Progress in scale-up of SMC in the Sahel

Issaka Sagara
MRTC Mali

ASTMH Atlanta 2016
Areas covered by ACCESS-SMC
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

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

<table>
<thead>
<tr>
<th>Country</th>
<th>Primary delivery method</th>
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<tbody>
<tr>
<td>Burkina Faso</td>
<td>Door-to-door</td>
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<tr>
<td>Chad</td>
<td>Door-to-door</td>
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<td>Gambia</td>
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<td>Guinea</td>
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<td>Mali</td>
<td><strong>Fixed point (mobile)</strong></td>
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<td>Niger</td>
<td><strong>Fixed point</strong></td>
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<td>Nigeria</td>
<td>Door-to-door</td>
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<td>Senegal</td>
<td>Door-to-door</td>
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</tbody>
</table>

* Door-to-door in some urban areas at final SMC cycle
Delivery door to door or at fixed points

Burkina Faso

Niger
Prévention saisonnière de paludisme

Carte d’enregistrement de l’enfant

Délégation Sanitaire Régionale de Chad
District Sanitaire de
Centre de santé de
Nom de l’enfant :
Date de naissance ou âge :
Nom de la mère ou de la tutrice :

<table>
<thead>
<tr>
<th>Année</th>
<th>Mois</th>
<th>Date d’administration des doses</th>
<th>Observations</th>
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<thead>
<tr>
<th>Nombre d’enfants ayant reçu SP et ALQ montrés en cercle par enfant</th>
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<tr>
<td>Nombre d’enfants qui ne sont PAS éligibles à la CPS</td>
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<td>Nombre d’enfants NON éligibles</td>
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<tr>
<td>Nombre d’enfants ayant reçu une dose de SP ou ALQ montrés en cercle par enfant</td>
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<th>Nombre de stock de médicaments</th>
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Nom et signature du Recu : [signature]
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SMC register used in Chad

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<tr>
<th>Date passage 1: 2015 2 21 014</th>
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<td>Age en mois</td>
<td>Sexe (Enfants de 3 ans ou plus)</td>
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<td>Nom et prénom de l'enfant (3 - 59 mois)</td>
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</table>

T treated
M unwell
R refused
E excluded
Children who are unwell are referred for diagnosis and treatment. If appropriate and they do not have malaria they may then receive SMC.
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

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

<table>
<thead>
<tr>
<th>Country</th>
<th>N</th>
<th>Given card</th>
<th>At least 1</th>
<th>At least 3</th>
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</thead>
<tbody>
<tr>
<td>Burkina Faso</td>
<td>105</td>
<td>77%</td>
<td>82%</td>
<td>71%</td>
</tr>
<tr>
<td>Chad</td>
<td>68</td>
<td>63%</td>
<td>85%</td>
<td>67%</td>
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<tr>
<td>Gambia</td>
<td>302</td>
<td>30%</td>
<td>30%</td>
<td>24%</td>
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<tr>
<td>Guinea</td>
<td>212</td>
<td>82%</td>
<td>82%</td>
<td>45%</td>
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<tr>
<td>Mali</td>
<td>151</td>
<td>13%</td>
<td>16%</td>
<td>11%</td>
</tr>
<tr>
<td>Niger</td>
<td>676</td>
<td>34%</td>
<td>34%</td>
<td>21%</td>
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<tr>
<td>Nigeria</td>
<td>75</td>
<td>53%</td>
<td>61%</td>
<td>49%</td>
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• 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

Burkina Faso

Gambia

Mali

- Green: 3 or more SMC treatments
- Blue: 4 SMC treatments
- Yellow: 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

- 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

17 control districts without SMC

11 ACCESS-SMC districts with SMC in 2015:

45% reduction in cases <5yrs in 2015
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.
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: <5 years 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 Batienon
• WHO/TDR; WHO Safety and Vigilance; CAPM Rabat; WHO GMP
• CRS
• MC
• LSHTM
• UNITAID
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.