Achieving World Health Organization Targets for Hepatitis B in Infants and 5-year olds by 2030: Results from 17 WHO AFRO Countries

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INTRODUCTION

- 90% of children infected with the hepatitis B virus (HBV) via perinatal transmission become chronic carriers.
- Perinatal prophylaxes for HBV such as vaccination, hepatitis B immune globulin (HBIG) and treatment of high viral load mothers are available but few countries in the World Health Organization Africa Region (WHO AFRO) have all options available in existing frameworks.
- This raises the question of how the WHO 2030 hepatitis B elimination target of 0.1% prevalence in 5-year olds can be met with the current intervention types [1].

AIM

- Use a modeling approach to describe HBV-related disease progression from 2016 - 2030 in 17 WHO AFRO countries (Burkina Faso, Burundi, Cameroon, Central African Republic, Chad, Ethiopia, Gabon, Gambia, Kenya, Madagascar, Malawi, Nigeria, Rwanda, Senegal, Tanzania, Uganda, Zimbabwe).
- Consider the impact of scaling up interventions to meet WHO 2030 targets for HBV in infants (90% vaccination coverage) and 5-year olds (0.1% prevalence).

METHOD

- 17 PRoGReSs models were seeded with published, expert verified, and/or extrapolated epidemiology data related to serological prevalence, diagnosis, vaccination and treatment [2-3].
- At baseline, 2016–2030 trends in the infant (<1 year old) and 5 year old population were analyzed, assuming the immunization paradigm from 2014 remained constant.
- To meet WHO targets for HBV in 5-year olds by 2030, interventions were introduced after 2017 first by expanding coverage rates for the 3-dose vaccine (3D), then treatment of high viral load mothers, birth-dose (BD) and HBIG.

RESULTS

Base

- In 2016, on average across all countries, BD and 3D coverage were 8.8% and 80.4% respectively, with a very low percentage (<1%) of infected mother assumed to be on treatment (Table 1).
- No country reported systematic provision of HBIG.

Infants

- At baseline, 3D coverage from Burkina Faso, Burundi, Gambia, Malawi, Rwanda, Tanzania, Uganda (all > 90%) and Zimbabwe met the WHO target of 90% 3D coverage by 2030 (Table 1).
- Gambia alone, with 96% BD coverage met the WHO target of 90% BD by 2030 (Table 1).
- Prevalent infant cases declined in all countries except in the Central African Republic (CAR) which saw a 13% increase in infant cases.

5 Year Olds

- In Kenya, Malawi and Rwanda , sustaining 3D rates (all > 80%) was sufficient to meet WHO targets for 5 year olds by 2030.
- 5-year-old prevalence was projected to increase in Burkina Faso and CAR (8% and 68% respectively).
- In all other countries, 5-year-old prevalence was projected to decline; however, using baseline assumptions, no other country met WHO targets for this population.

Meeting WHO targets

- On average and across all countries, the following coverages need to be achieved by 2025 for WHO targets in 5 year olds to be met by 2030:
  o >90% 3D and BD coverage
  o 62% of infected mothers treated.
- In this analysis, no country needed expansions to HBIG to achieve WHO targets in 5 year olds.

Infants

- By 2025, increases of 2% (Tanzania) to 77% (CAR) were needed to meet infant WHO targets for 3D by 2030.
- Meeting BD targets in other countries required increases of 3% (Gambia) and 45% (Nigeria) and >70% (all others) by 2025 to meet 2030 targets.

5 Year Olds

- Detailed country level changes to coverage needed by 2025 to meet WHO 2030 targets in 5 year olds can be found in Table 1.

Table 1. Changes to vaccination coverage needed to meet WHO targets in 5 year olds

Country	Base			WHO		
	3D Coverage (2014)	Treated Mothers (2014)	BD Coverage (2014)	BD Coverage (2025)	3D Coverage (2025)	Treated Mothers (2025)
Burkina Faso	91.0%	0.0%	0.0%	99.0%	99.0%	80.0%
Burundi	95.0%	0.0%	0.0%	74.3%	98.0%	52.5%
Cameroon	87.0%	0.0%	0.0%	99.0%	99.0%	85.0%
Central African Republic	23.0%	0.0%	0.0%	99.0%	99.0%	99.0%
Chad	46.0%	0.0%	0.0%	74.3%	85.8%	74.3%
Ethiopia	77.0%	0.0%	0.0%	95.0%	96.0%	75.0%
Gabon	70.0%	0.0%	0.0%	99.0%	99.0%	65.0%
Gambia	96.0%	0.0%	96.0%	99.0%	99.0%	99.0%
Kenya	81.0%	0.0%	0.0%	81.0%	81.0%	0.0%
Madagascar	73.0%	0.0%	0.0%	99.0%	99.0%	50.0%
Malawi	91.0%	0.0%	0.0%	91.0%	91.0%	0.0%
Nigeria	66.0%	0.0%	54.0%	***99.0%	99.0%	85.0%
Rwanda	99.0%	0.0%	0.0%	99.0%	99.0%	0.0%
Senegal	89.0%	0.0%	0.0%	99.0%	99.0%	80.0%
Uganda	95.0%	3.0%	0.0%	99.0%	99.0%	70.0%
Tanzania	97.0%	0.0%	0.0%	99.0%	99.0%	50.0%
Zimbabwe	91.0%	0.0%	0.0%	99.0%	99.0%	75.0%
Average	80.4%	0.2%	8.8%	91.7%	96.5%	62.0%

***Nigeria could meet targets by keeping the 2014 BD coverage of 54% while expanding 3-dose coverage and treatment of mothers to 99% by 2025

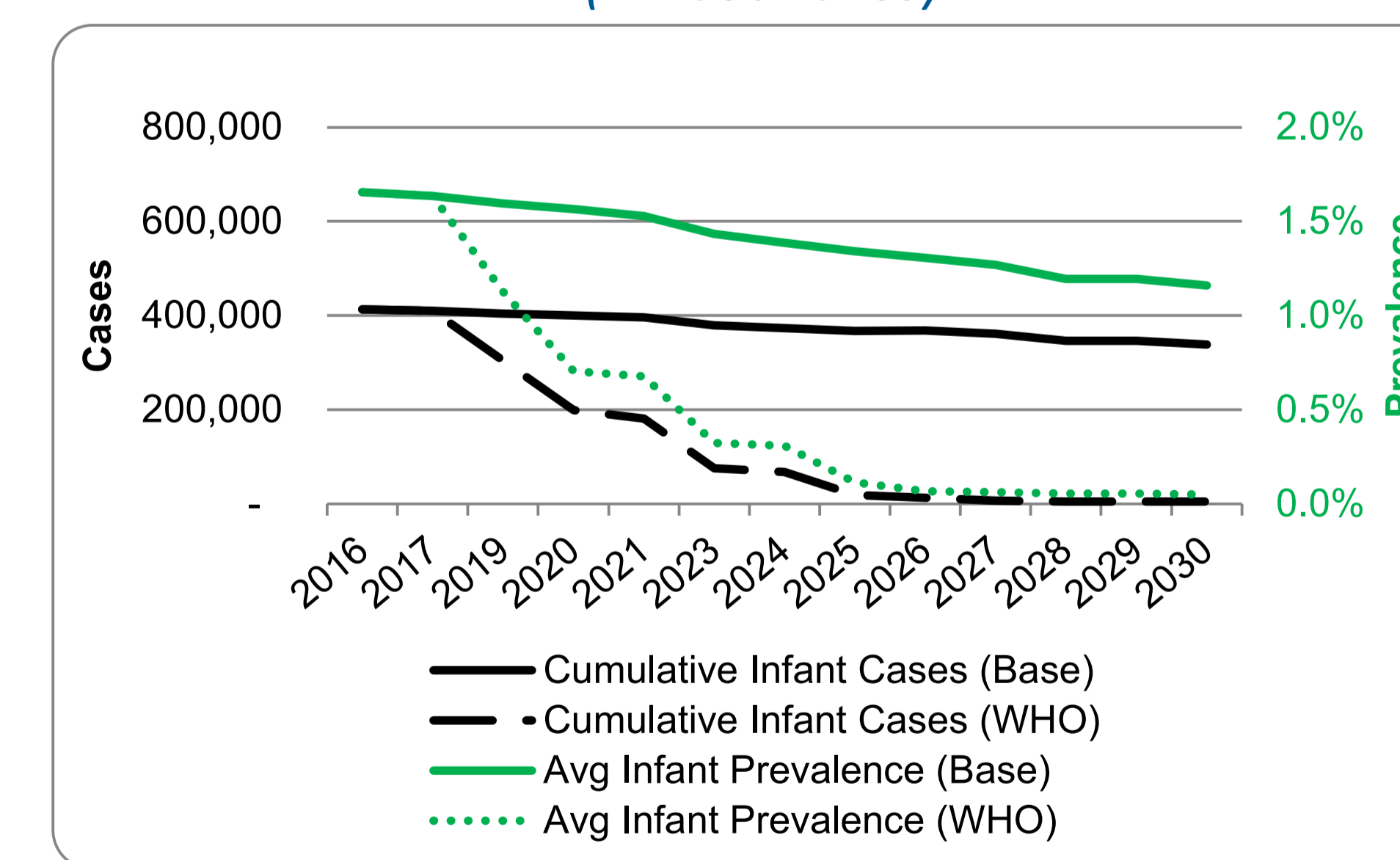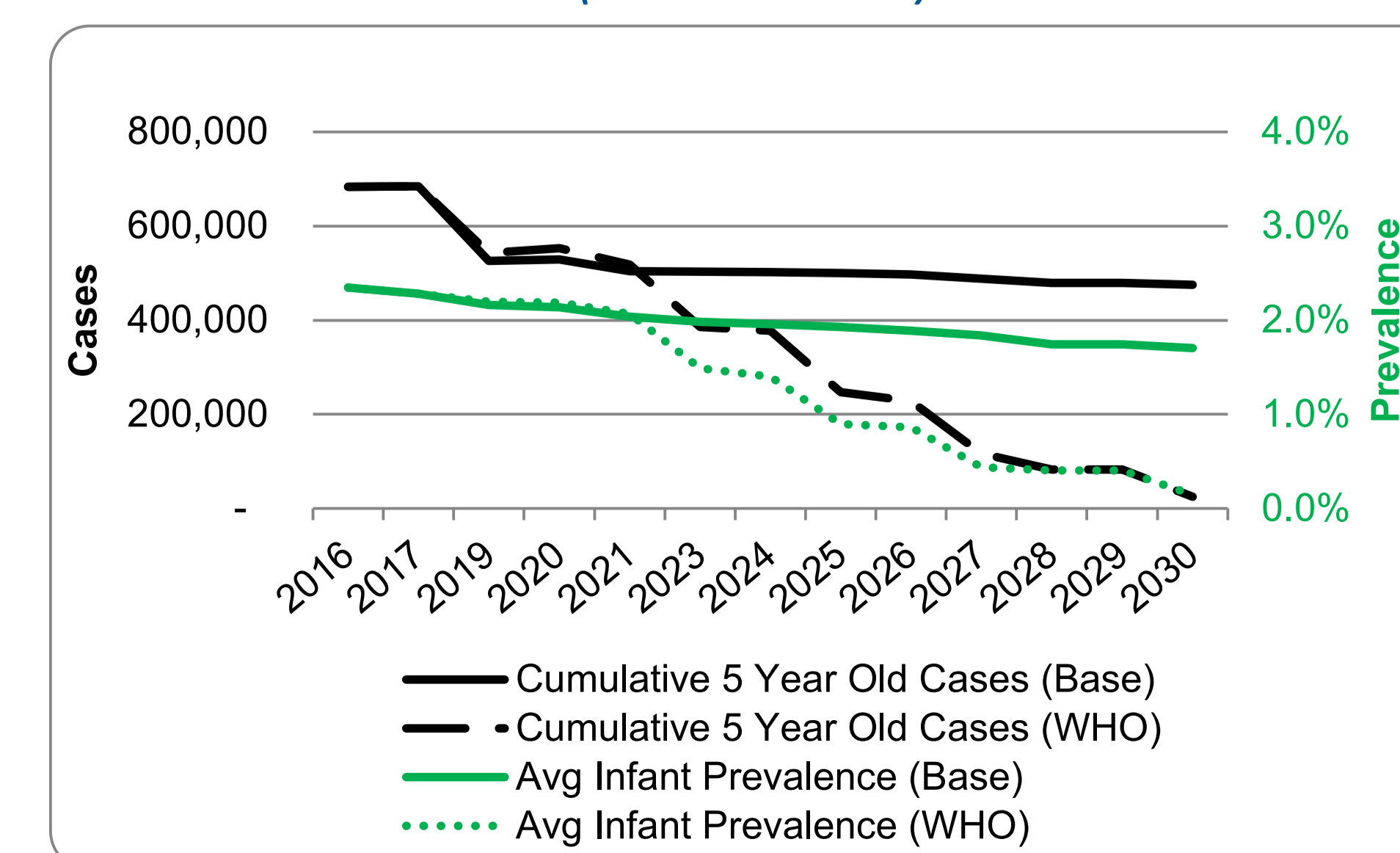*Figure 1. Change in cumulative cases and average prevalence in infants, 2016 – 2030 (All Countries)*

- Cumulative Infant Cases (Base)
- Cumulative Infant Cases (WHO)
- Avg Infant Prevalence (Base)
- Avg Infant Prevalence (WHO)

Figure 2. Change in cumulative cases and average prevalence in 5 year olds, 2016 – 2030 (All Countries)

- Cumulative 5 Year Old Cases (Base)
- Cumulative 5 Year Old Cases (WHO)
- Avg Infant Prevalence (Base)
- Avg Infant Prevalence (WHO)

CONCLUSION

- Current efforts go a long way towards reducing HBV disease burden as some countries could achieve WHO 2030 HBV targets for 5-year olds with the existing 3D coverage rates.
- Most countries, however, will need to expand access to 3D and BD coverage as well as treatment for infected mothers.
- Carefully designed strategies are thus necessary to maximize resources.

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CONTACT INFORMATION

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