Use of a mathematical model to guide the choice of geographic or demographic expansion of Seasonal Malaria Chemoprevention (SMC) in Benin

Dr Rock AIKPON
Deputy Coordinator
NMCP Benin

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Outline

- Background
- Justification
- Considerations for Modeling
- Use for programmatic decisions
- Lessons learned and recommendations

Background

- Total population Benin: 12,910,087
- Pop Total U5: 2,226,990 (17.25%)
- Area: 115,000km2

- **SMC target** :children aged 3 to 59 months

- **Annual cycles**: 4monthly round with 1 or 3 intakes supervised by Community Health Workers (CHWs)

- **Digitization**: has been implemented progressively from 2020

Historic of SMC implementation in Benin

2019   2020   2021-2023

Nombre de prises supervisées   1   3
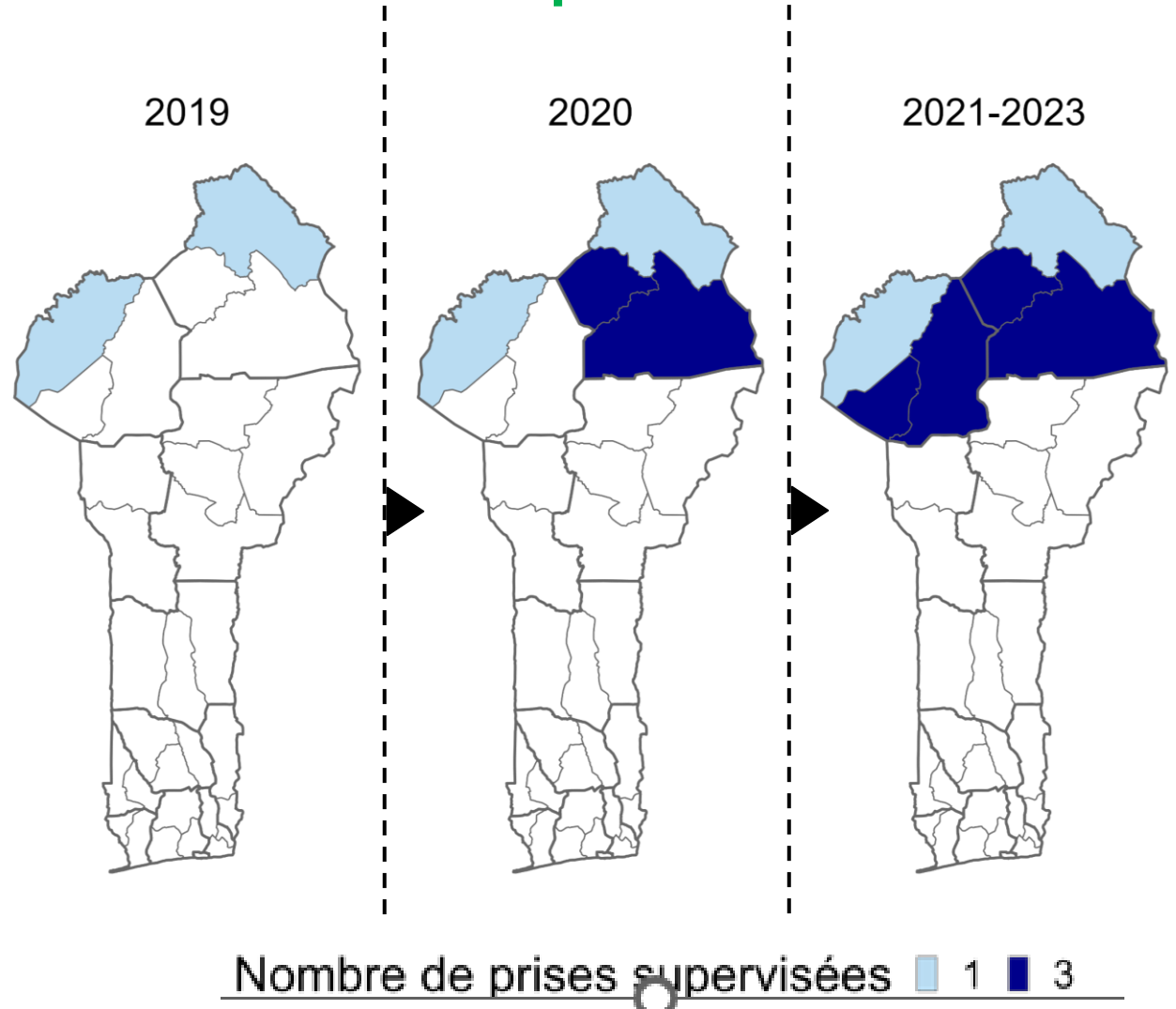
Justification

- The WHO's recommendation to expand the SMC, coupled with the new 2024-2027 NSP, were the catalysts for this need to expand the SMC in our country.

1

Demographic extension in the same northern departments but extended to children under under 10 years of age

Alibori
Atacora

Or

2

Geographic extension to southern departments for children less than 5 years old

Borgou
Donga

Collines

Modeling for SMC extension decision

Considerations for Modeling

Prevalence

36%

53.9%

51.3%

40.2%

41.6%

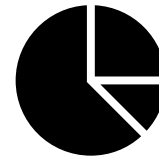Prevalence of malaria in children under 5 (DHS 2017)
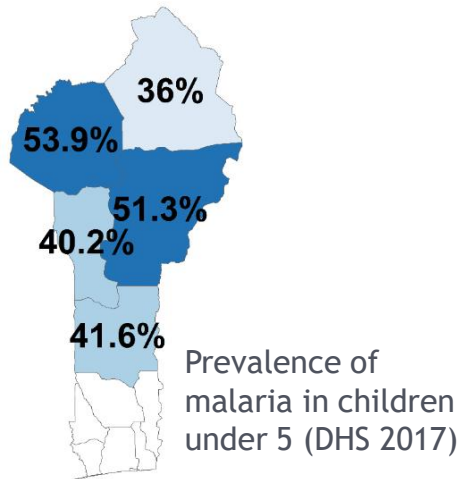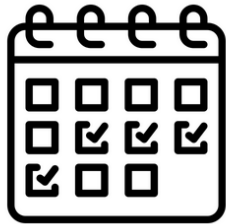
Seasonality

Target population

Age distribution of malaria disease burden.

Other interventions (e.g. PID, MIILD)

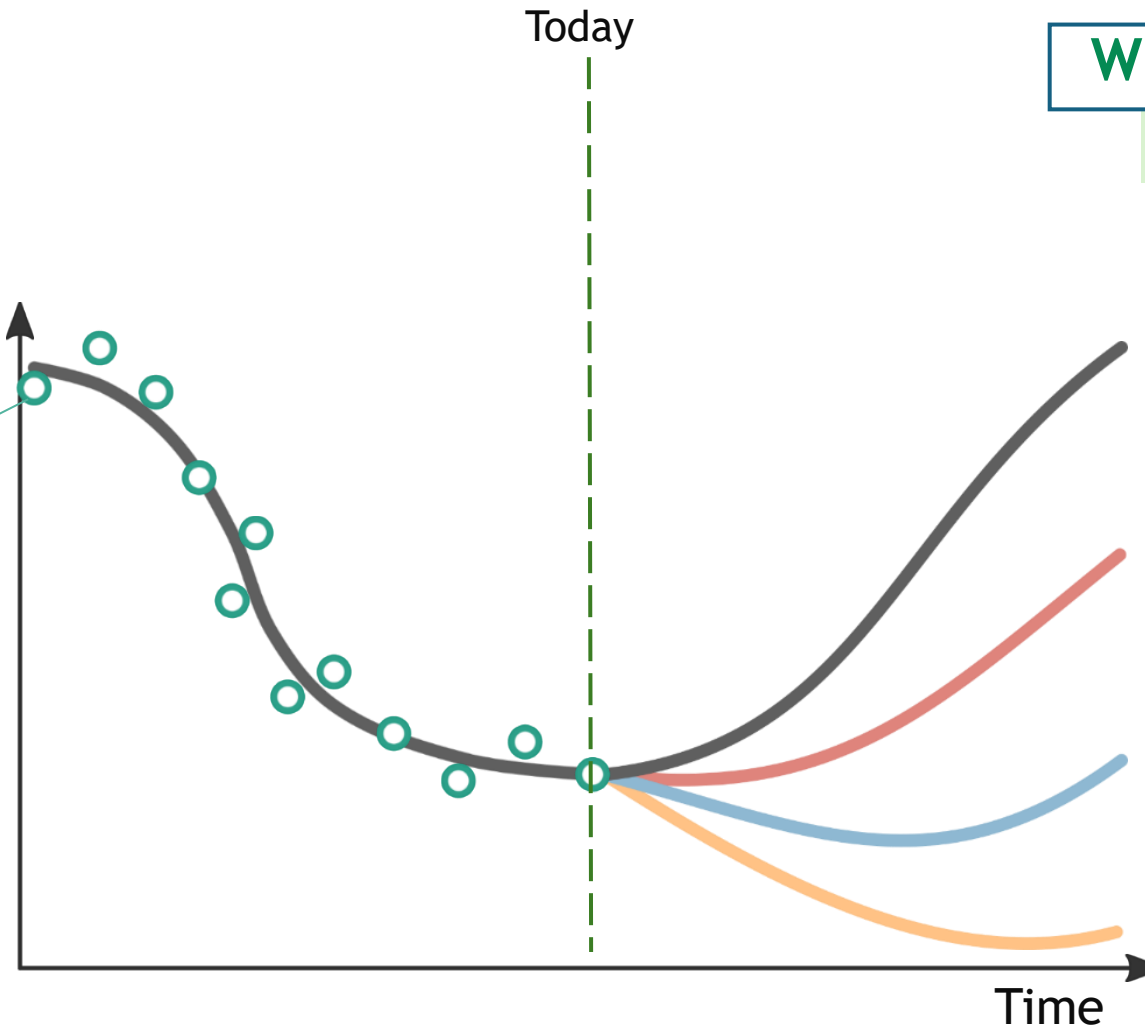**Costs**

Modeling for SMC extension decision

Modeling for SMC extension decision

Severe cases all ages between 2024 and 2026 (in thousands)

1 Alibori+Atacora

2 Borgou+Donga +Collines

90

60

30

0

Scheduled interventions
Demographic extension
Geographic extension
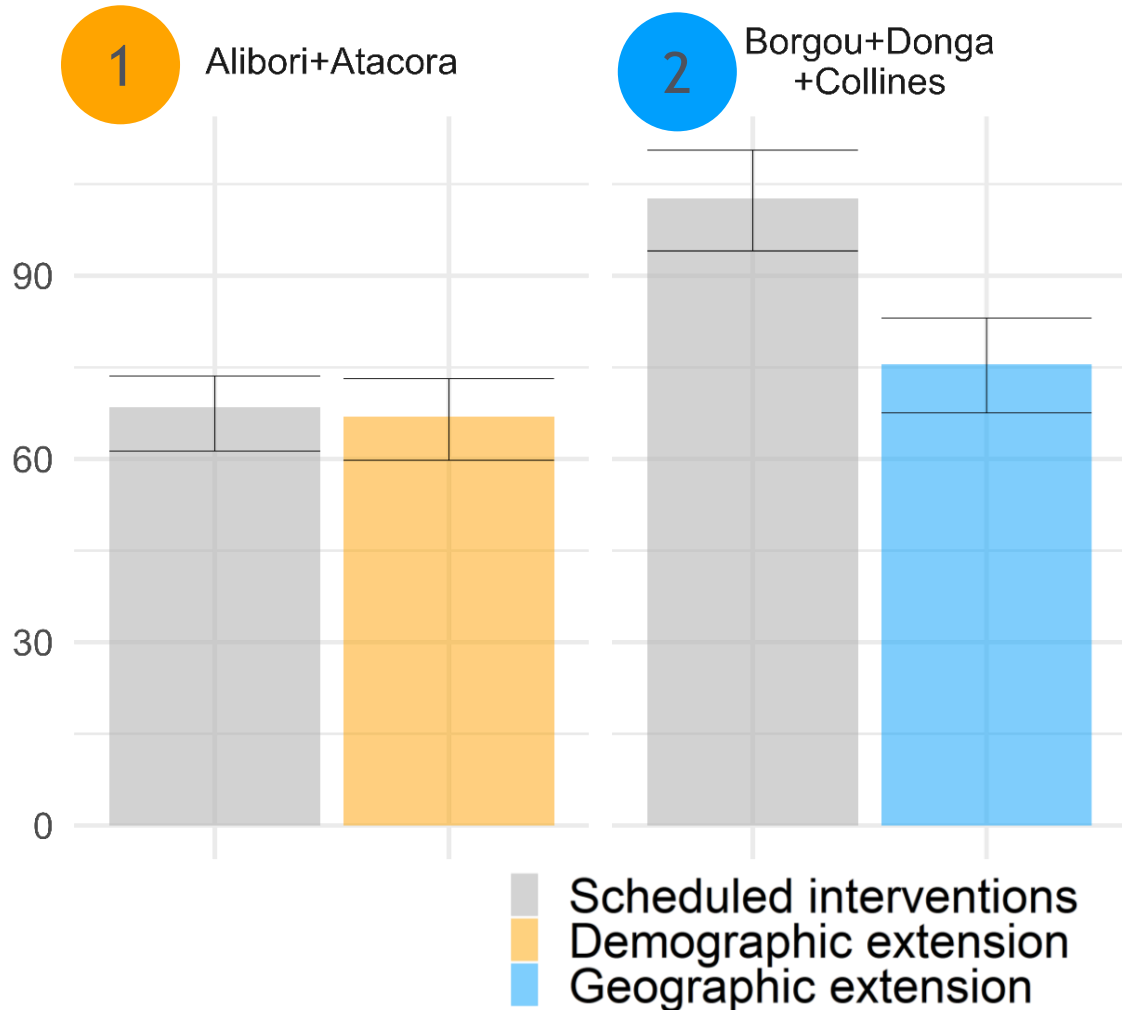
Subtraction

Servere cases avoided between 2024 and 2026 (in thousands)

1 Alibori+Atacora

2 Borgou+Donga +Collines

30

20

10

0

3,000 severe cases avoided

27,000 severe cases avoided
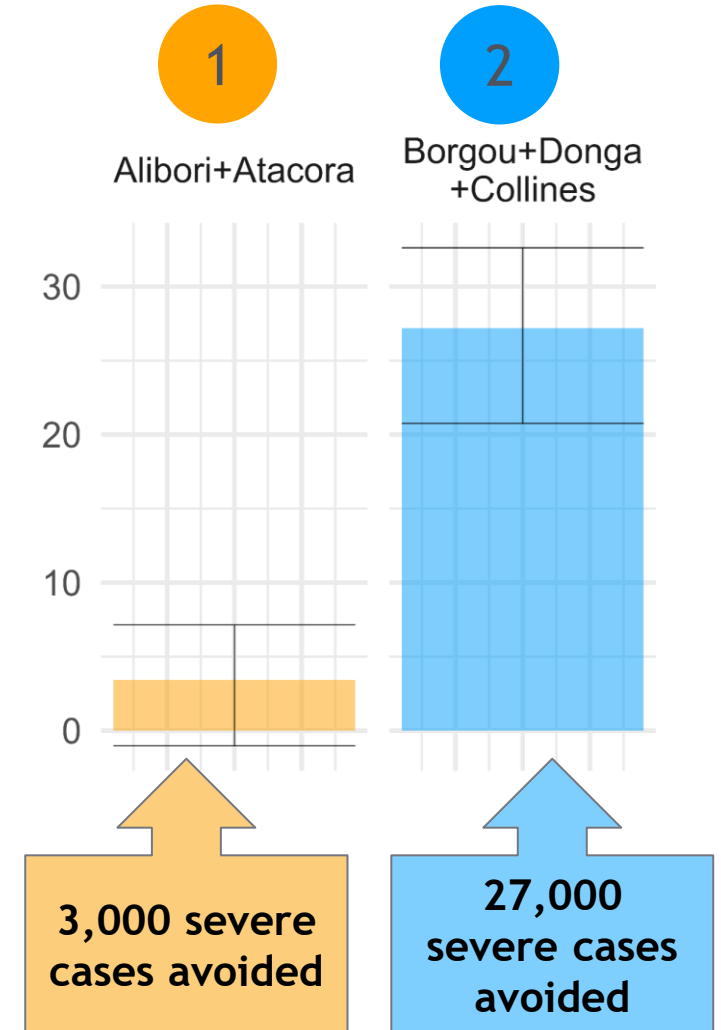
Modeling for SMC extension decision

Number of severe cases prevented between 2024 and 2026 per 1,000 additional children targeted
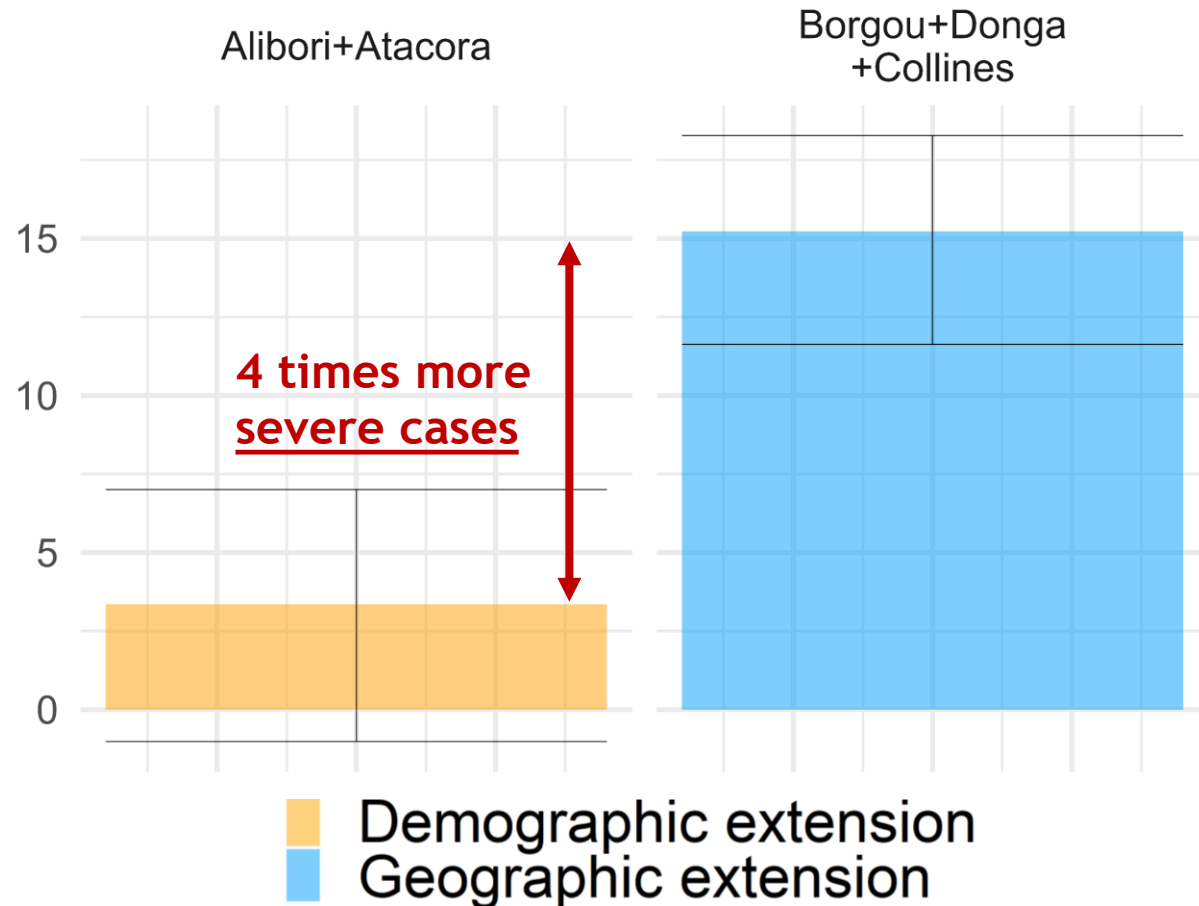
Geographic expansion could prevent
4 times more severe cases
per 1,000 additional children targeted, compared with demographic extension.

Modeling for SMC extension decision

There are almost twice as many children to target in the geographic expansion scenario than in the demographic expansion scenario

1 **Demographic extension** in the same northern departments but extended to children **under 10 years of age**

Alibori
Atacora

3,000 serious cases averted

/!\ **1 million** more children aged 5 to 10 to be covered

2 **Geographic extension** to southern departments for children **under 5 years of age**

Borgou
Donga

Collines

27,000 serious cases averted

/!\ **1.8 million** more children under 5 to be covered

Use for programmatic decisions

- Helpful for choosing the best extension approach rational base.

- This has convinced the Global Fund

- The costs of each extension approach also had to be taken into account

- Benin has recently implemented a new community Health policy, which considerably reduces personnel and training costs. Geographical extension therefore costs no more than demographic extension.
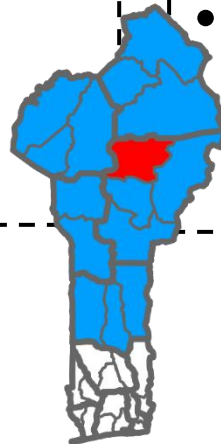
Lessons learned and recommendations

Lessons learned and future developments in Benin

- Modeling: a tool to help decision-making via epidemiological forecasts, and thus assess the future impact of interventions

- Provides mathematical evidence for our advocacy with donors, thus facilitating negotiations with PTFs

- Helpful to optimize resources

Recommendations for other NMCPs

- The importance of understanding malaria transmission dynamics helps to contextualize modeling (e.g. seasonal variability in incidence or transmission disparities in different areas).

- Importance of high-quality epidemiological and population (denominator) data

- When modeling, take into account all interventions to calculate their exact impact.

Thank you for your attention