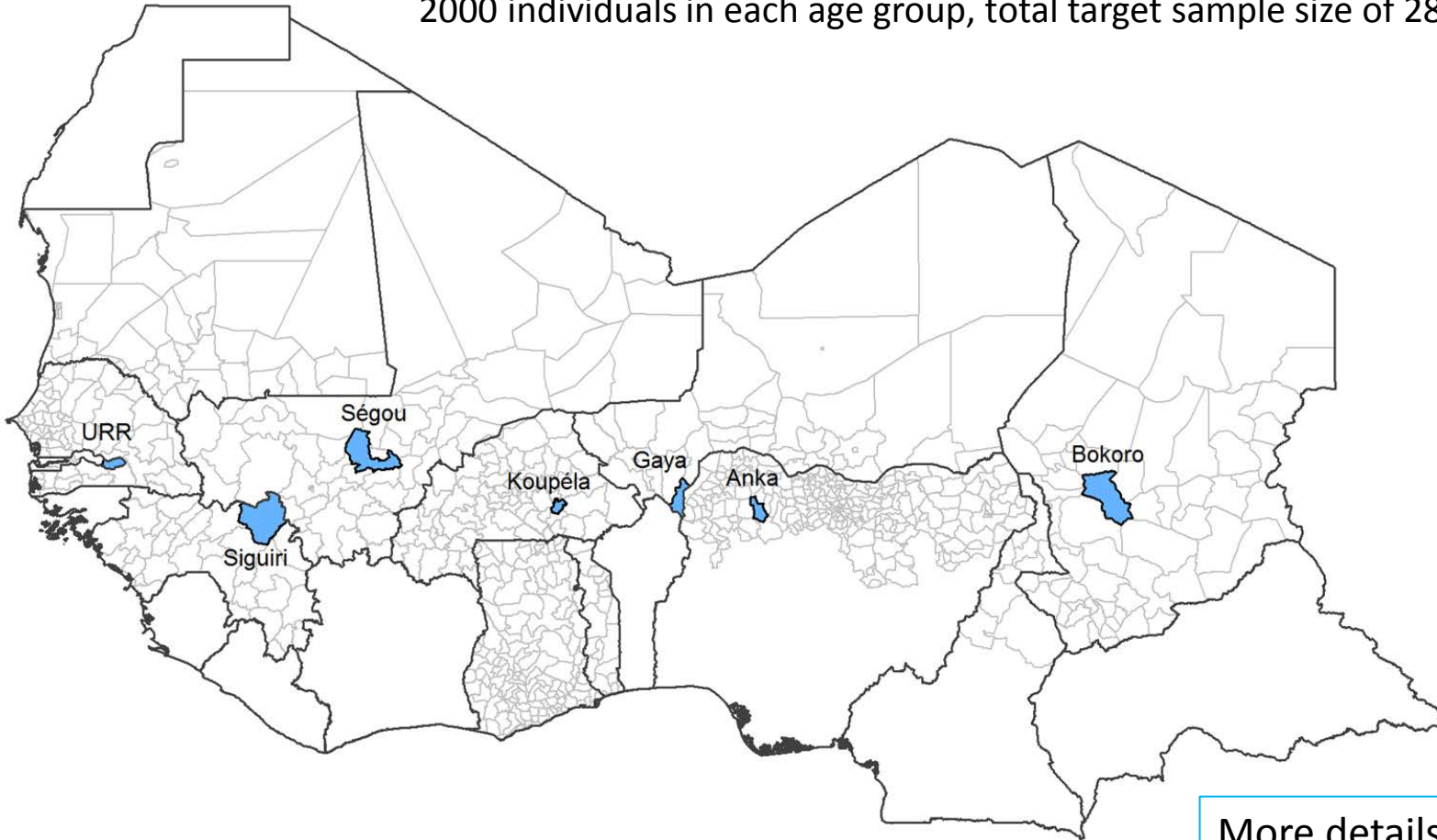
Number of confirmed cases in SMC areas in older age groups (in red) and in children (in blue). Dashed blue lines are the expected cases in children if SMC had not been implemented.

Drug resistance: Sampling for molecular markers

Community surveys in 2015 in areas that had not started SMC (except Gambia which had started SMC in 2014)

2 age groups: after the end of the transmission season: <5years and 10-30 years

2000 individuals in each age group, total target sample size of 28,000



- low frequencies of mutations associated with SP resistance, and no samples with AQ resistant genotypes
- Four samples (0.14%) carried *pfmdr1_YY* but only one had CVMNK/CVIET.
- Eight samples (0.33%) carried *dhfr_triple* and *dhps_double* mutations. None of these samples carried *pfmdr1_YY*.

More details in the talk by K Beshir
Wed 16 Nov 8am Marriott Atrium A
113: Malaria: Chemotherapy for control and elimination

Summary

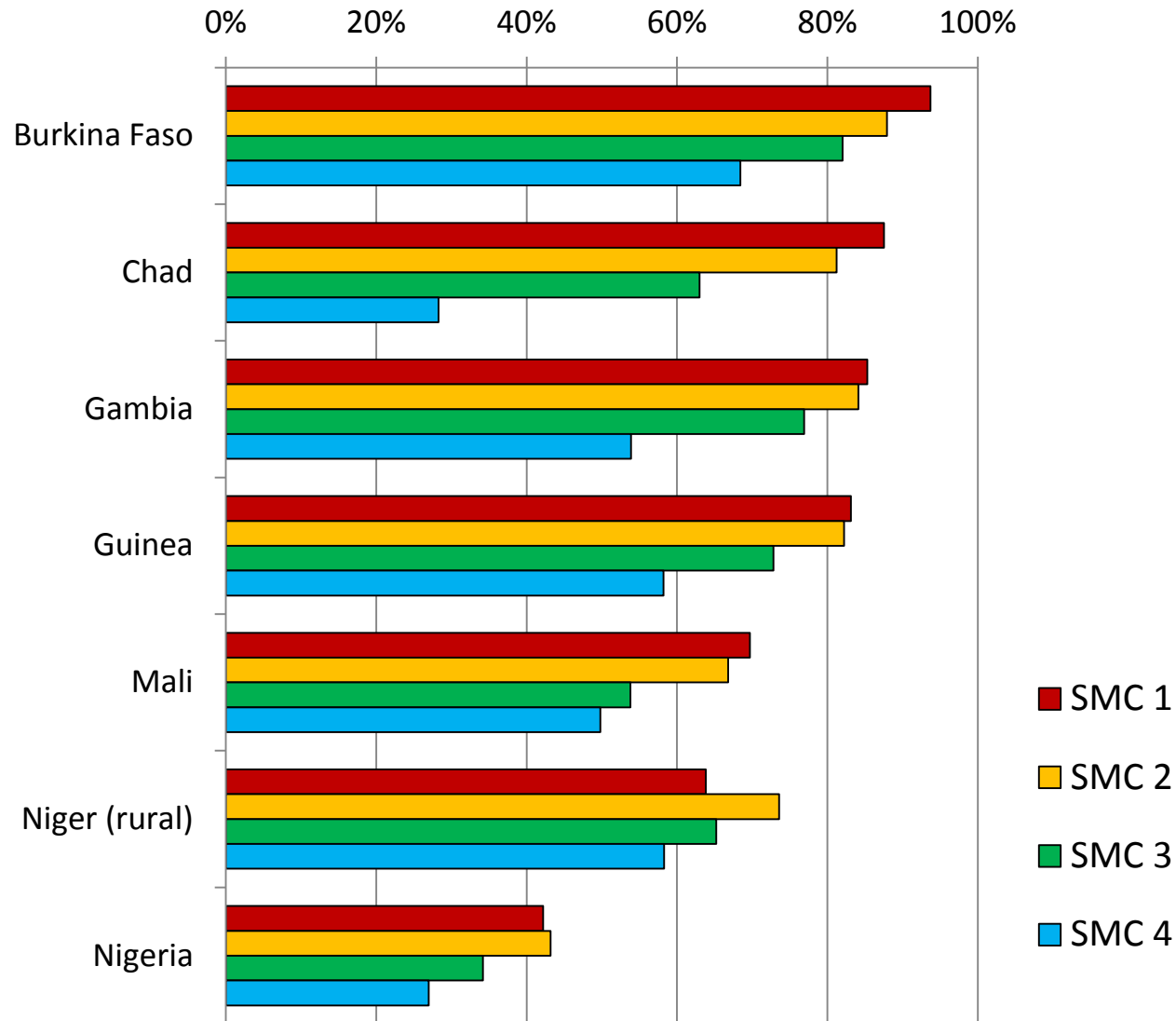
1. Countries have been quick to adopt SMC strategy since it was endorsed by WHO in 2012, scale-up has been rapid: 7.5m children in 2015 (3m through ACCESS-SMC), 15m (7m through ACCESS-SMC) in 2016
2. Despite this, high coverage was achieved in 8 countries in 2015
3. Treatment efficacy at least 80% over 4 weeks, consistent with low frequency of markers of AQ and SP resistance
4. Routine HMIS data consistent with a substantial impact of SMC in 2015, against a background of an increase in malaria transmission in many countries despite high LLIN coverage
5. Timely procurement and effective supply chain are critical for optimum impact - to start SMC cycles on time
6. Reliable record of child's SMC dates is necessary for monitoring
7. 4 cycles needed for full protection – need to adapt local strategies to reach children in all 4 cycles
8. Higher more equitable coverage door-to-door than through fixed points
9. Testing and treatment of febrile children: advantage of delivery by mobile teams or through community case management, but additional mobilisation needed for mobile teams to achieve high coverage
10. Careful monitoring is needed to ensure that delivery is effective and that drugs remain safe and efficacious
11. Recent scale-up of diagnostic testing for malaria has facilitated assessment of impact but malaria information systems need to be strengthened - to guide implementation and to allow better tracking of progress
12. SMC programmes have benefitted from regional coordination which needs to be maintained

Acknowledgments

- Burkina Faso: IRSS, PNLP, MC
- Chad: CSSI, PNLP, MC
- Gambia: MRC, NMCP, CRS
- Guinea: UGANC, PNLP, CRS
- Mali: MRTC, PNLP, CRS
- Niger: CERMES, EpiCentre, PNLP, CRS
- Nigeria: ERIC, JEDIMA, NMEP, MC
- Senegal: UCAD, PNLP
- SMC Working group: C Rwagacondo, M-R Fabry, H Jakou, M Kalleh, JL Ndiaye, P Batiénon
- WHO/TDR; WHO Safety and Vigilance; CAPM Rabat; WHO GMP
- CRS
- MC
- LSHTM
- UNITAID



Coverage at individual SMC cycles in 2015



- Confirmed coverage at cycles shown (where month was recorded on card or month recalled by mother) – will be conservative
- Coverage was consistently lower at the final (4th) cycle
- Possible access issues at end of rainy season
- Reasons for this being explored