

# COVID-19 Scenario Modeling Hub Report

27 June, 2023

Scenario Modeling Hub Team<sup>1</sup>

## Executive Summary

In a new round of projections, the Scenario Modeling Hub evaluated the trajectory of COVID-19 during April 16, 2023 to April 19, 2025 (104-week horizon), under 6 scenarios about the annual uptake of reformulated boosters (minimal uptake, uptake in 65+ corresponding to 2021 booster levels, or uptake in all ages corresponding to 2021 levels) and extent of immune escape of circulating variants (50% vs 20% annually). Eight teams contributed both national and state-specific projections, while one team submitted results for a subset of states. Our ensemble results are based on the trimmed LOP approach. Detailed scenario descriptions and setting assumptions are provided [here](#).

## Key Takeaways from the Seventeenth Round

- Based on the national ensemble, the main period of COVID19 activity is expected to occur in late fall and early winter over the next 2 years, with median peak incidence between November and mid January. Lowest incidences are projected to occur in August of each year.
- For the range of scenarios considered, weekly hospitalizations and deaths are likely to stay within last year's range, and unlikely to hit Delta or Omicron peaks. Further, weekly hospitalizations are likely to remain at low or medium community transmission levels and unlikely to reach high transmission levels (>20 weekly hospitalizations per 100,000), as defined by the CDC.
- In the most pessimistic scenario (no booster, high immune escape) we project 2.1 million hospitalizations (1.4 million-4.5 million) and 209,000 deaths (138,000-479,000) over the 2-year projection period, with 839,000 hospitalizations and 87,000 deaths in the first cold month season (Sep 2023-Apr 2024). In the most optimistic scenario (boosters for all ages, low immune escape) this reduces to 1.4 million hospitalizations (907,000-2 million) and 122,000 deaths (55,000-201,000) over 2 years, with 484,000 hospitalizations and 45,000 deaths occurring in the first cold month season. The Sep 2024-Apr 2025 season is projected to be slightly (5-22%) more severe than the coming season.
- Vaccination of 65+ and of all ages would significantly reduce disease burden compared to no vaccination scenarios, irrespective of immune escape assumptions. Under low and high immune escape scenarios vaccination of 65+ reduces hospitalizations by 11% and 9%, and reduces deaths by 16% and 13%; targeting all ages reduces hospitalizations by 23% and 17%, and deaths by 26% and 20%, compared to no vaccination. In absolute numbers vaccinating 65+ would result in 202,000 (114,000-290,000) fewer hospitalizations and 28,000 (13,000-44,000) fewer deaths nationally over the two year projection period in low immune escape scenarios, compared to no vaccination. Expanding vaccination to all ages increases these reductions to 430,000 (264,000-598,000) hospitalizations and 49,000 (29,000-69,000) deaths under low immune escape assumptions. Reductions in numbers of deaths and hospitalizations are similar, but slightly higher, in high immune escape scenarios.
- A few caveats are worth noting:
  - We assumed the VE of reformulated boosters would be 65% against symptomatic disease at the time of reformulation in June of each year. The effectiveness of reformulated boosters against existing and new variants remains unclear, as does the pace of waning after multiple booster shots and repeat infections.
  - We assumed continuous immune escape rather than discrete variants, mirroring observations of evolutionary changes in the last year. We did not consider the impact of a significant new variant that would have accumulated a large amount of antigenic changes, transmissibility advantage over a very short period, akin to Delta or Omicron. We also assumed that the intrinsic severity

<sup>1</sup>Compiled by Justin Lessler, Rebecca Borchering, Emily Howerton, Claire Smith, Sara Loo, Sung-mok Jung, Erica Carcelén, and Shaun Truelove.

(severity in naive populations) of future circulating strains would remain similar to that of Omicron lineages.

- There is considerable heterogeneity between states and between individual models. In particular, in the high immune escape scenarios some models project a second smaller peak in late Spring.
- We switched calibration of death data to a different dataset (NCHS) following the end of the CSSE surveillance system, which may introduce small differences when comparing RD17 death projections with those of past rounds. Further, we no longer project case trajectories. Hospitalizations from HHS protect continue to be a stable outcome, although reporting to this system remains unclear over the full 2 year projection period.
- These are results based on projections from 9 teams, of which 8 provided national estimates for hospitalizations and 6 provided national estimates for deaths. Results will be updated as projections from additional models become available.

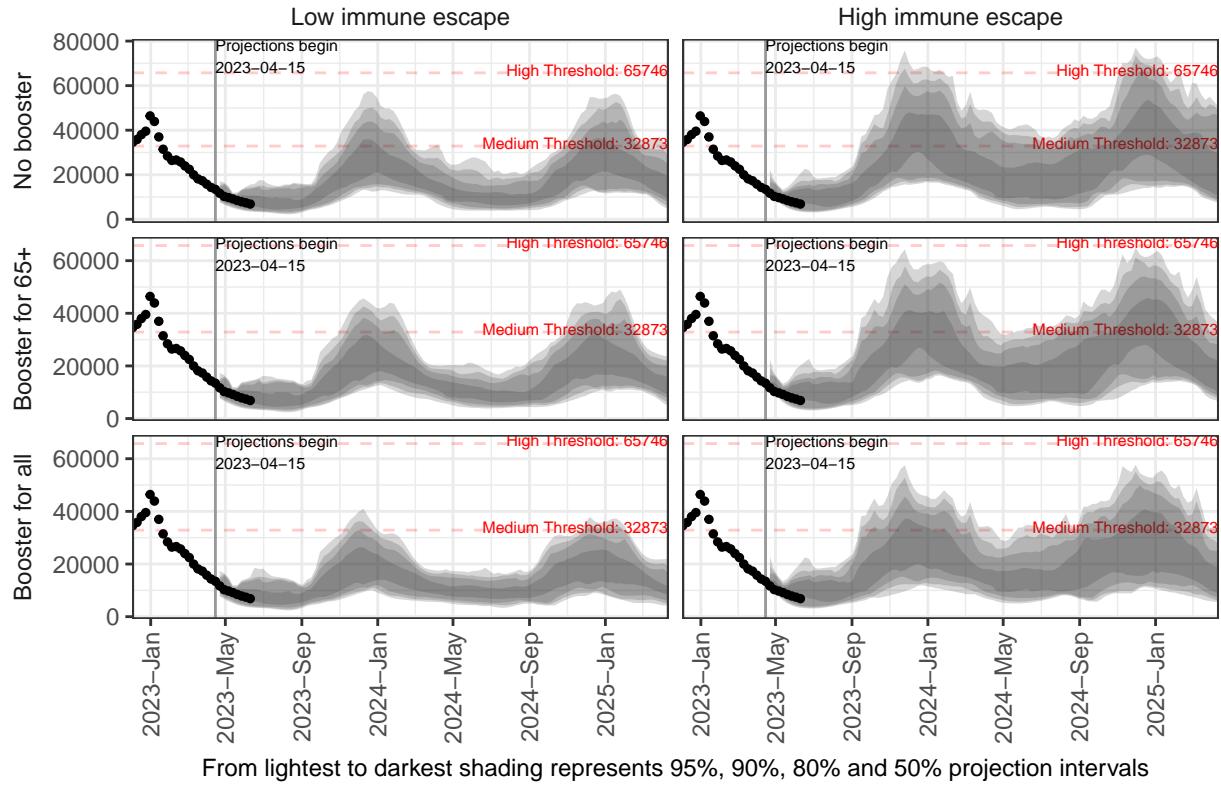
## Round 17 Scenario Specifications

	<b>Low immune escape</b> • Immune escape occurs at a constant rate of <b>20% per year</b>	<b>High immune escape</b> • Immune escape occurs at a constant rate of <b>50% per year</b>
<b>No vaccine recommendation</b> • Uptake negligible or continues at very slow levels based on existing 2022 booster trends	Scenario A	Scenario B
<b>Reformulated annual vaccination recommended for 65+ and immunocompromised</b> • Reformulated vaccine has <b>65% VE against variants circulating on June 15</b> • Vaccine becomes <b>available September 1</b> • Uptake in 65+ same as first booster dose recommended in September 2021 • Uptake in individuals under 65 negligible or continues to trickle based on 2022 booster trends	Scenario C	Scenario D
<b>Reformulated annual vaccination recommended for all currently eligible groups</b> • Reformulated vaccine has <b>65% VE against variants circulating on June 15</b> • Vaccine becomes <b>available September 1</b> • 65+ uptake same as first booster dose recommended in September 2021 • Coverage in individuals under 65+ saturates at levels of the 2021 booster (approximately 34% nationally)	Scenario E	Scenario F

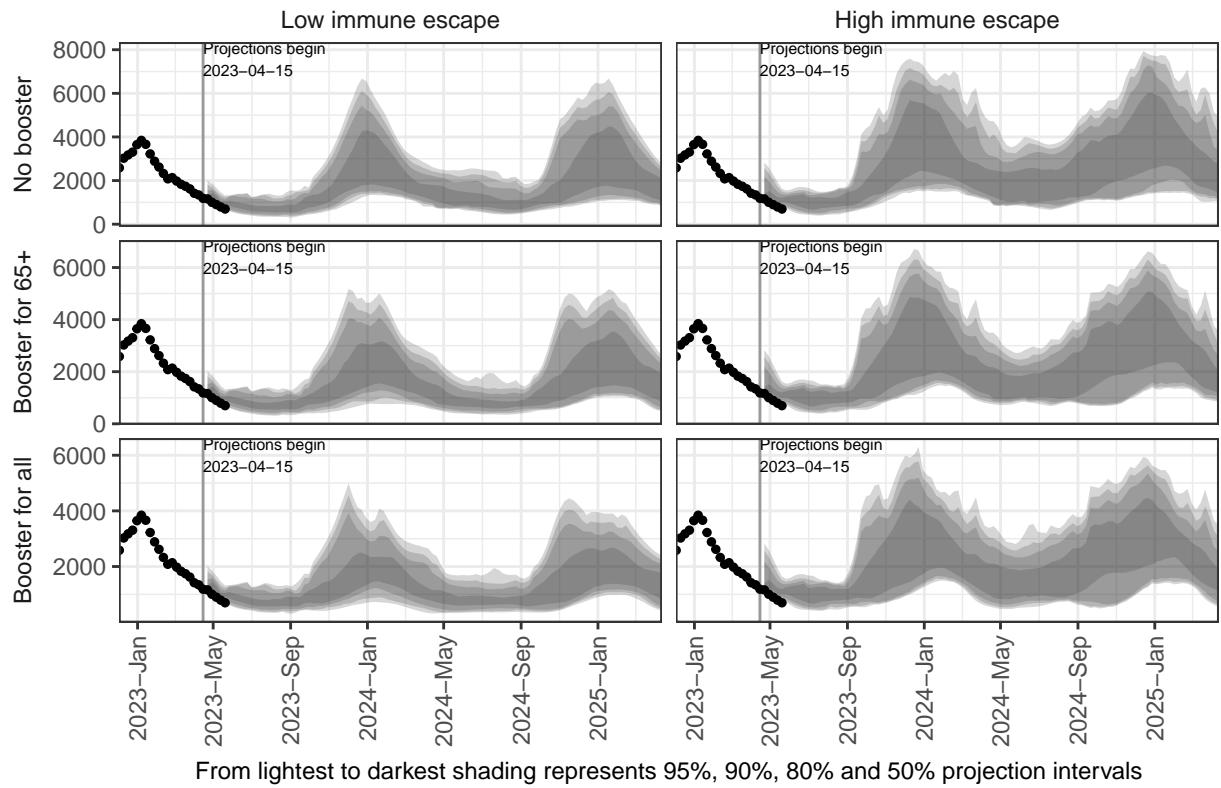
## Ensemble projection intervals

Incident hospitalizations and deaths in the national ensemble. Hospitalization thresholds were calculated based on the [CDC COVID-19 community levels indicators](#).

### National ensemble projection intervals – Hospitalizations

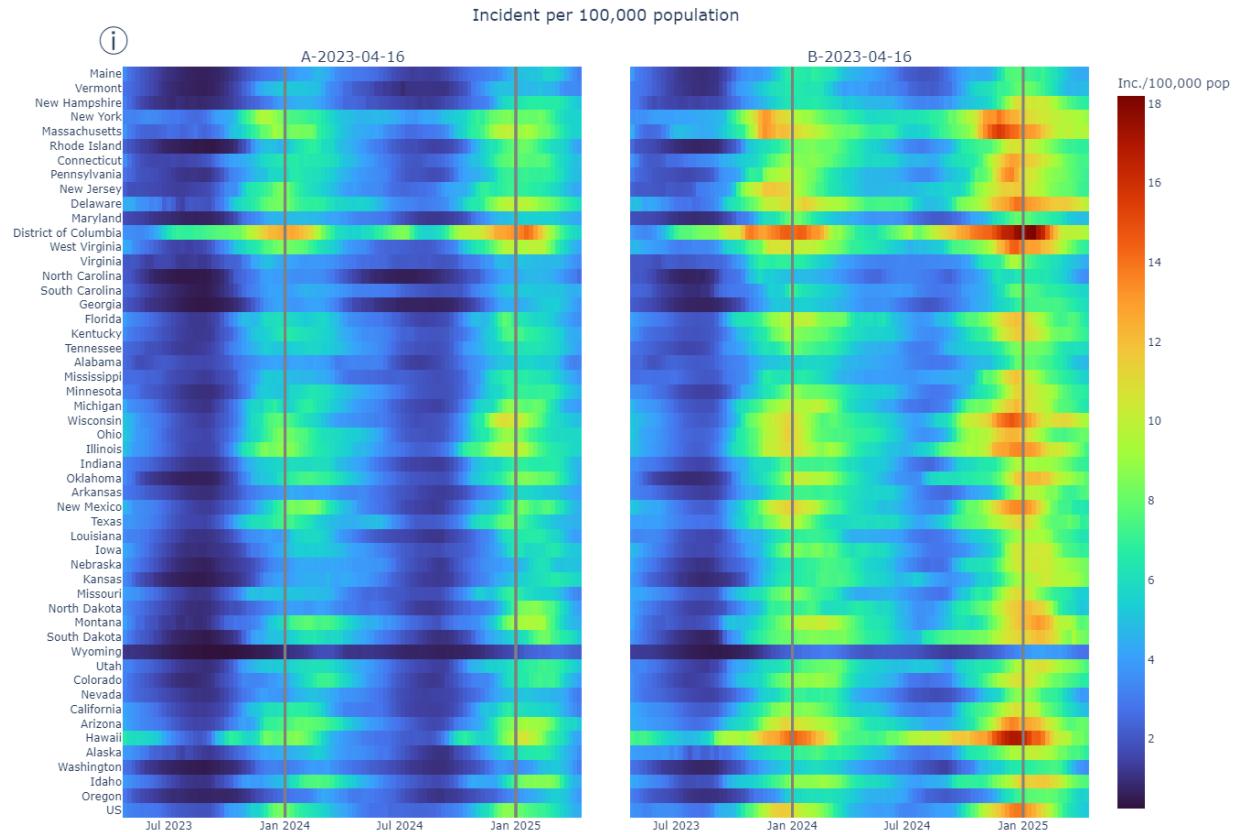


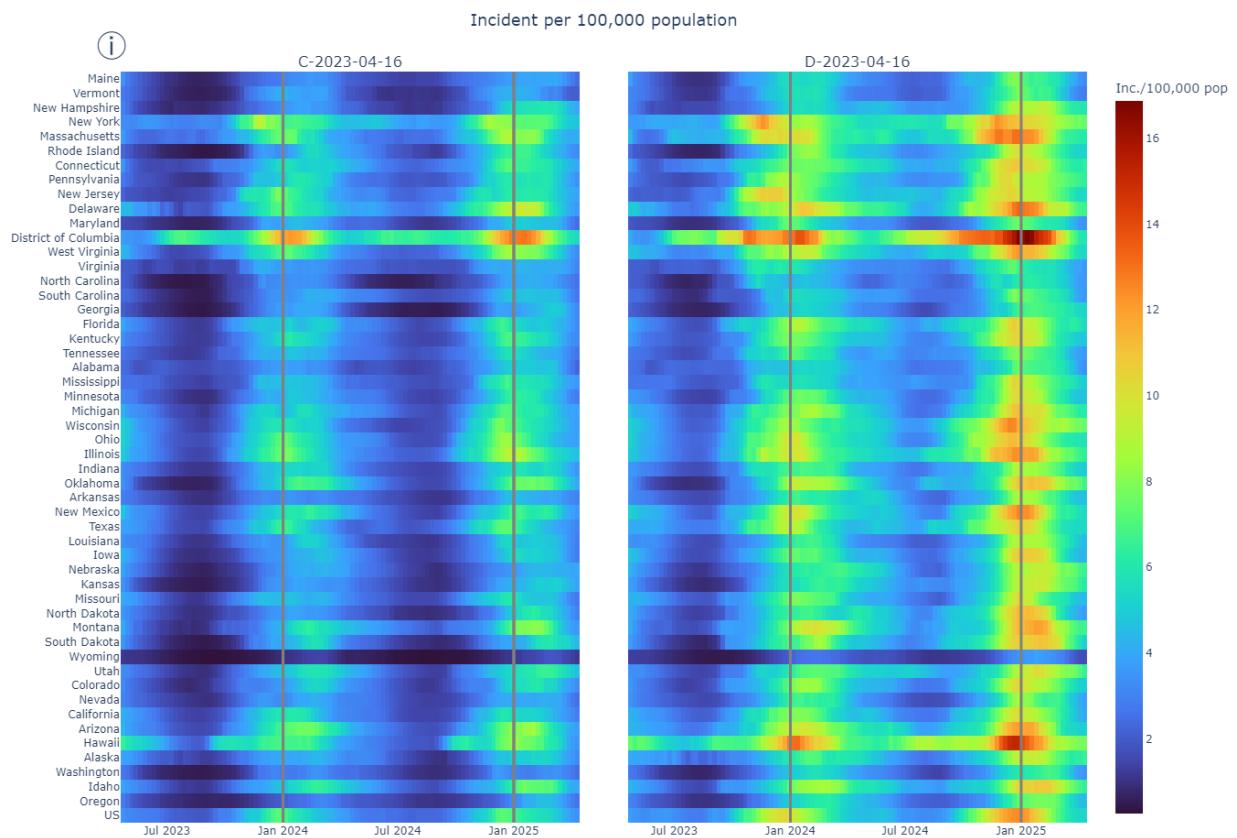
## National ensemble projection intervals – Deaths

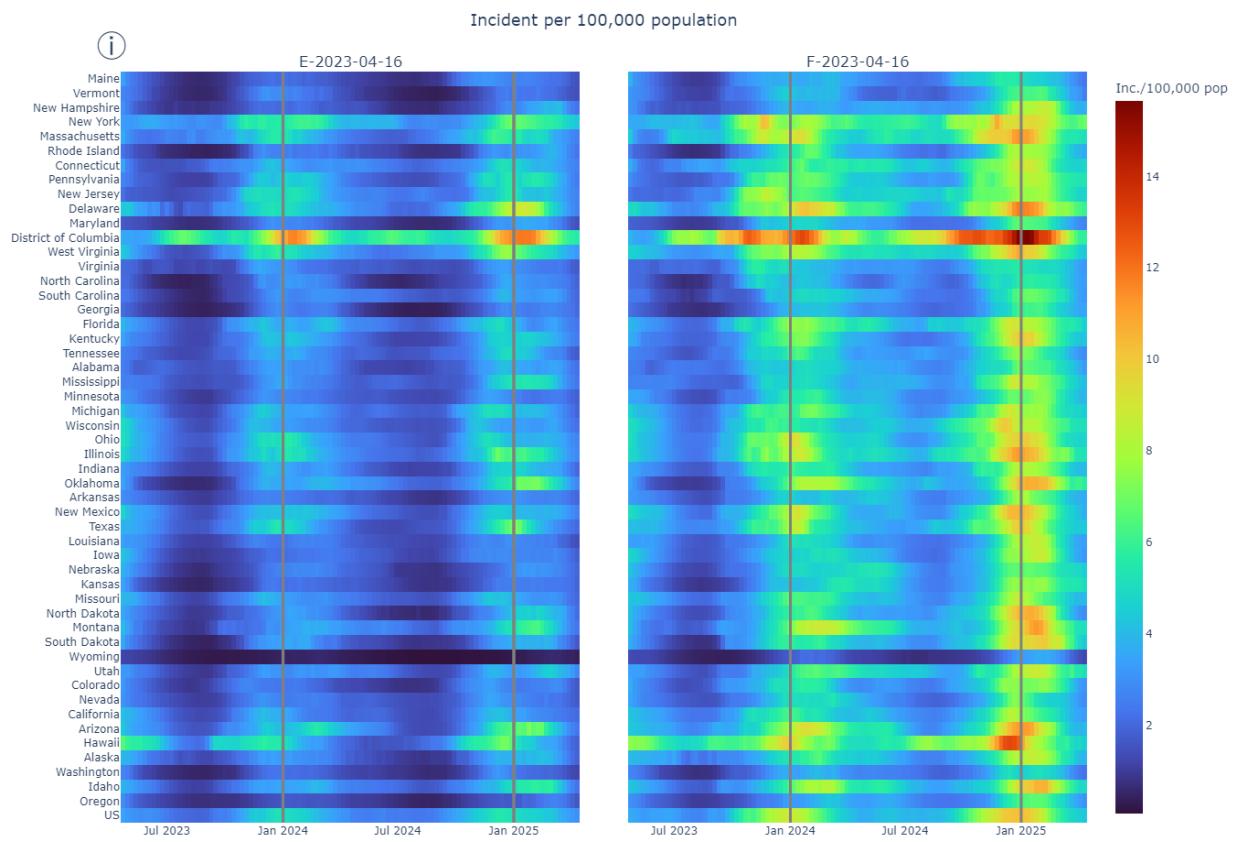


## Spatiotemporal waves

These plots represent weekly incidences over time (x-axis) and geography (y-axis) and provide a snapshot of how the epidemic progresses over time and space. A specific quantile is represented by the median. Metrics displayed represent incidence per population each week and in each state that are projected to occur in a given week and state. Please note that more populous states will tend to have higher values. Geographically synchronous epidemic waves will appear as red vertical lines.

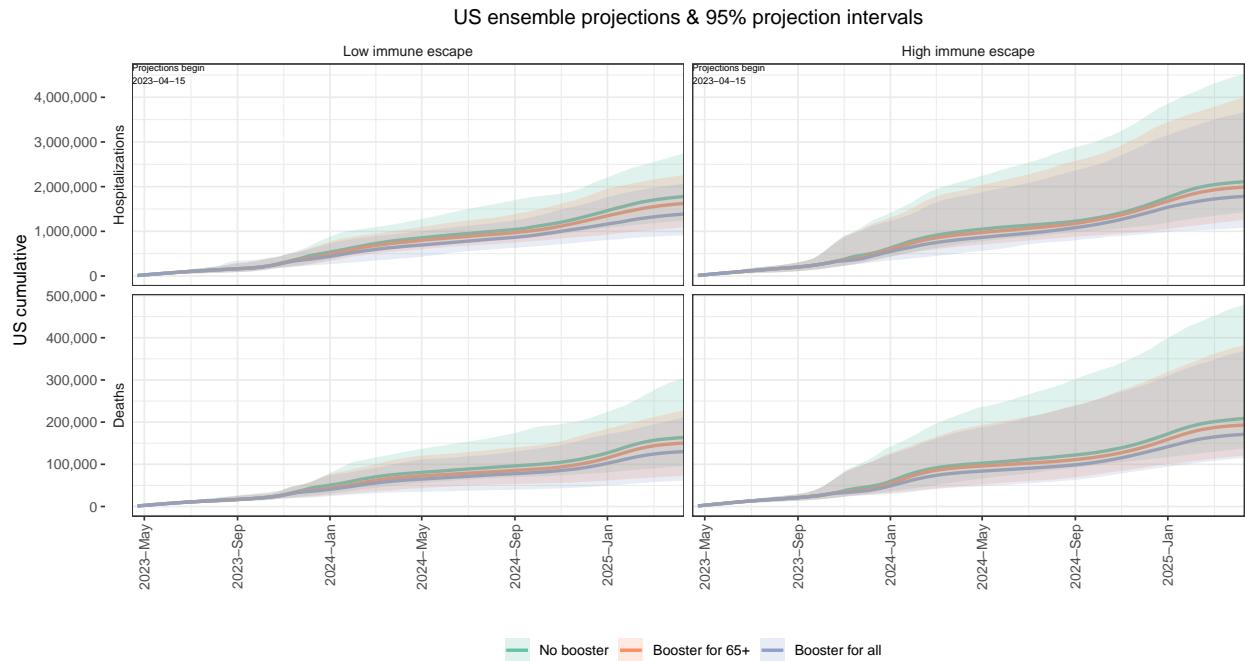






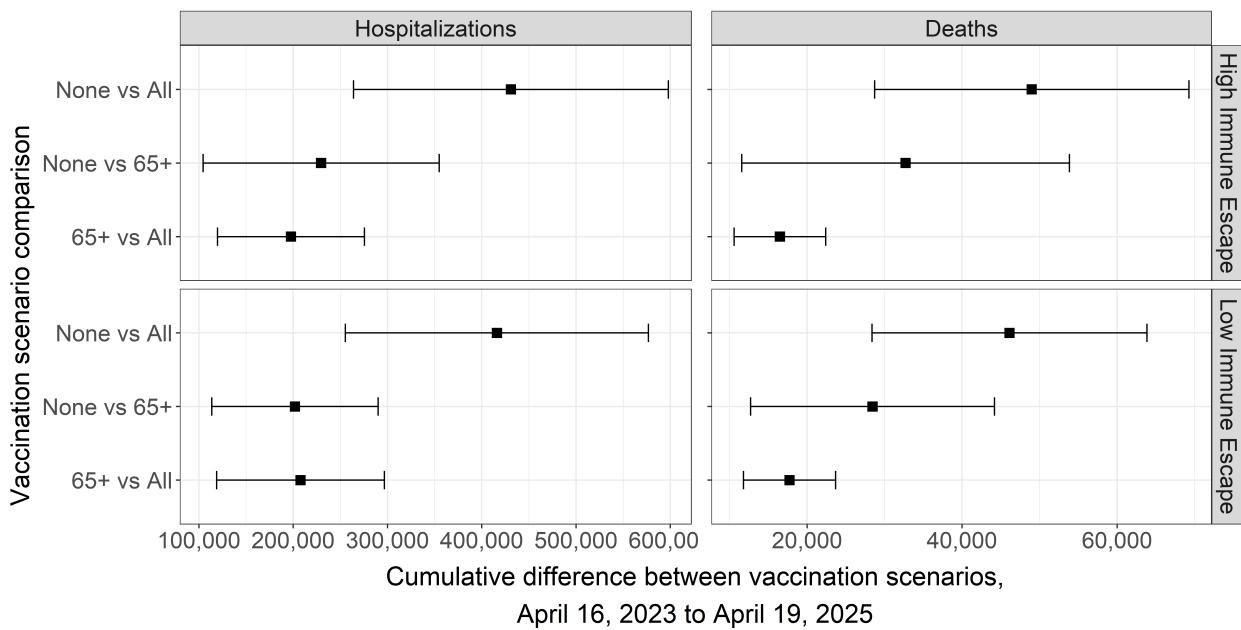
## National ensemble projections

Ensemble projections for national cumulative hospitalizations and deaths separated by scenario.

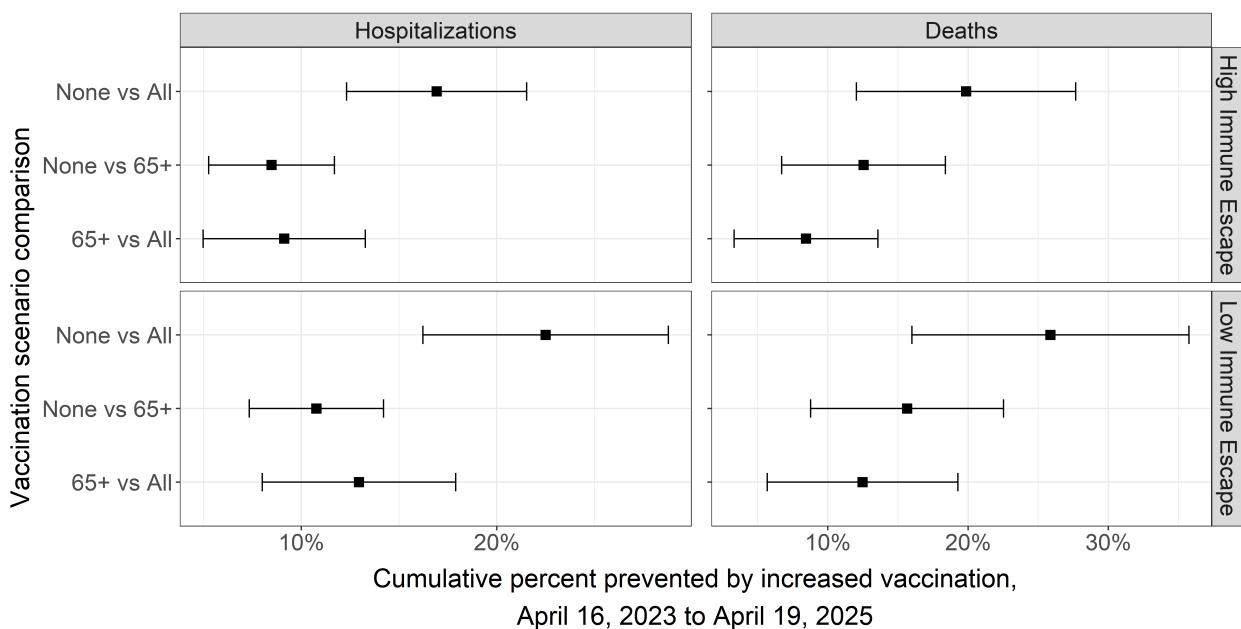


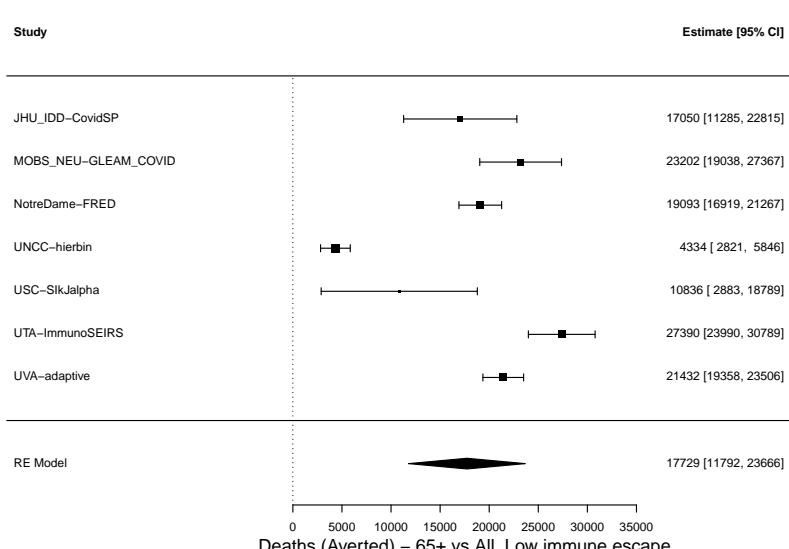
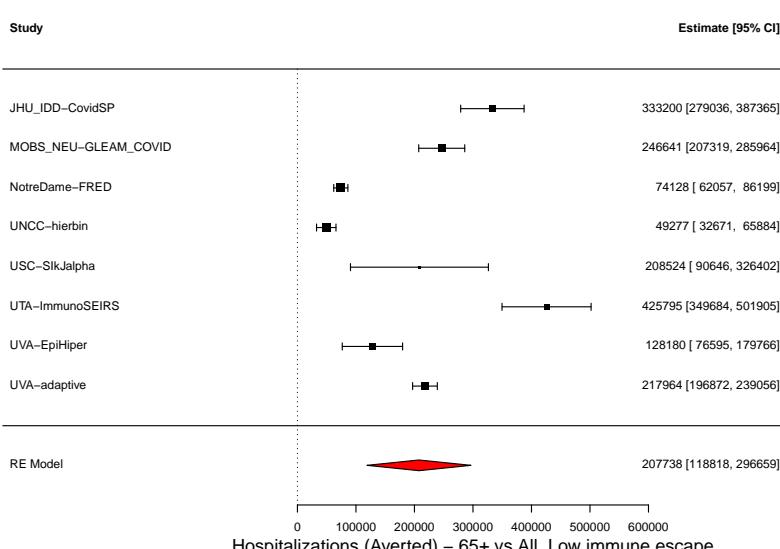
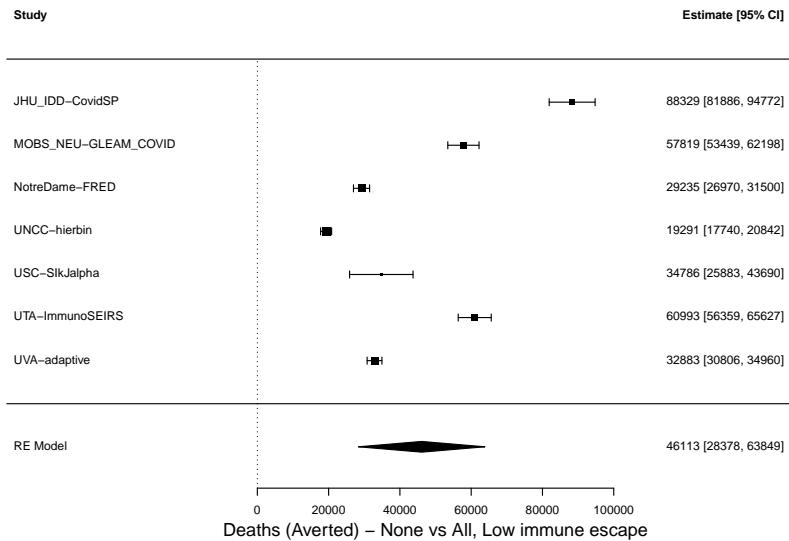
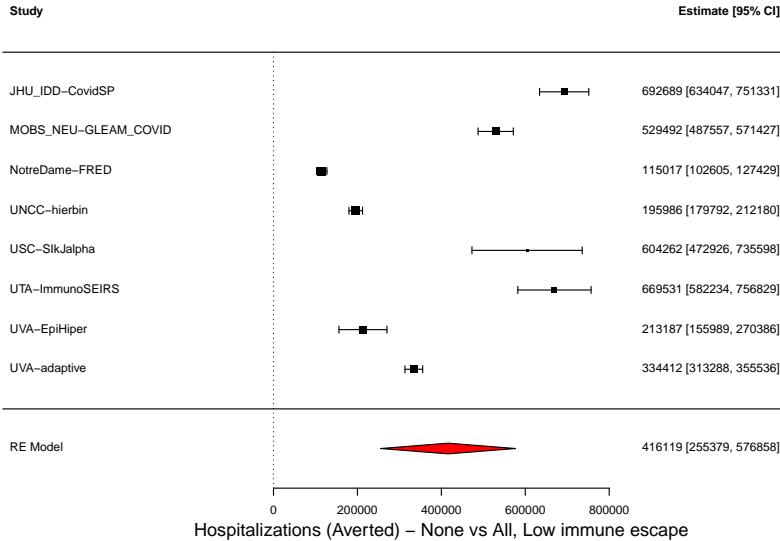
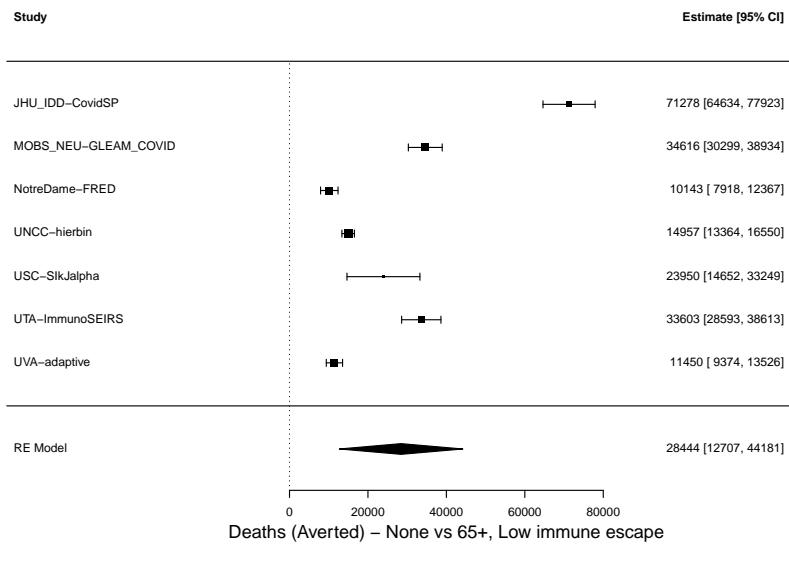
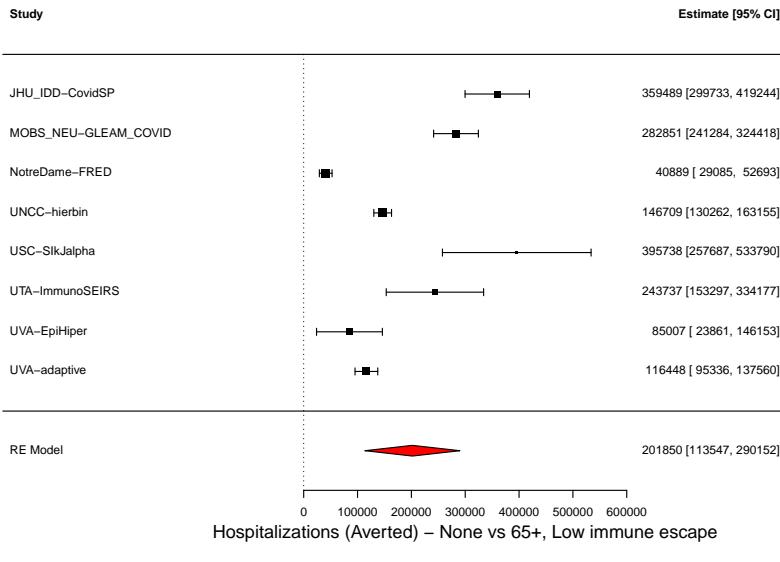
## Differences between scenarios

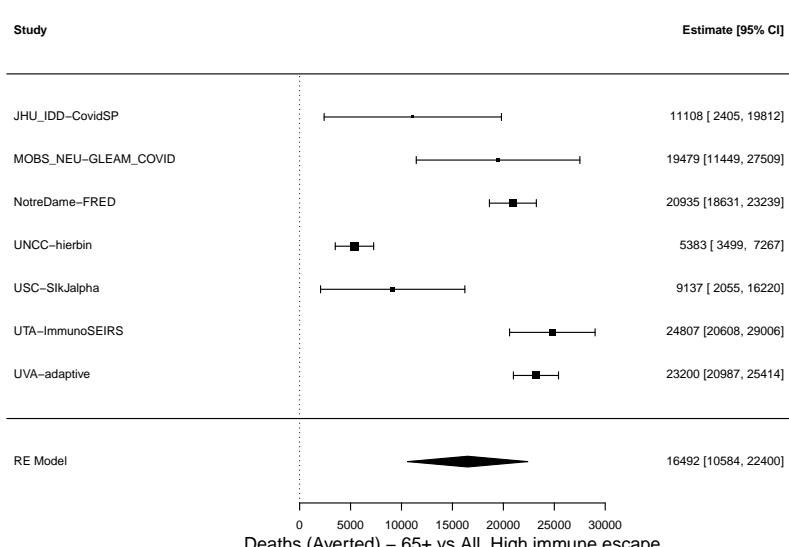
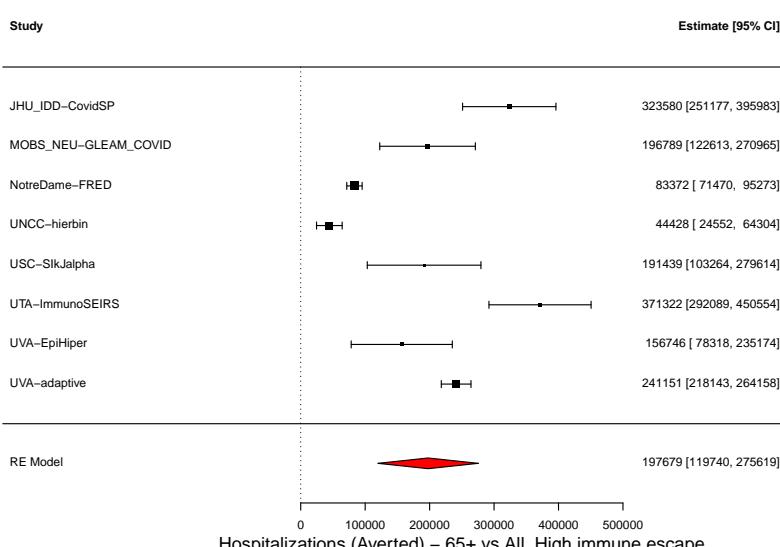
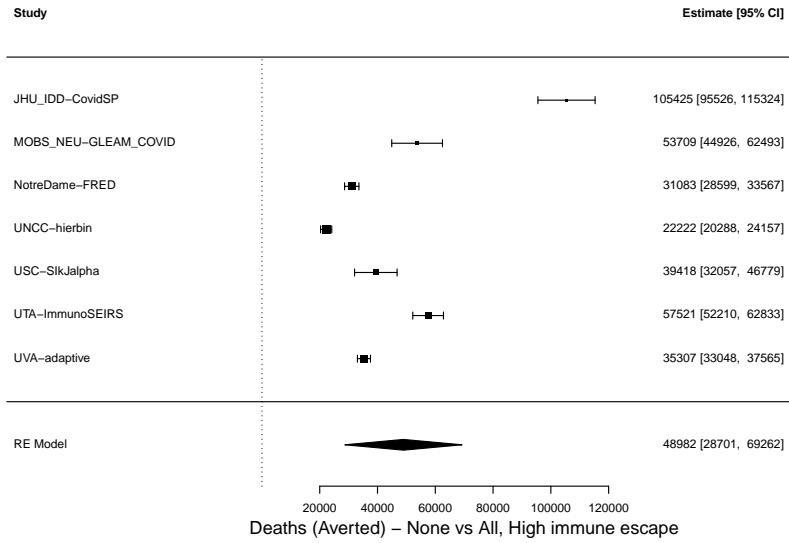
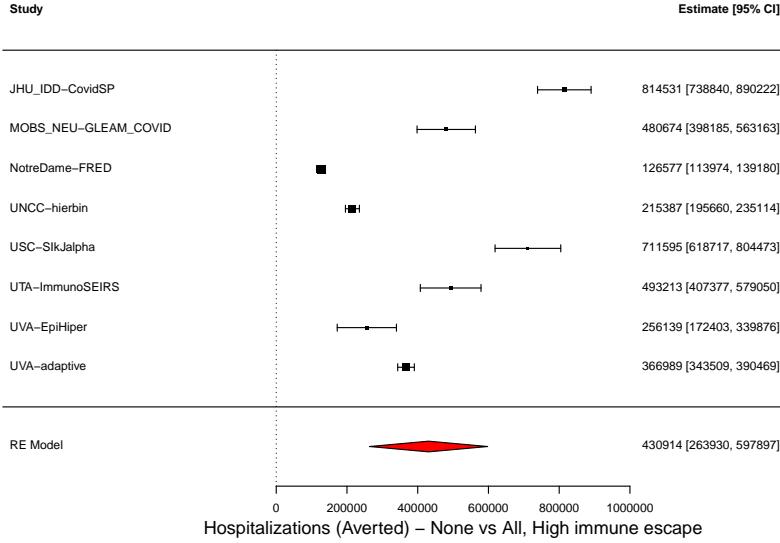
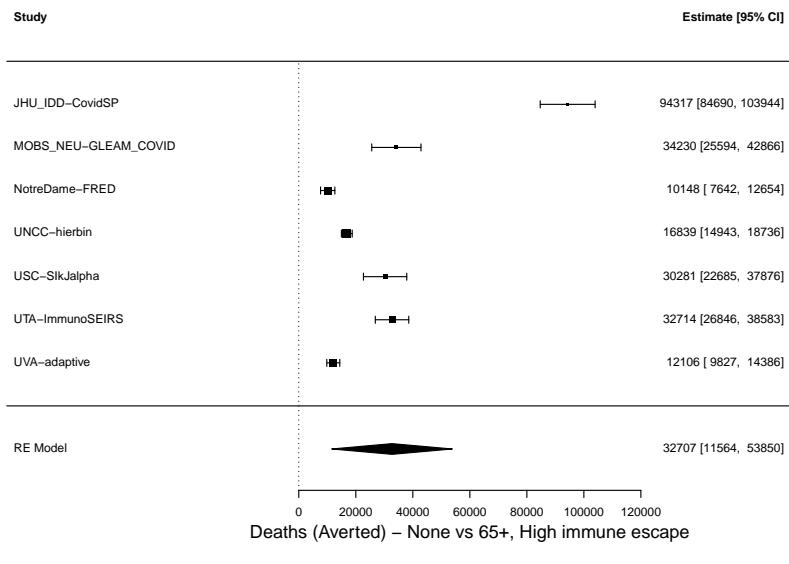
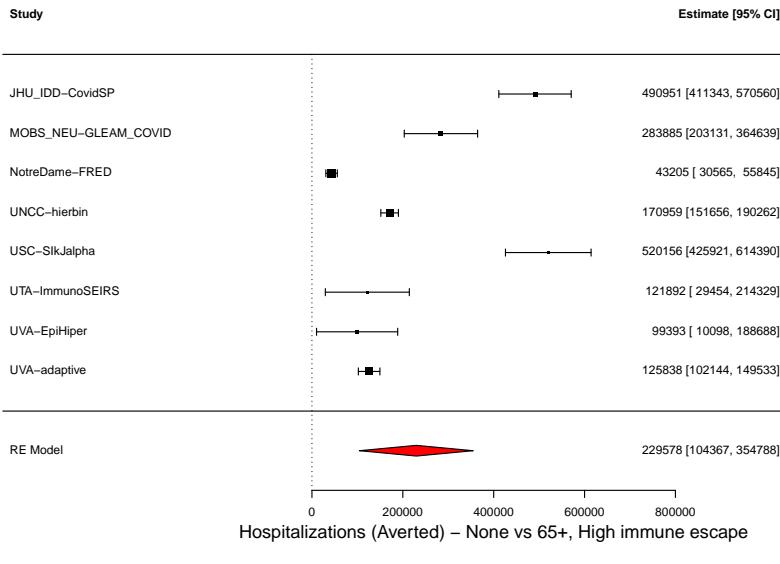
Cumulative pooled differences between vaccination scenarios from April 16, 2023 to April 19, 2025, absolute differences.

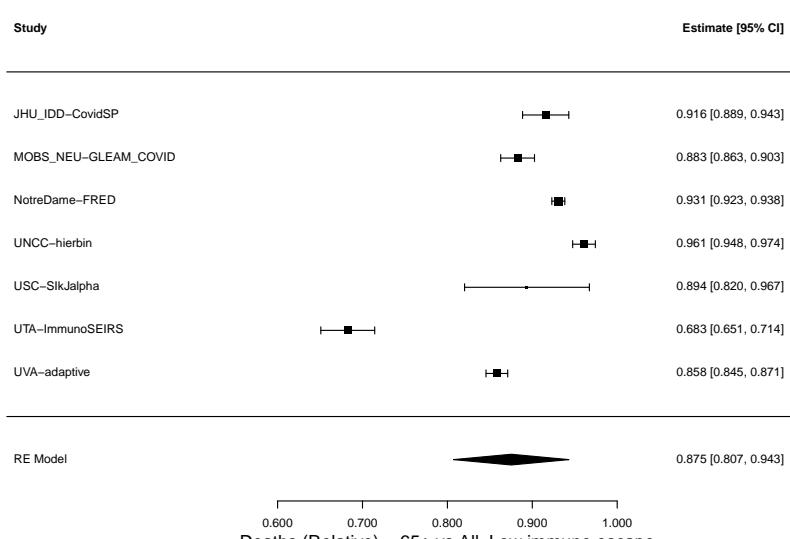
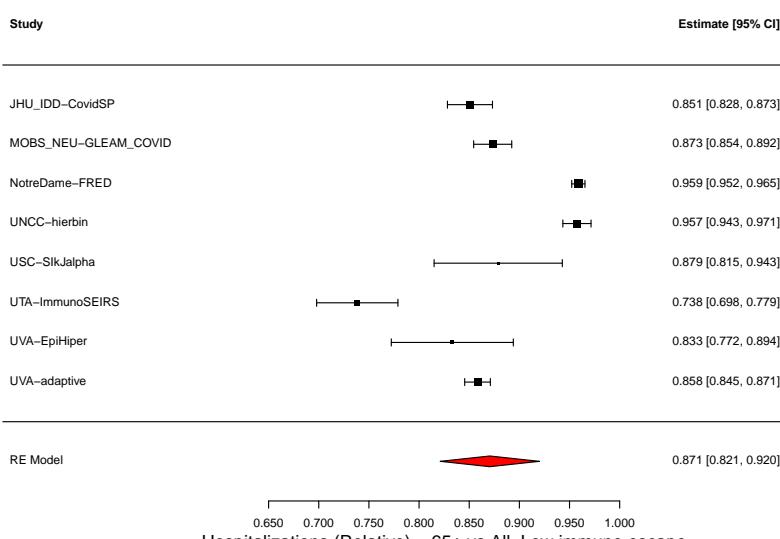
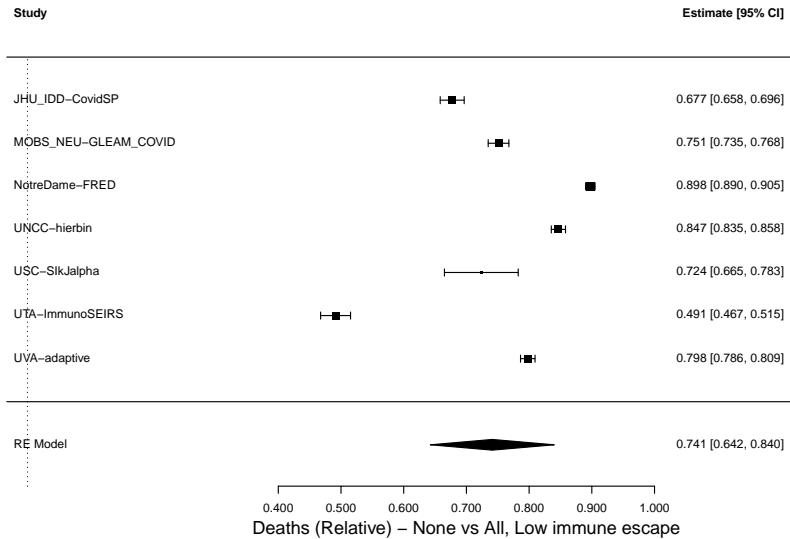
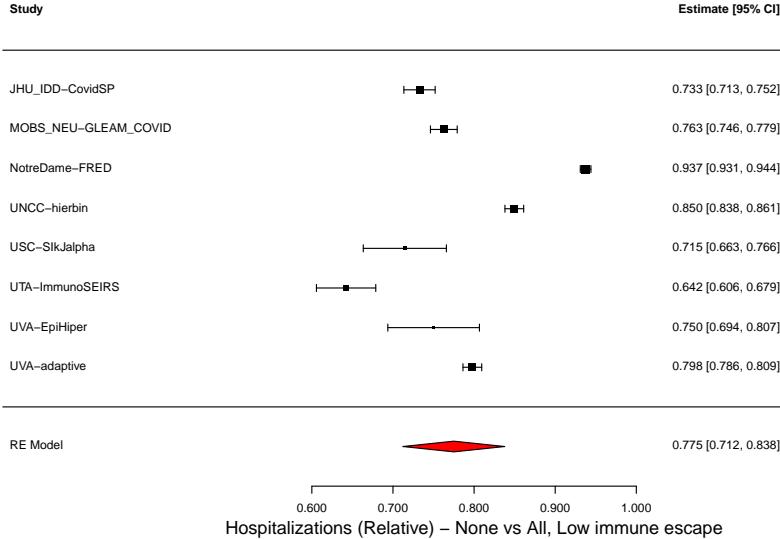
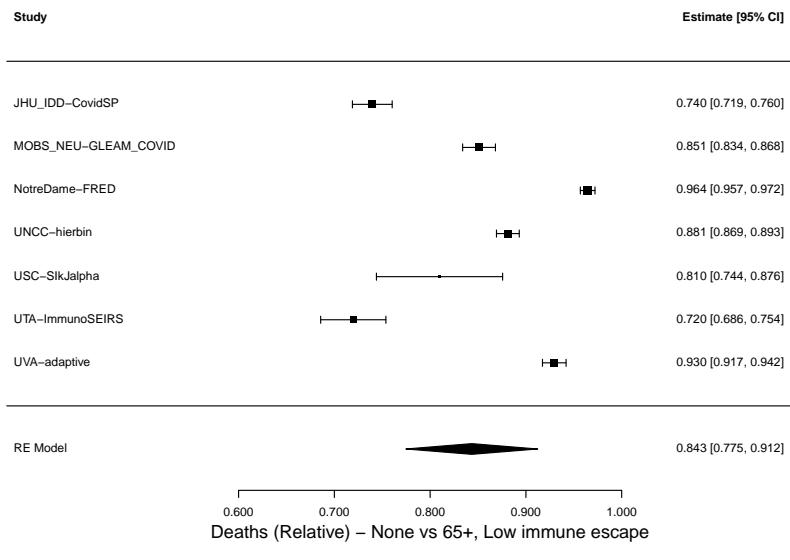
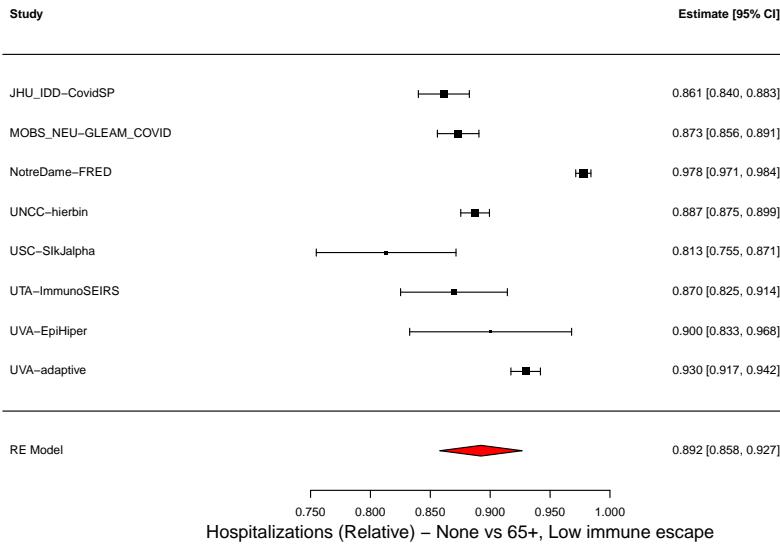


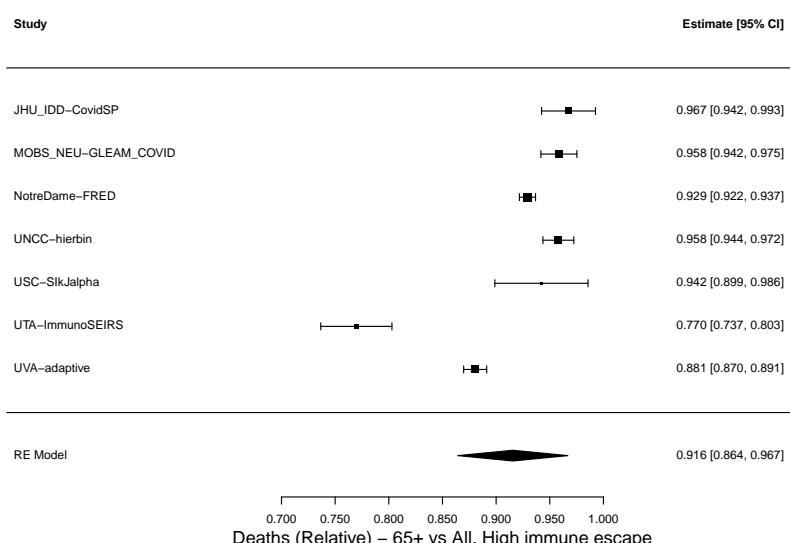
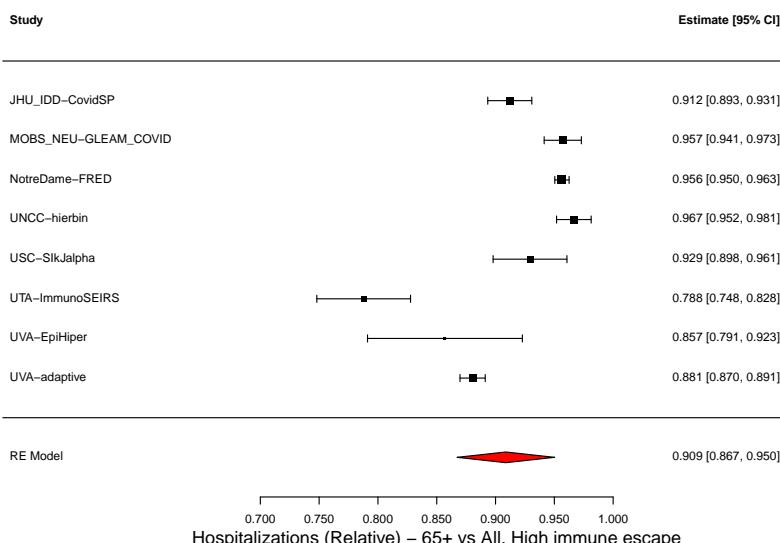
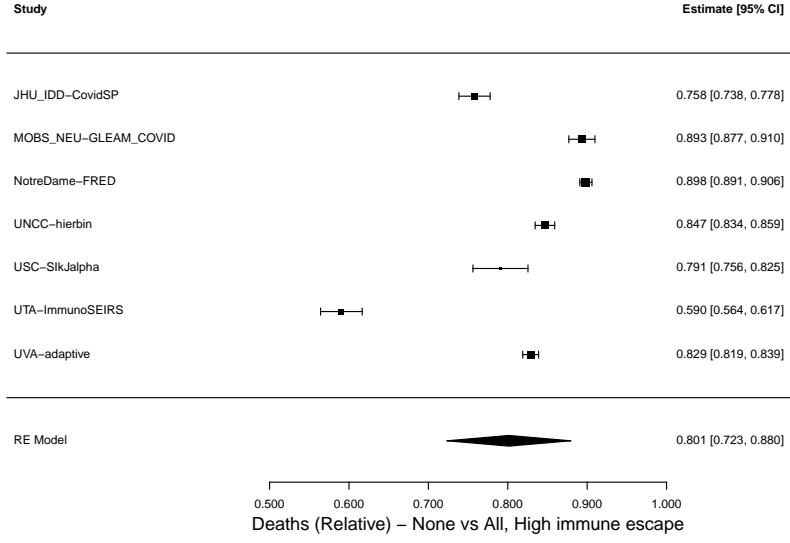
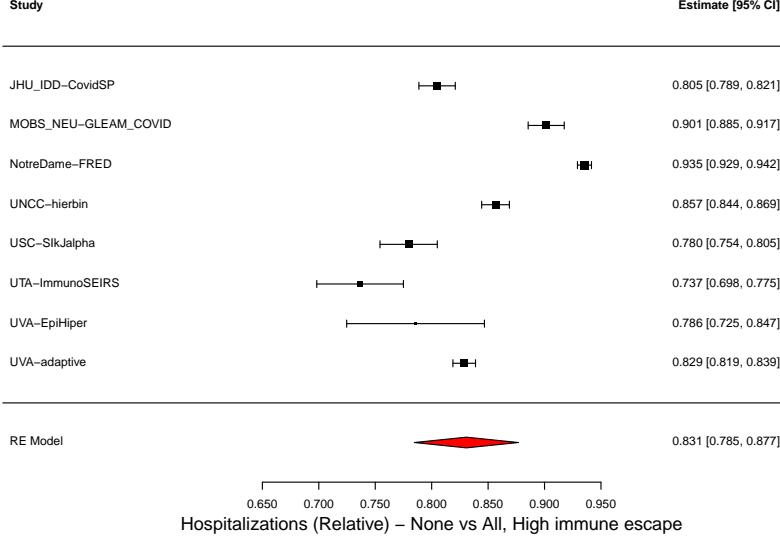
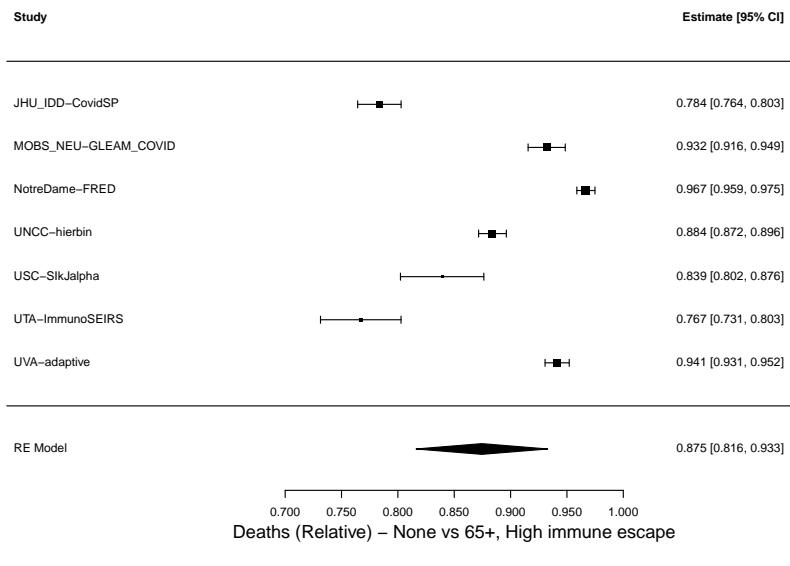
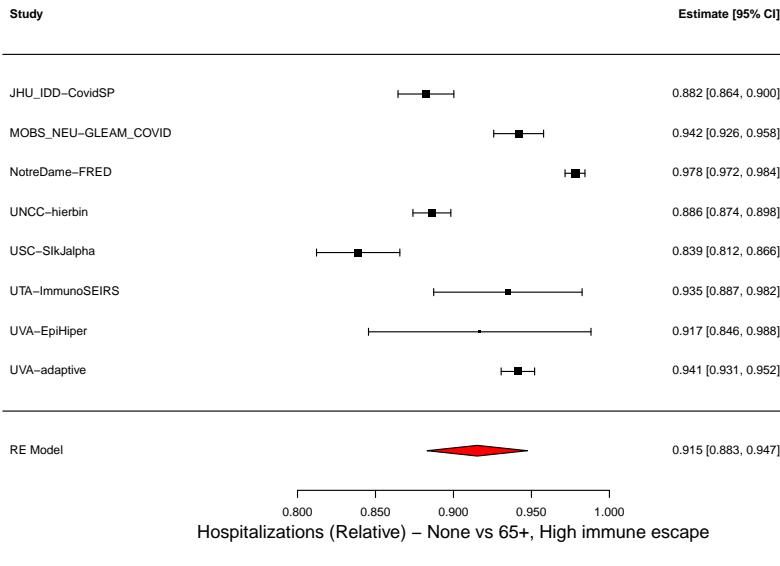
Cumulative pooled differences between vaccination scenarios from April 16, 2023 to April 19, 2025, relative differences.



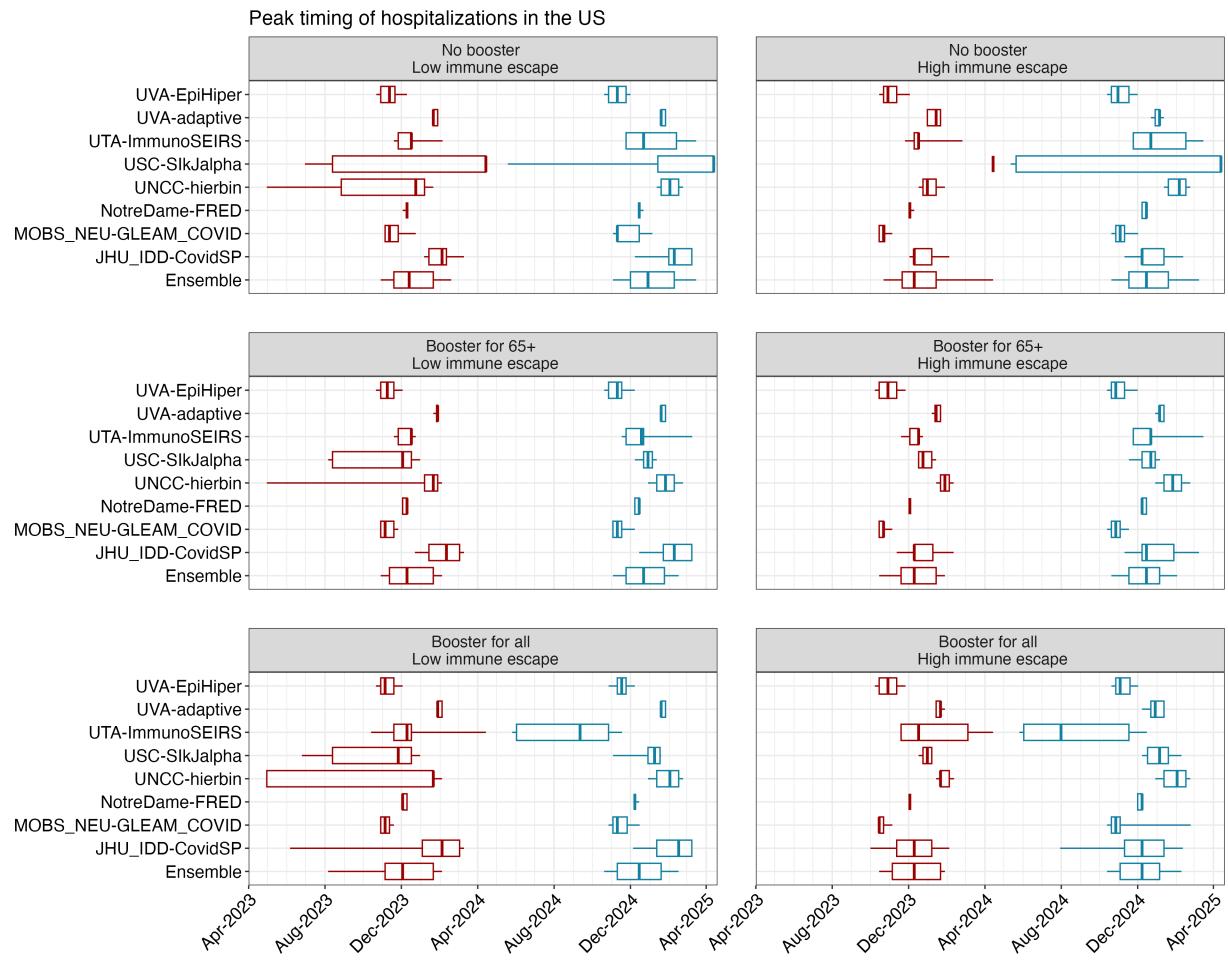




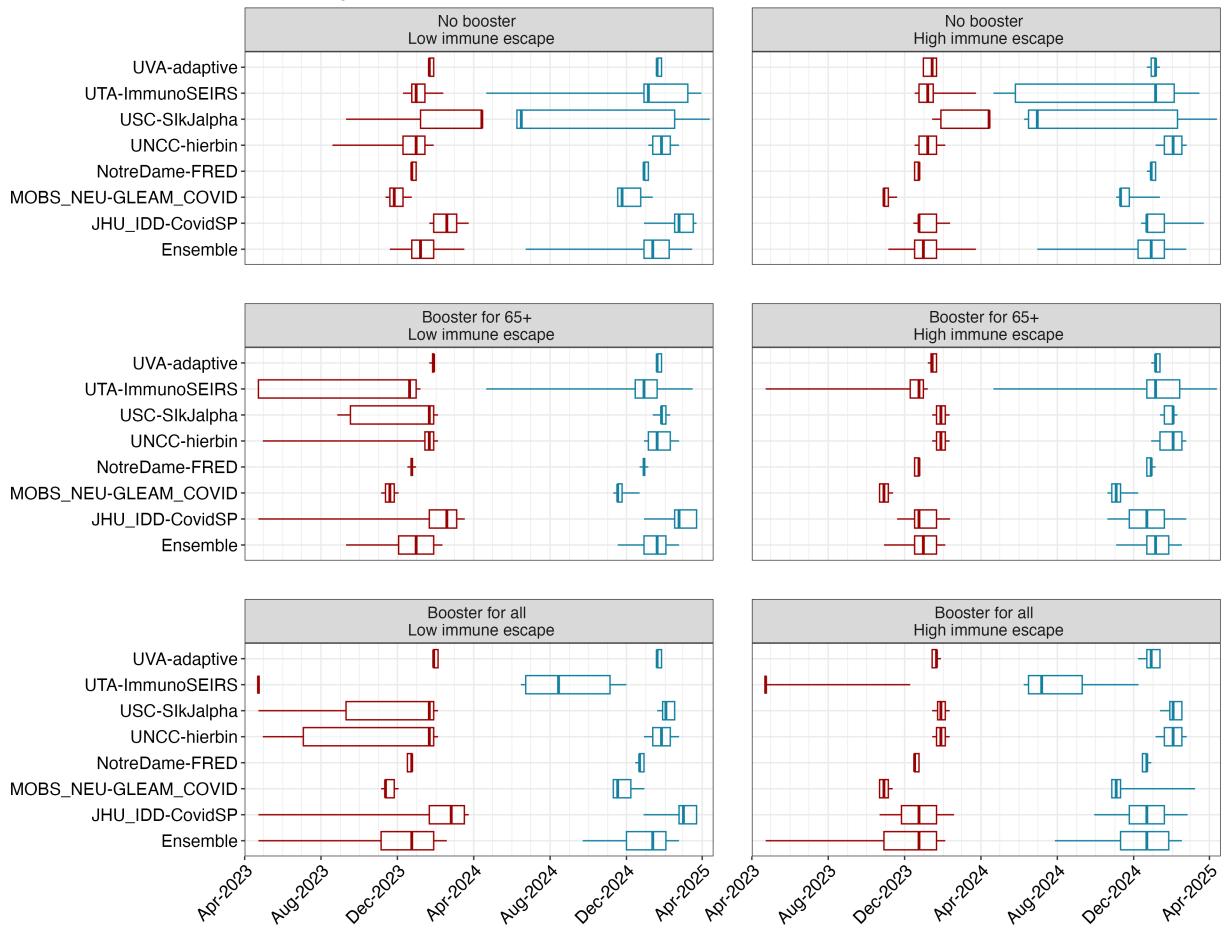




## Probability of peak timing



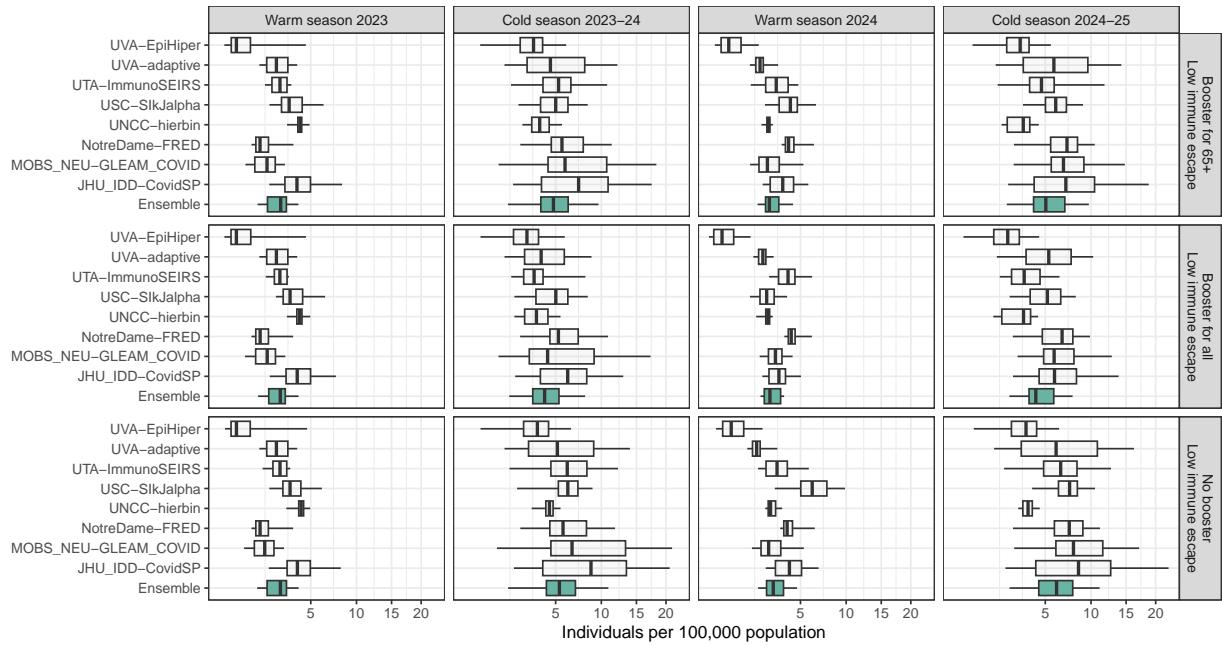
### Peak timing of deaths in the US



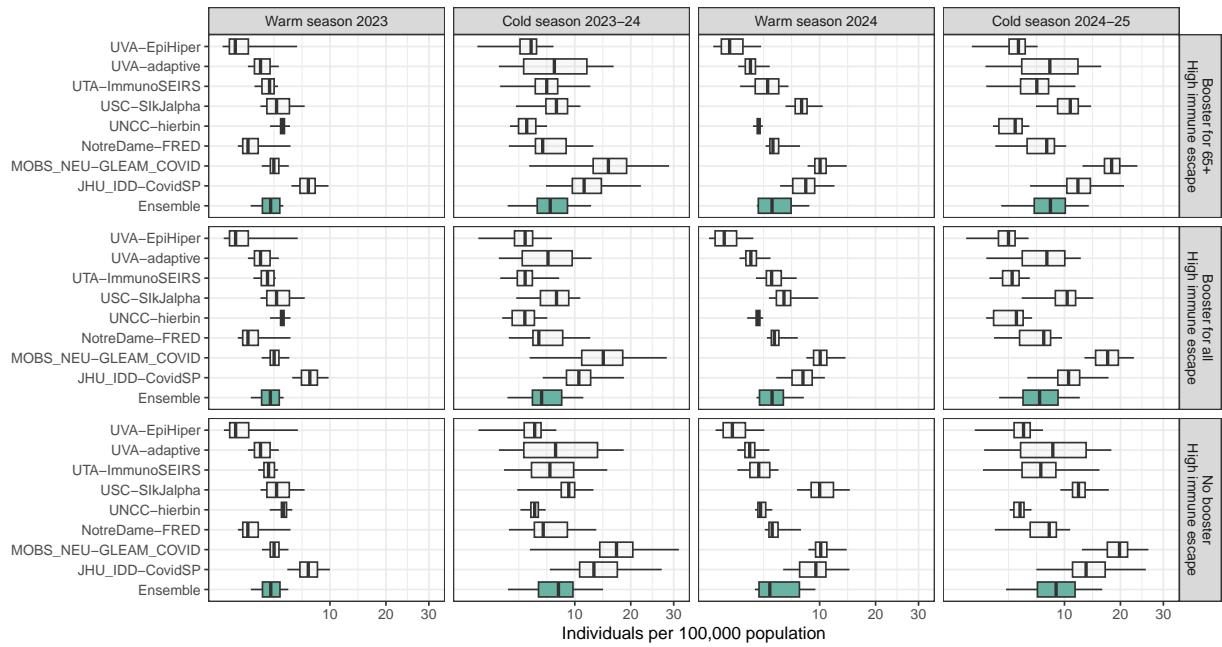
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## # A tibble: 6 x 18
##   origin_date scenario_id location target    horizon type quantile model value
##   <date>      <chr>     <chr>   <chr>      <dbl> <chr>   <dbl> <fct> <dbl>
## 1 2023-04-16  A-2023-04-16 02    inc death      1 quan~  0.025 Notr~  0
## 2 2023-04-16  A-2023-04-16 02    inc death      2 quan~  0.025 Notr~  0
## 3 2023-04-16  A-2023-04-16 02    inc death      3 quan~  0.025 Notr~  0
## 4 2023-04-16  A-2023-04-16 02    inc death      4 quan~  0.025 Notr~  0
## 5 2023-04-16  A-2023-04-16 02    inc death      5 quan~  0.025 Notr~  0
## 6 2023-04-16  A-2023-04-16 02    inc death      6 quan~  0.025 Notr~  0
## # i 9 more variables: target_end_date <date>, abbreviation <fct>,
## #   location_name <fct>, population <dbl>, target_type <chr>,
## #   scenario_name <chr>, a1 <fct>, a2 <fct>, full_scenario <chr>
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## Model variation by season

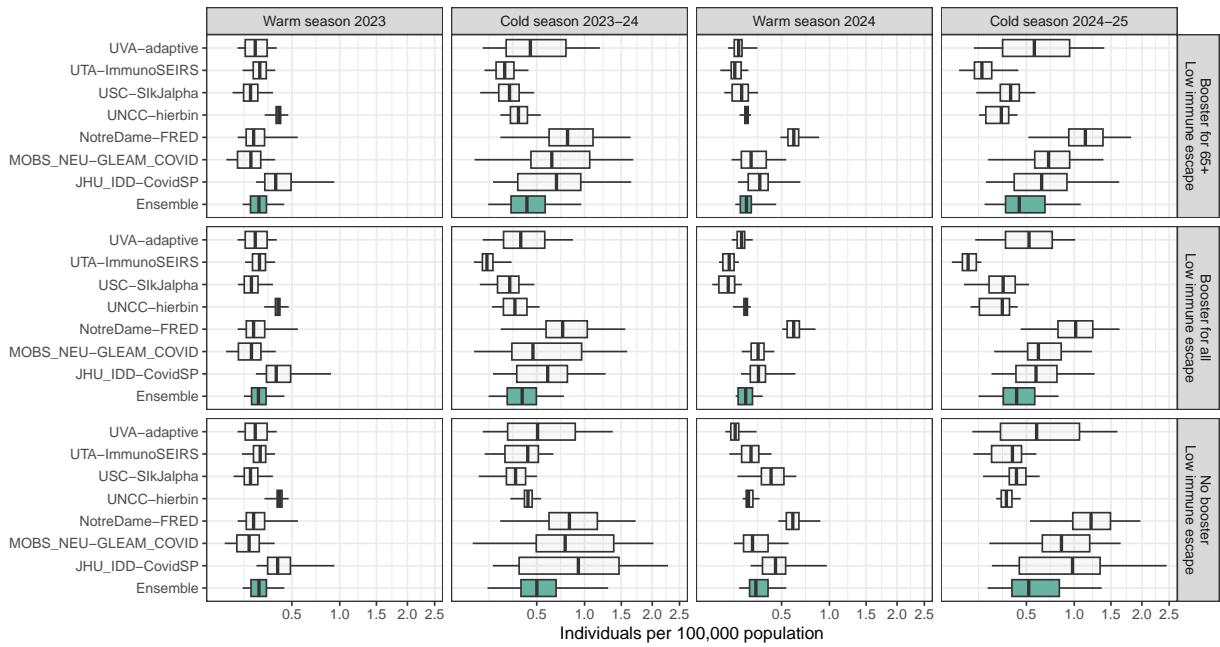
Model variation in Hospitalizations during warm (Apr 15–Sep 1) and cold (Sep 2–Apr 14) seasons – Low immune escapade



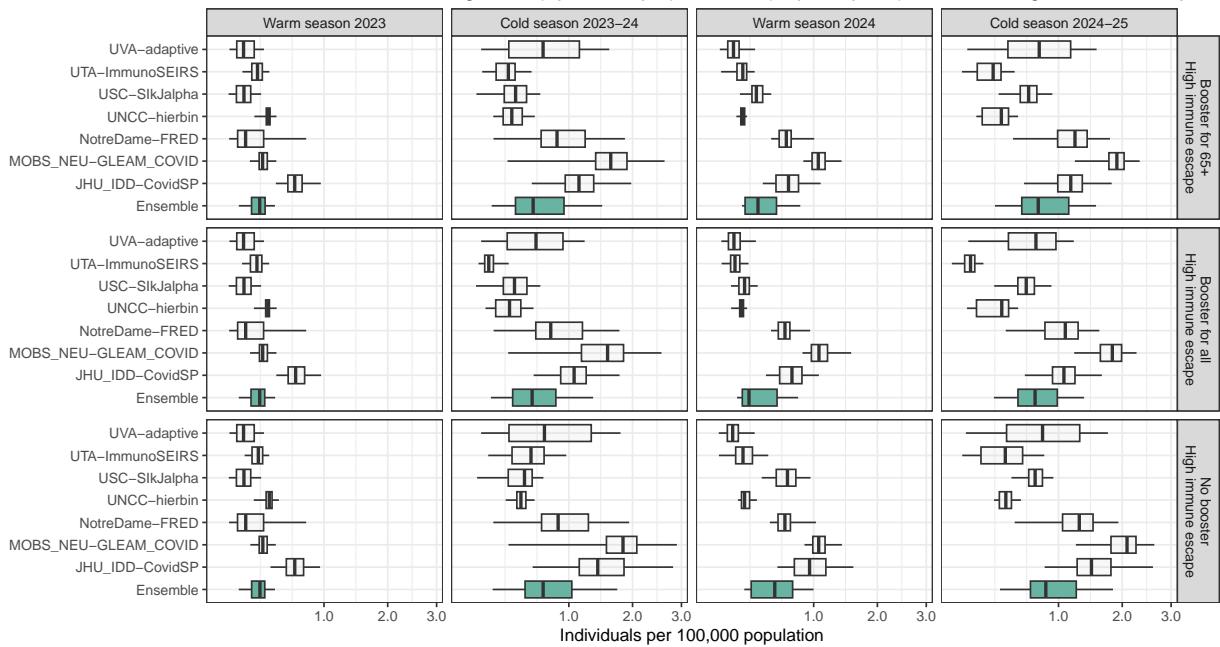
Model variation in Hospitalizations during warm (Apr 15–Sep 1) and cold (Sep 2–Apr 14) seasons – High immune escapade



Model variation in Deaths during warm (Apr 15–Sep 1) and cold (Sep 2–Apr 14) seasons – Low immune escape

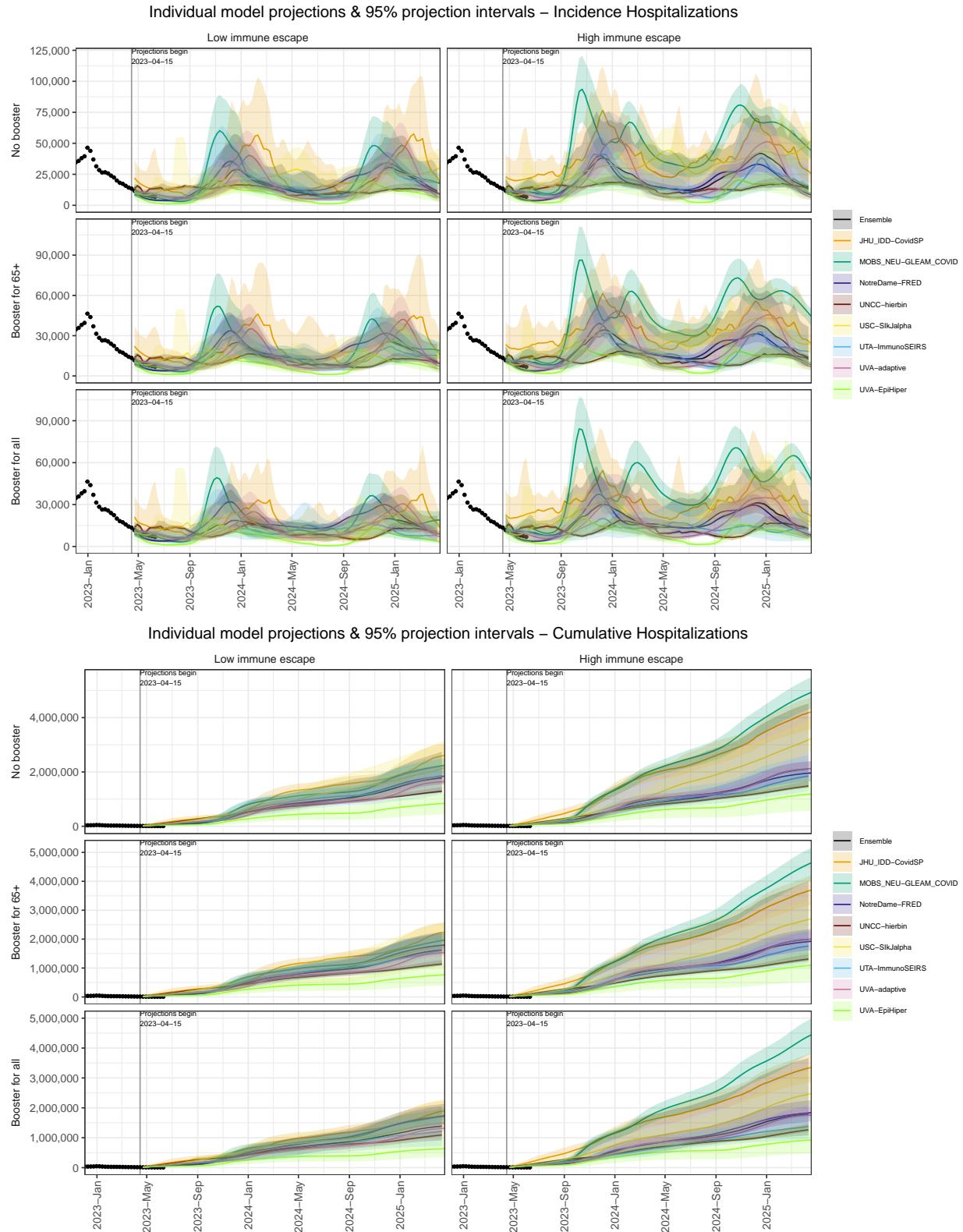


Model variation in Deaths during warm (Apr 15–Sep 1) and cold (Sep 2–Apr 14) seasons – High immune escape

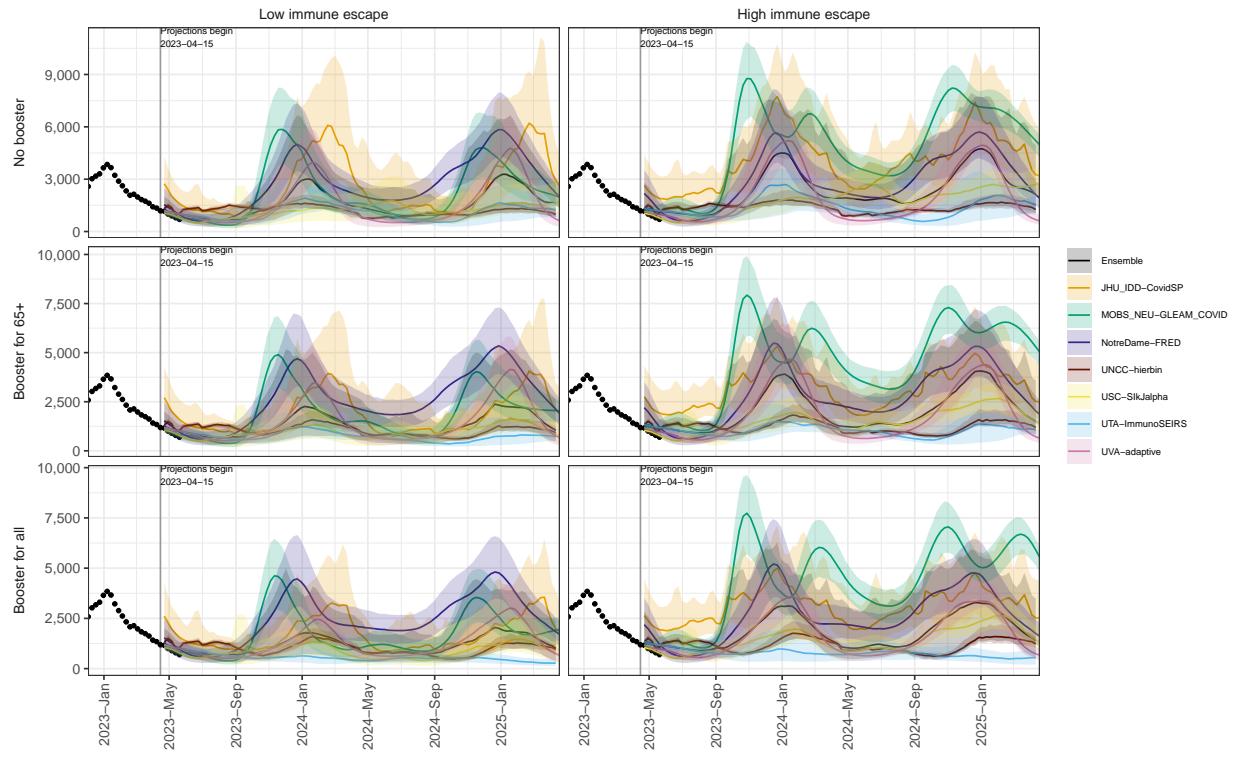


## National individual model projections

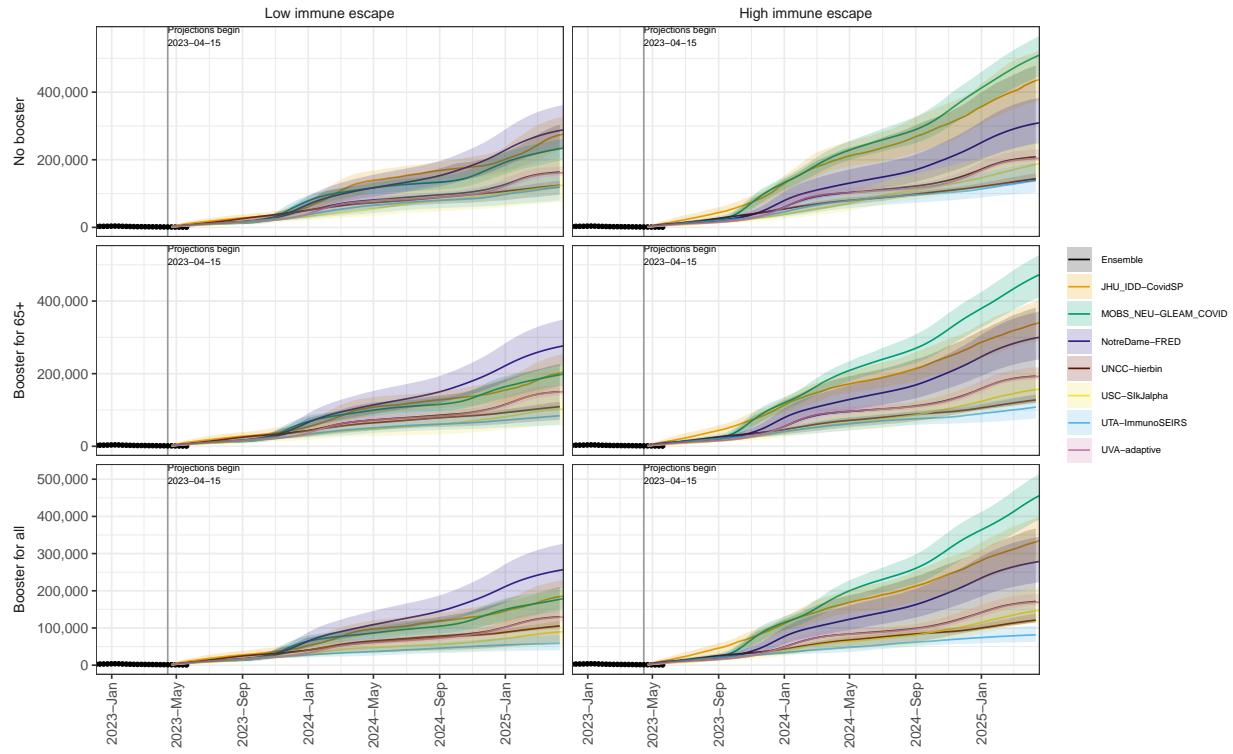
Individual model projections and ensemble by scenario for national hospitalizations and deaths.



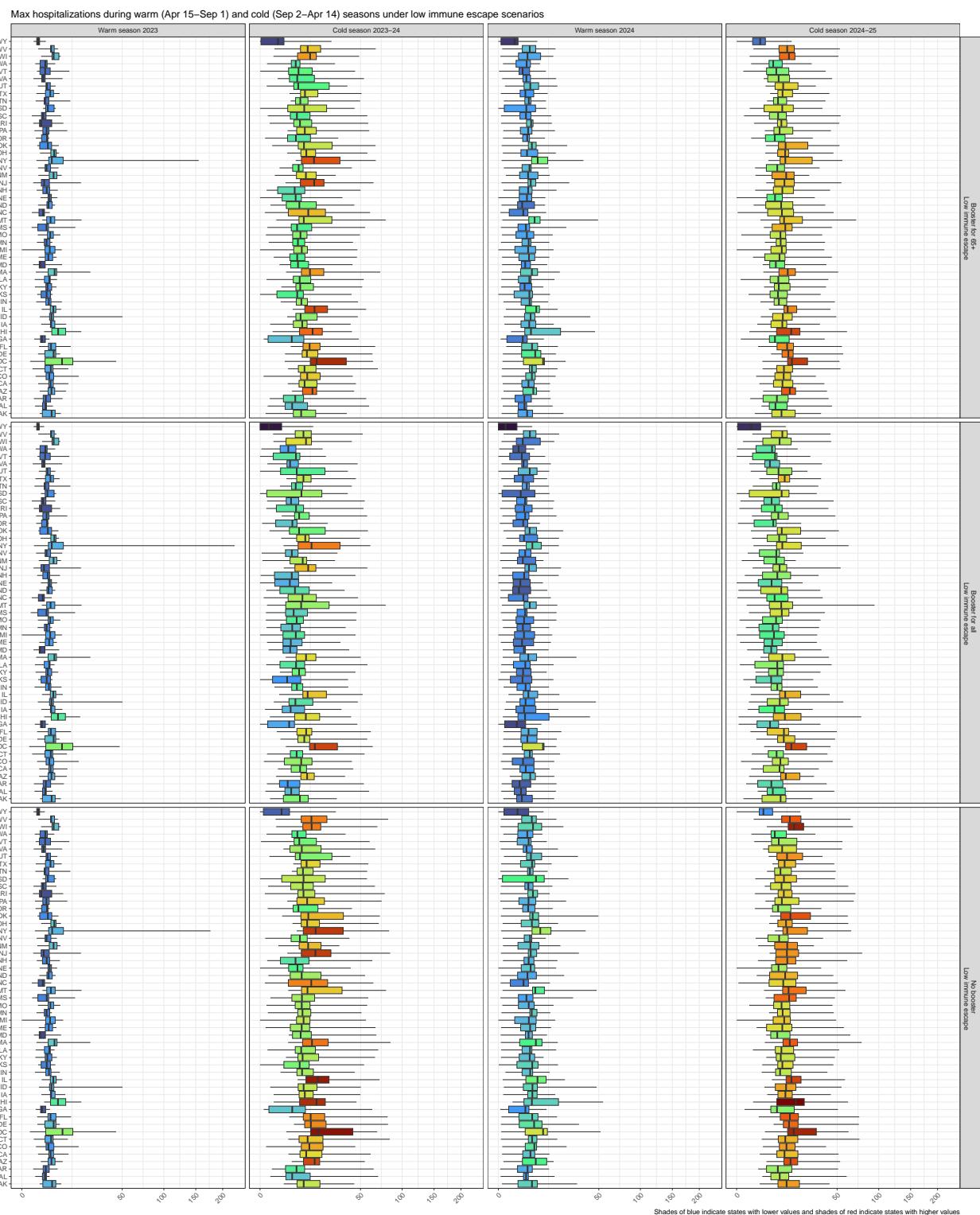
### Individual model projections & 95% projection intervals – Incidence Deaths



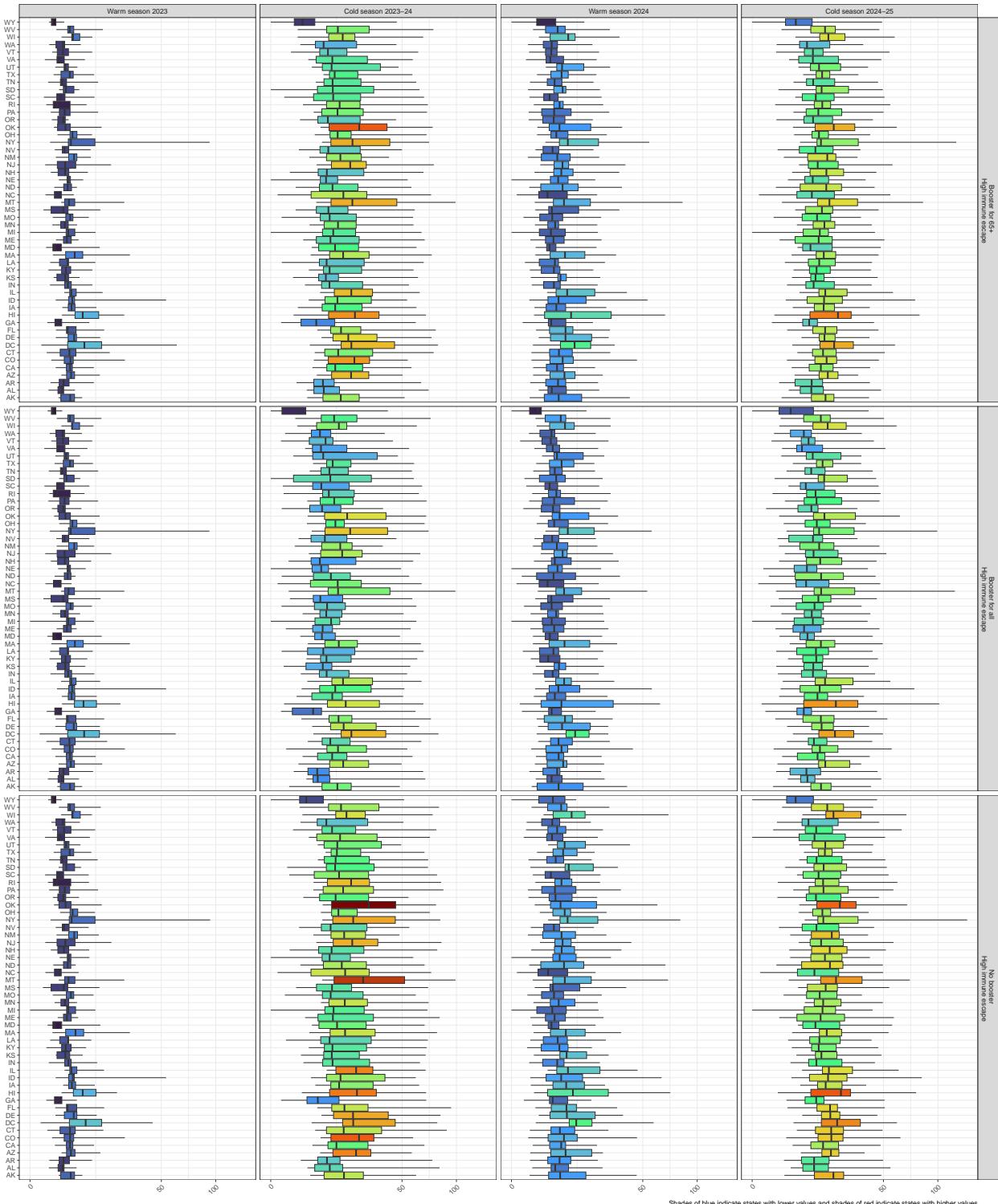
### Individual model projections & 95% projection intervals – Cumulative Deaths



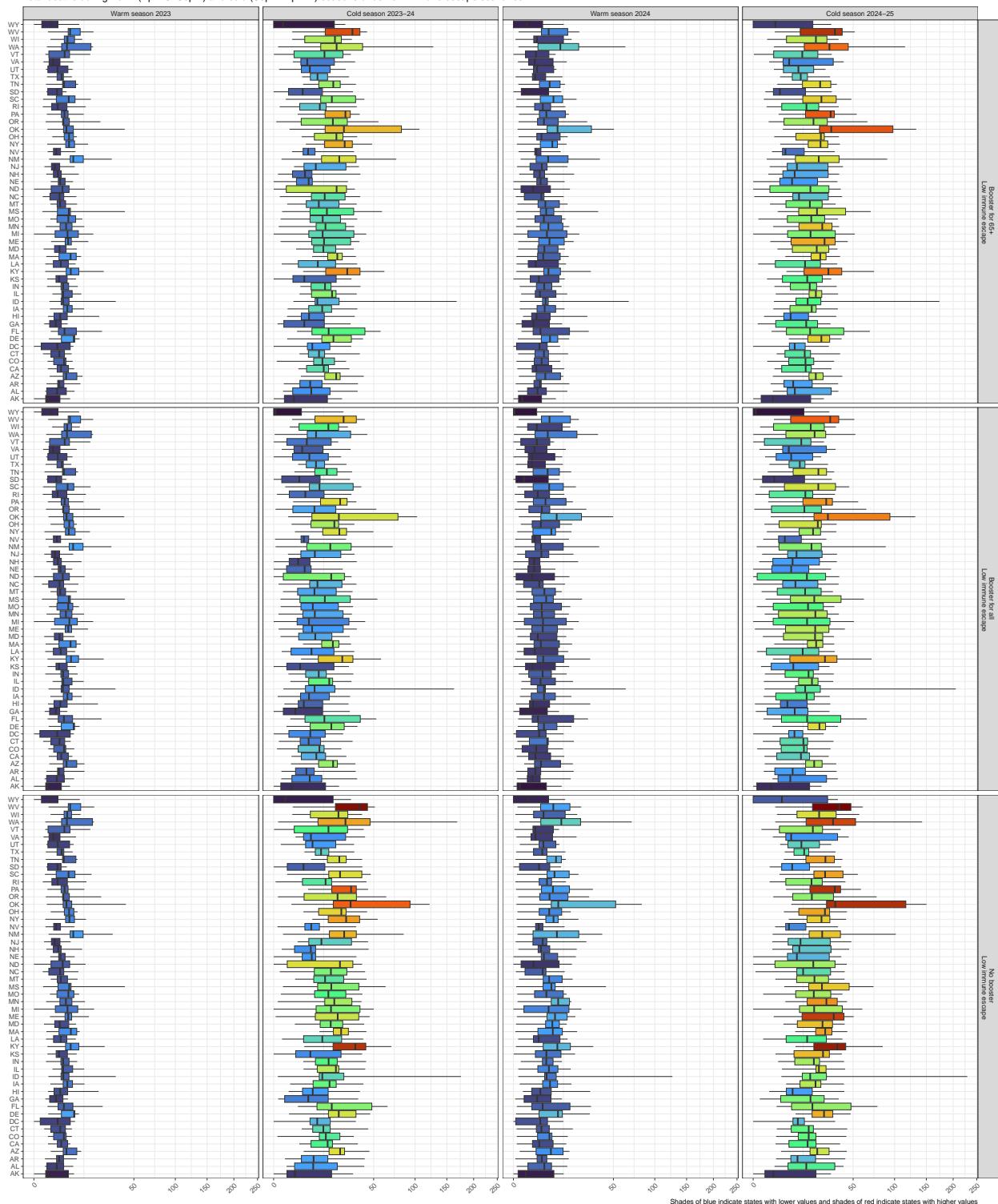
## State-level seasonal plots for the national ensemble



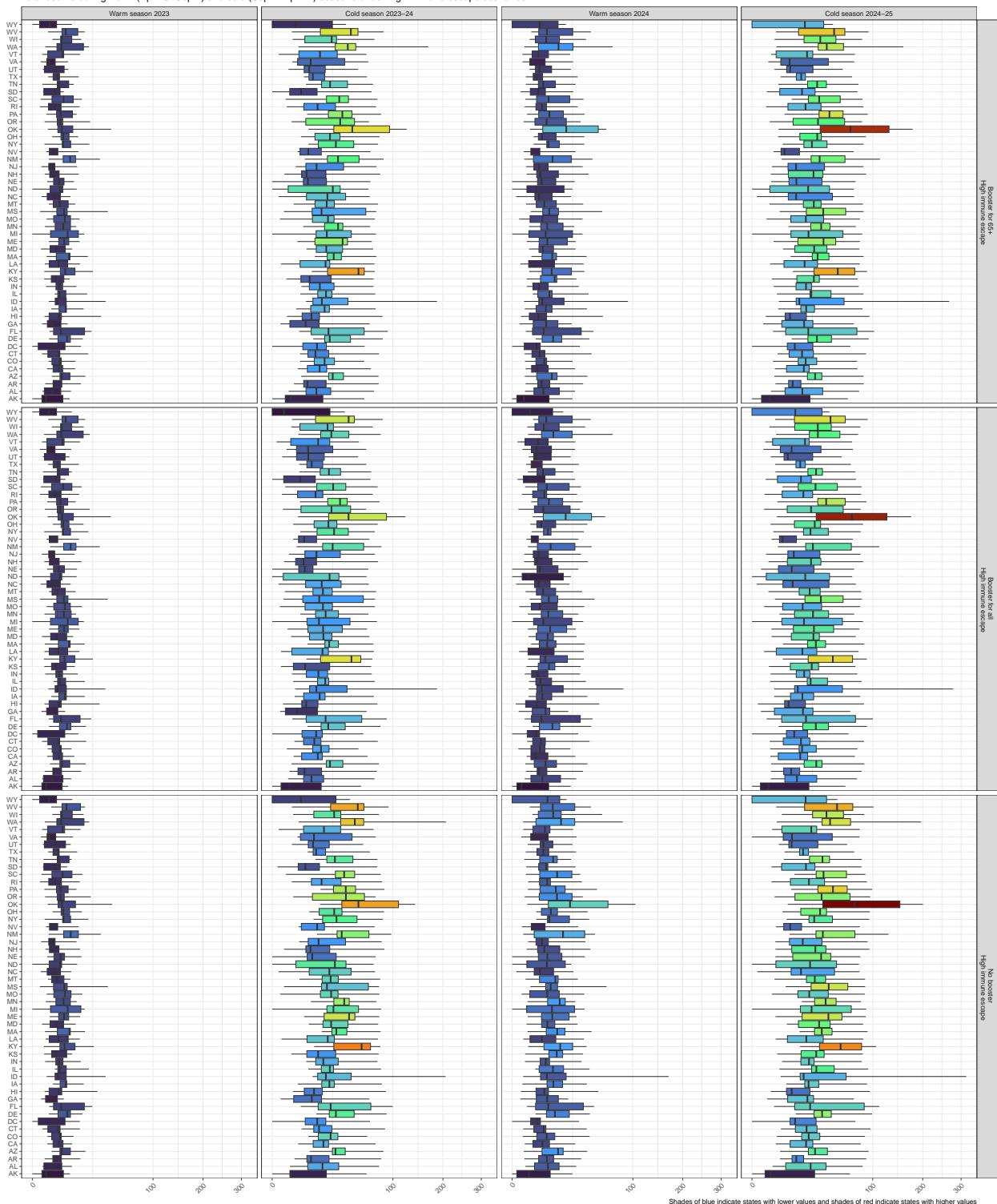
Max hospitalizations during warm (Apr 15–Sep 1) and cold (Sep 2–Apr 14) seasons under high immune escape scenarios



Total deaths during warm (Apr 15–Sep 1) and cold (Sep 2–Apr 14) seasons under low immune escape scenarios

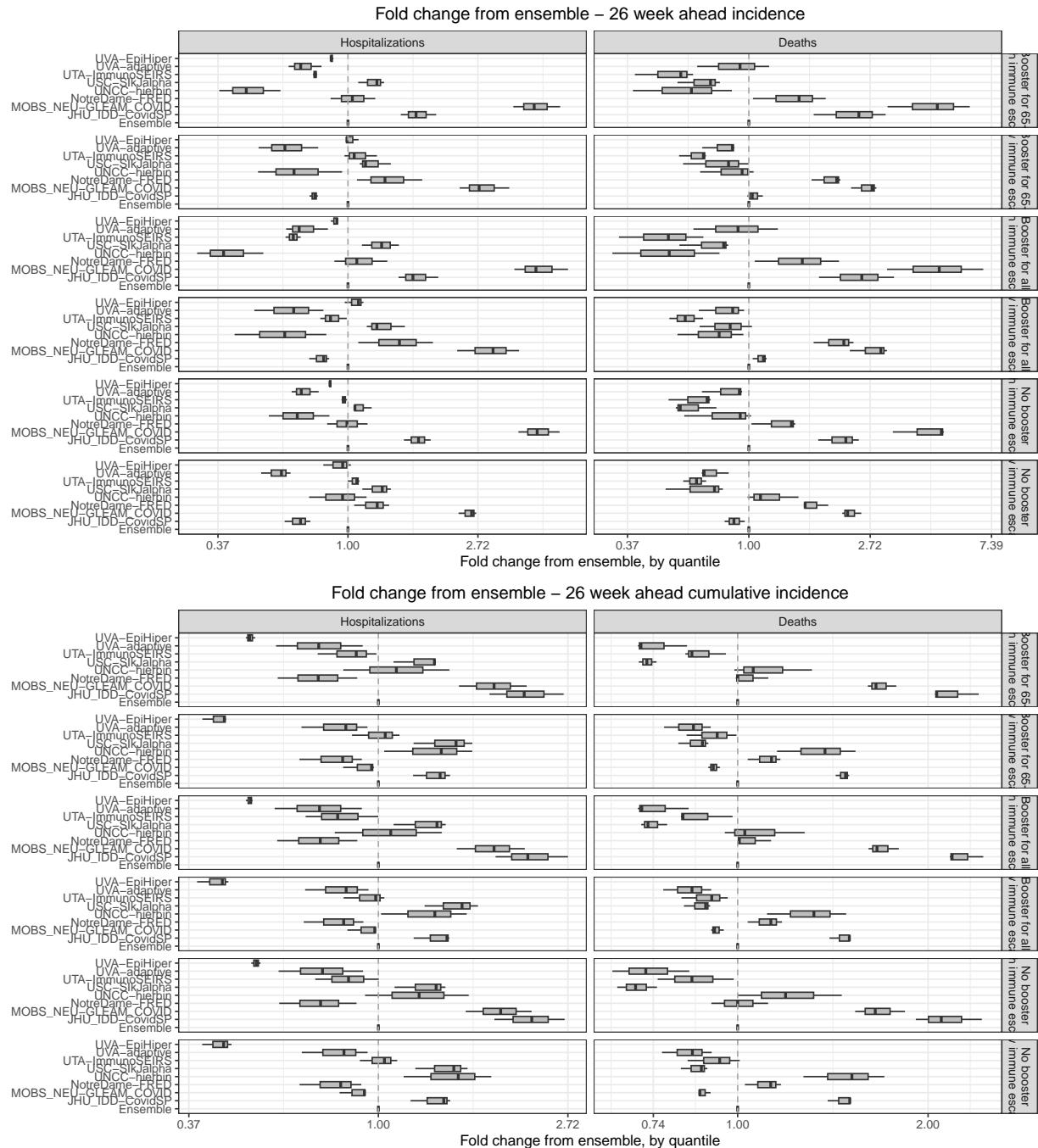


Total deaths during warm (Apr 15–Sep 1) and cold (Sep 2–Apr 14) seasons under high immune escape scenarios

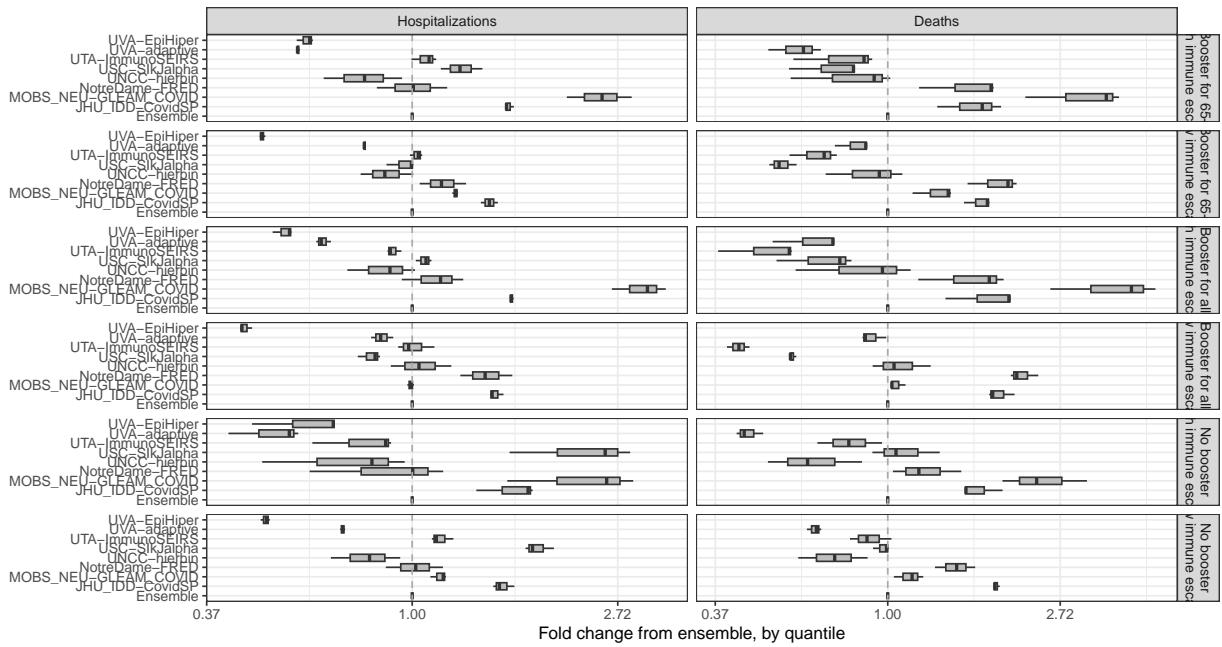


## Supplemental Plots and Tables

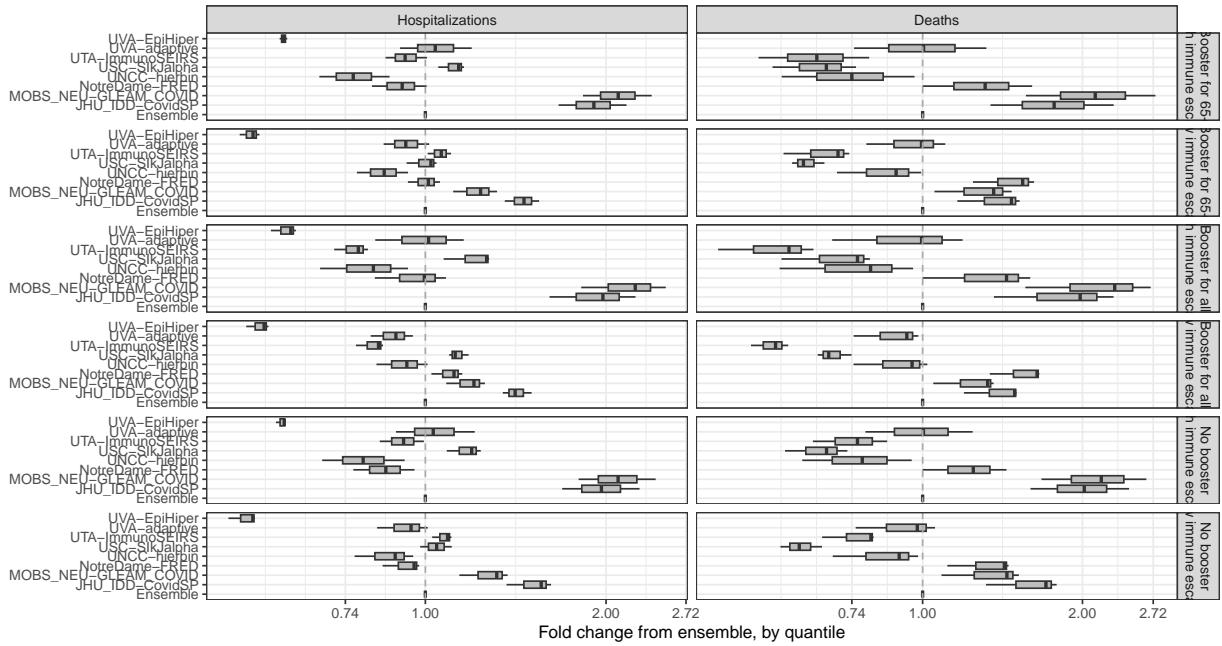
### Difference between model and ensemble distributions



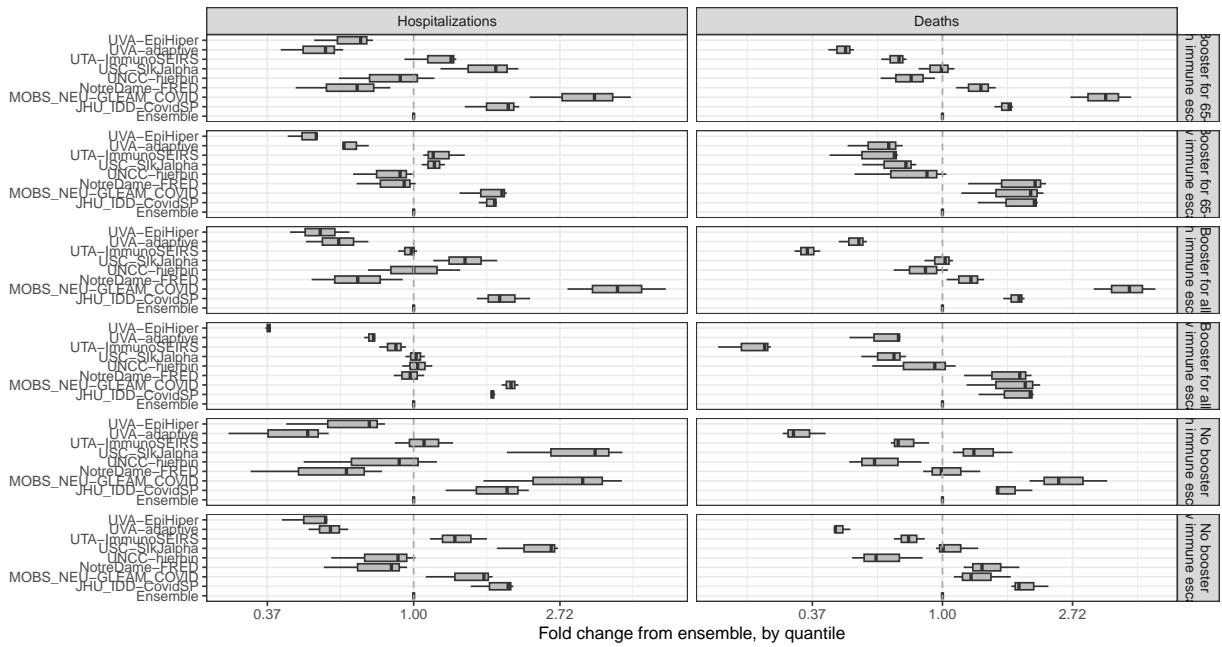
Fold change from ensemble – 52 week ahead incidence



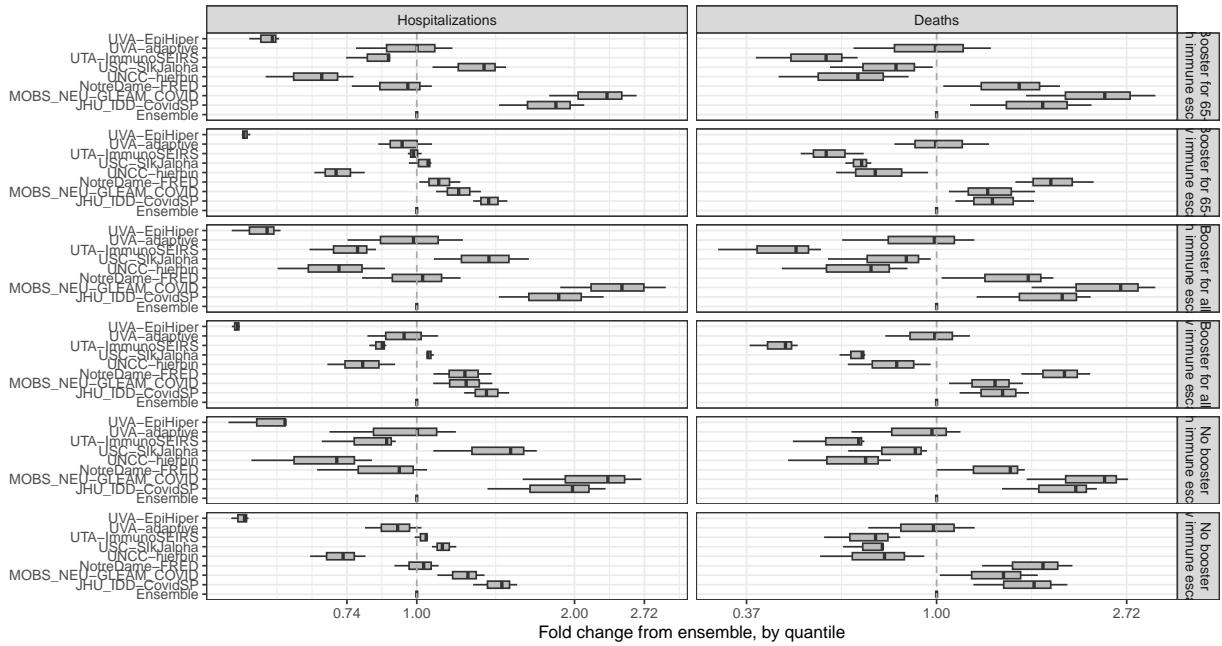
Fold change from ensemble – 52 week ahead cumulative incidence



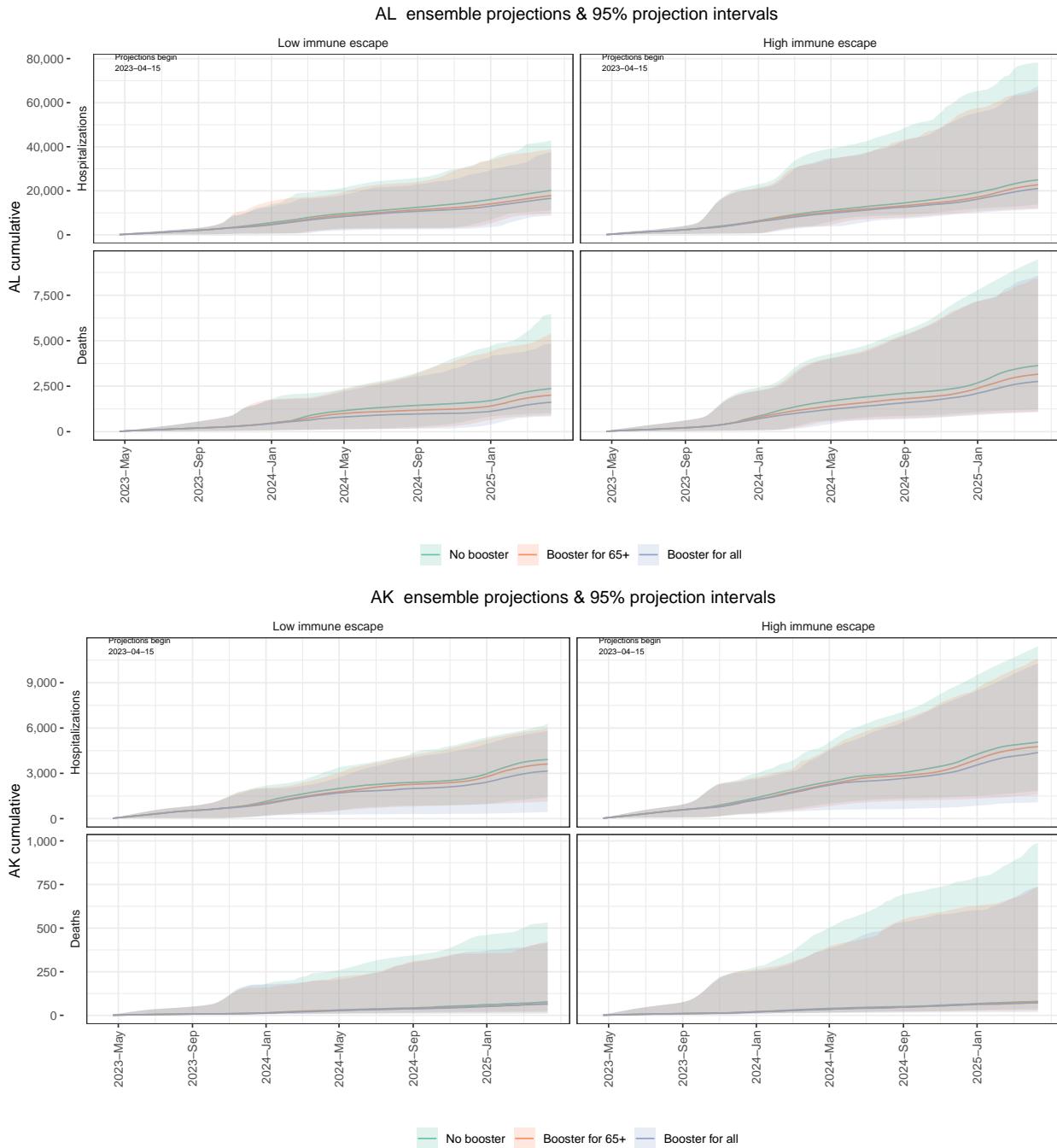
Fold change from ensemble – 104 week ahead incidence



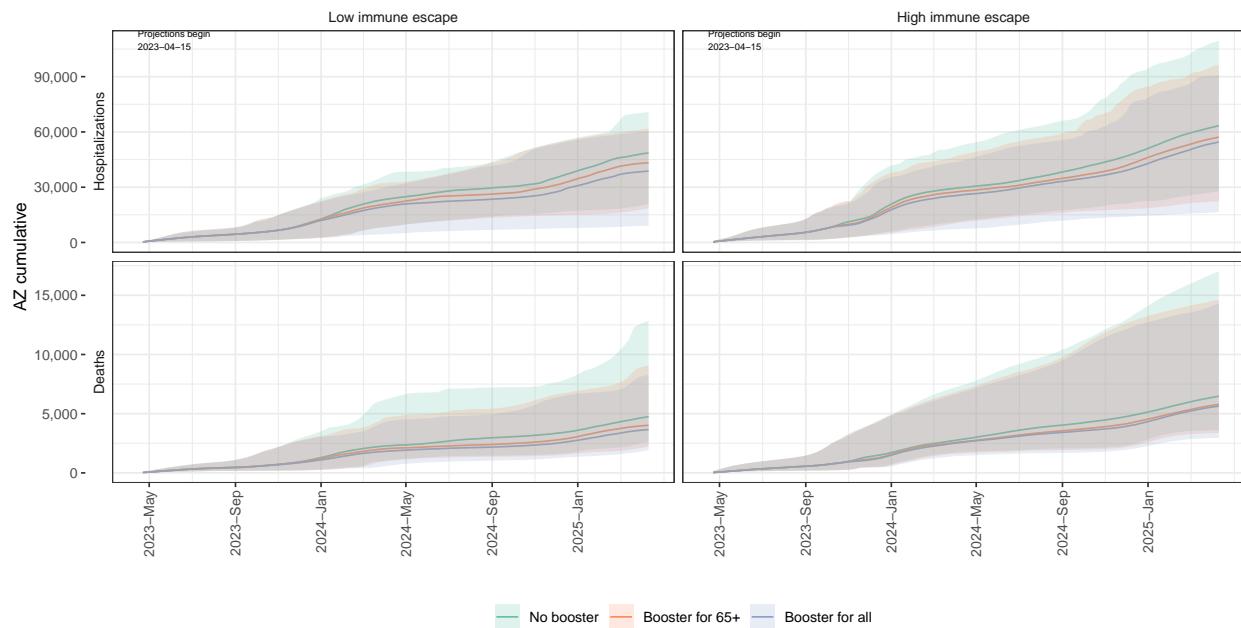
Fold change from ensemble – 104 week ahead cumulative incidence



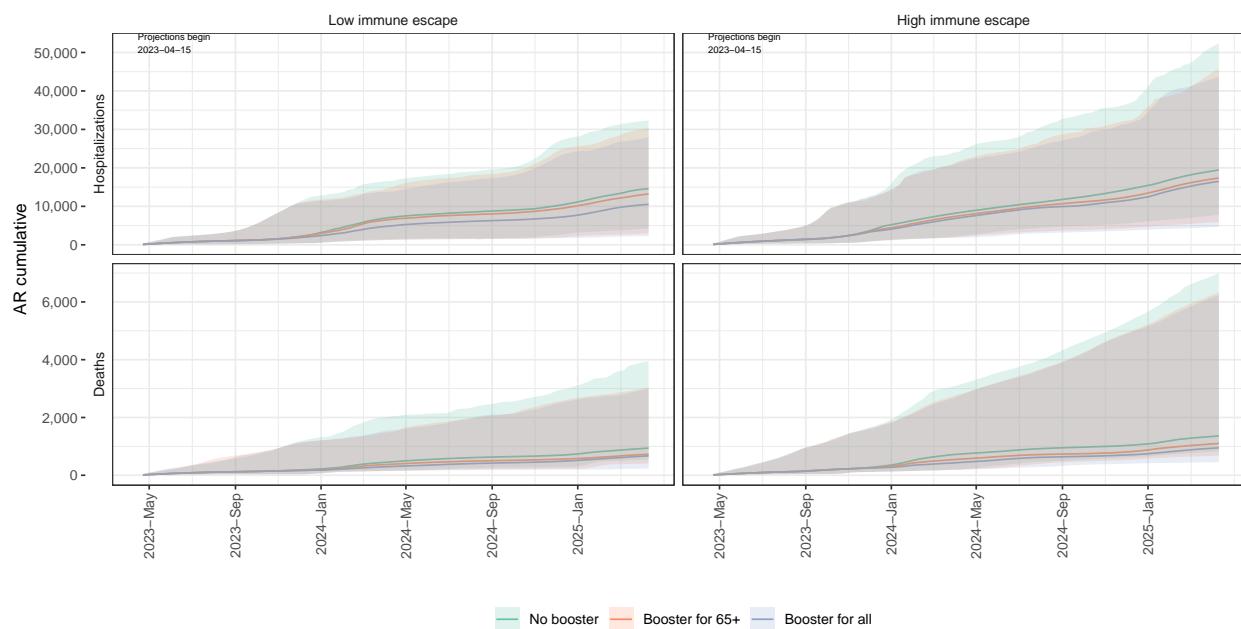
## State-level ensemble plots



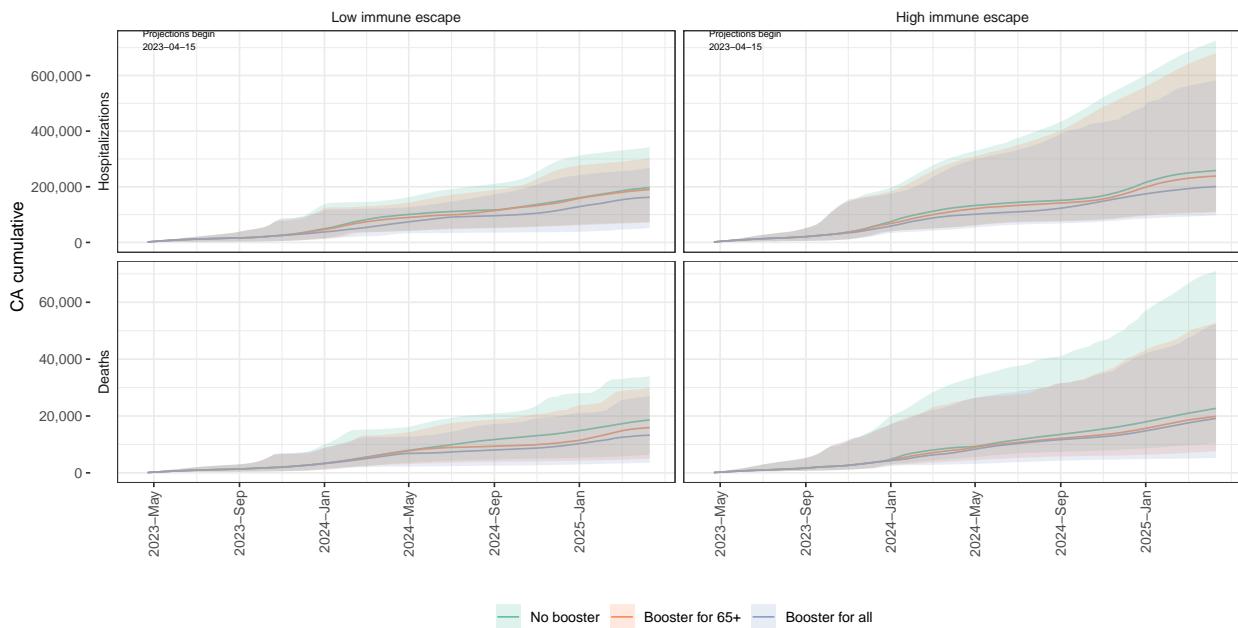
### AZ ensemble projections & 95% projection intervals



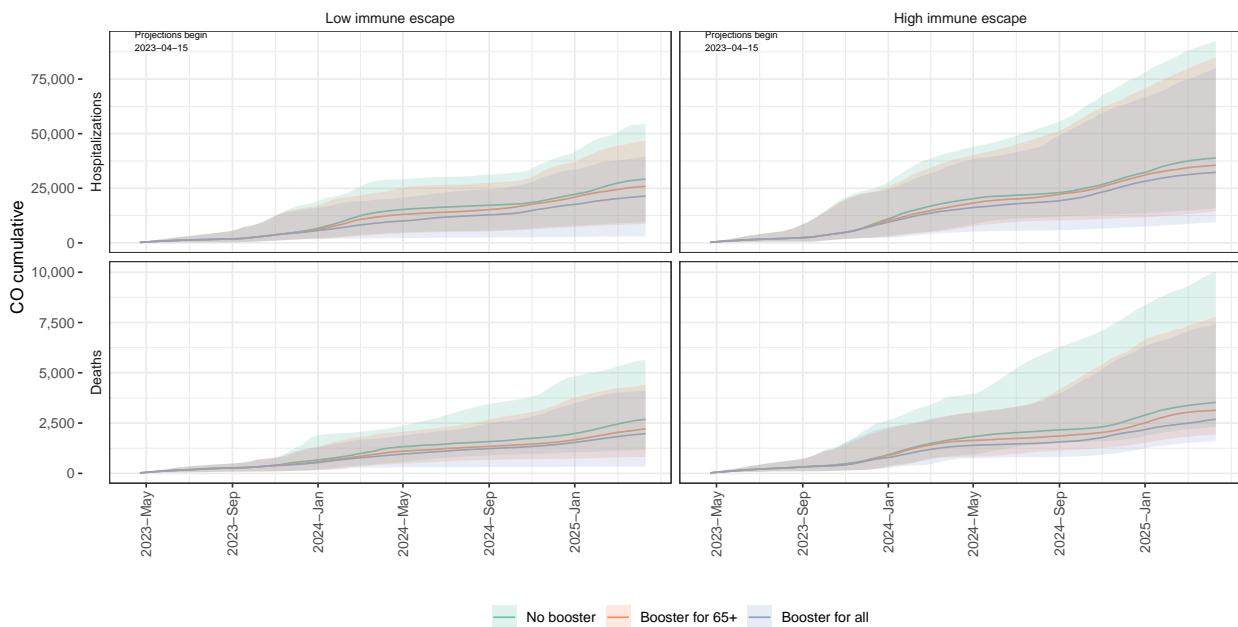
### AR ensemble projections & 95% projection intervals



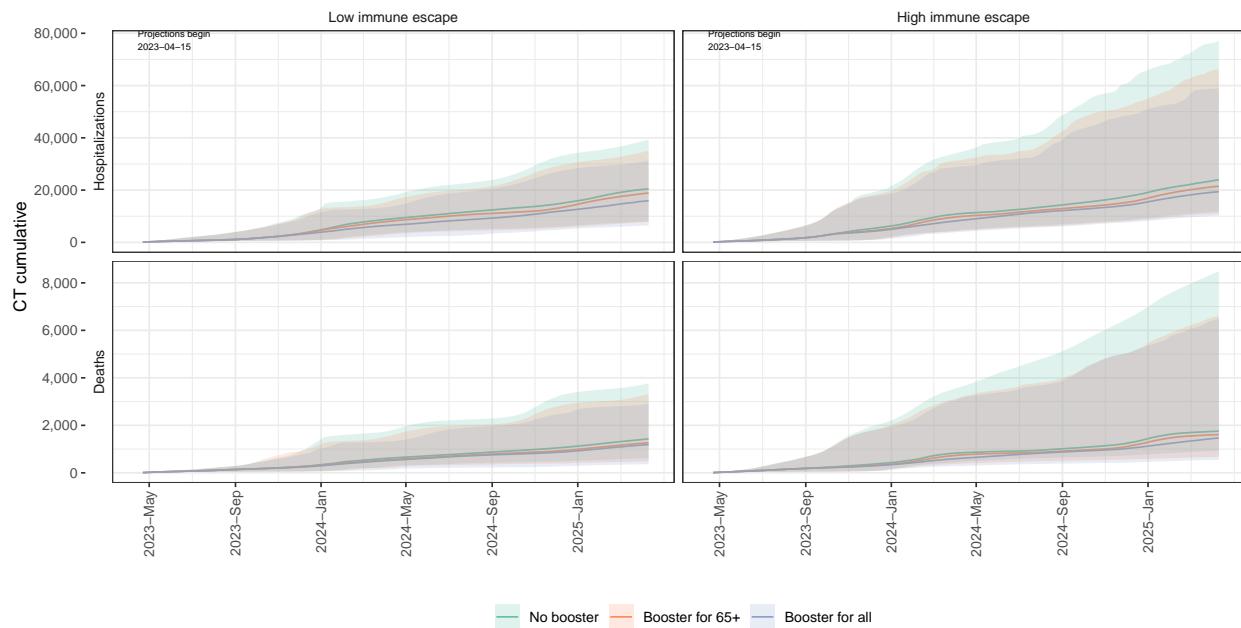
### CA ensemble projections & 95% projection intervals



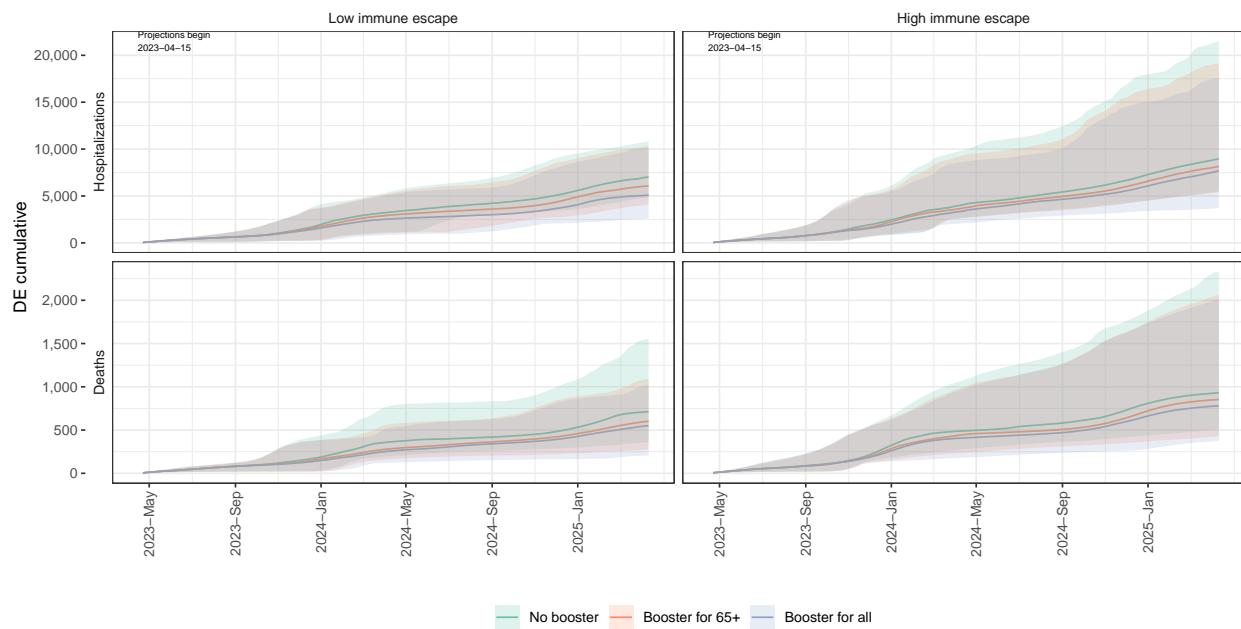
### CO ensemble projections & 95% projection intervals



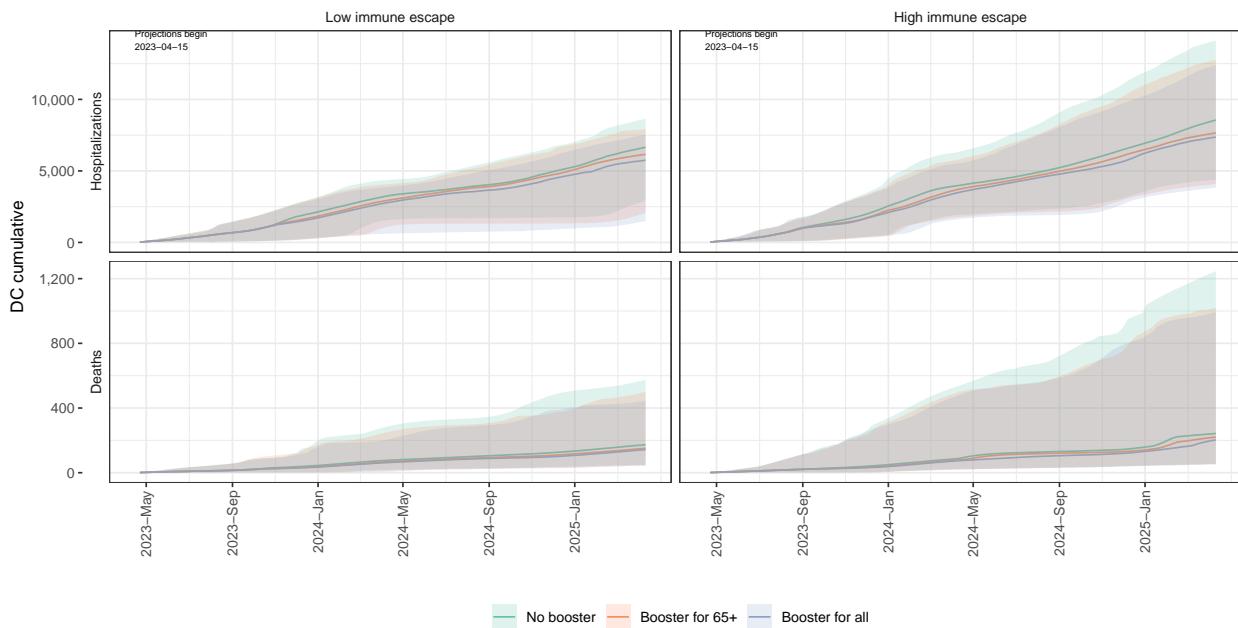
### CT ensemble projections & 95% projection intervals



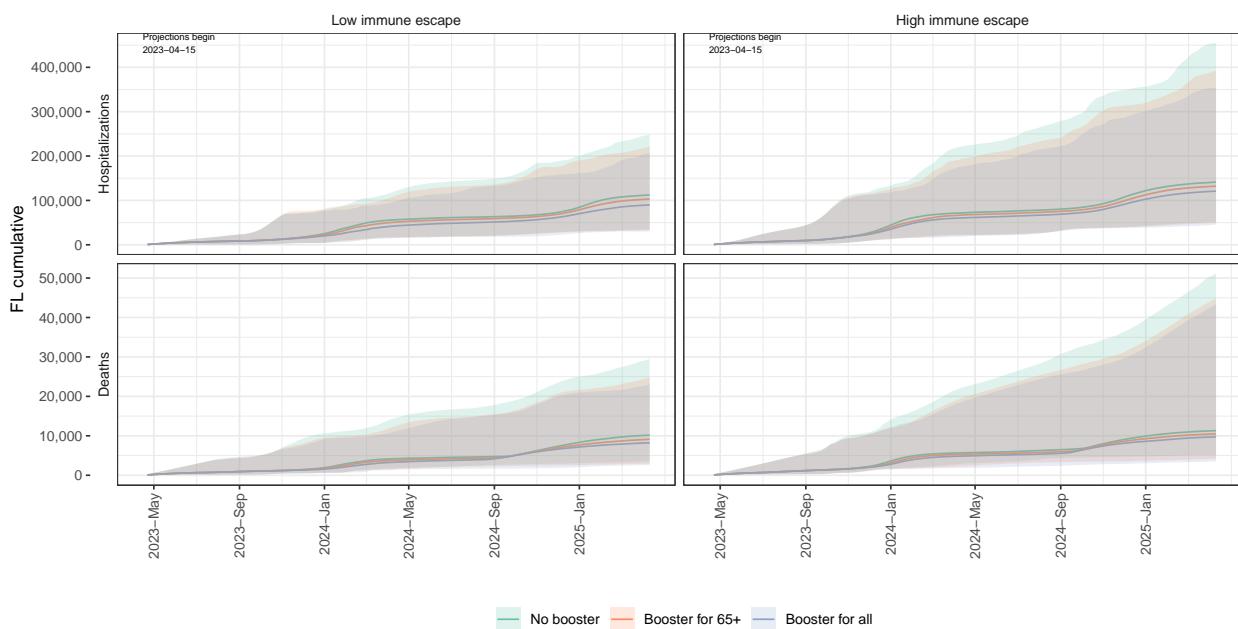
### DE ensemble projections & 95% projection intervals



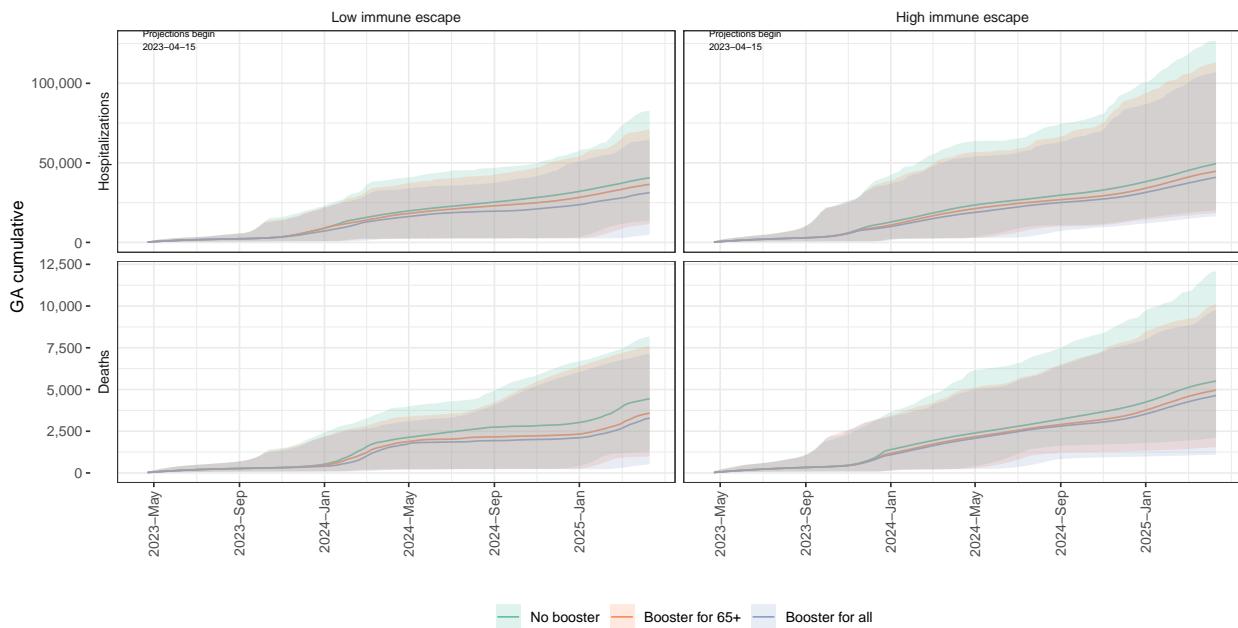
### DC ensemble projections & 95% projection intervals



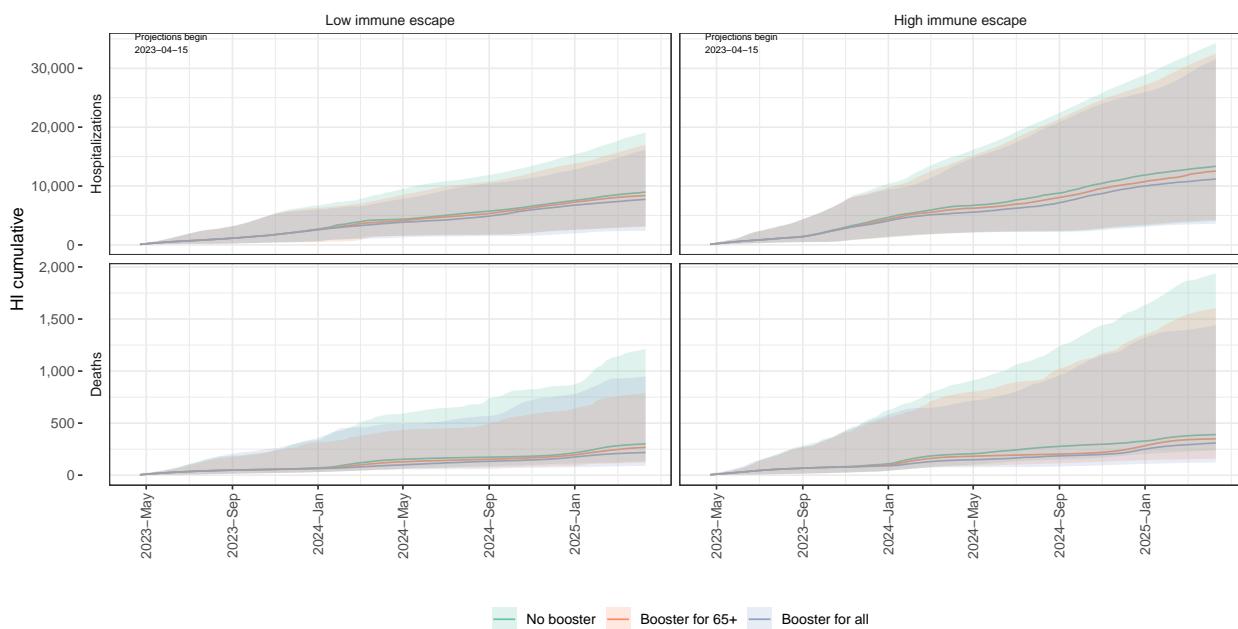
### FL ensemble projections & 95% projection intervals



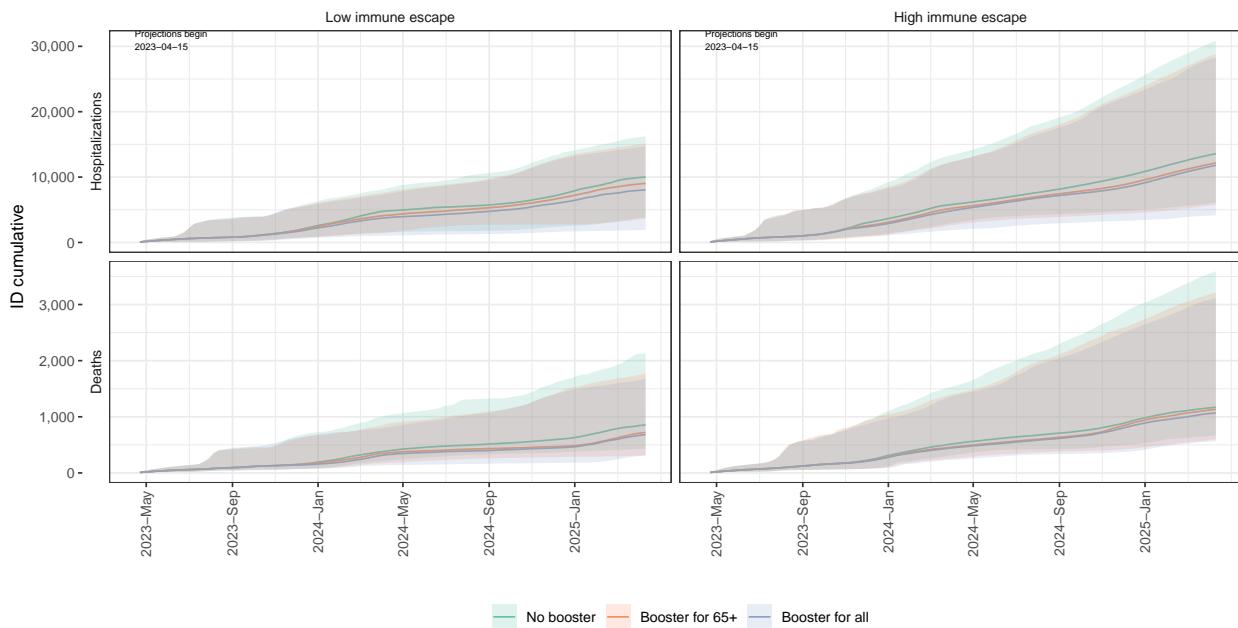
### GA ensemble projections & 95% projection intervals



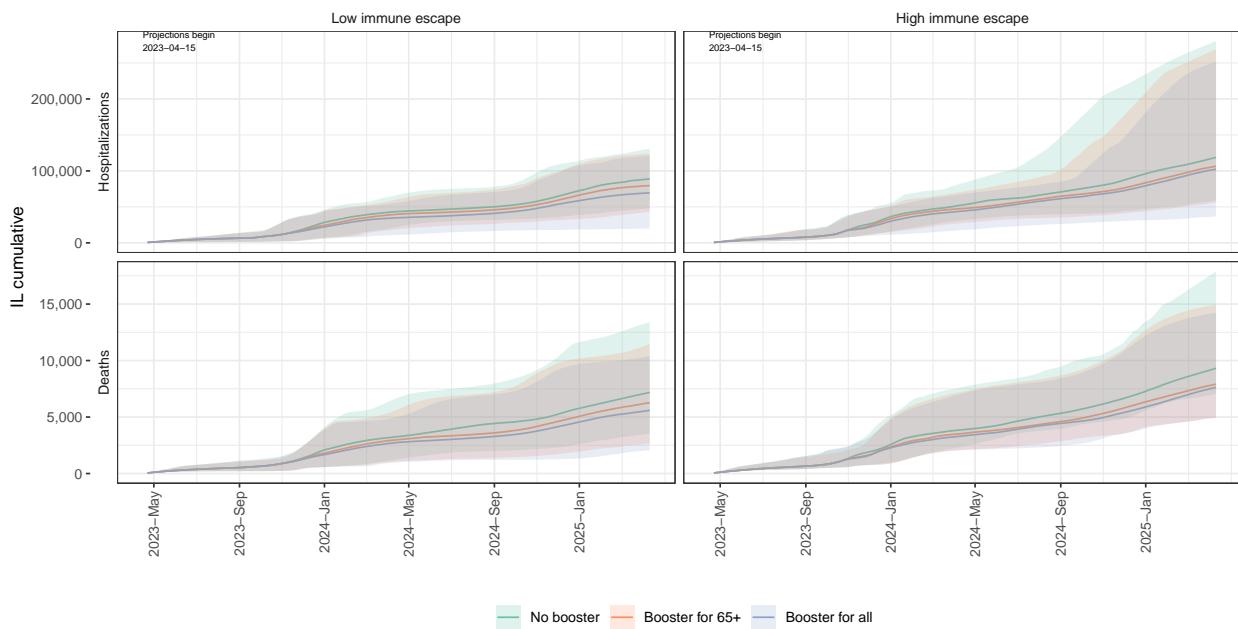
### HI ensemble projections & 95% projection intervals



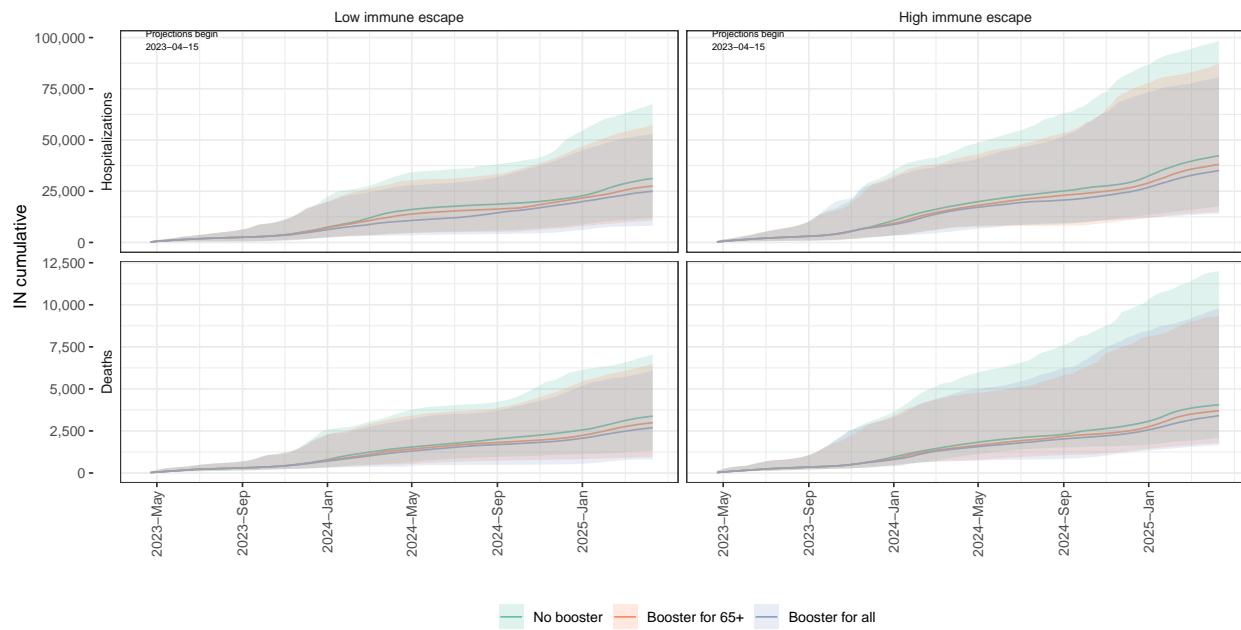
### ID ensemble projections & 95% projection intervals



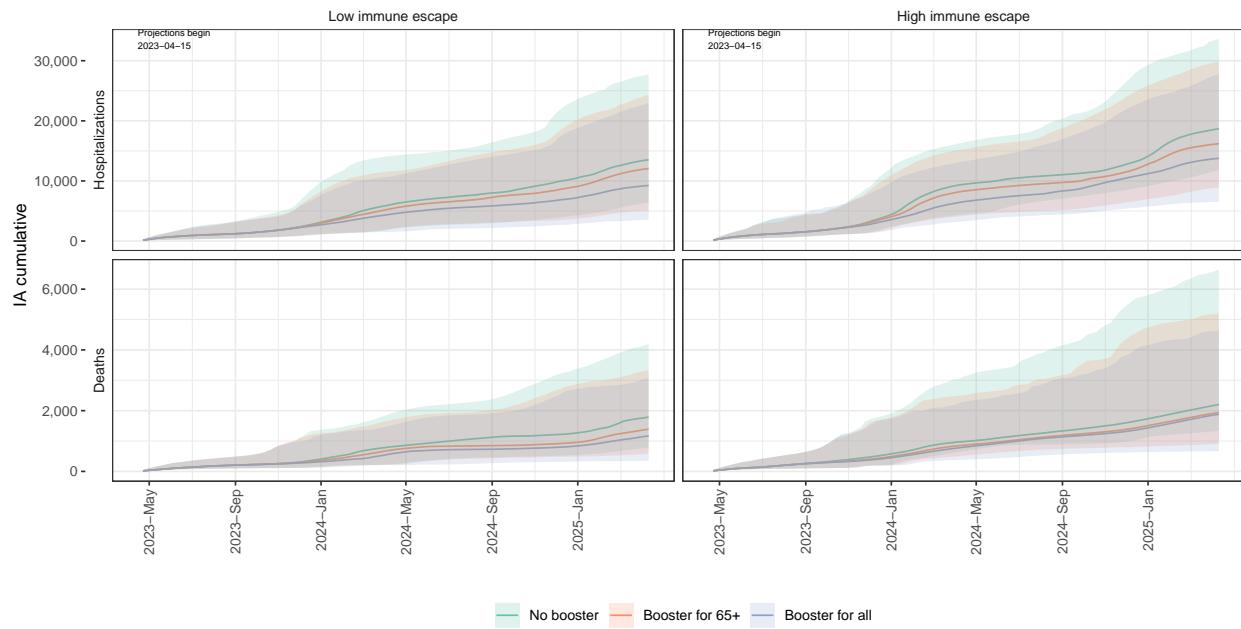
### IL ensemble projections & 95% projection intervals



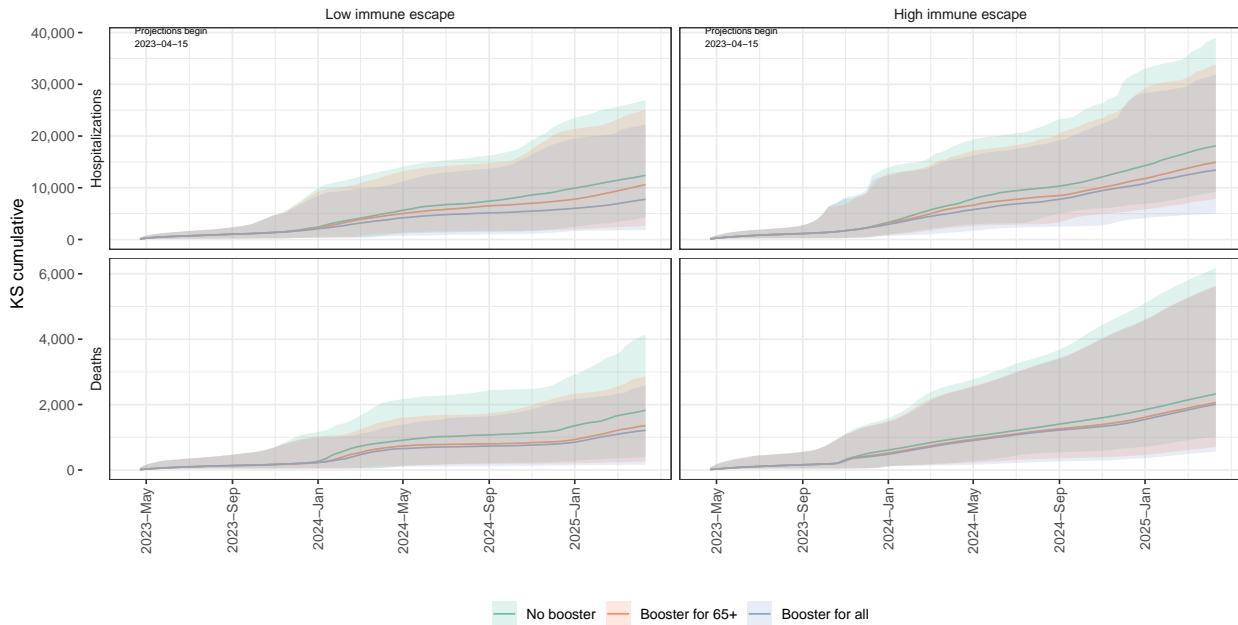
### IN ensemble projections & 95% projection intervals



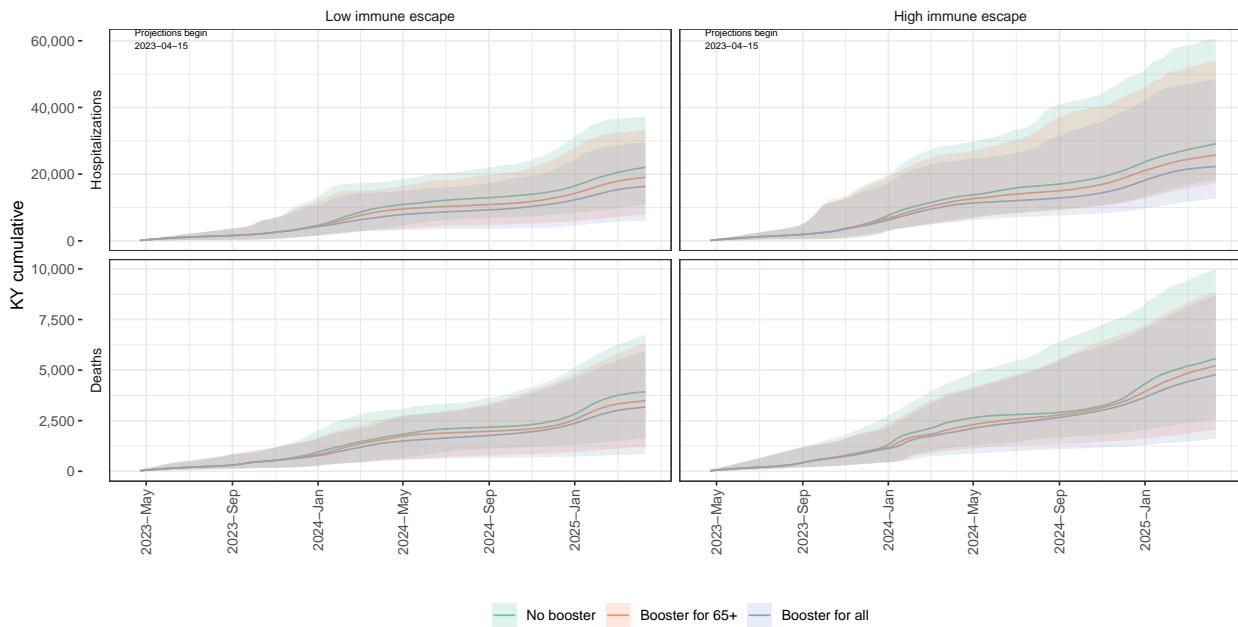
### IA ensemble projections & 95% projection intervals



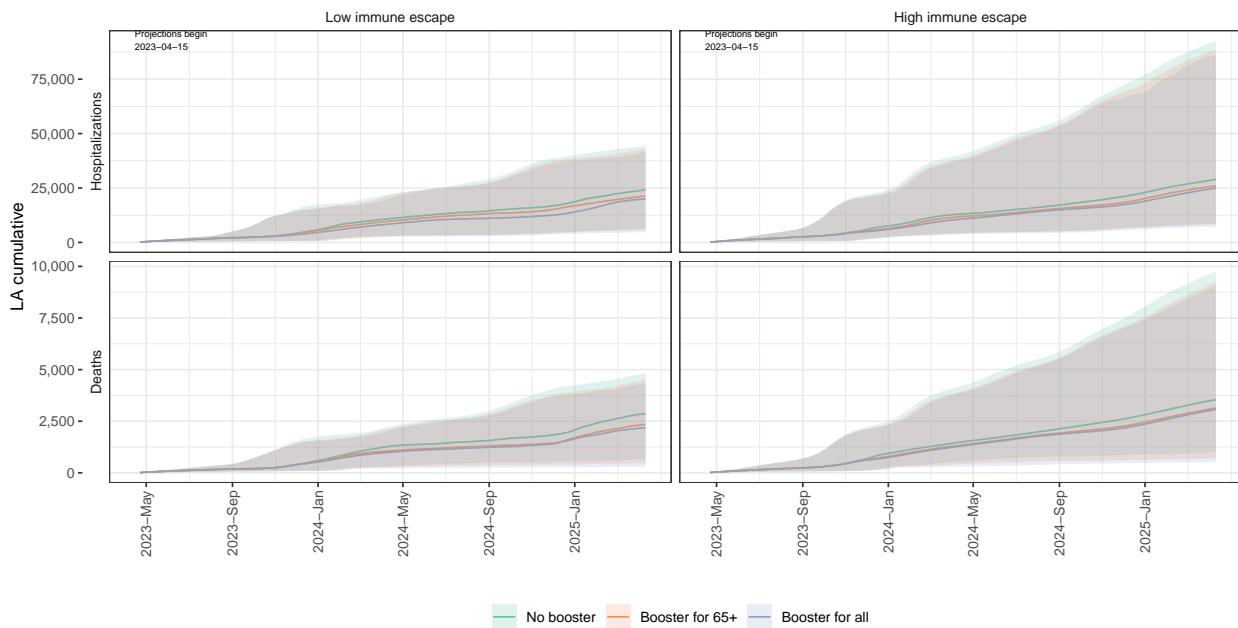
### KS ensemble projections & 95% projection intervals



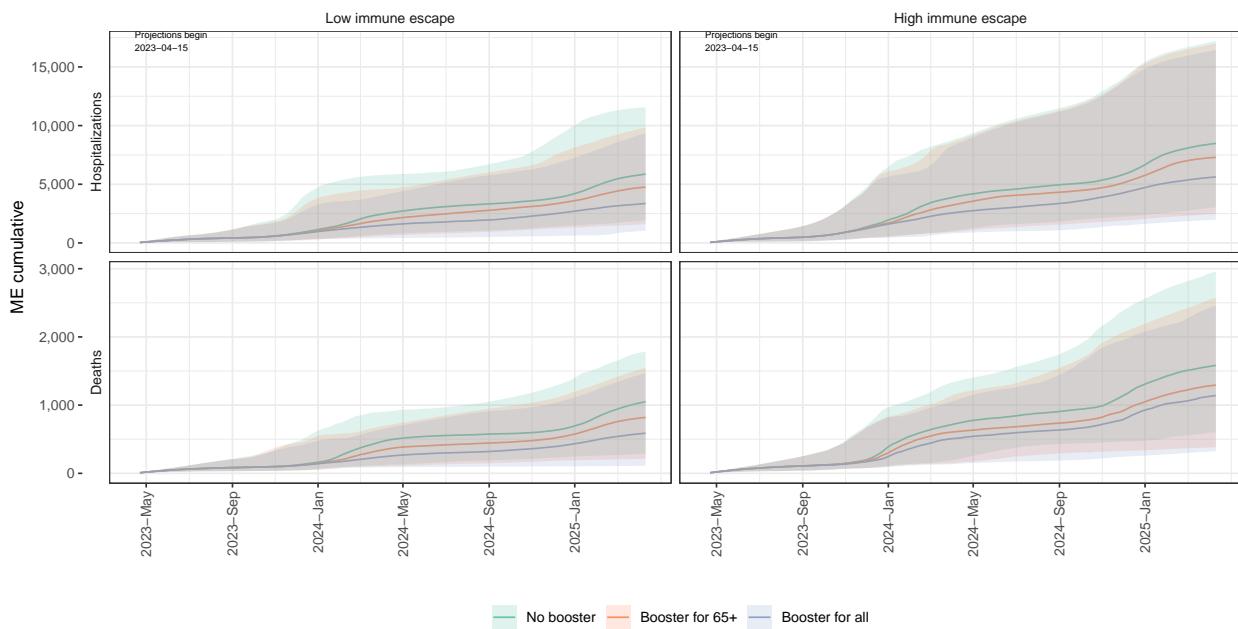
### KY ensemble projections & 95% projection intervals



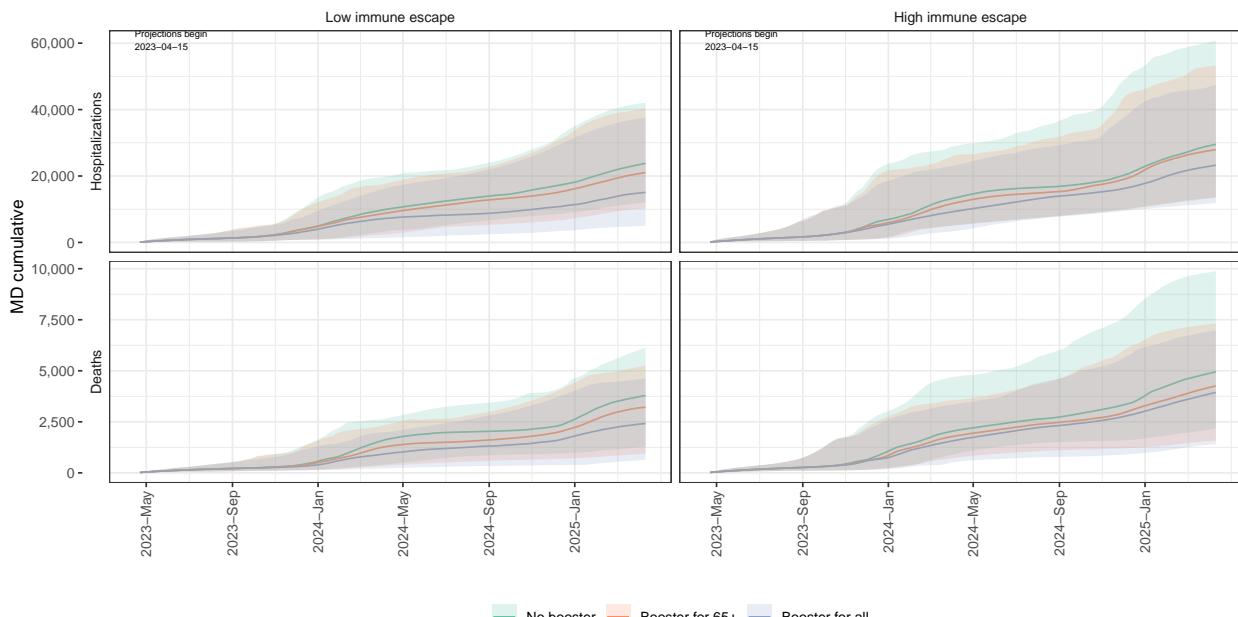
### LA ensemble projections & 95% projection intervals



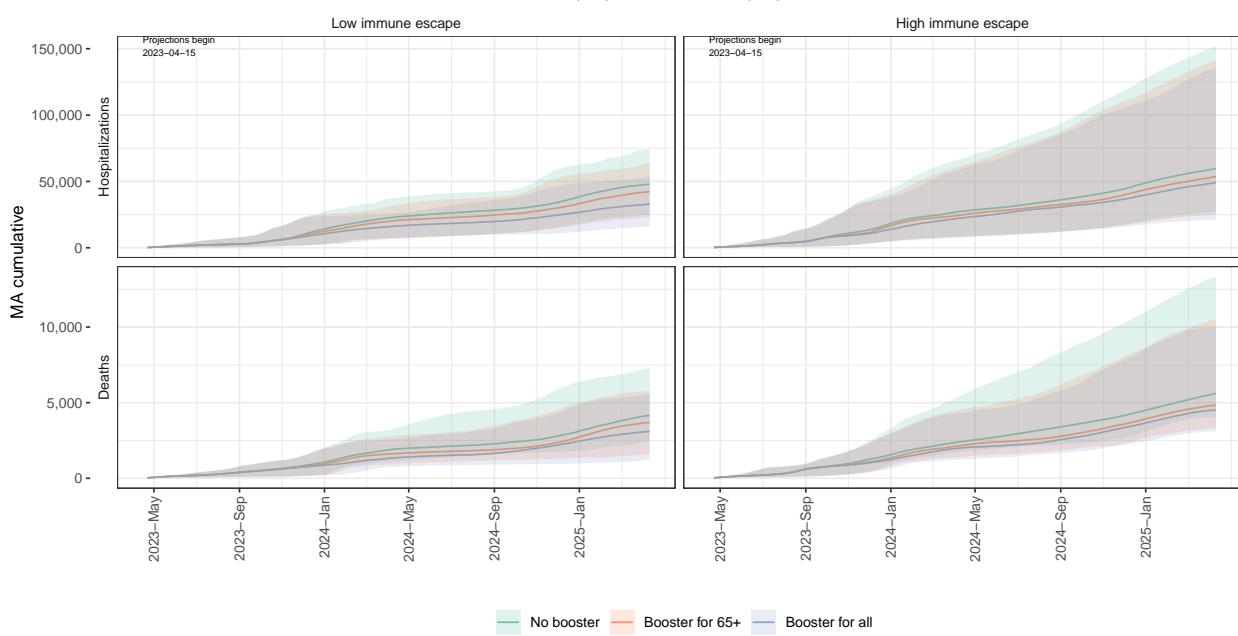
### ME ensemble projections & 95% projection intervals



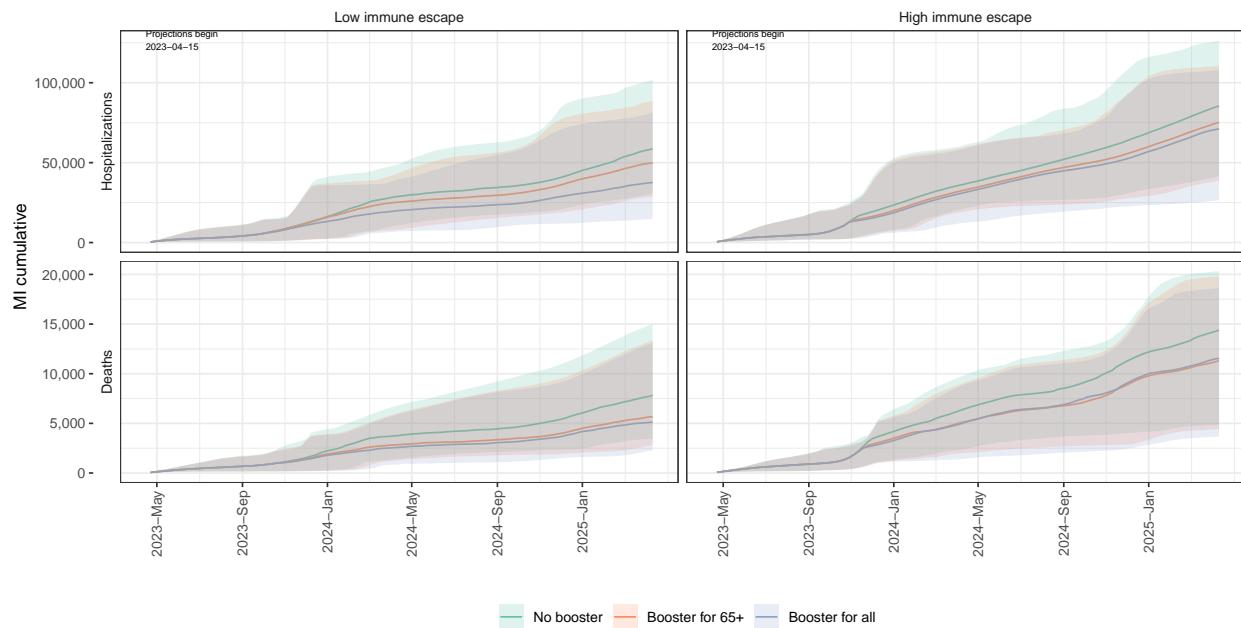
### MD ensemble projections & 95% projection intervals



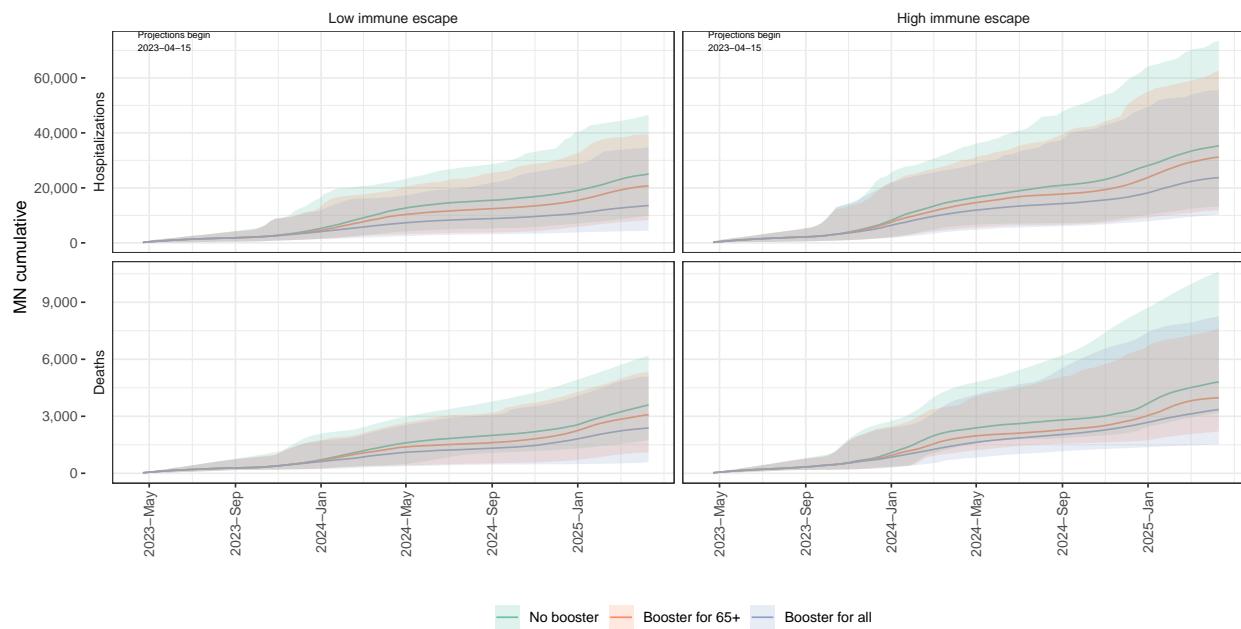
### MA ensemble projections & 95% projection intervals



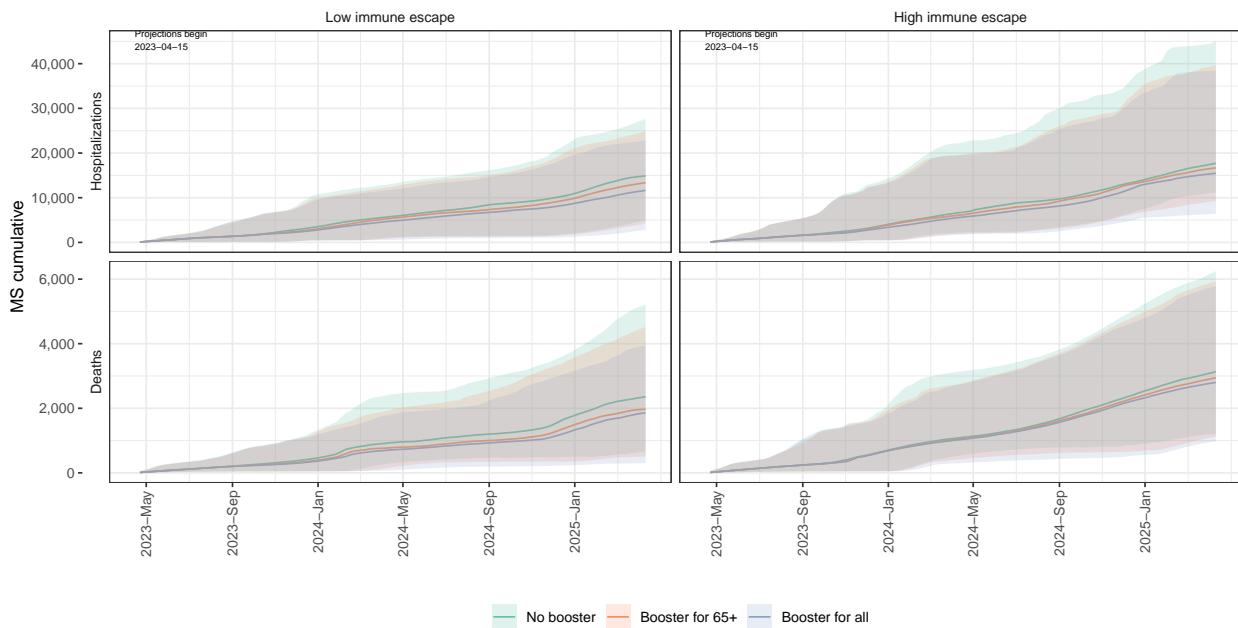
### MI ensemble projections & 95% projection intervals



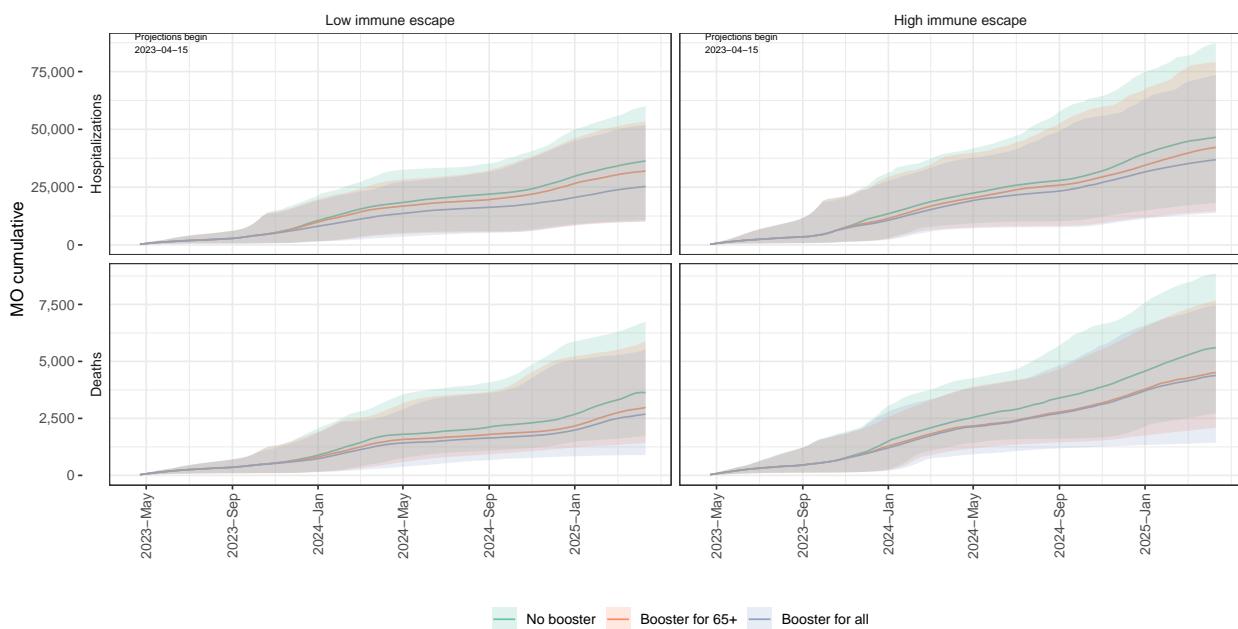
### MN ensemble projections & 95% projection intervals



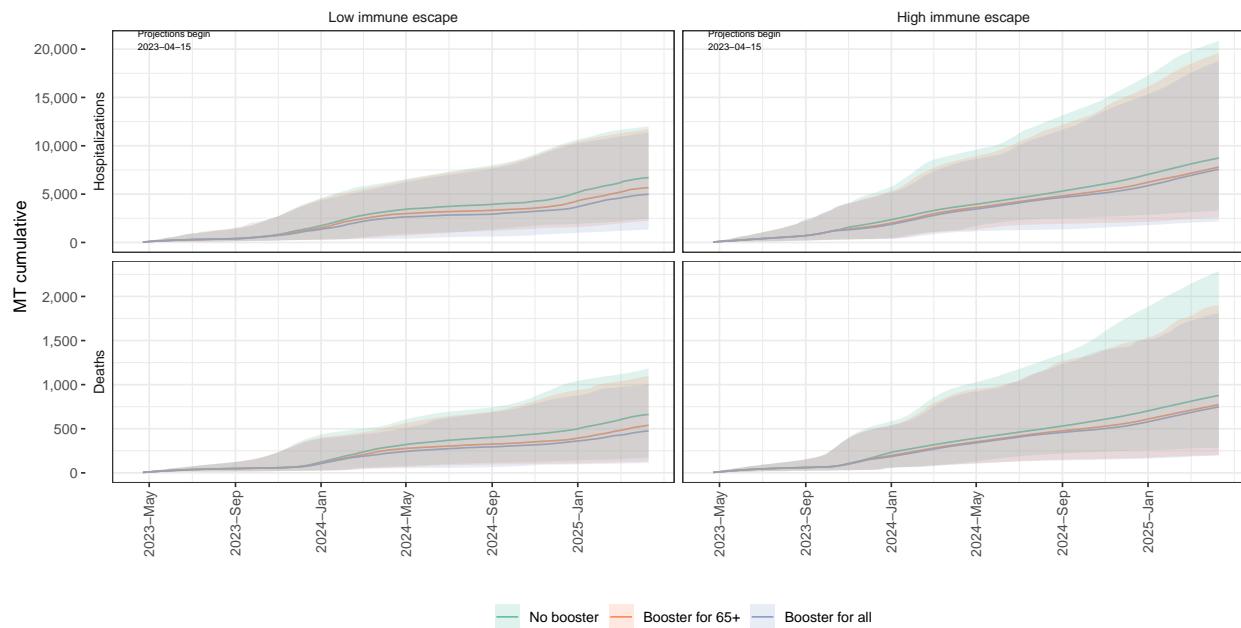
### MS ensemble projections & 95% projection intervals



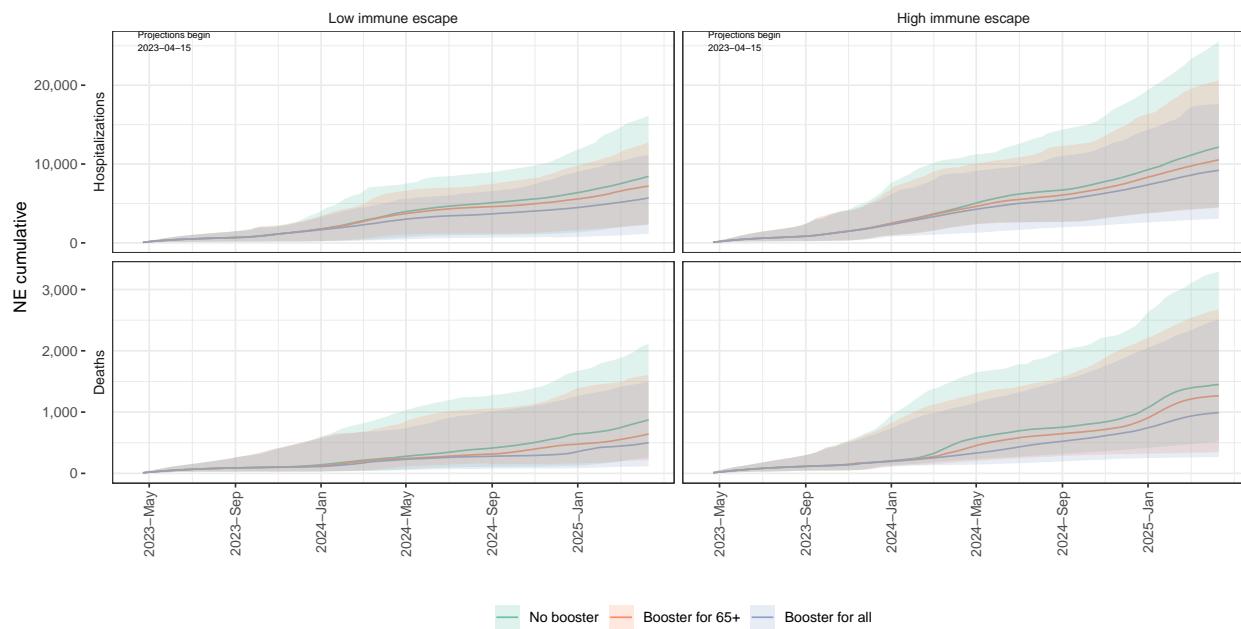
### MO ensemble projections & 95% projection intervals



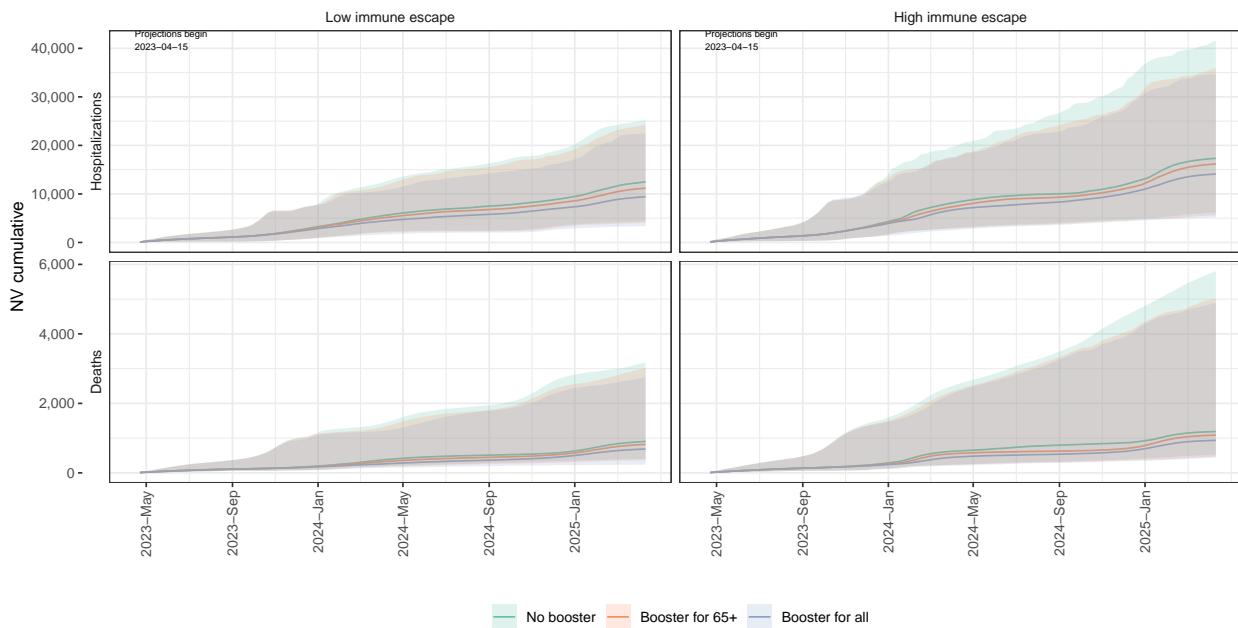
### MT ensemble projections & 95% projection intervals



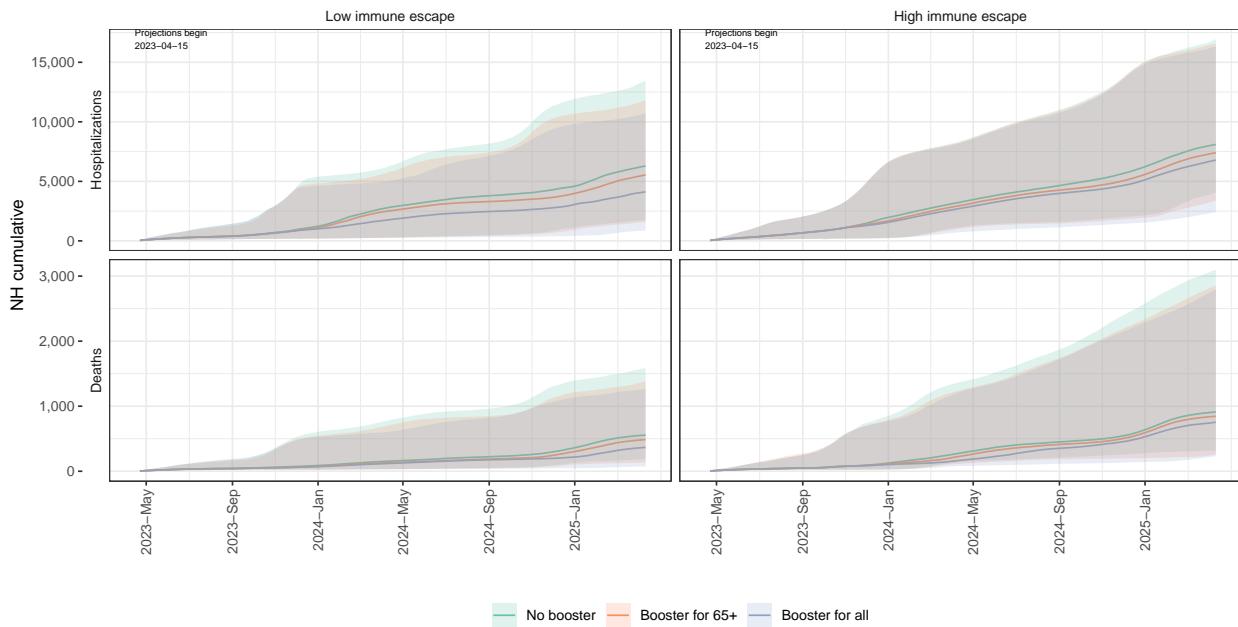
### NE ensemble projections & 95% projection intervals



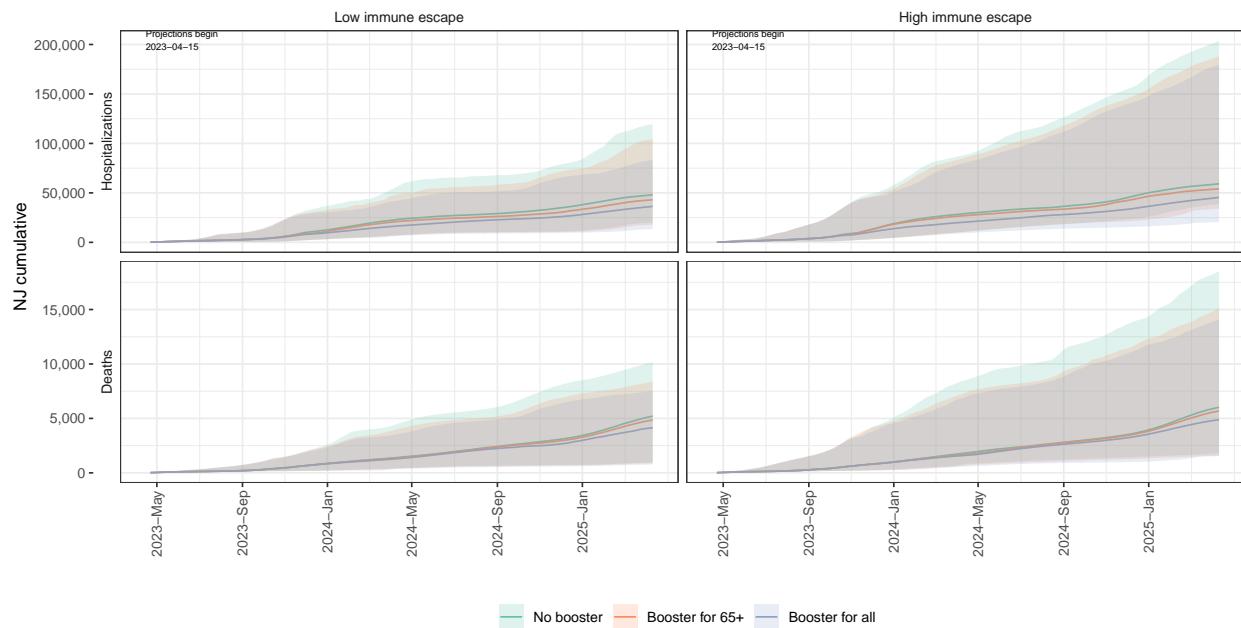
### NV ensemble projections & 95% projection intervals



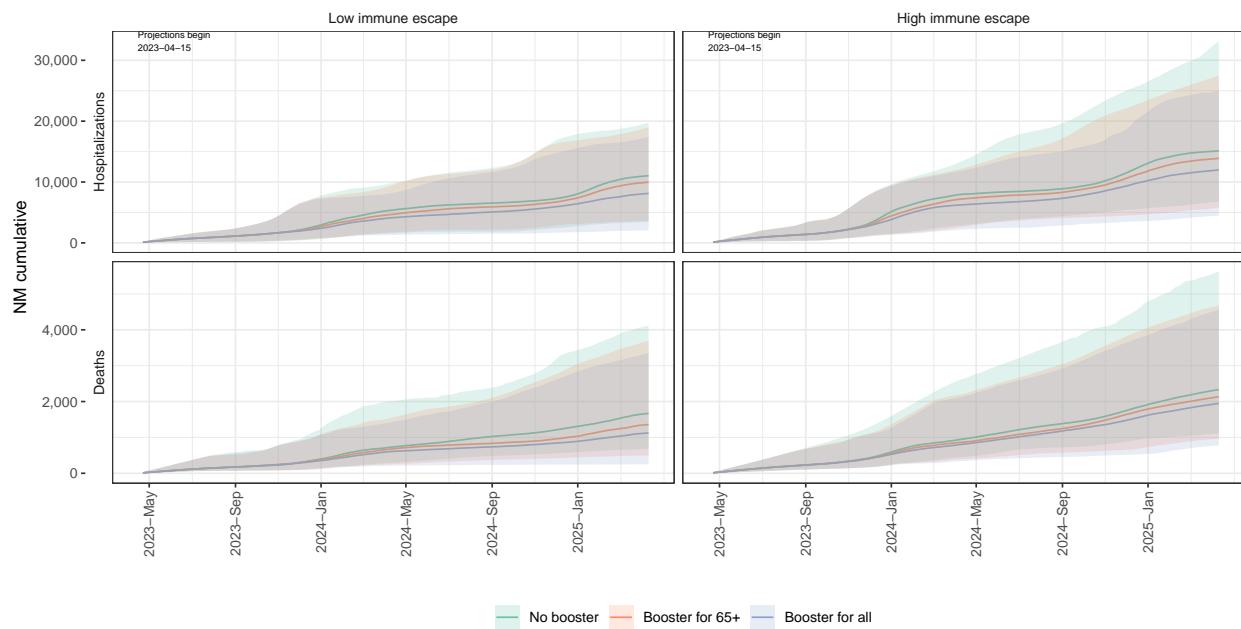
### NH ensemble projections & 95% projection intervals



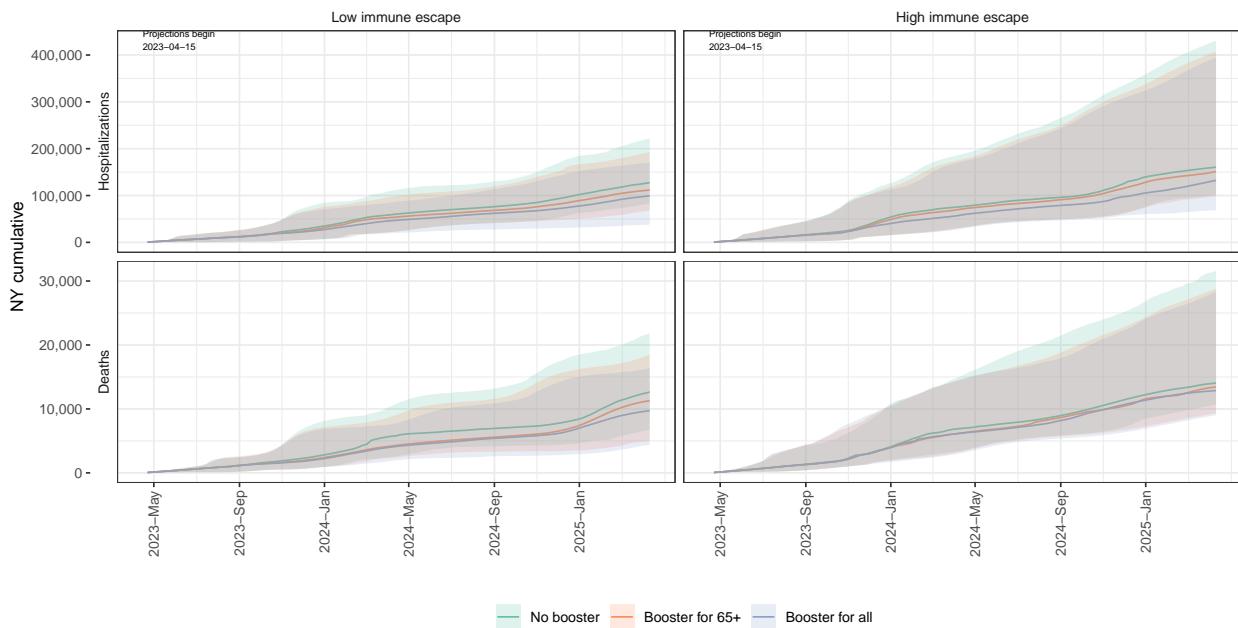
### NJ ensemble projections & 95% projection intervals



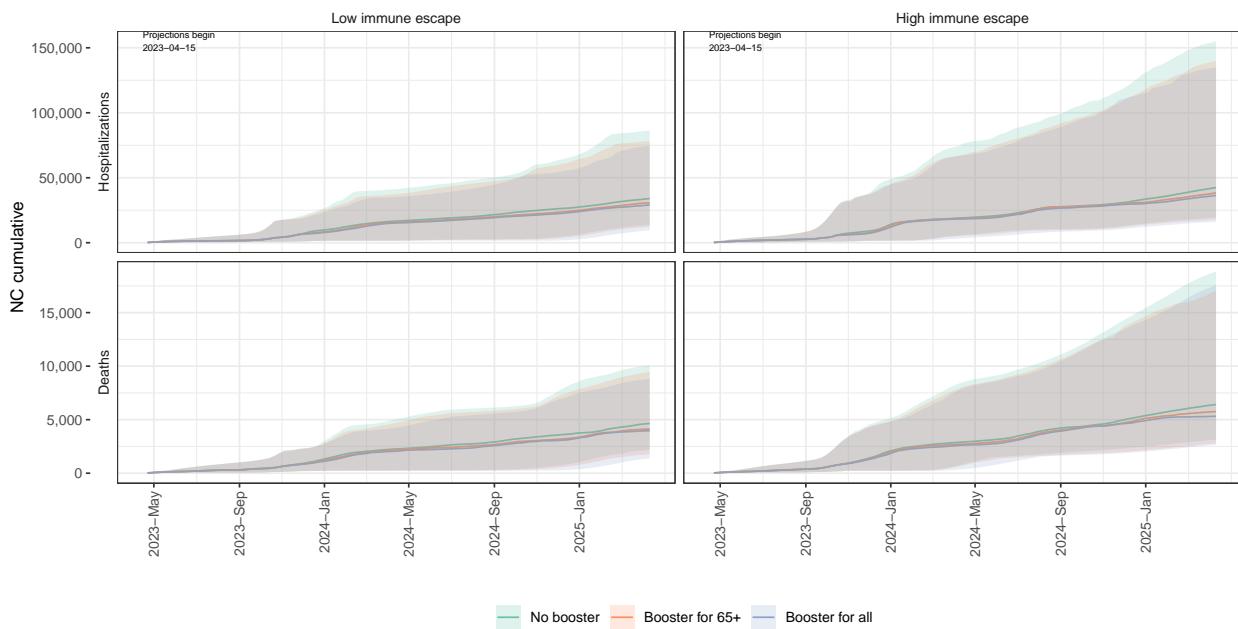
### NM ensemble projections & 95% projection intervals



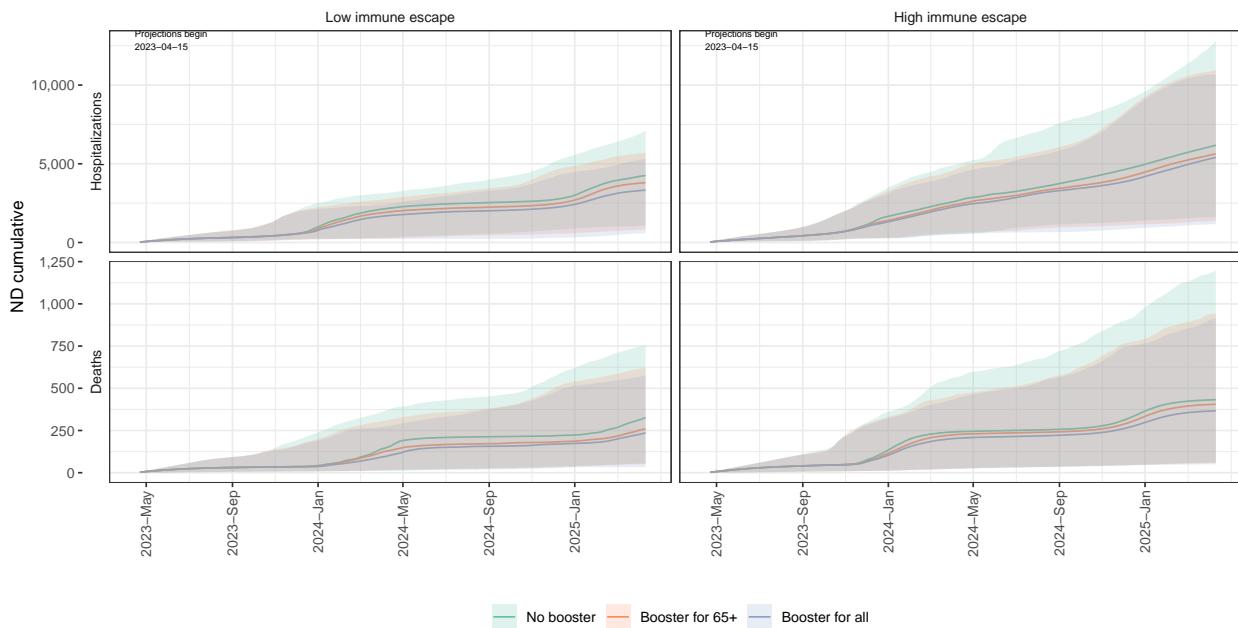
### NY ensemble projections & 95% projection intervals



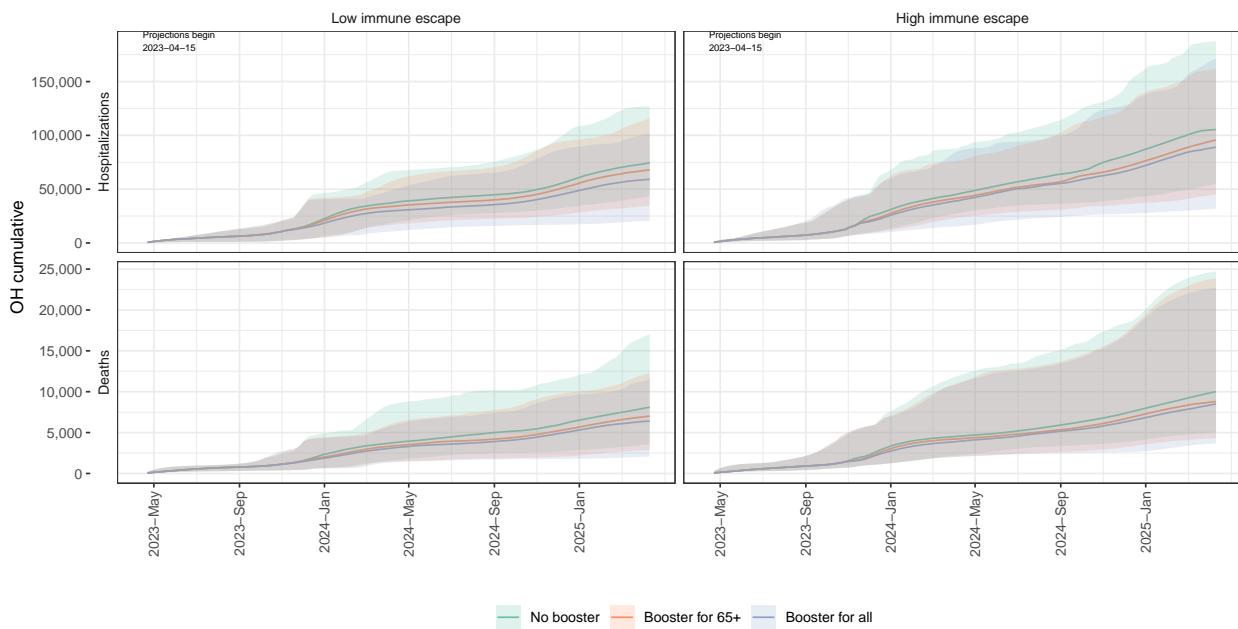
### NC ensemble projections & 95% projection intervals



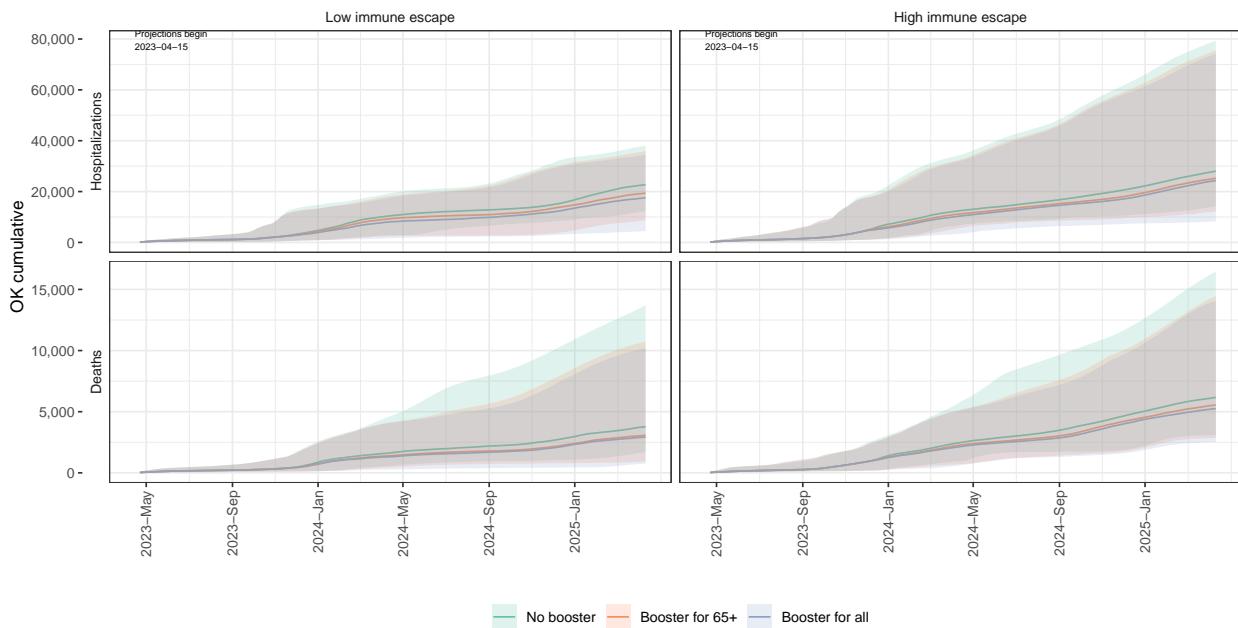
### ND ensemble projections & 95% projection intervals



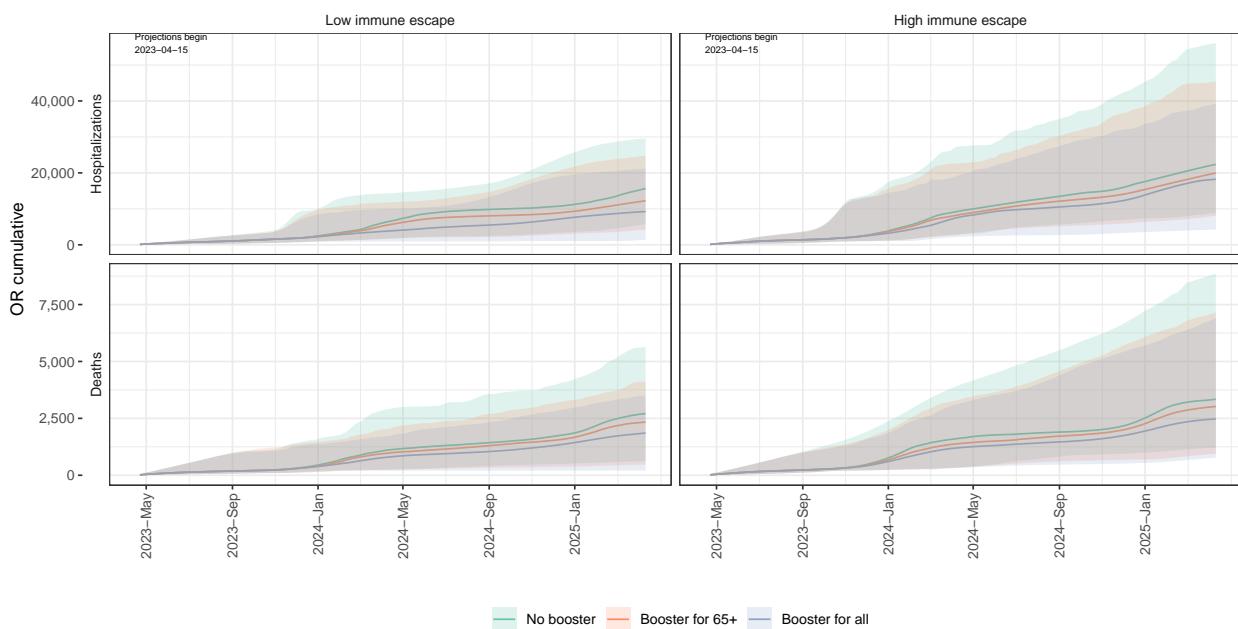
### OH ensemble projections & 95% projection intervals



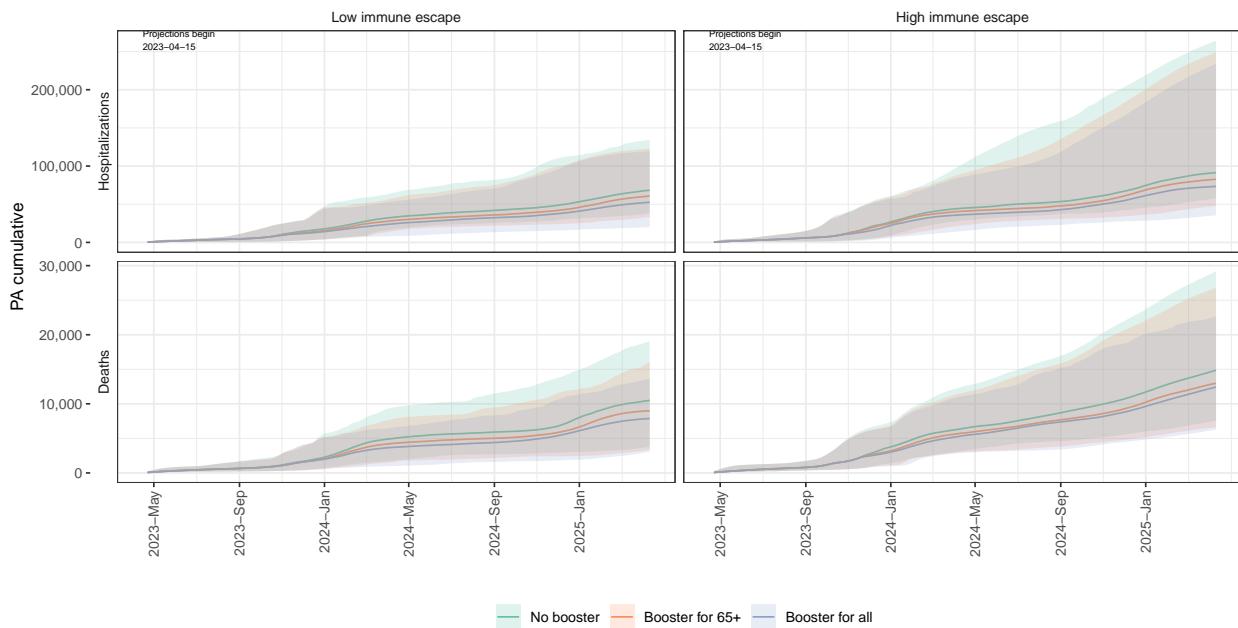
### OK ensemble projections & 95% projection intervals



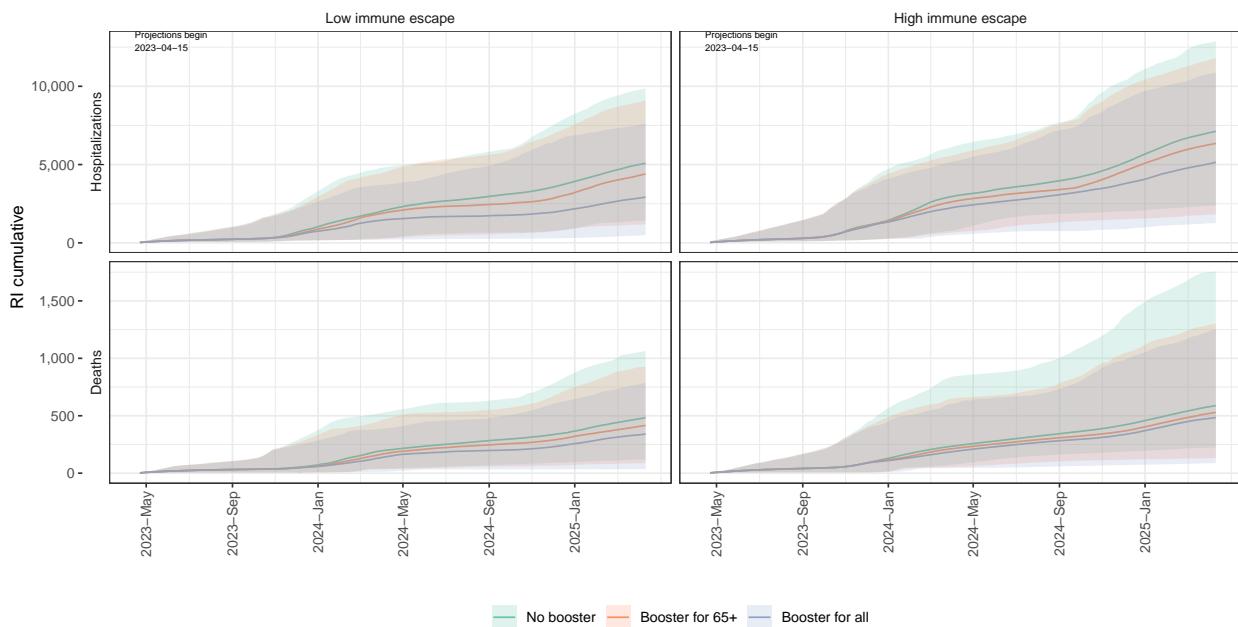
### OR ensemble projections & 95% projection intervals



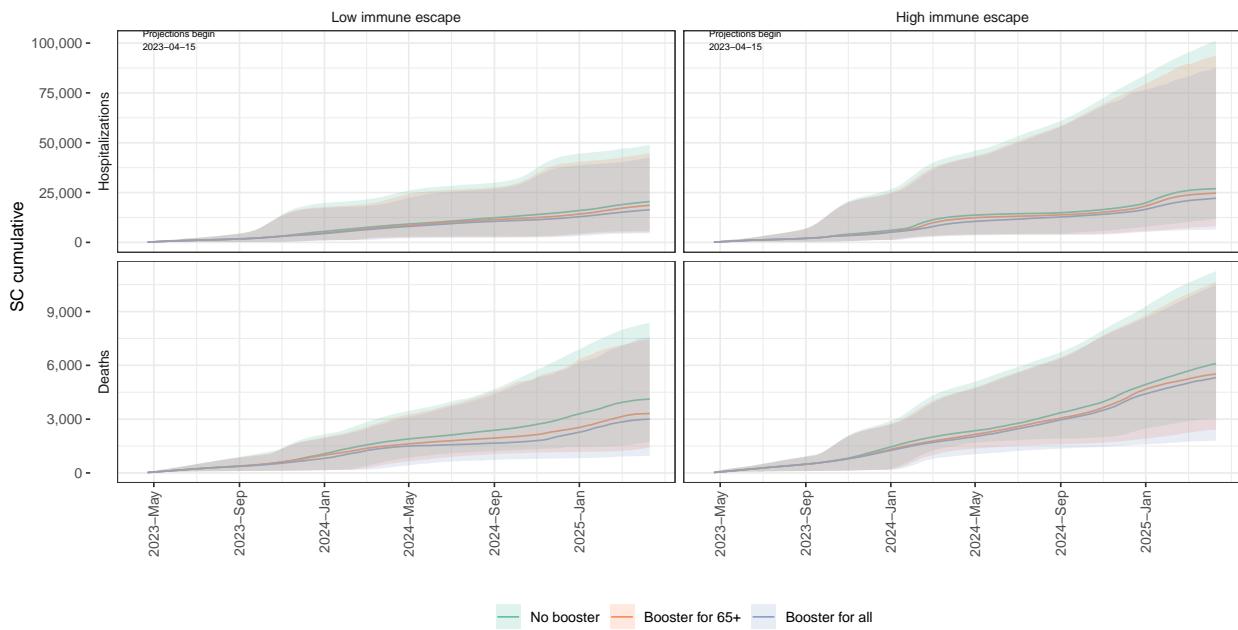
### PA ensemble projections & 95% projection intervals



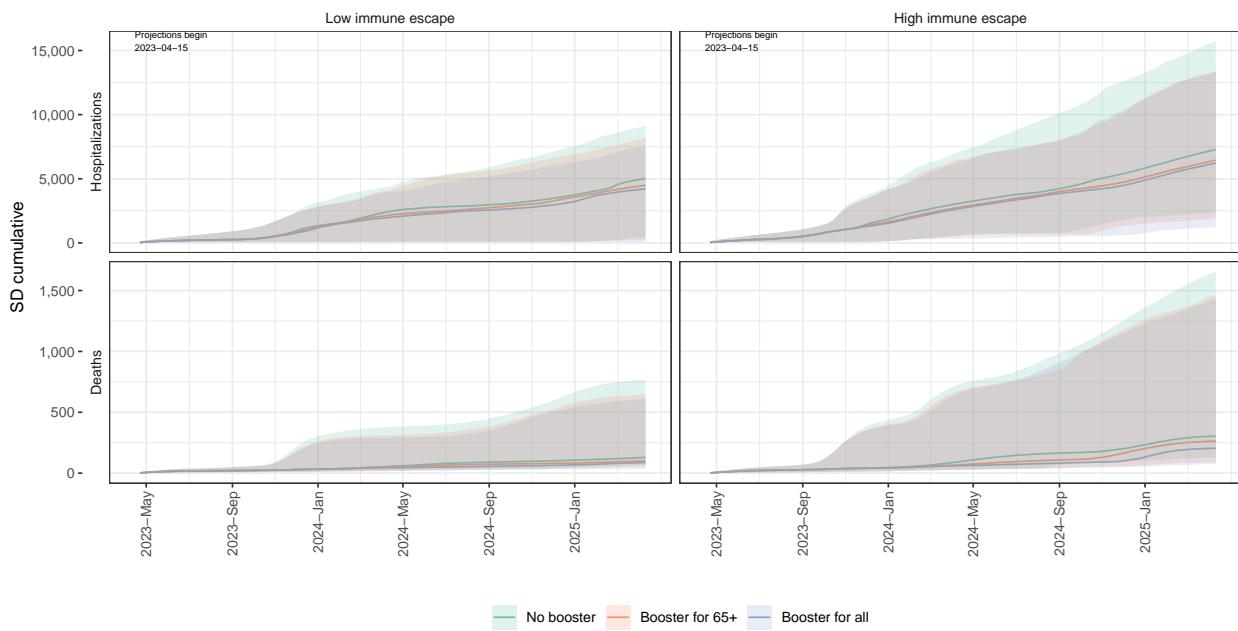
### RI ensemble projections & 95% projection intervals



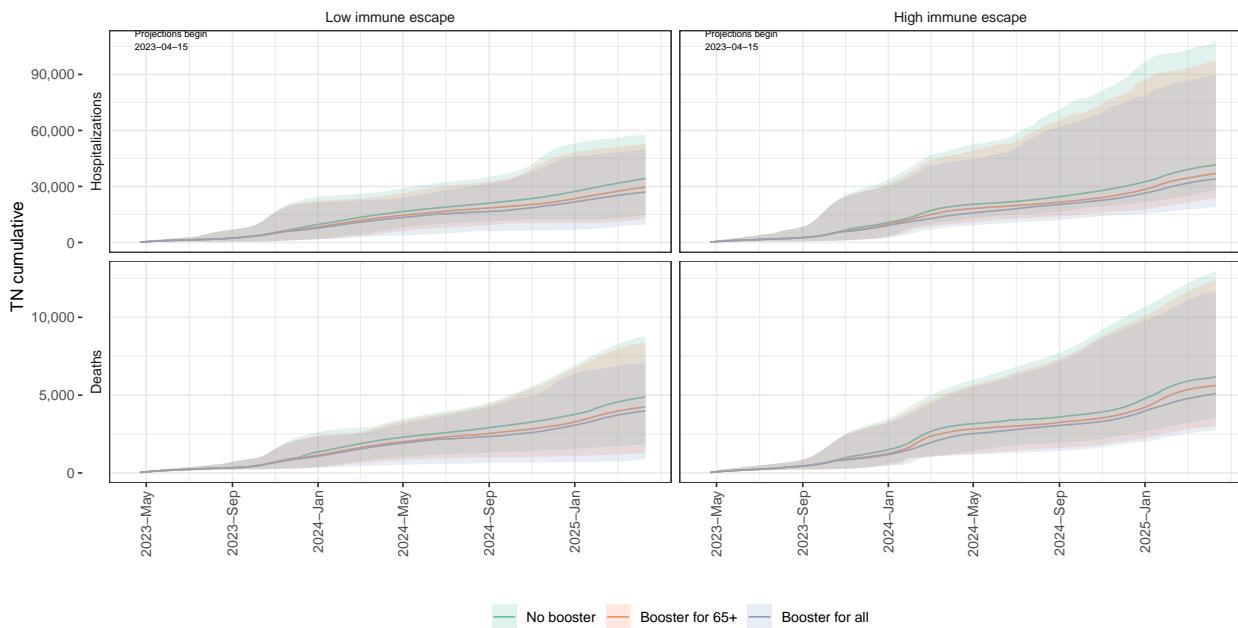
### SC ensemble projections & 95% projection intervals



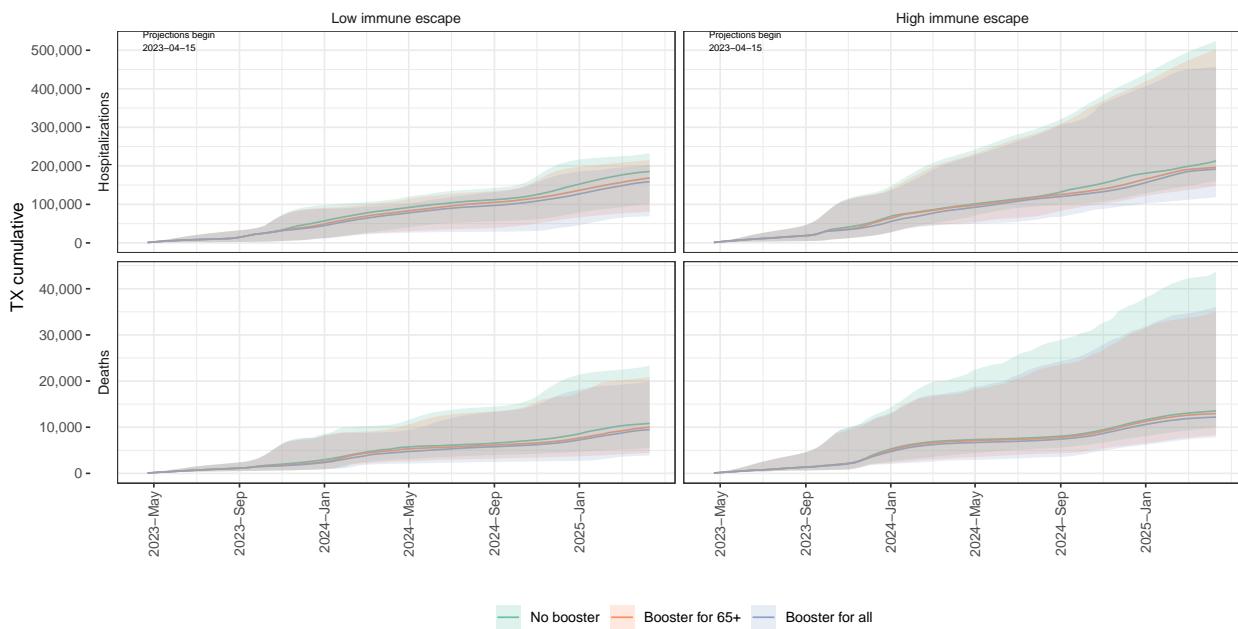
### SD ensemble projections & 95% projection intervals



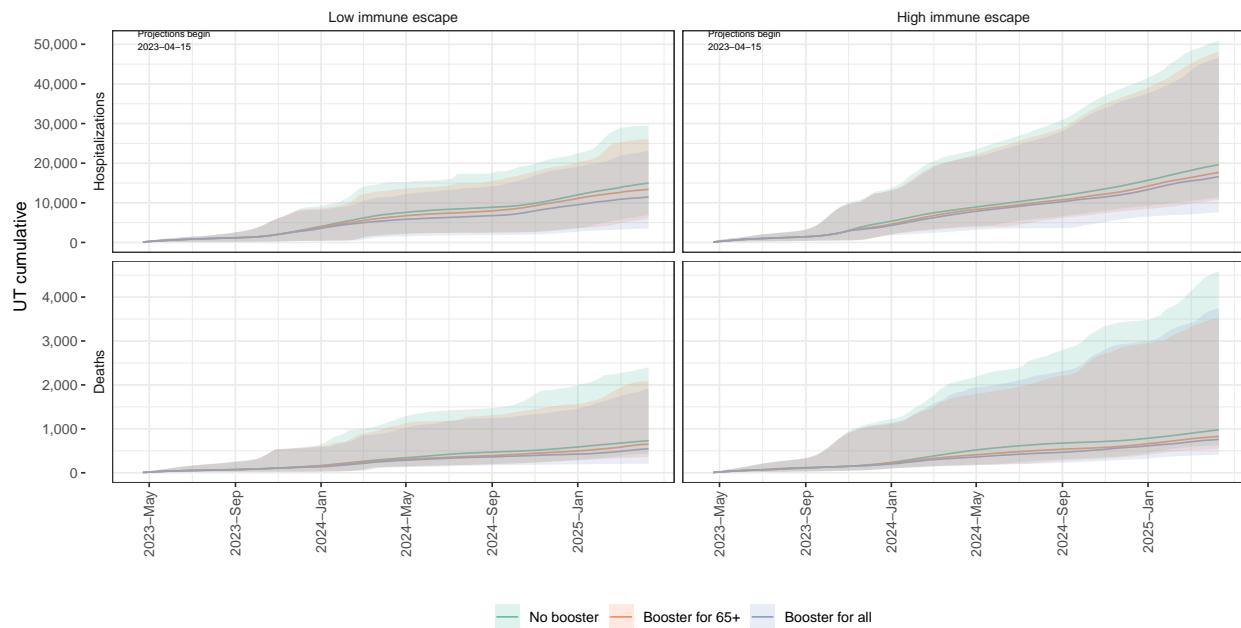
### TN ensemble projections & 95% projection intervals



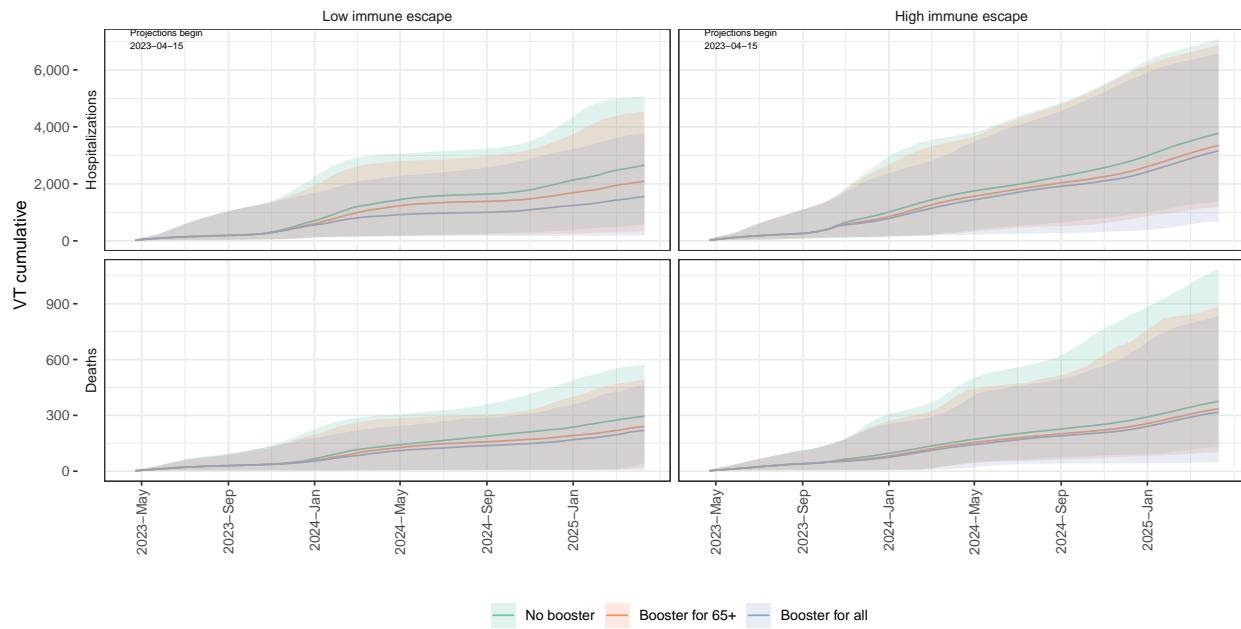
### TX ensemble projections & 95% projection intervals



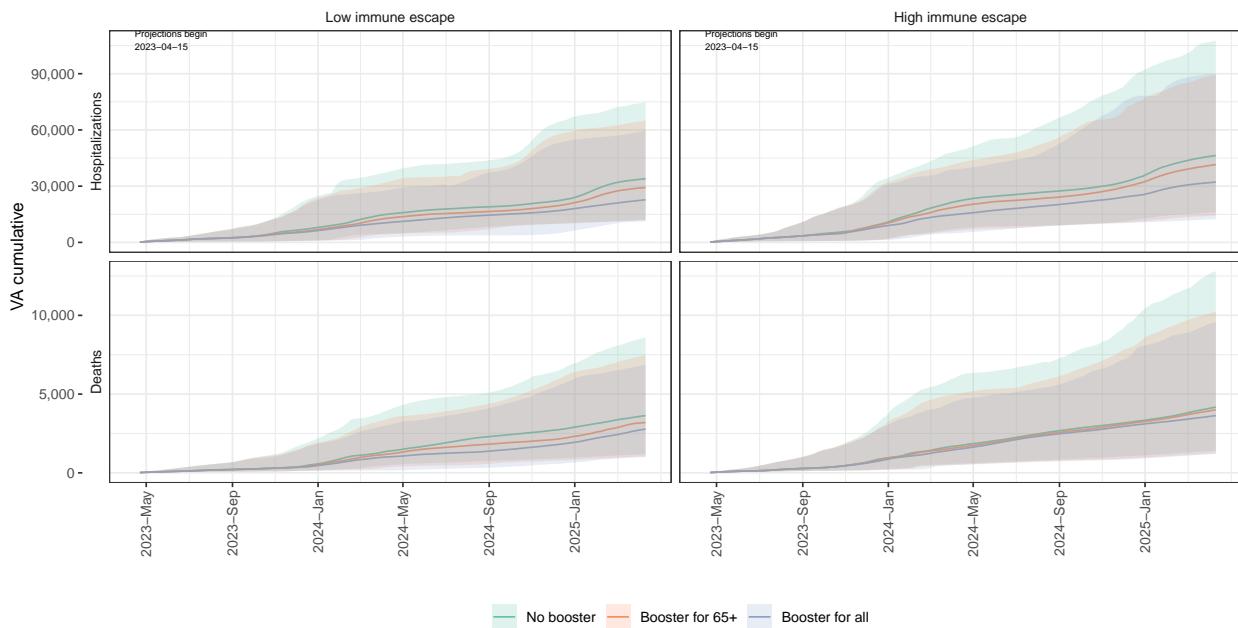
### UT ensemble projections & 95% projection intervals



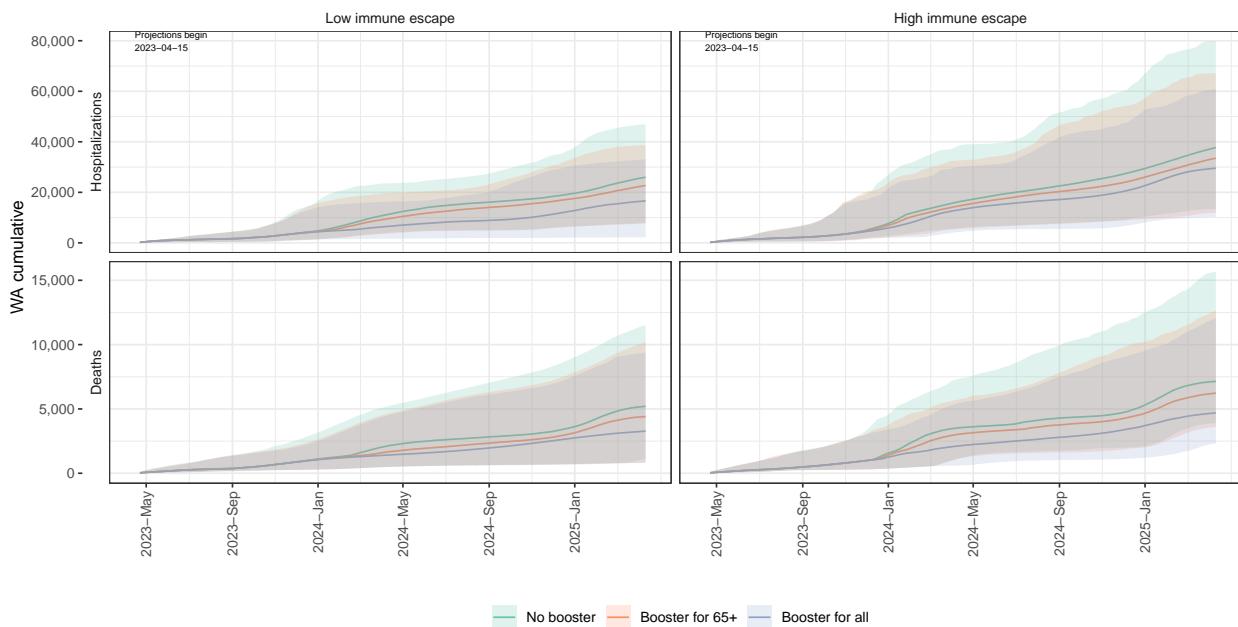
### VT ensemble projections & 95% projection intervals



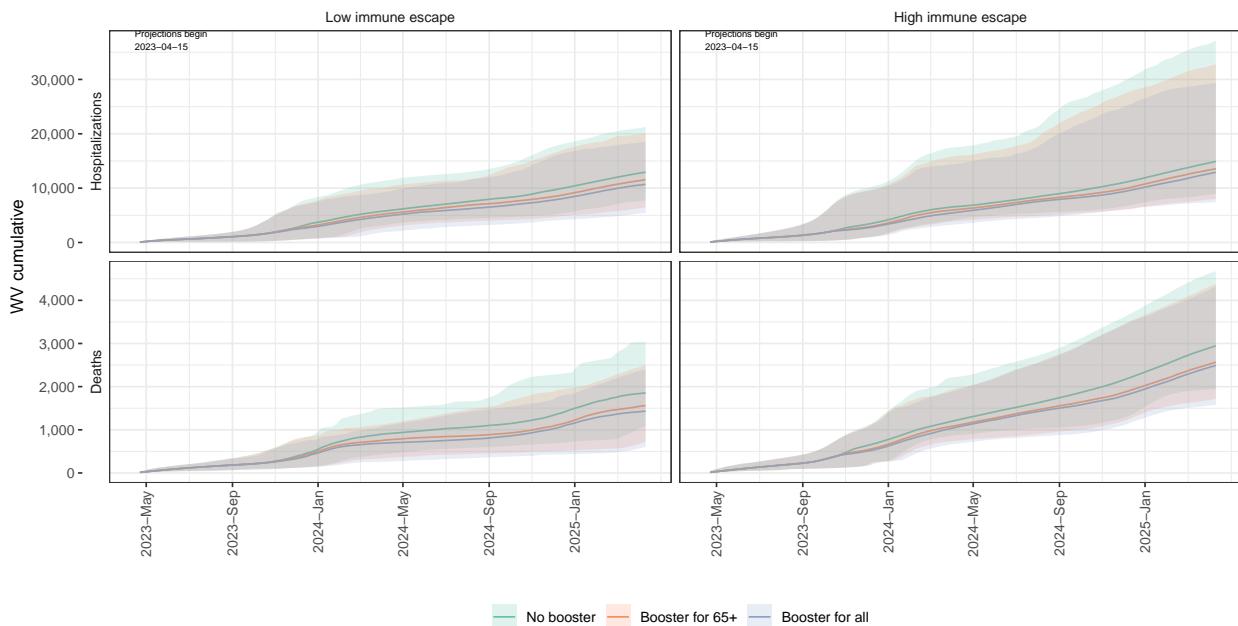
### VA ensemble projections & 95% projection intervals



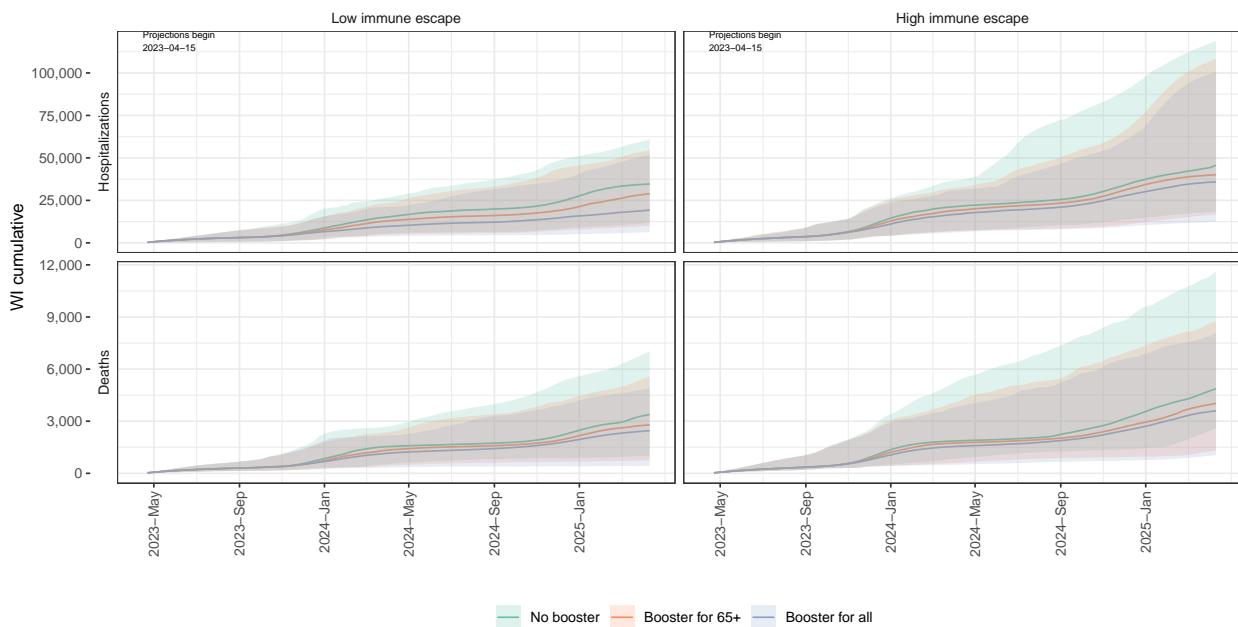
### WA ensemble projections & 95% projection intervals

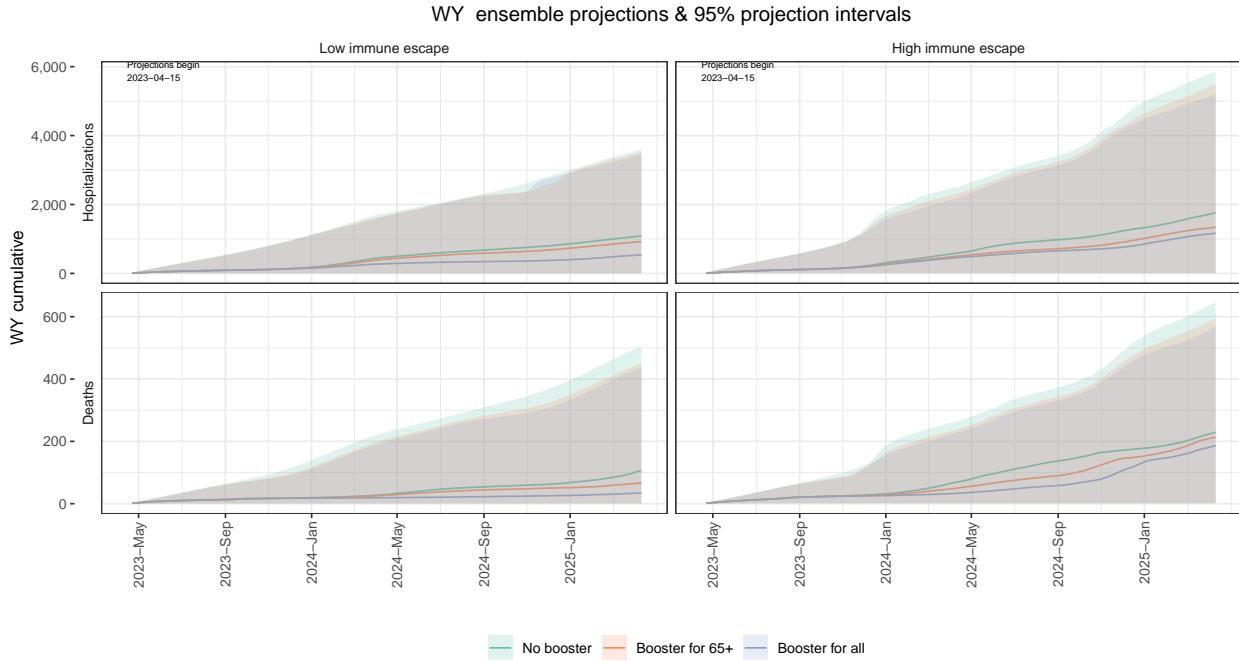


### WV ensemble projections & 95% projection intervals



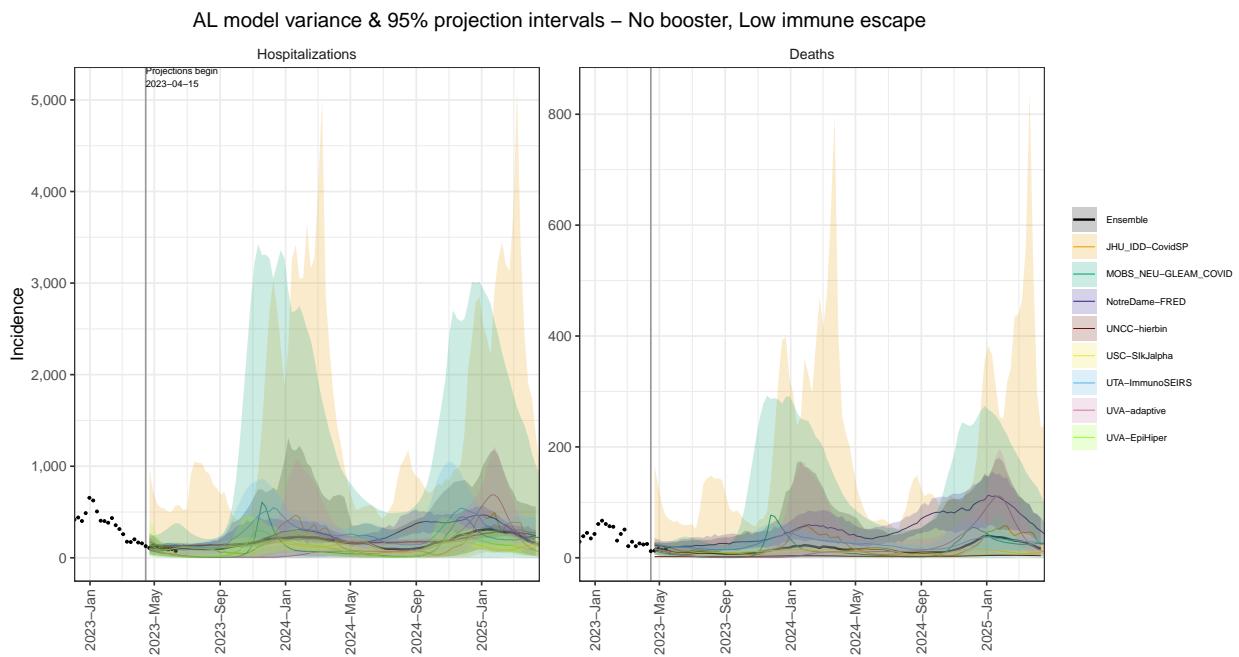
### WI ensemble projections & 95% projection intervals



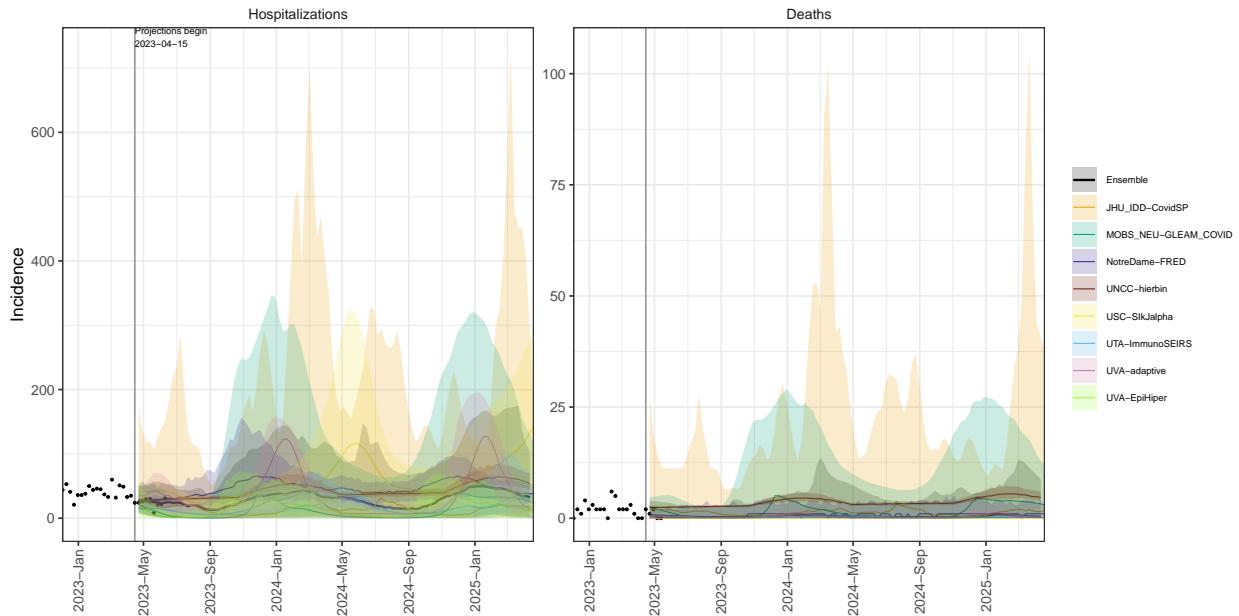


### State-level model variation

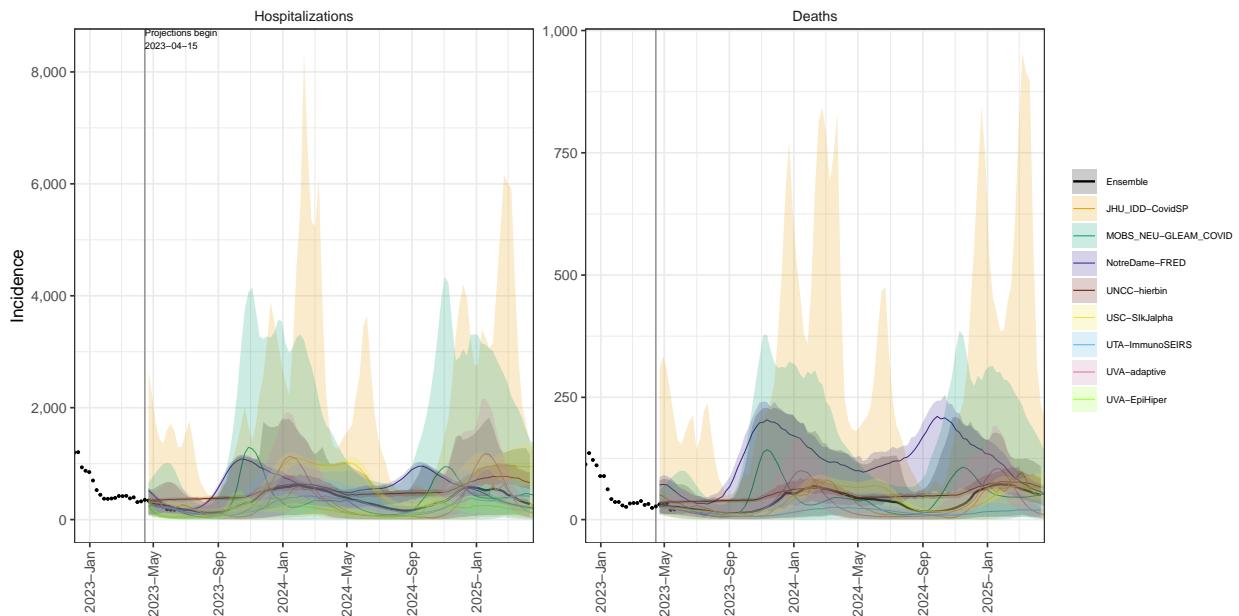
Model variation for No booster, Low immune escape scenario.



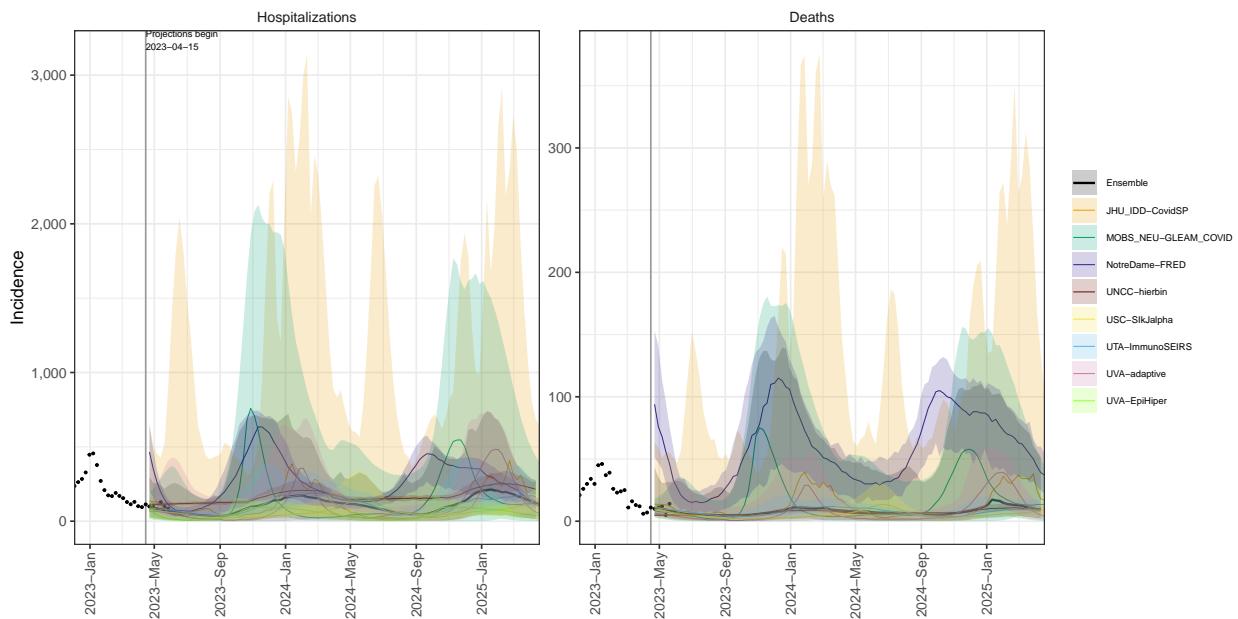
AK model variance & 95% projection intervals – No booster, Low immune escape



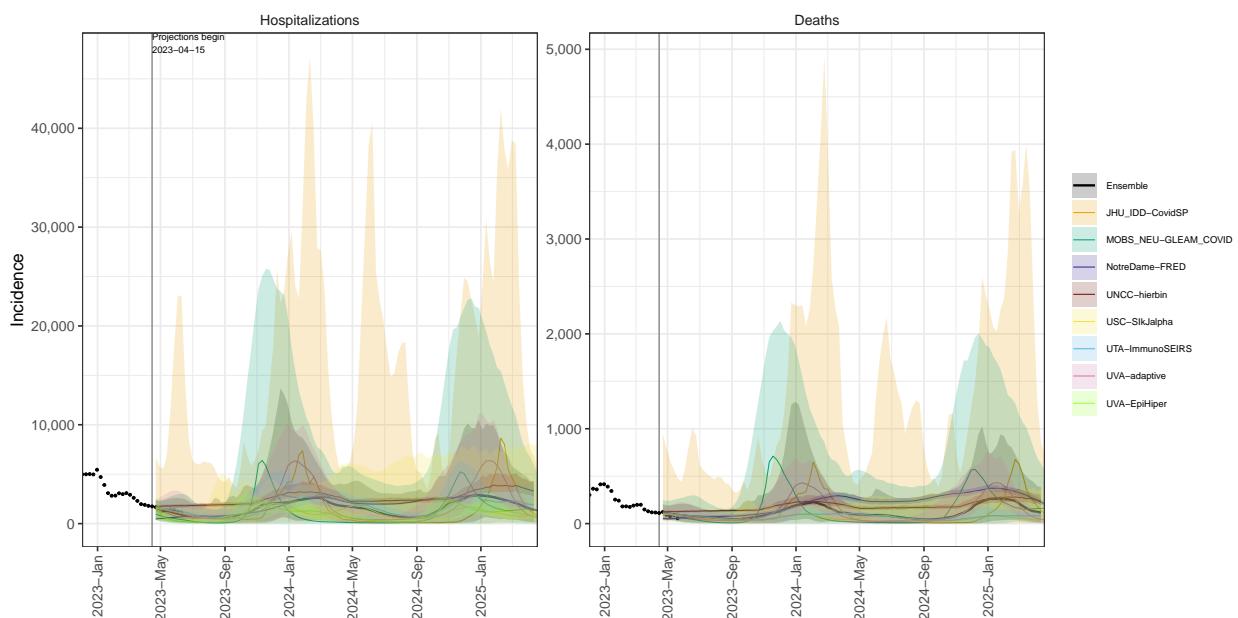
AZ model variance & 95% projection intervals – No booster, Low immune escape



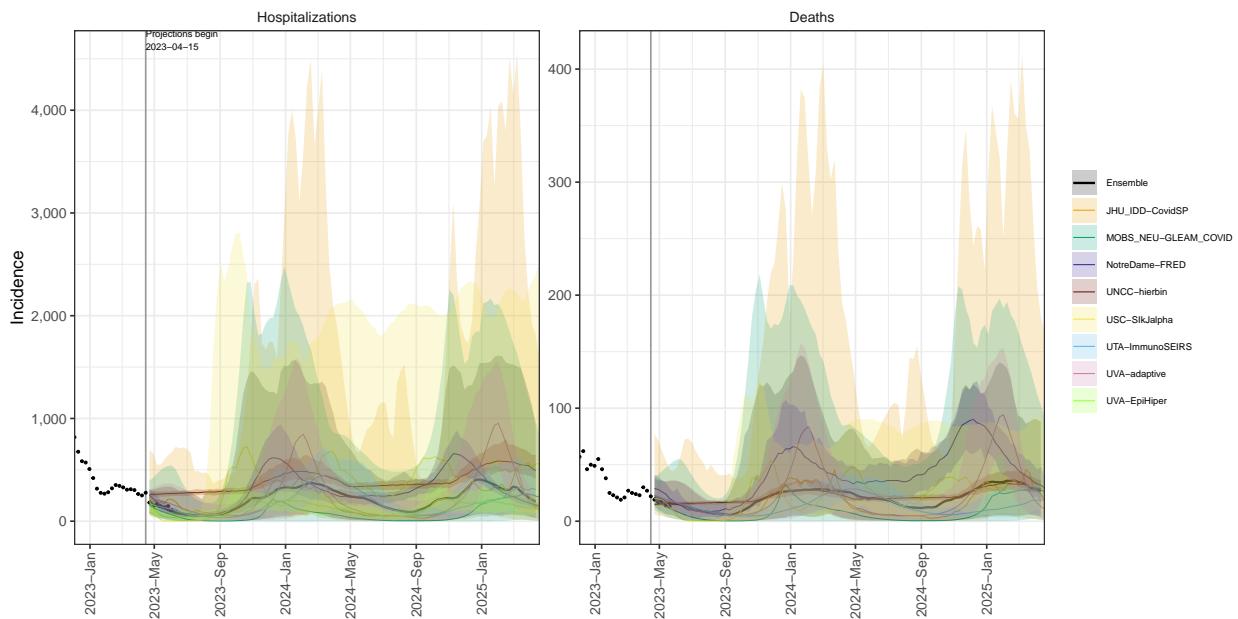
AR model variance & 95% projection intervals – No booster, Low immune escape



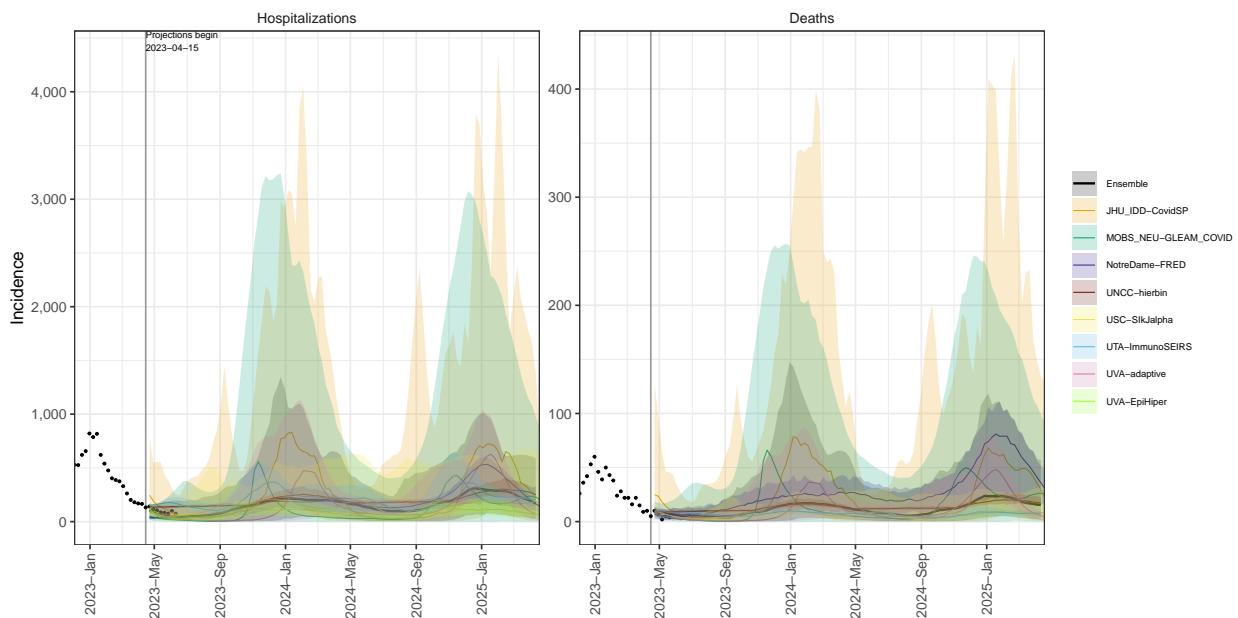
CA model variance & 95% projection intervals – No booster, Low immune escape



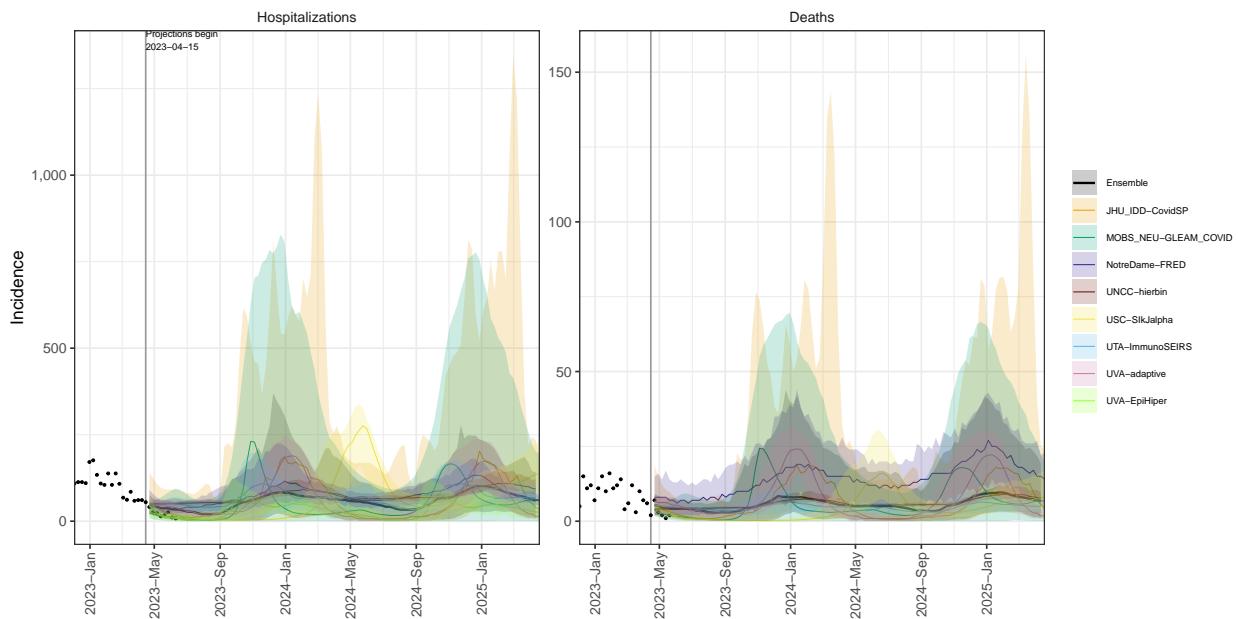
CO model variance & 95% projection intervals – No booster, Low immune escape



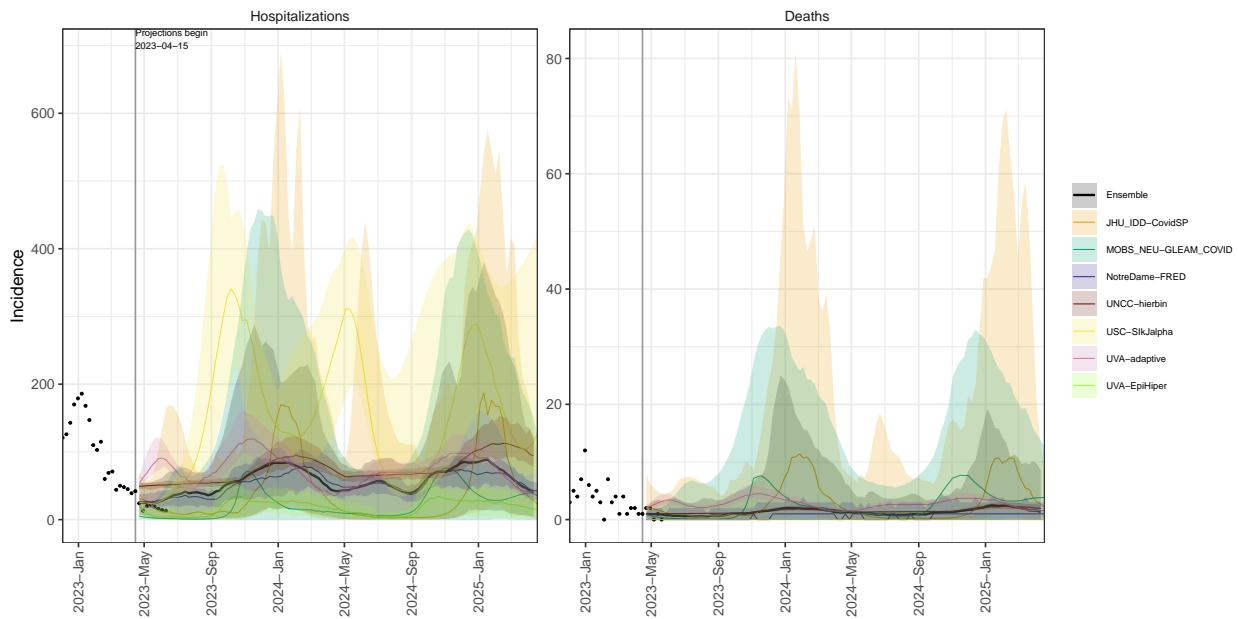
CT model variance & 95% projection intervals – No booster, Low immune escape



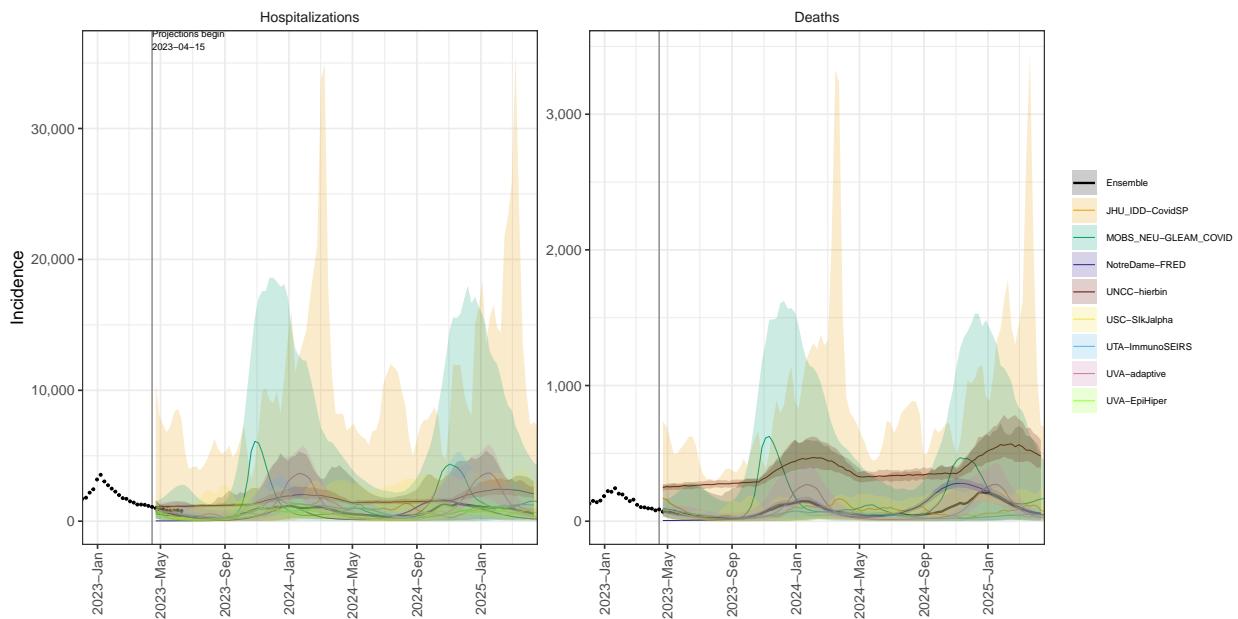
DE model variance & 95% projection intervals – No booster, Low immune escape



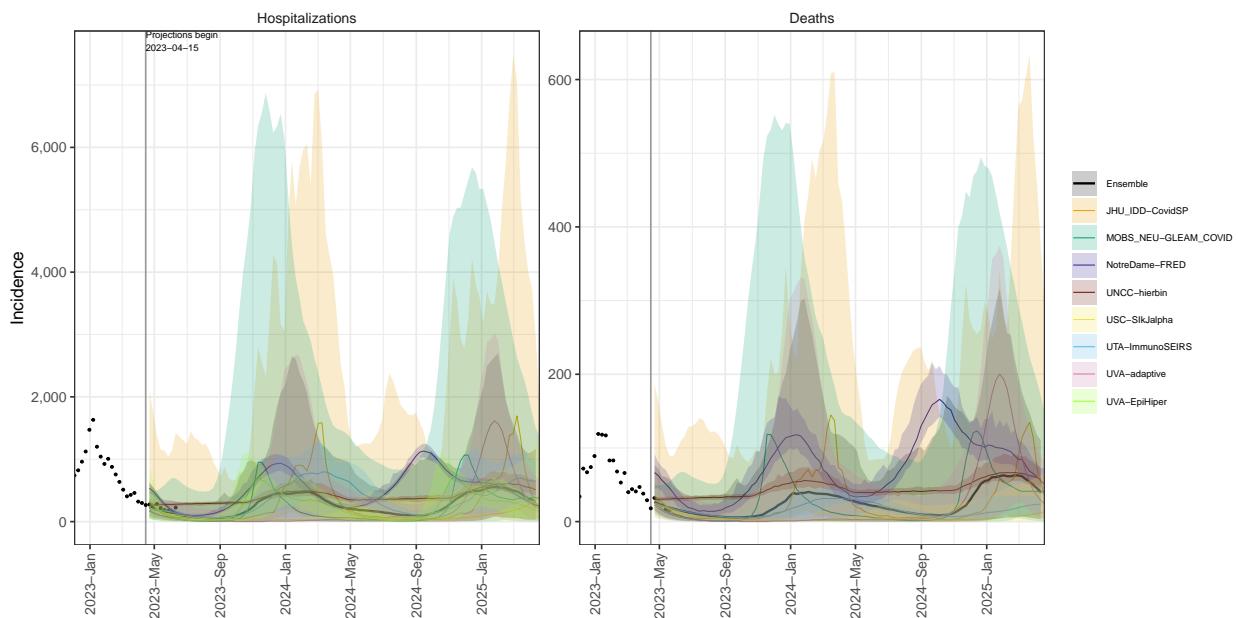
DC model variance & 95% projection intervals – No booster, Low immune escape



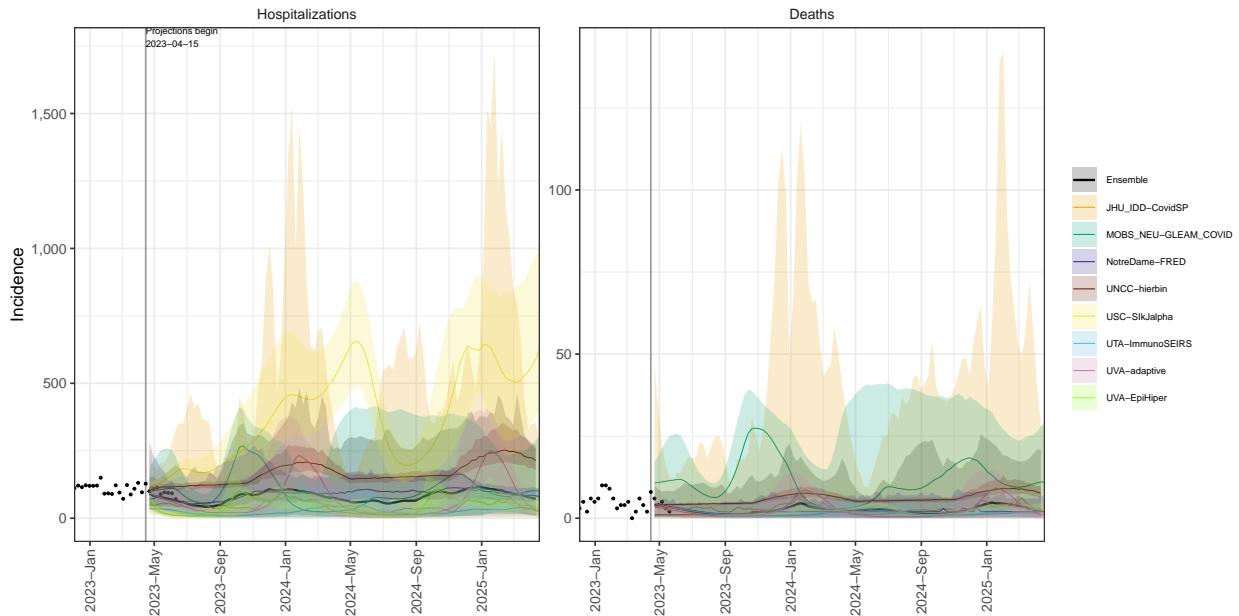
FL model variance & 95% projection intervals – No booster, Low immune escape



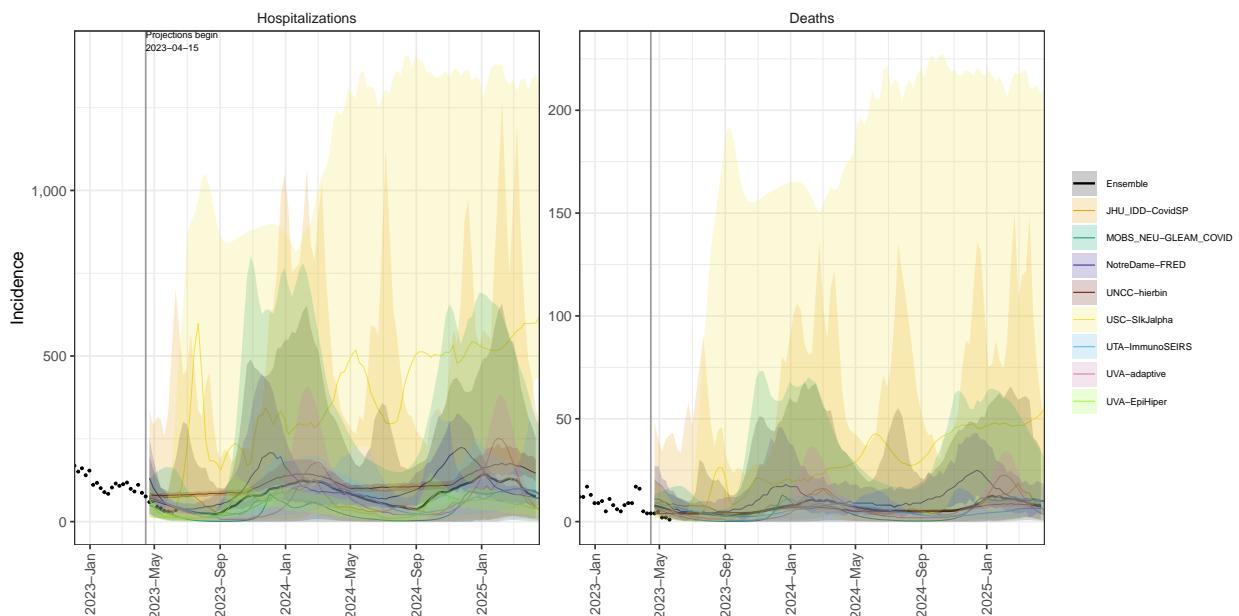
GA model variance & 95% projection intervals – No booster, Low immune escape



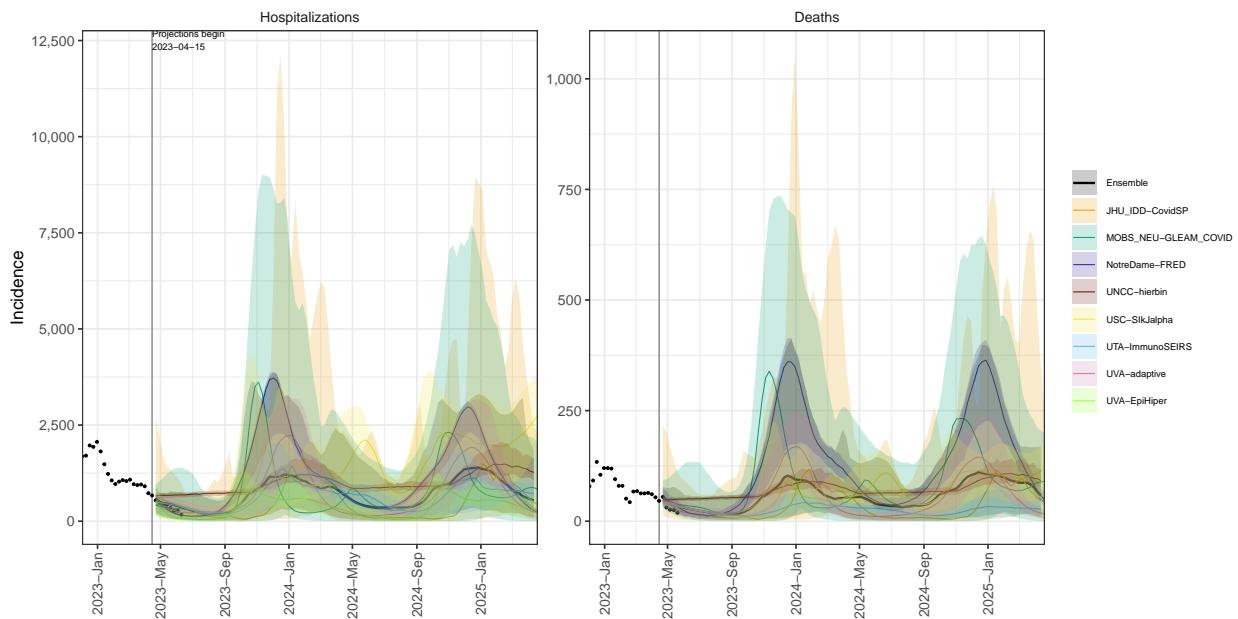
### HI model variance & 95% projection intervals – No booster, Low immune escape



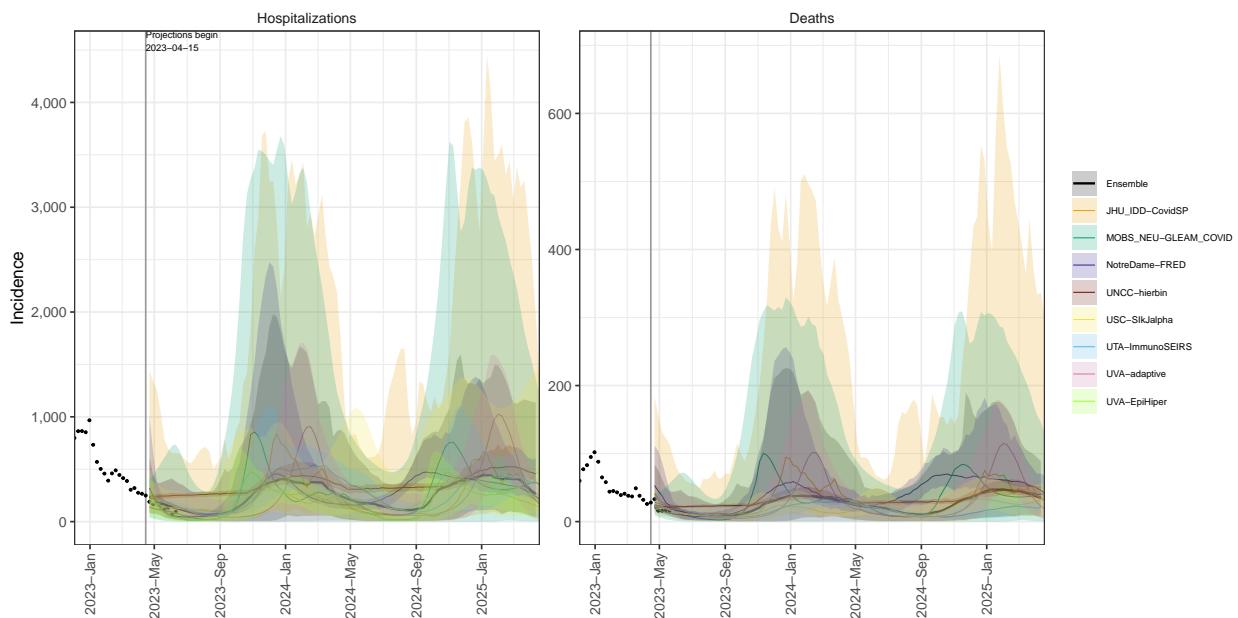
### ID model variance & 95% projection intervals – No booster, Low immune escape



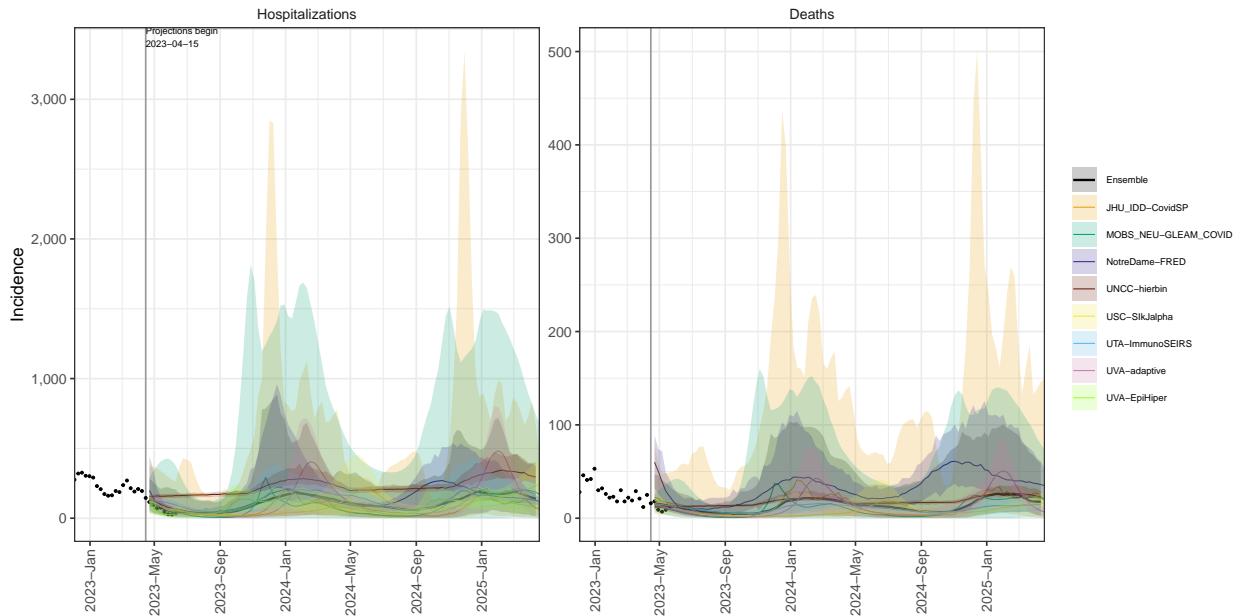
IL model variance & 95% projection intervals – No booster, Low immune escape



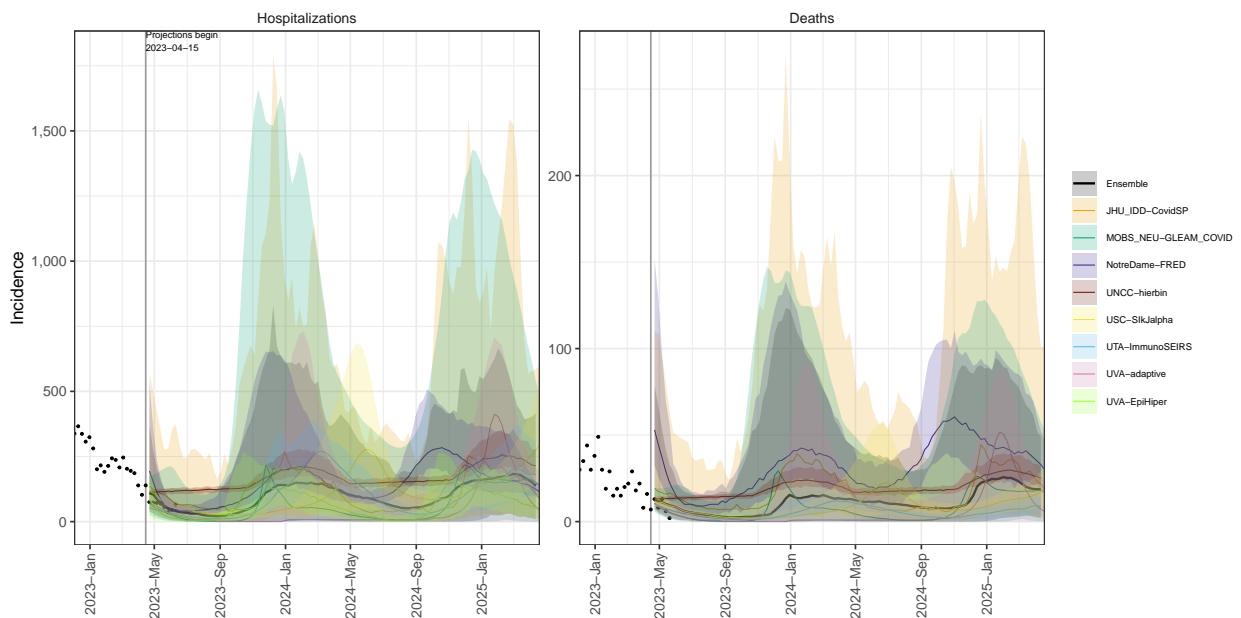
IN model variance & 95% projection intervals – No booster, Low immune escape



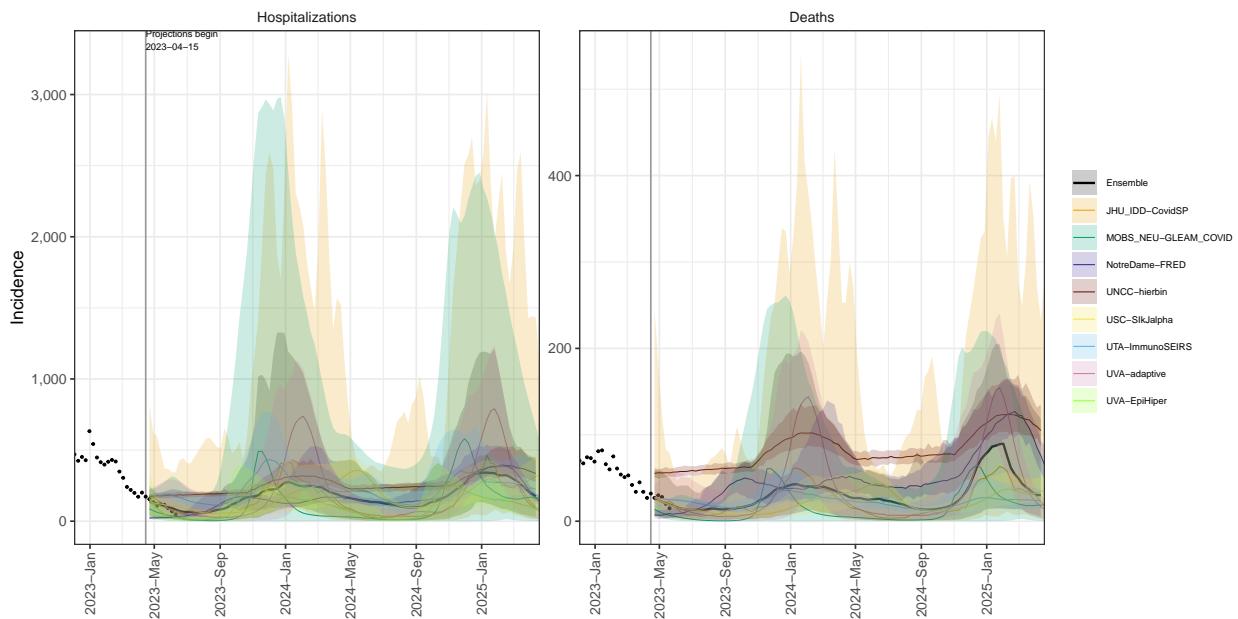
IA model variance & 95% projection intervals – No booster, Low immune escape



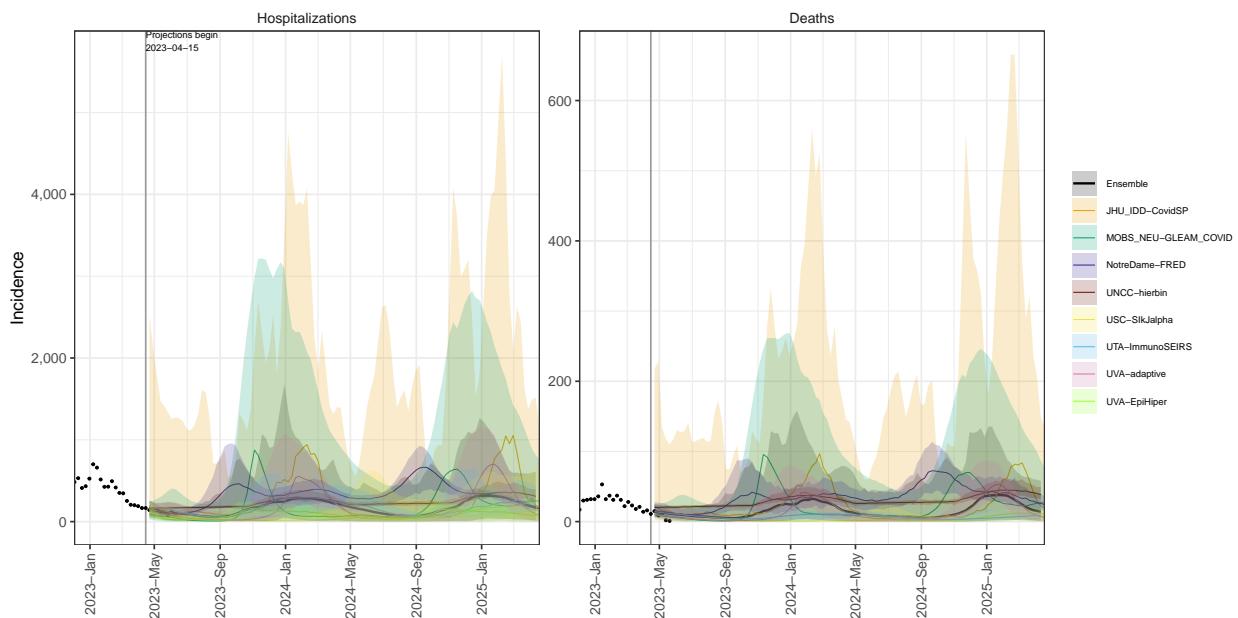
KS model variance & 95% projection intervals – No booster, Low immune escape



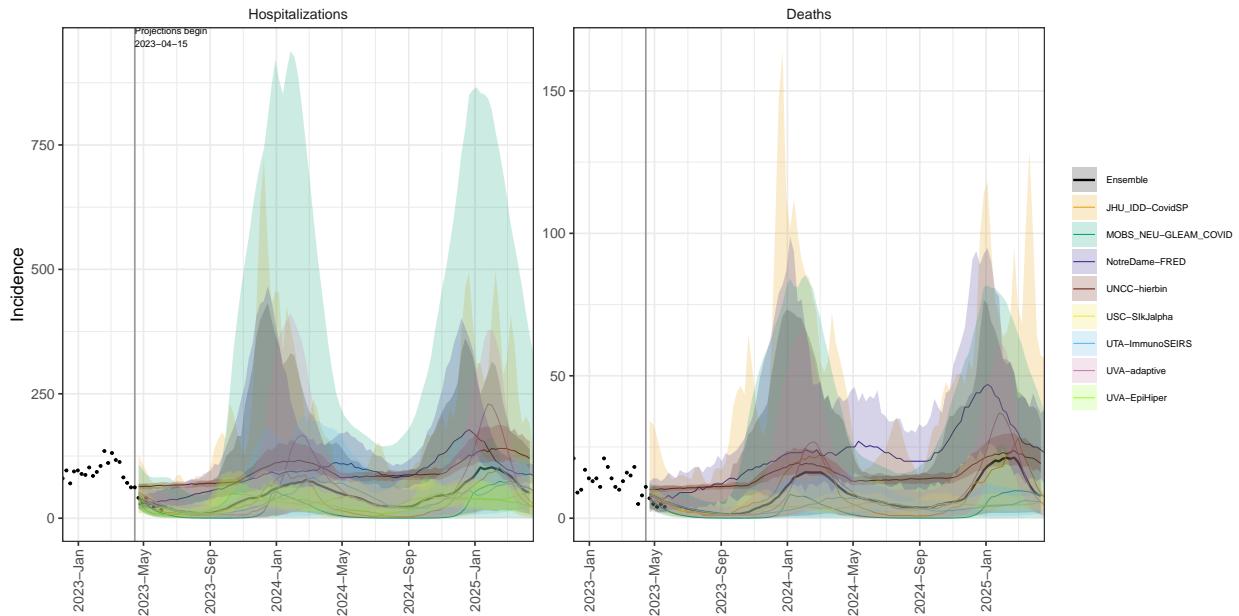
KY model variance & 95% projection intervals – No booster, Low immune escape



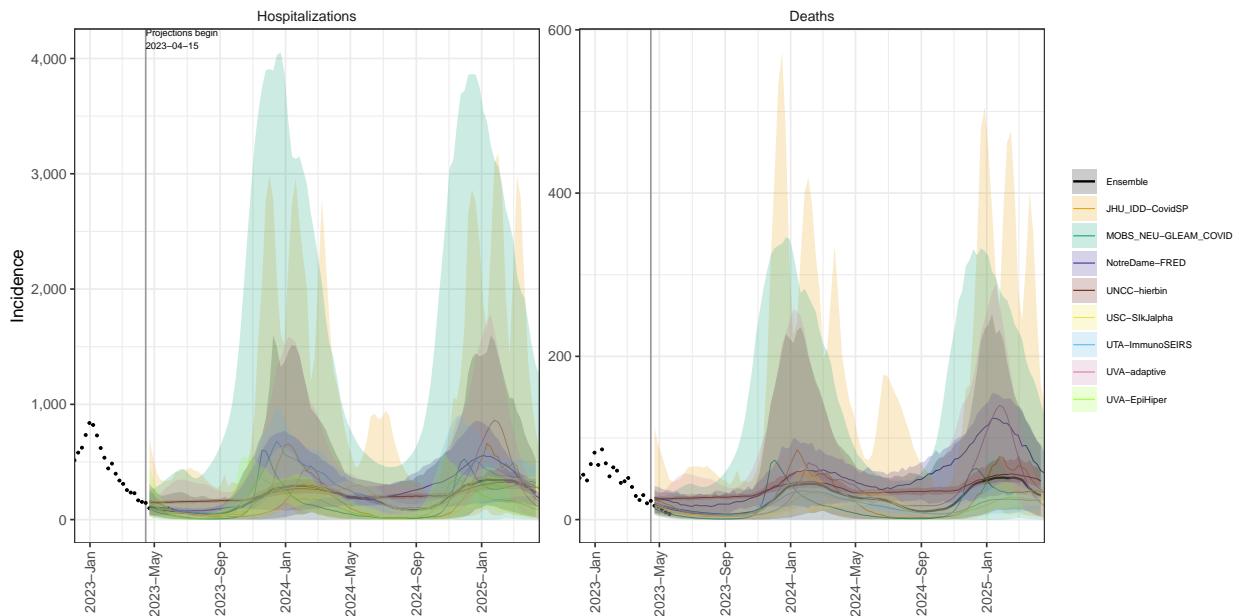
LA model variance & 95% projection intervals – No booster, Low immune escape



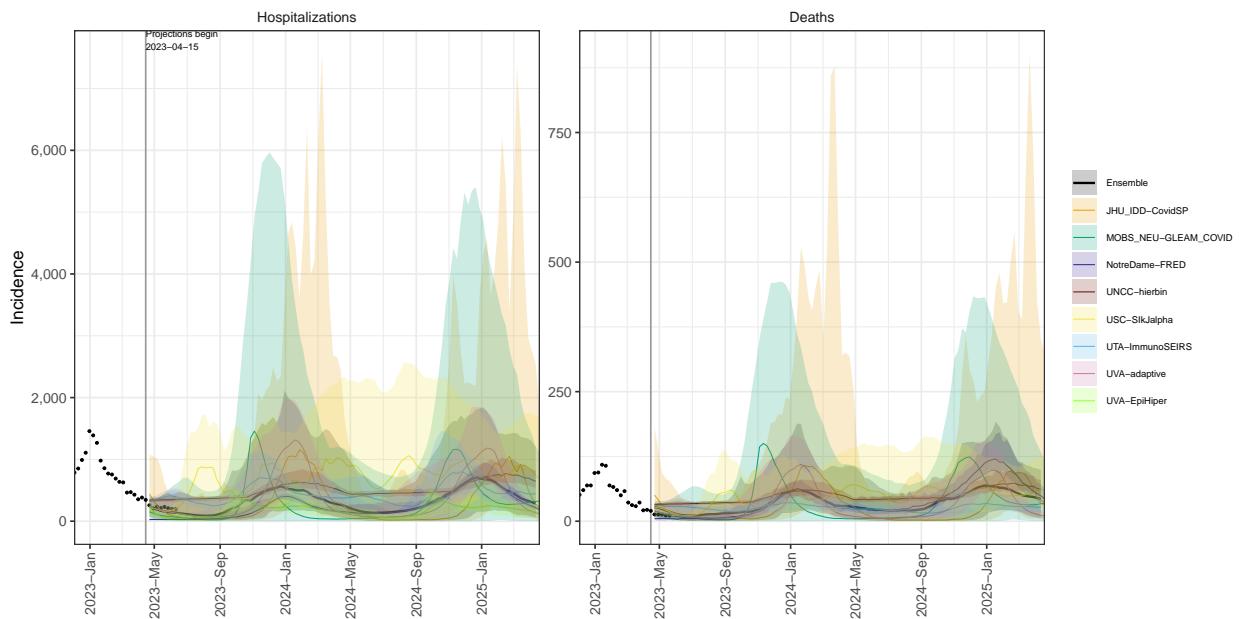
ME model variance & 95% projection intervals – No booster, Low immune escape



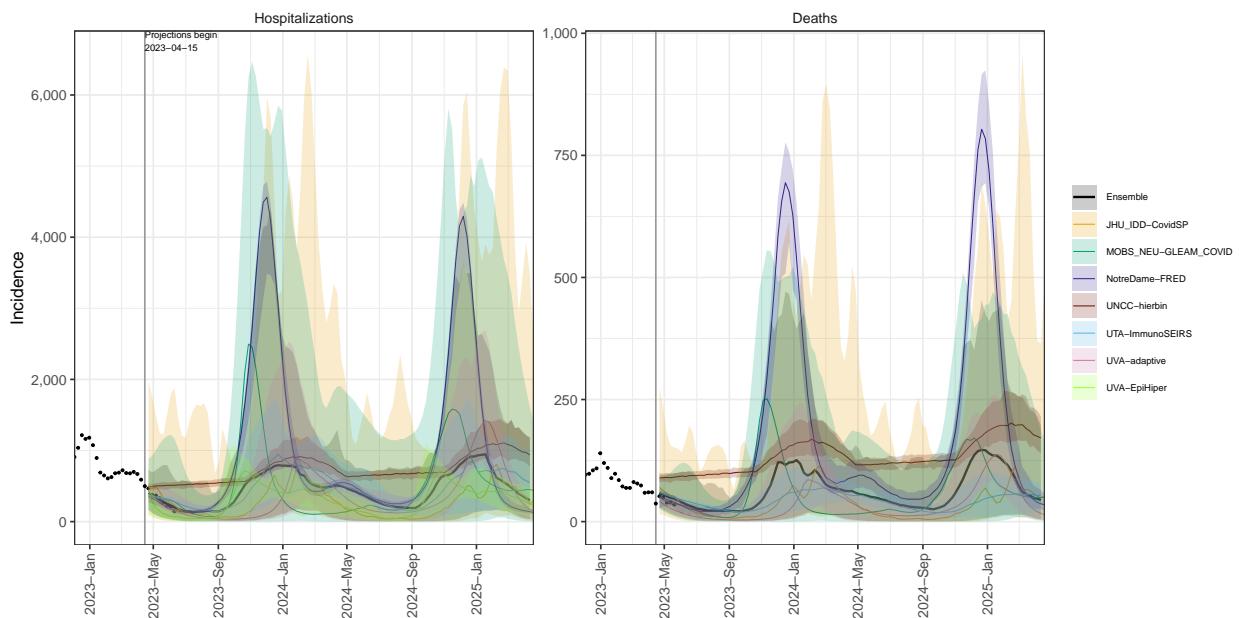
MD model variance & 95% projection intervals – No booster, Low immune escape



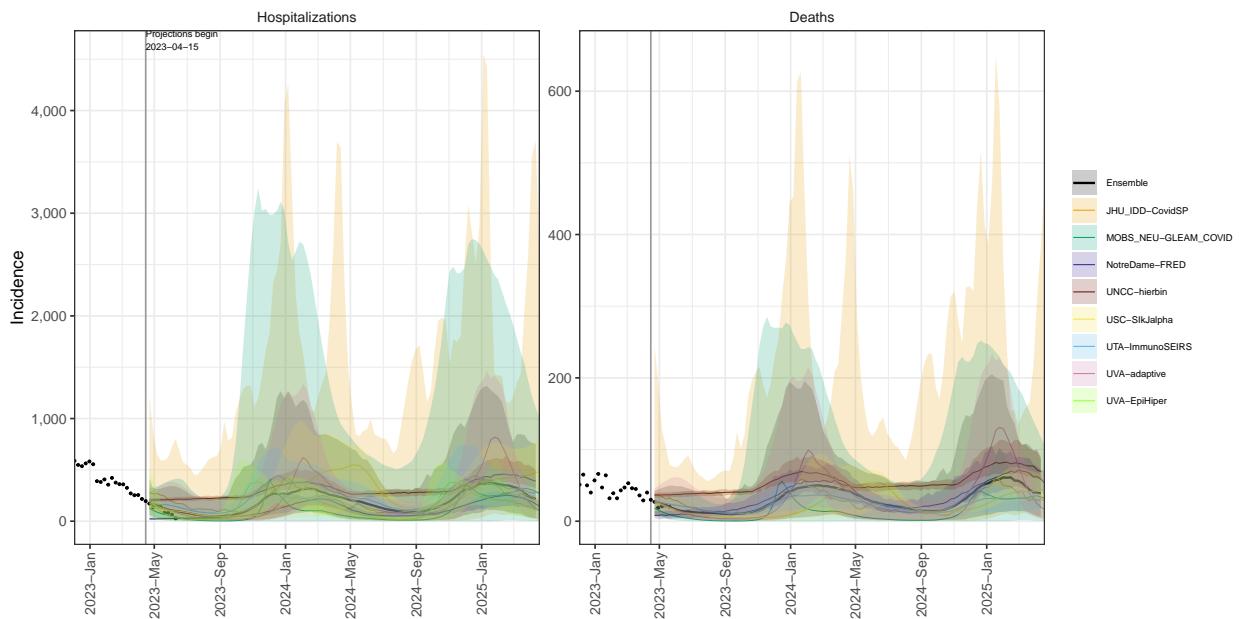
MA model variance & 95% projection intervals – No booster, Low immune escape



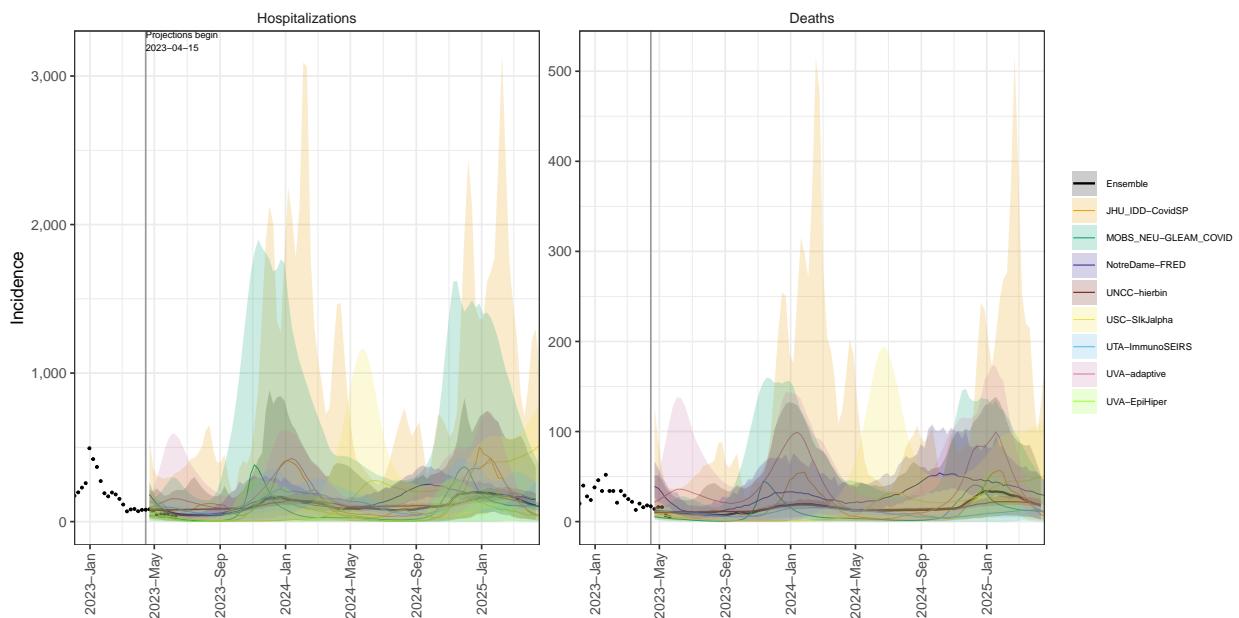
MI model variance & 95% projection intervals – No booster, Low immune escape



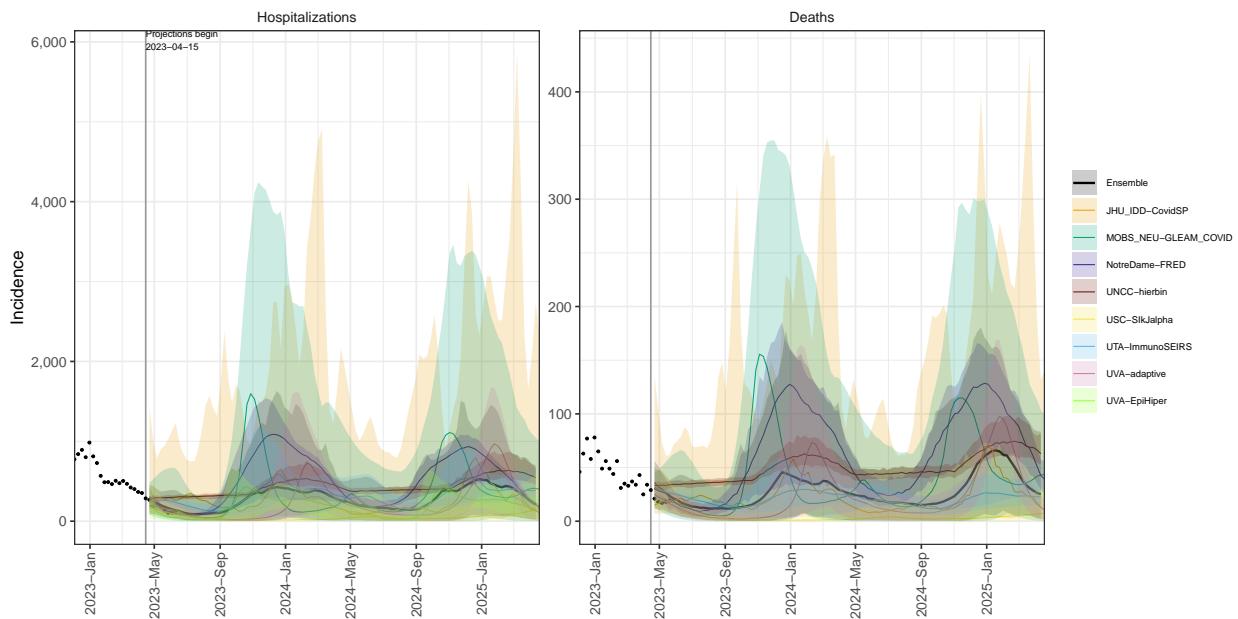
MN model variance & 95% projection intervals – No booster, Low immune escape



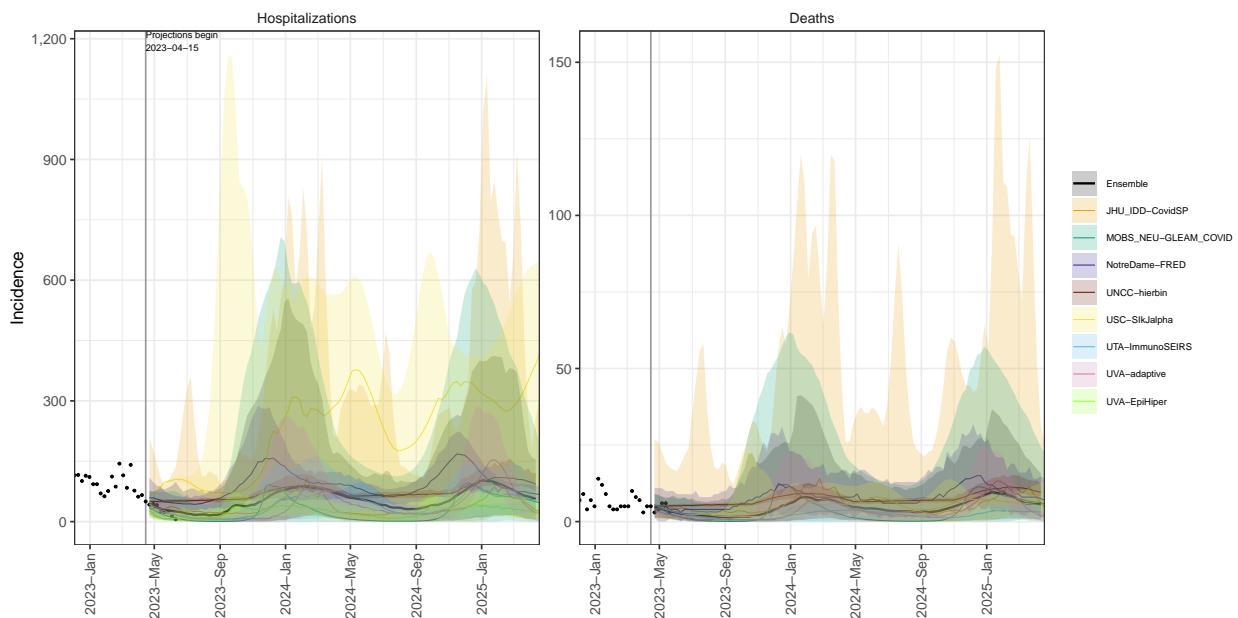
MS model variance & 95% projection intervals – No booster, Low immune escape



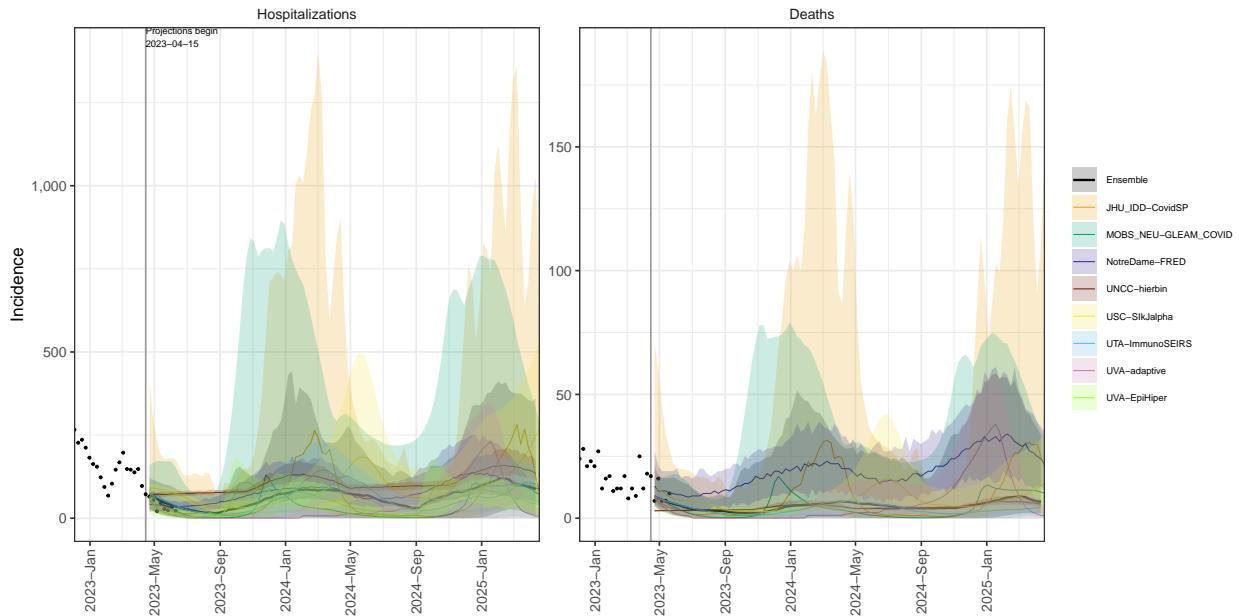
MO model variance & 95% projection intervals – No booster, Low immune escape



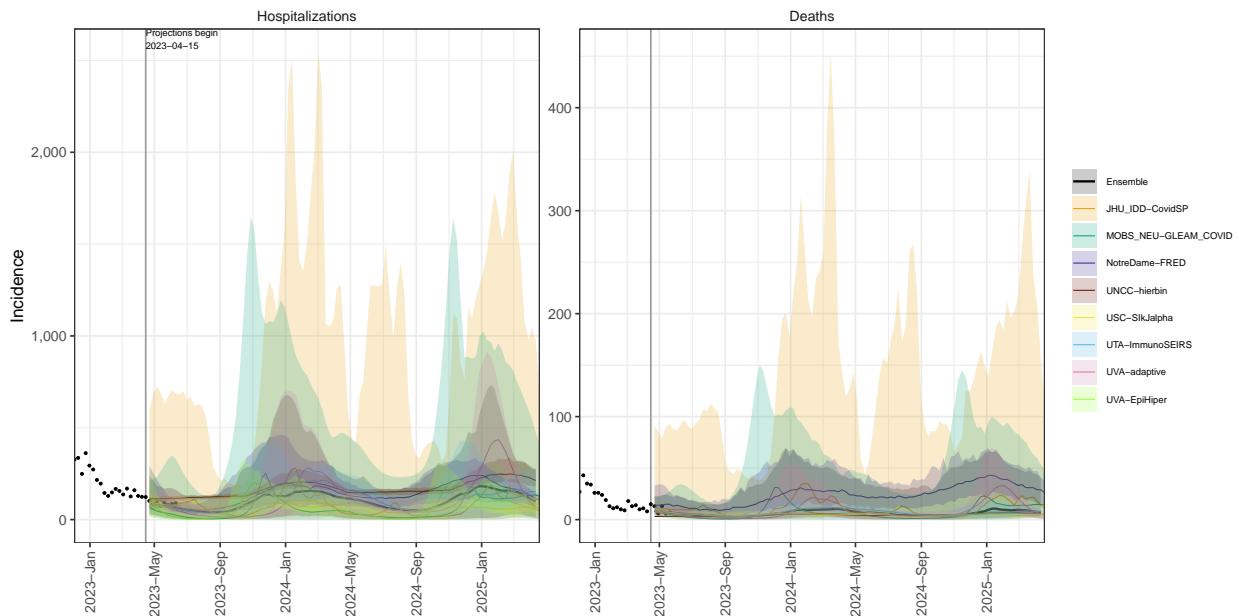
MT model variance & 95% projection intervals – No booster, Low immune escape



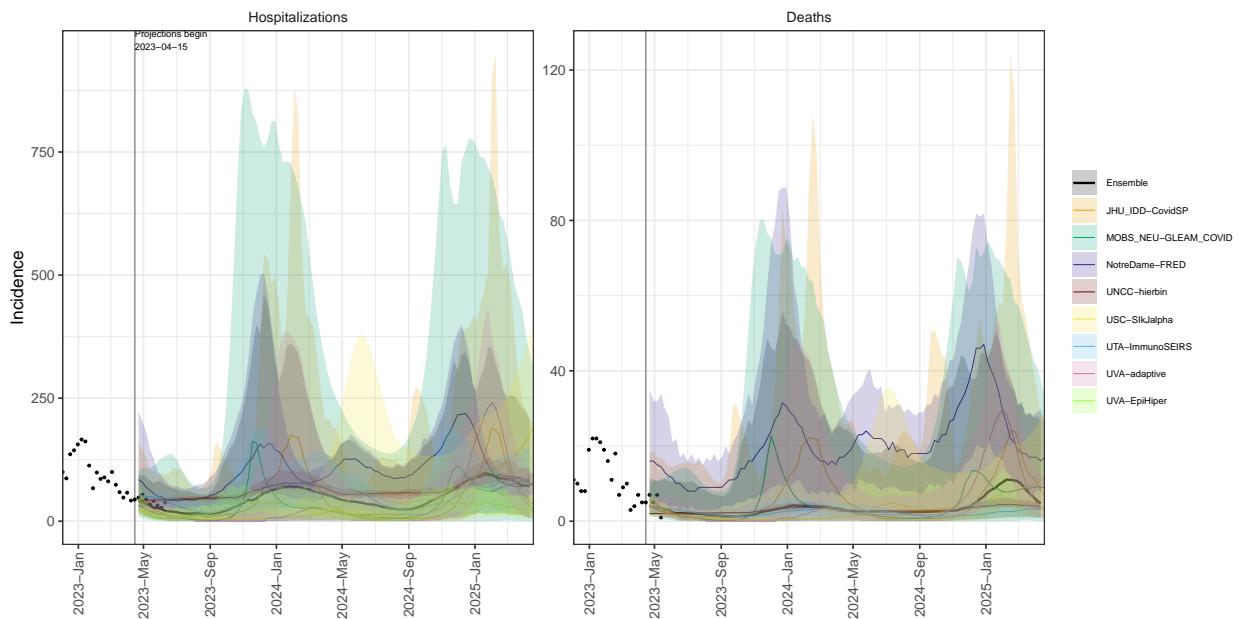
NE model variance & 95% projection intervals – No booster, Low immune escape



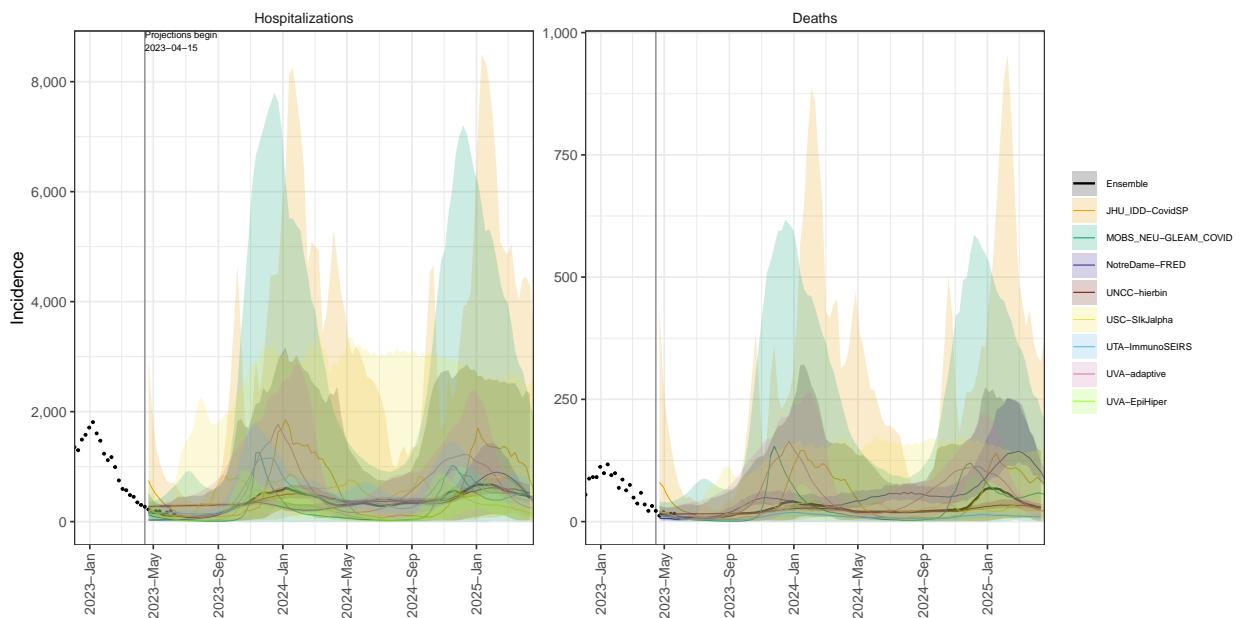
NV model variance & 95% projection intervals – No booster, Low immune escape



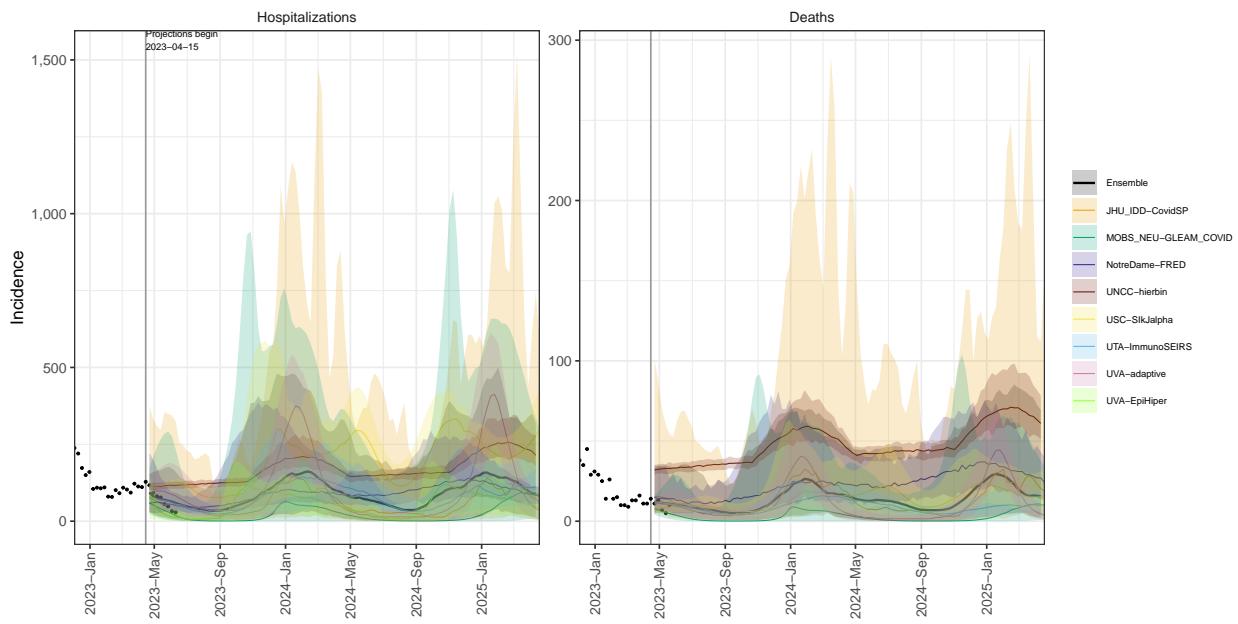
NH model variance & 95% projection intervals – No booster, Low immune escape



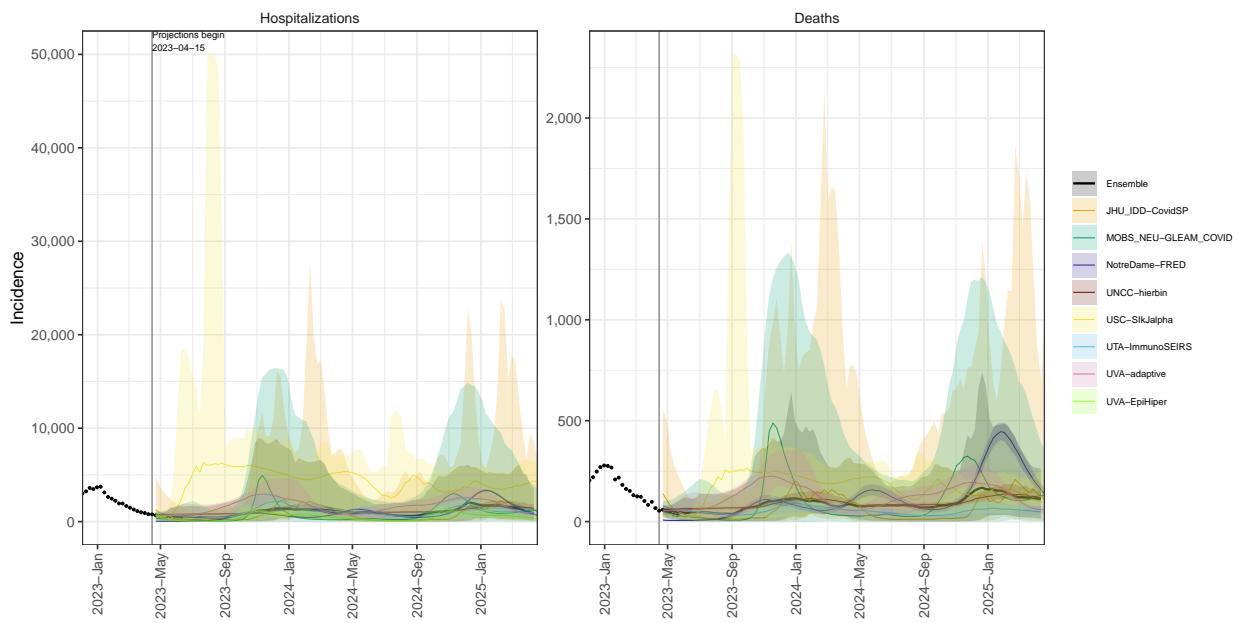
NJ model variance & 95% projection intervals – No booster, Low immune escape



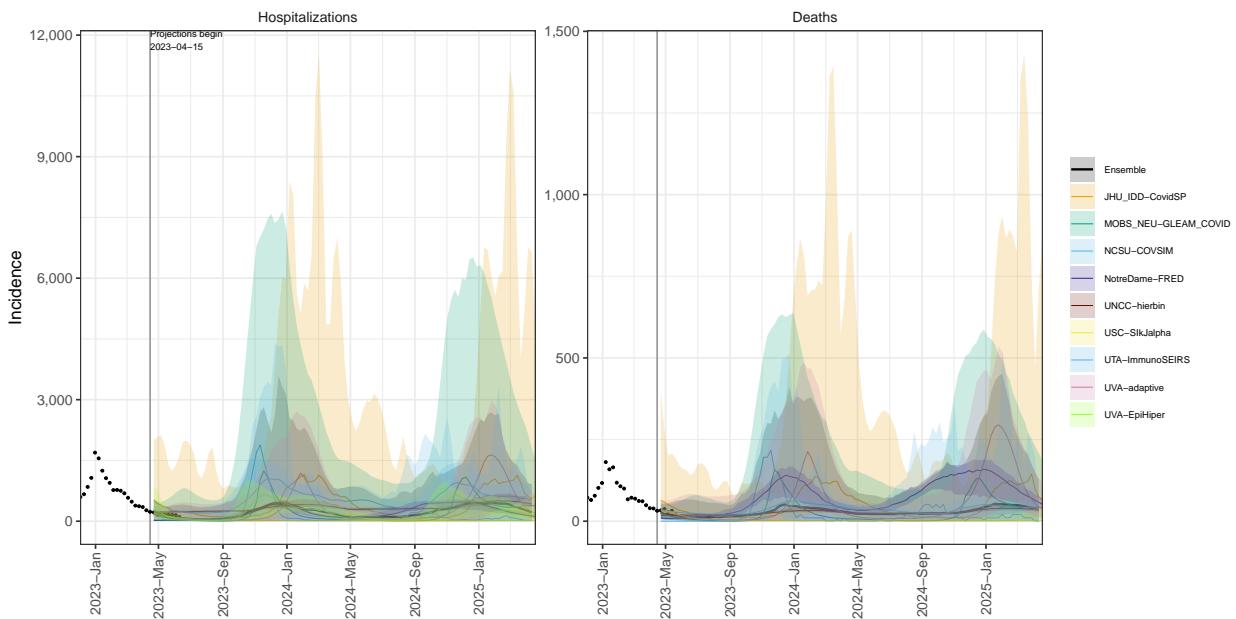
NM model variance & 95% projection intervals – No booster, Low immune escape



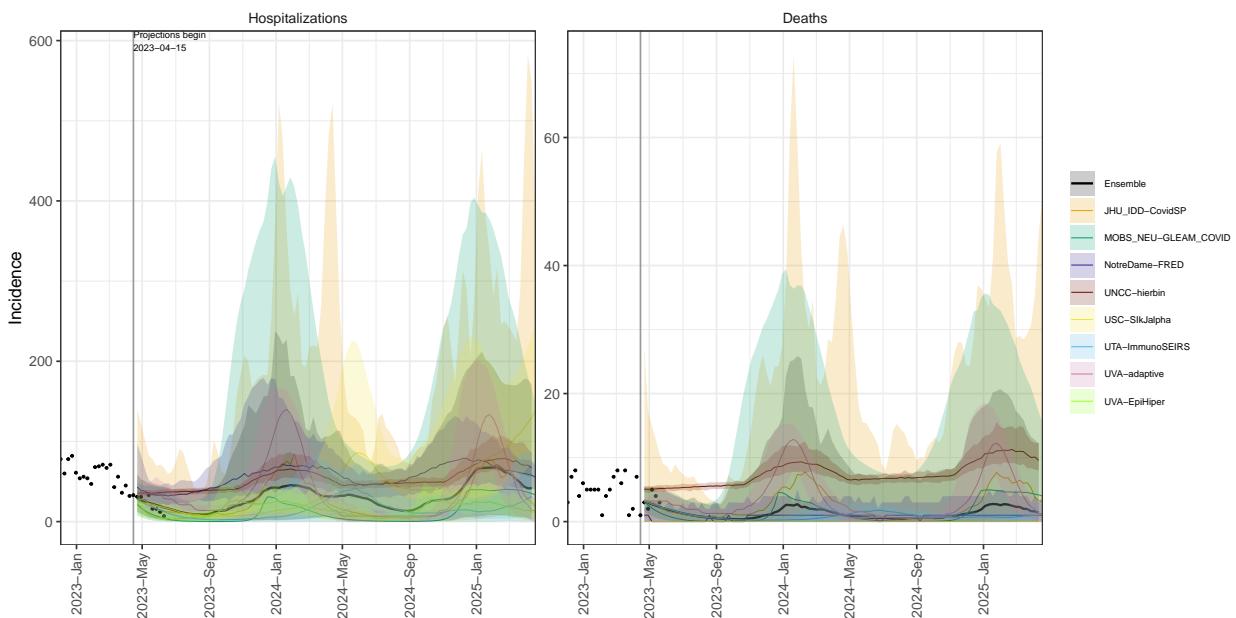
NY model variance & 95% projection intervals – No booster, Low immune escape



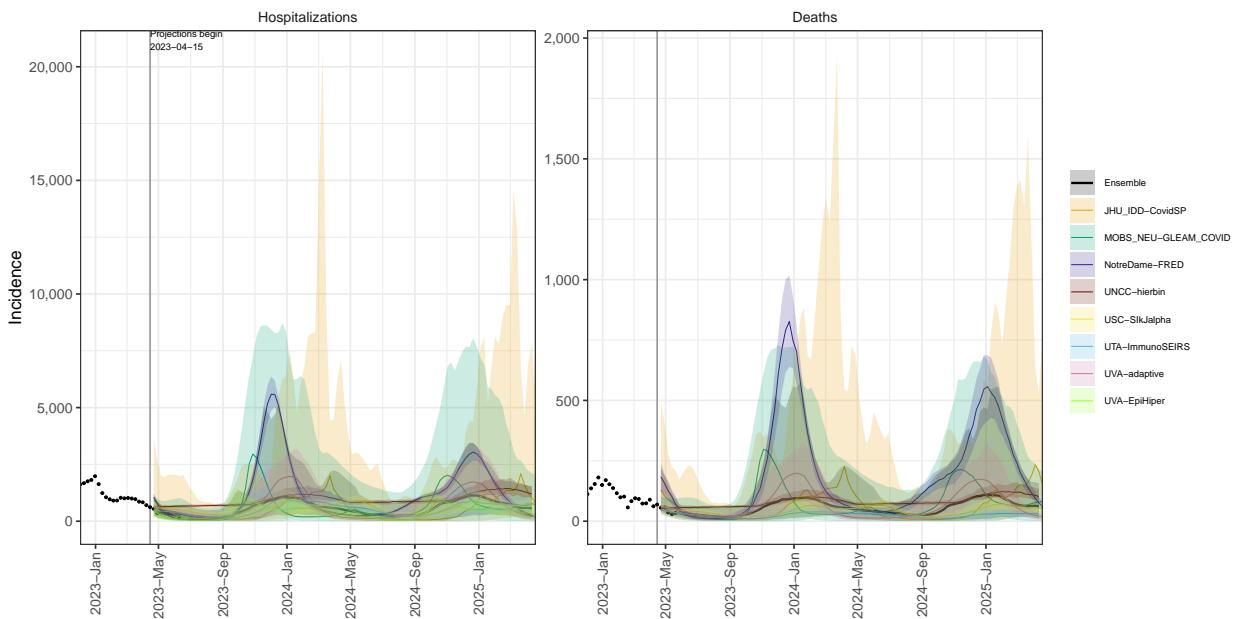
### NC model variance & 95% projection intervals – No booster, Low immune escape



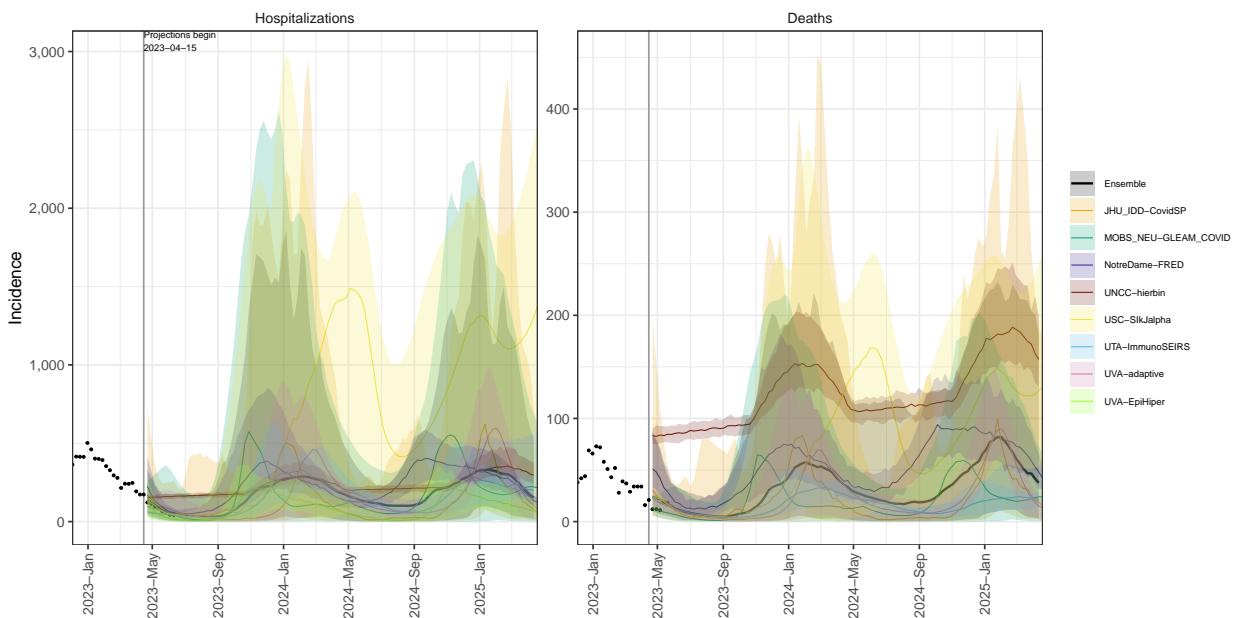
### ND model variance & 95% projection intervals – No booster, Low immune escape



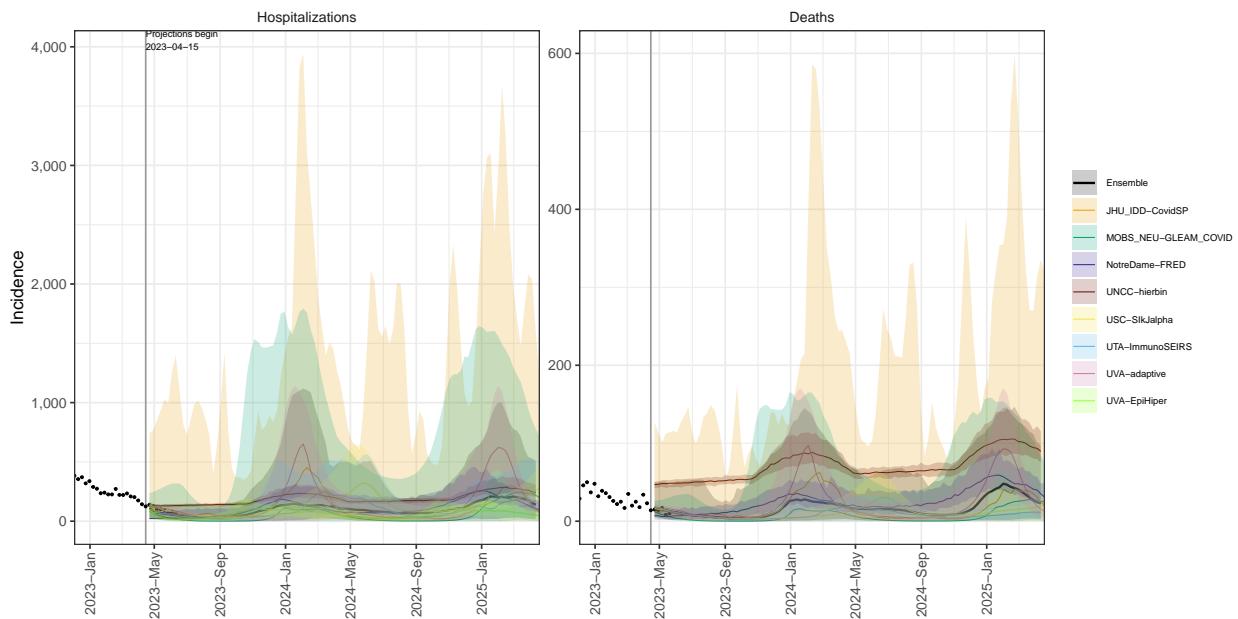
OH model variance & 95% projection intervals – No booster, Low immune escape



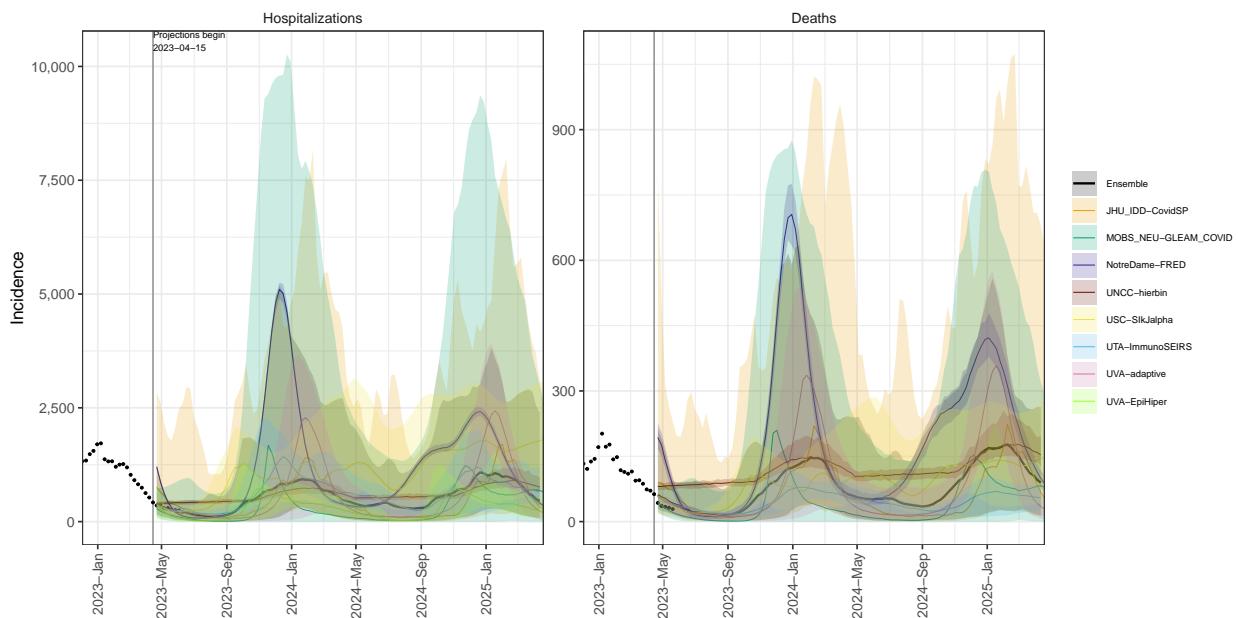
OK model variance & 95% projection intervals – No booster, Low immune escape



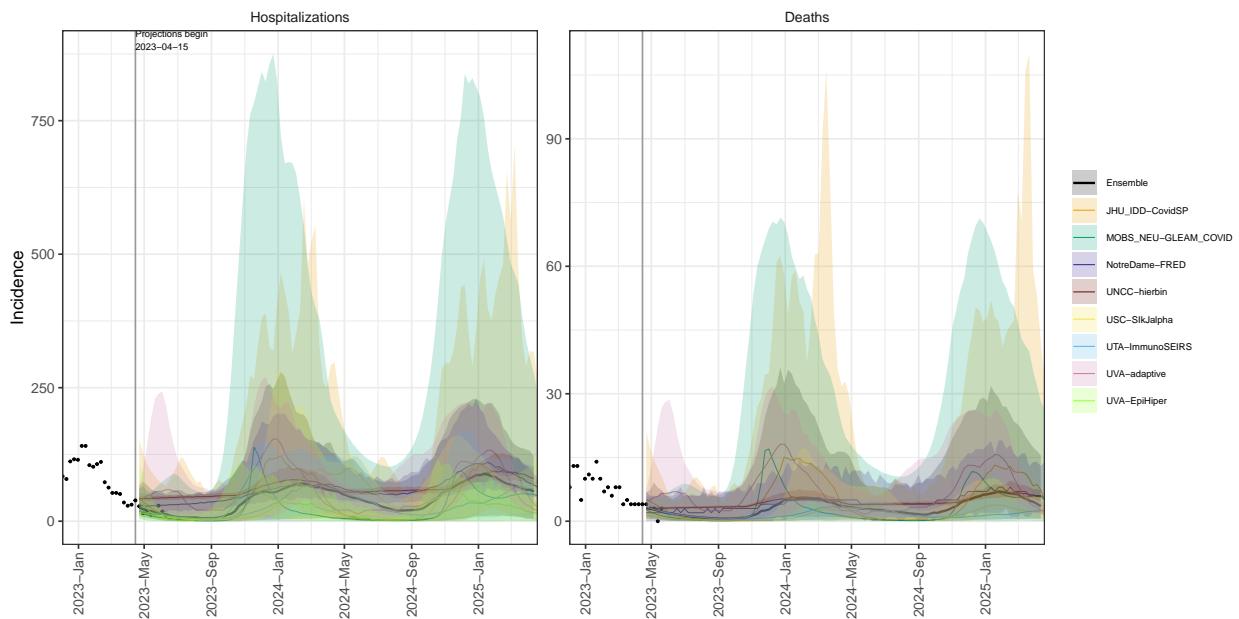
OR model variance & 95% projection intervals – No booster, Low immune escape



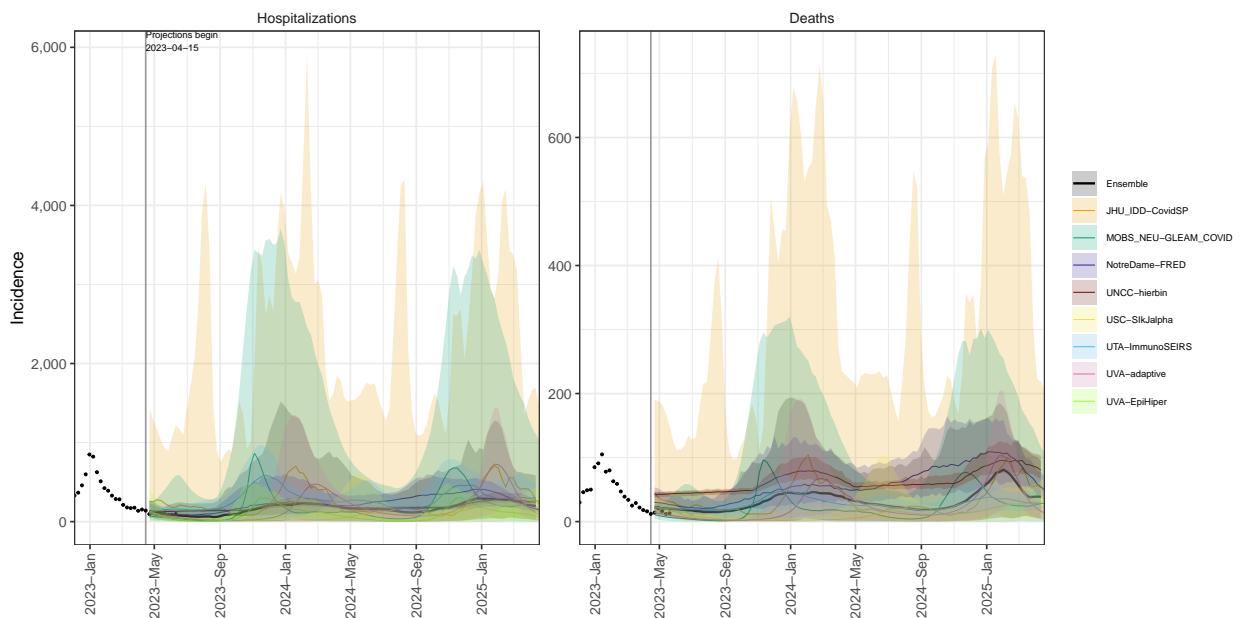
PA model variance & 95% projection intervals – No booster, Low immune escape



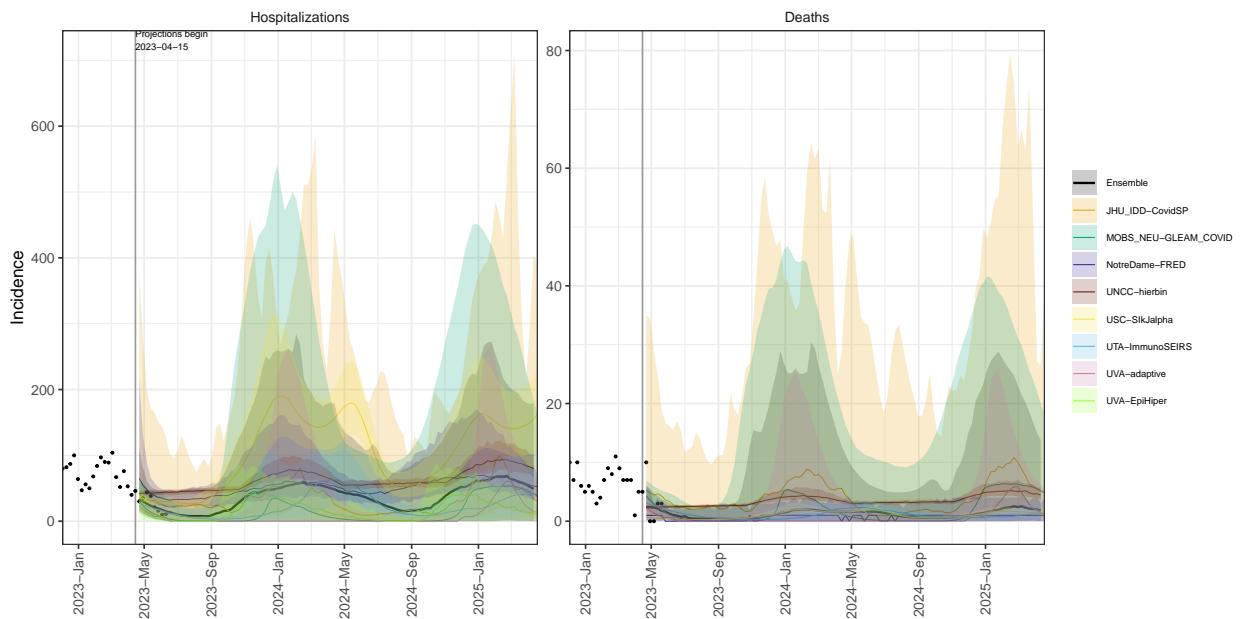
RI model variance & 95% projection intervals – No booster, Low immune escape



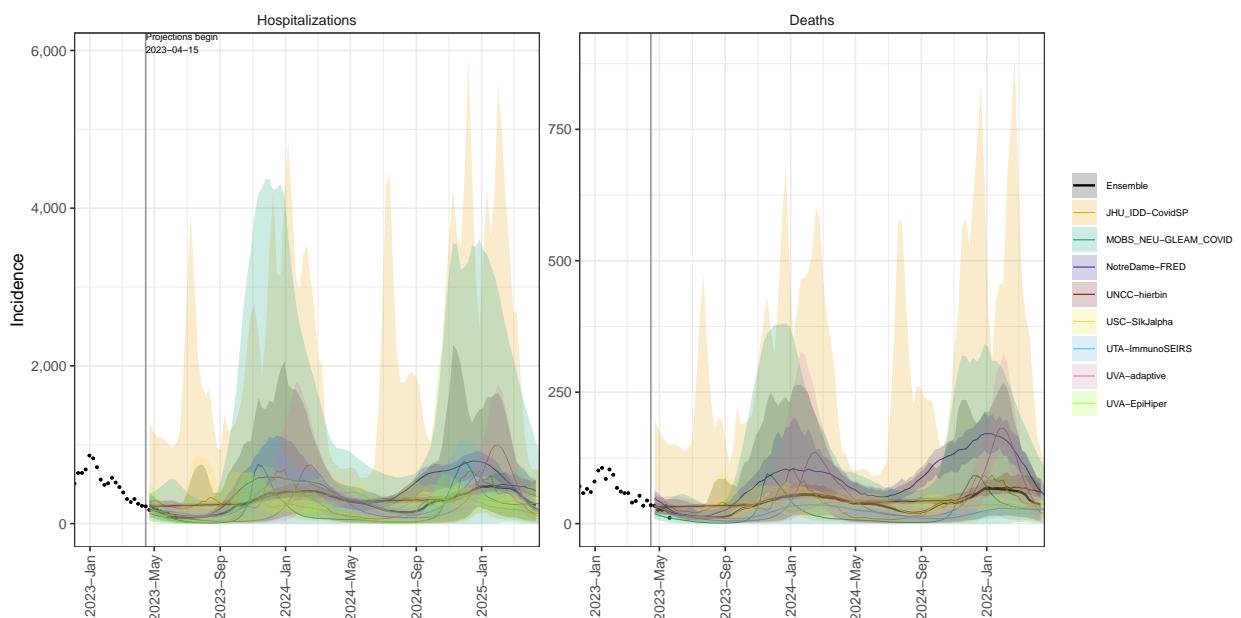
SC model variance & 95% projection intervals – No booster, Low immune escape



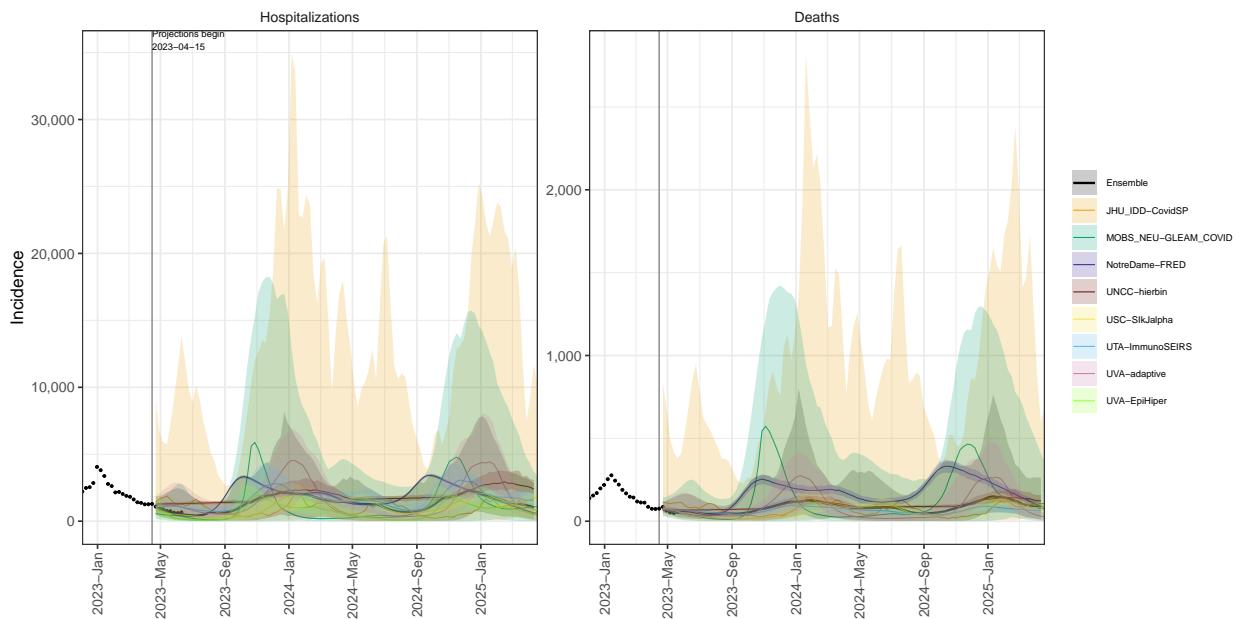
SD model variance & 95% projection intervals – No booster, Low immune escape



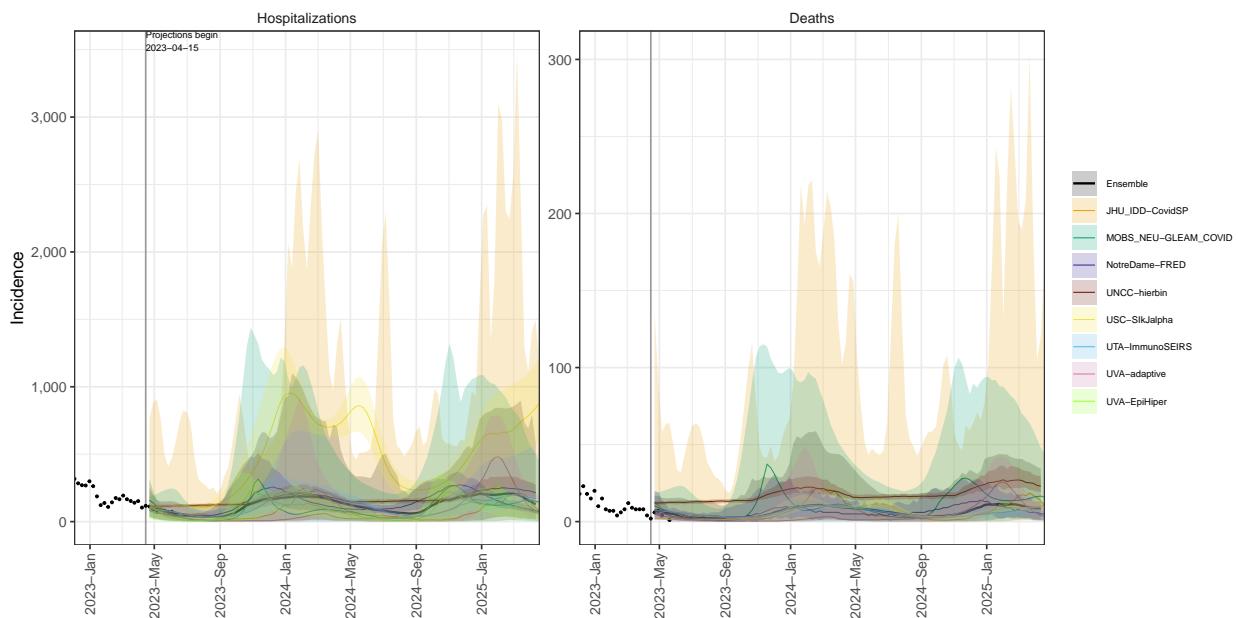
TN model variance & 95% projection intervals – No booster, Low immune escape



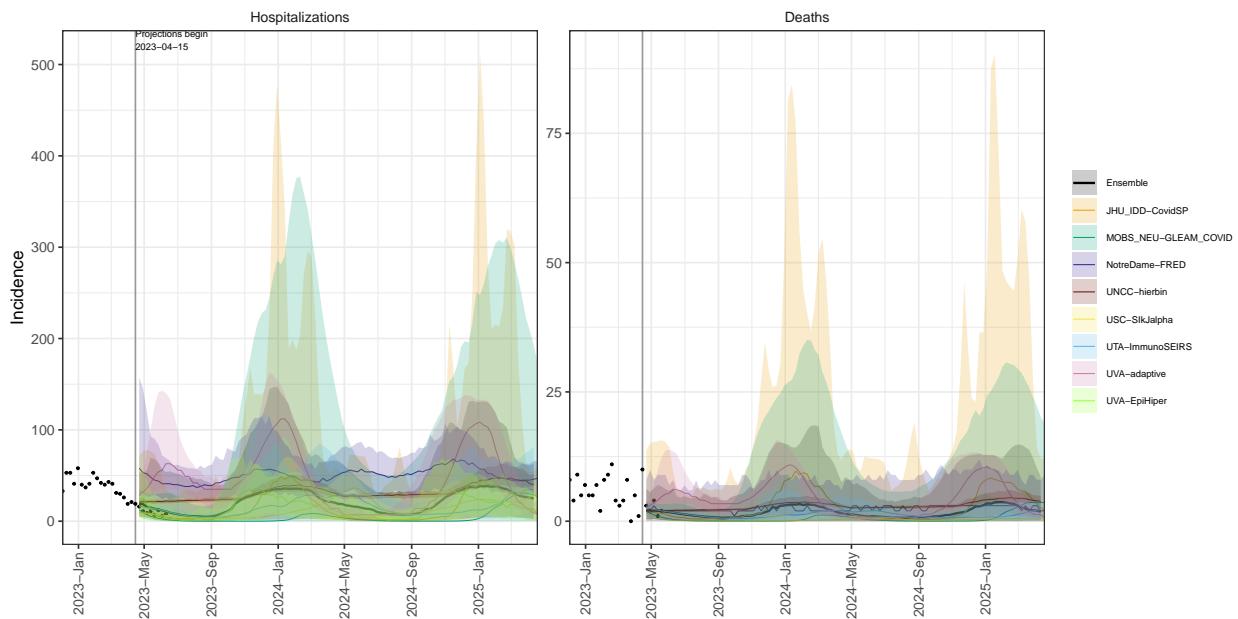
TX model variance & 95% projection intervals – No booster, Low immune escape



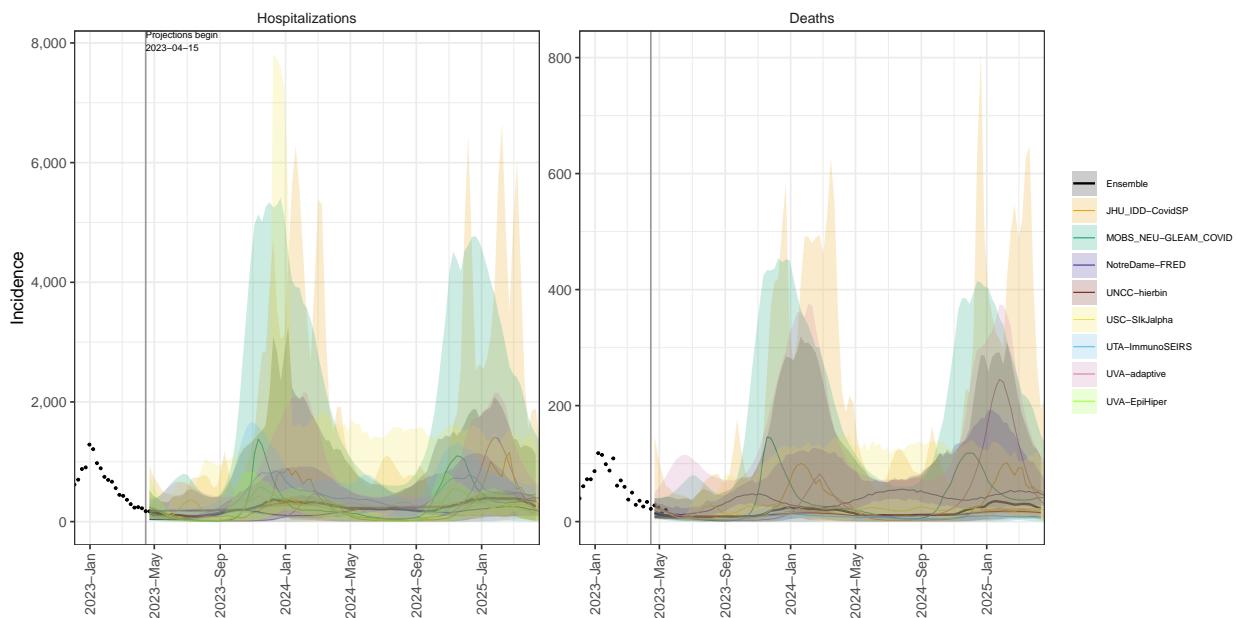
UT model variance & 95% projection intervals – No booster, Low immune escape



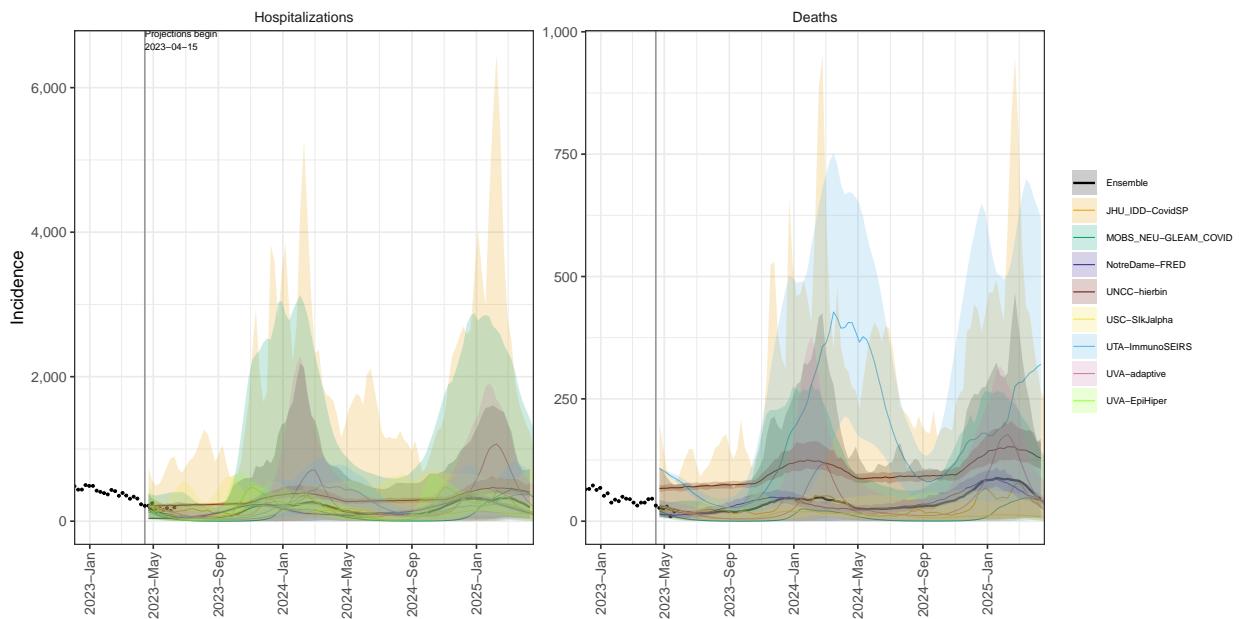
VT model variance & 95% projection intervals – No booster, Low immune escape



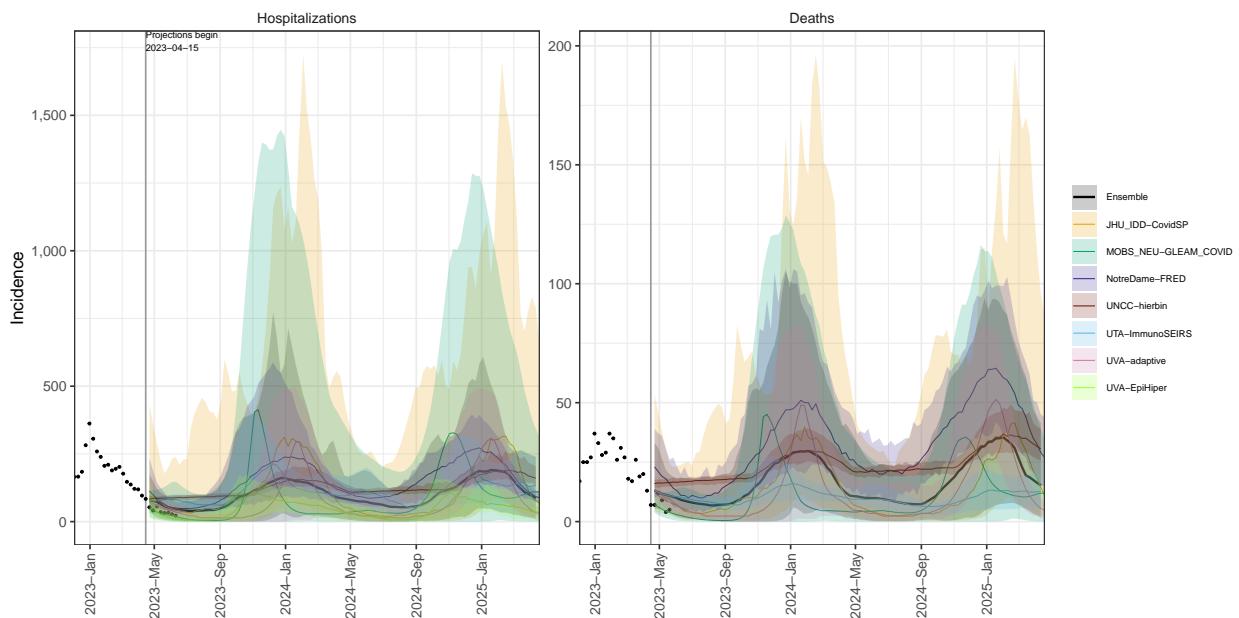
VA model variance & 95% projection intervals – No booster, Low immune escape



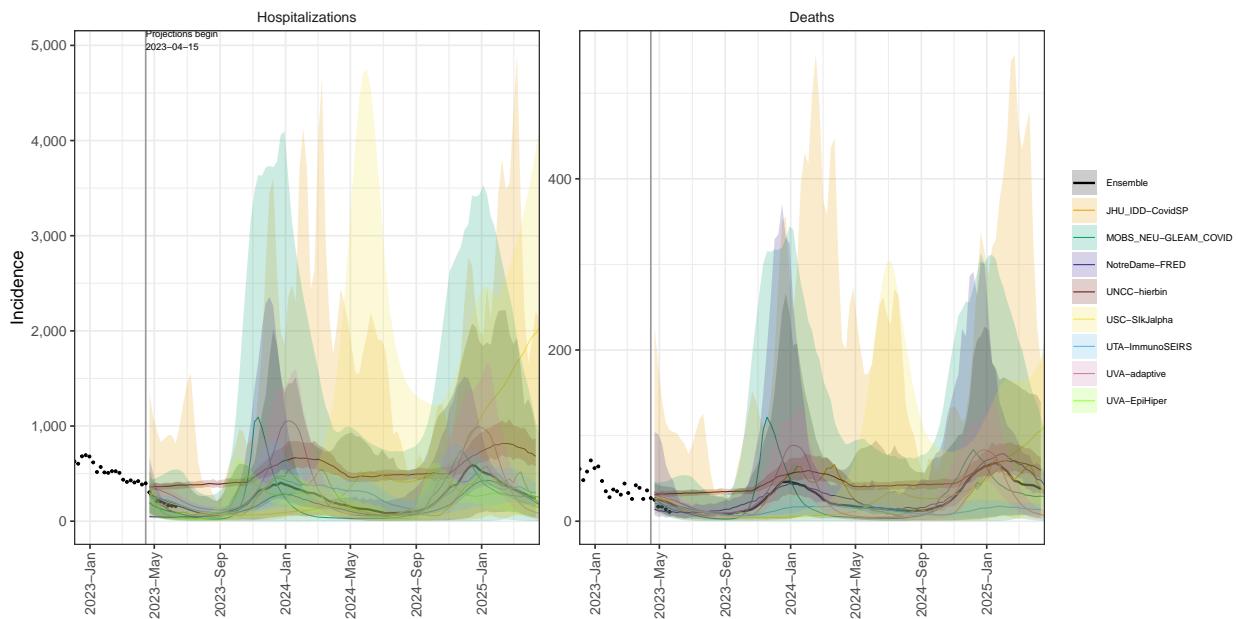
WA model variance & 95% projection intervals – No booster, Low immune escape



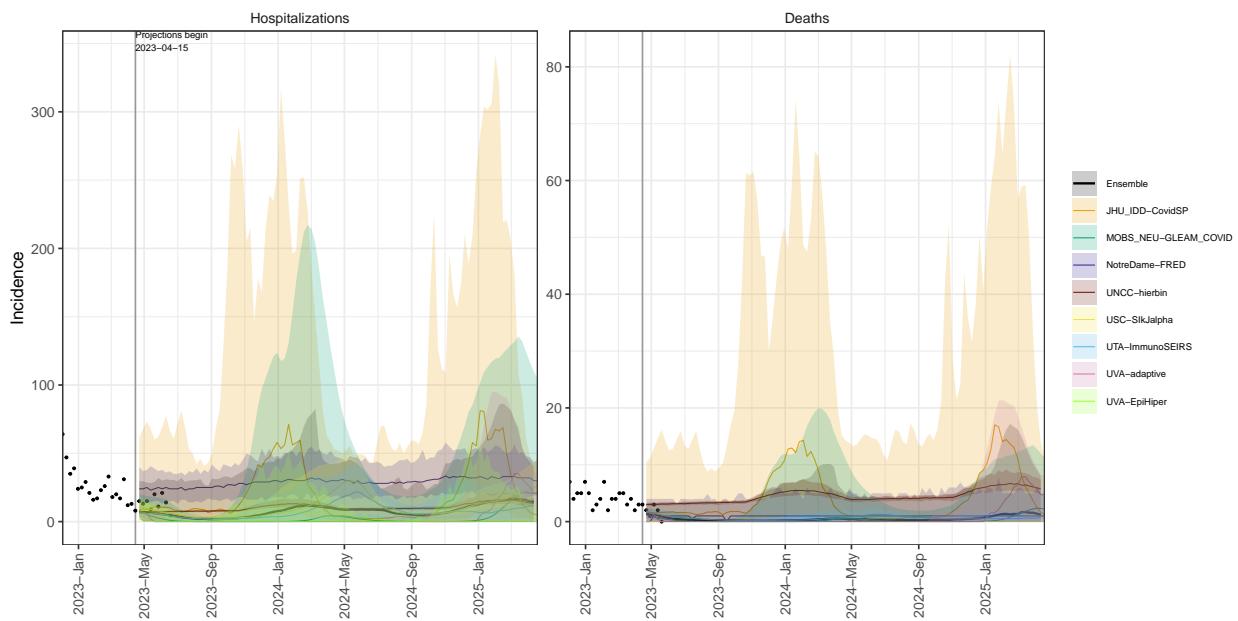
WV model variance & 95% projection intervals – No booster, Low immune escape



WI model variance & 95% projection intervals – No booster, Low immune escape

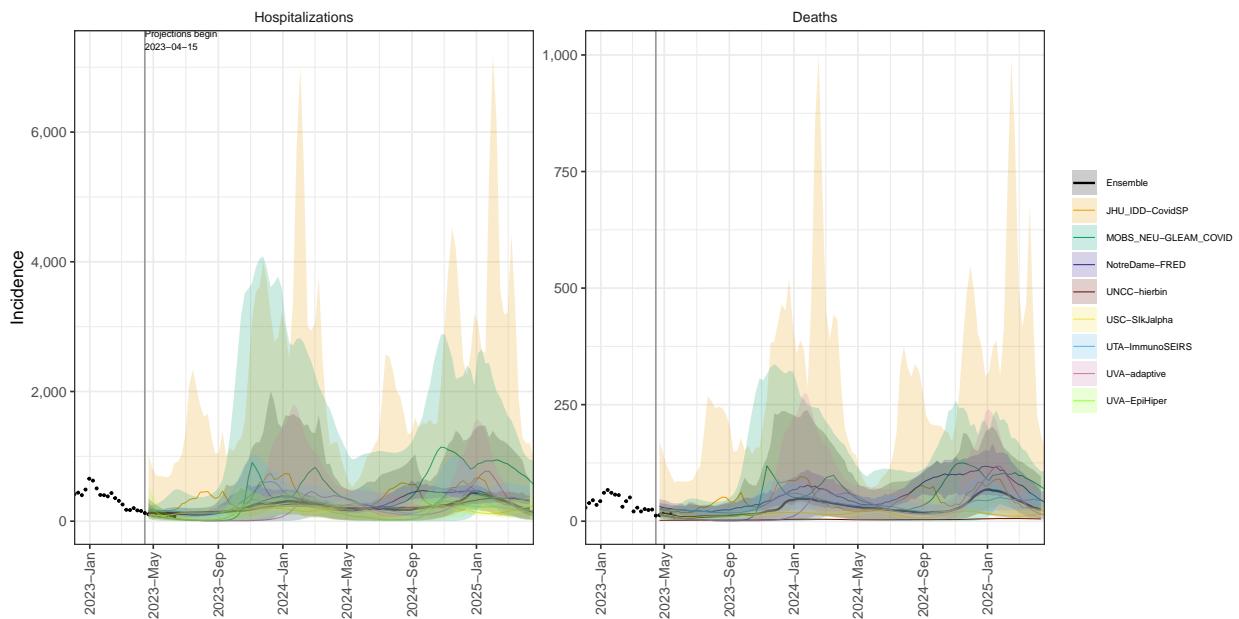


WY model variance & 95% projection intervals – No booster, Low immune escape

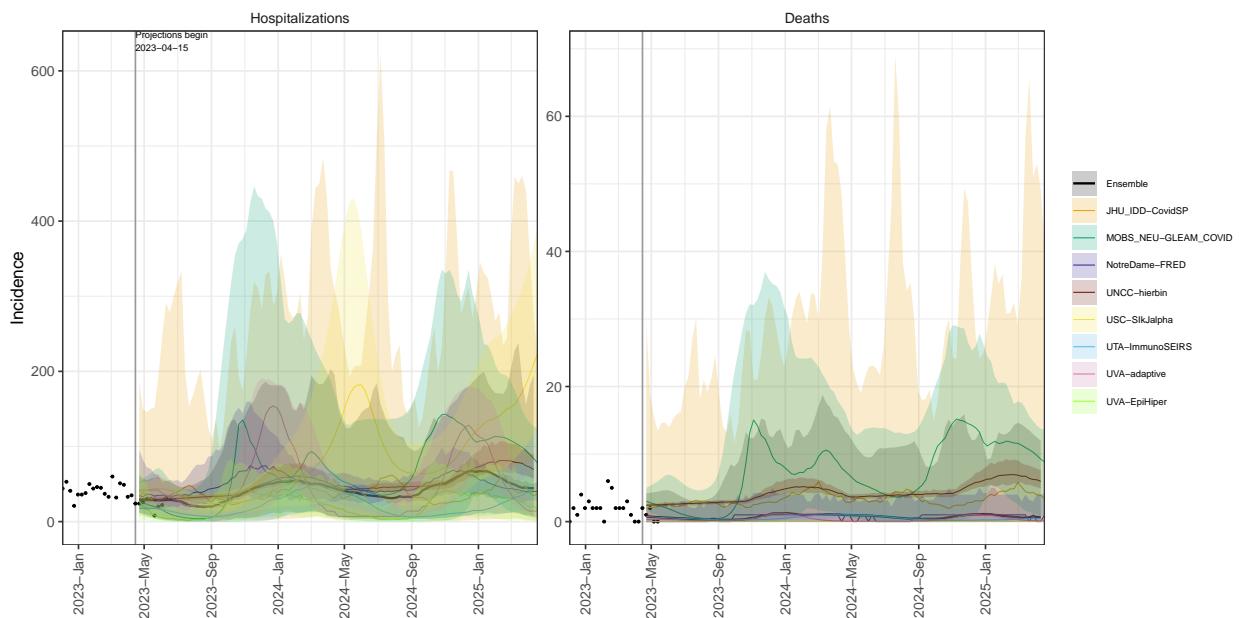


Model variation for No booster, High immune escape scenario.

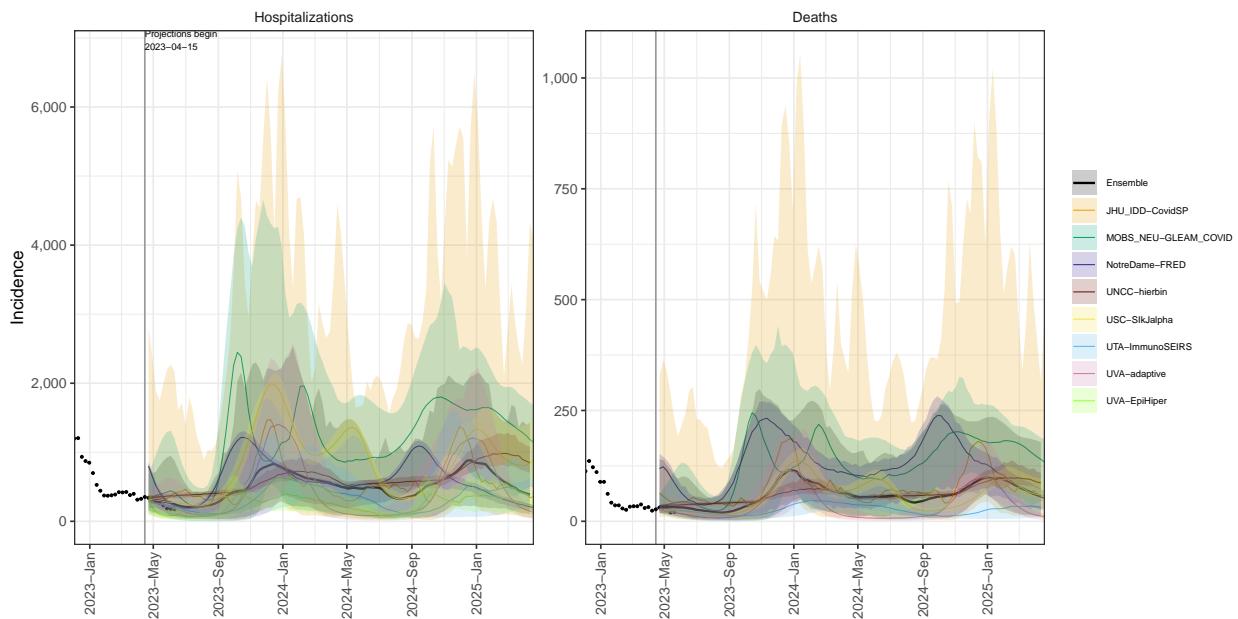
AL model variance & 95% projection intervals – No booster, High immune escape



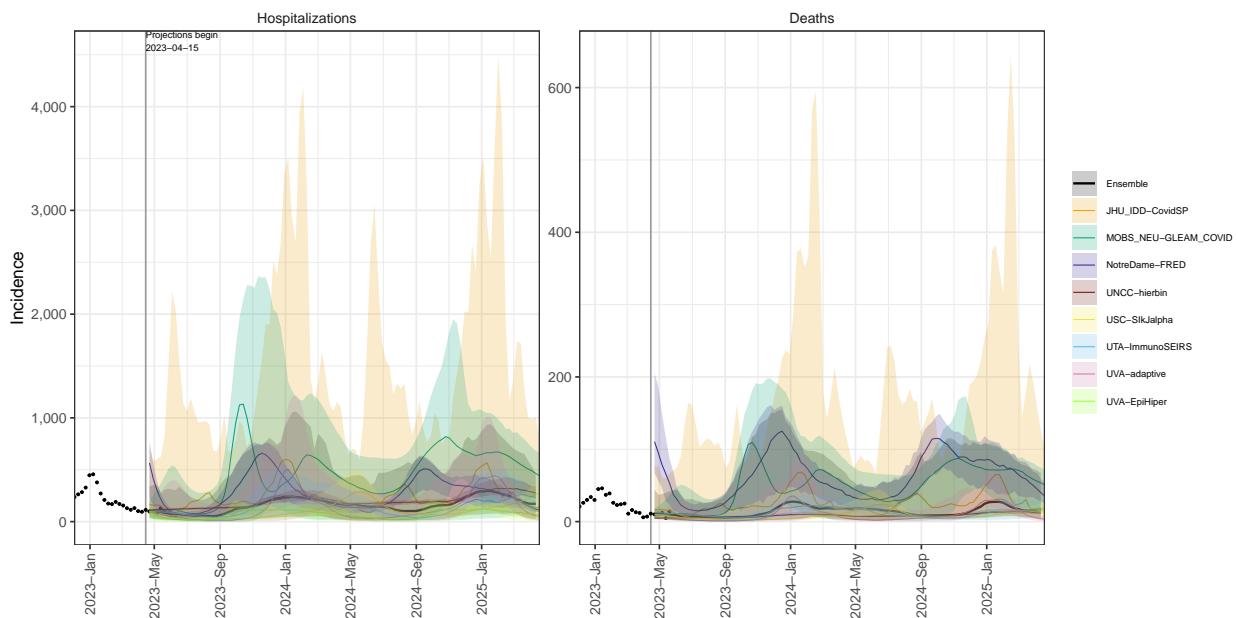
AK model variance & 95% projection intervals – No booster, High immune escape



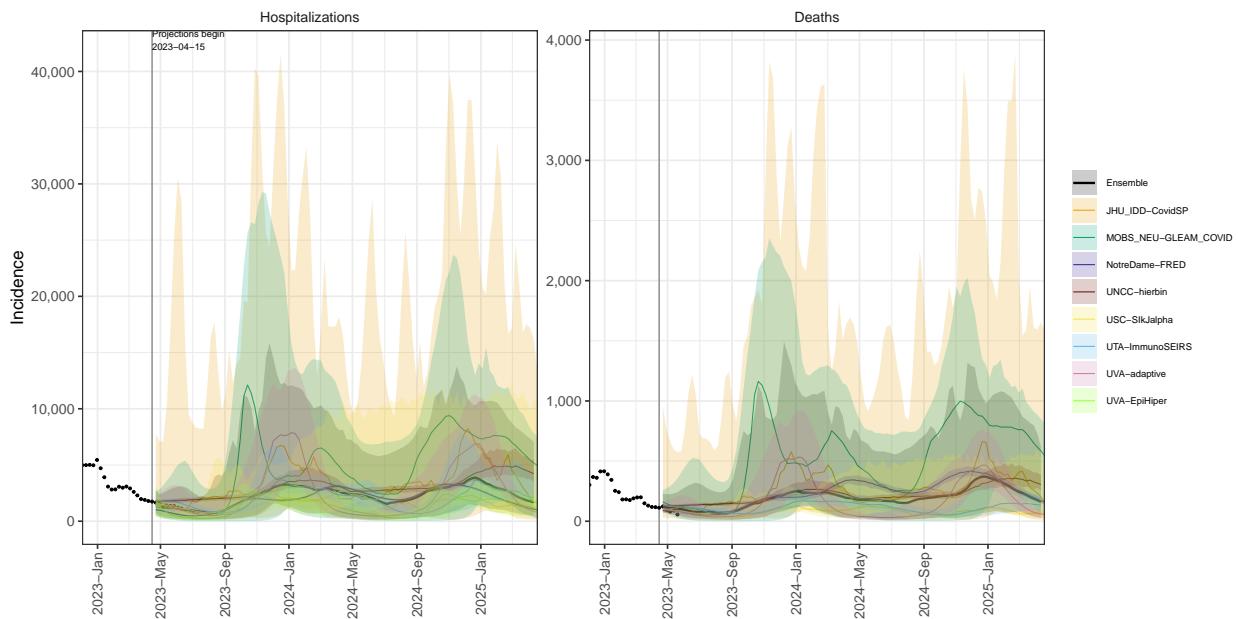
AZ model variance & 95% projection intervals – No booster, High immune escape



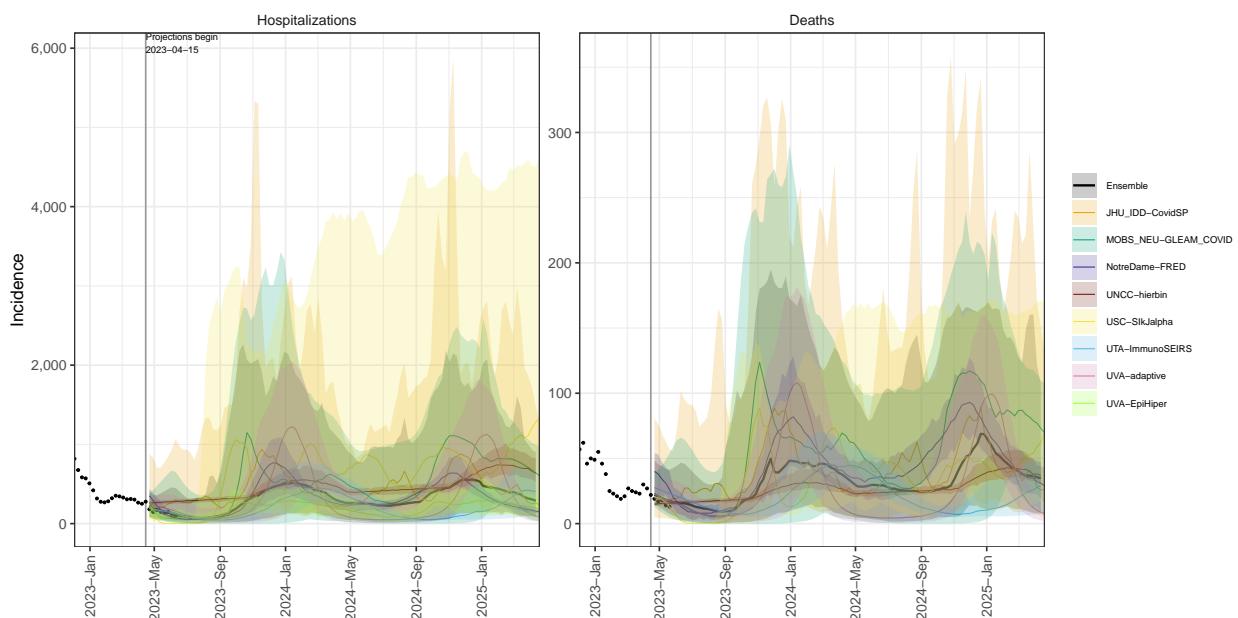
AR model variance & 95% projection intervals – No booster, High immune escape



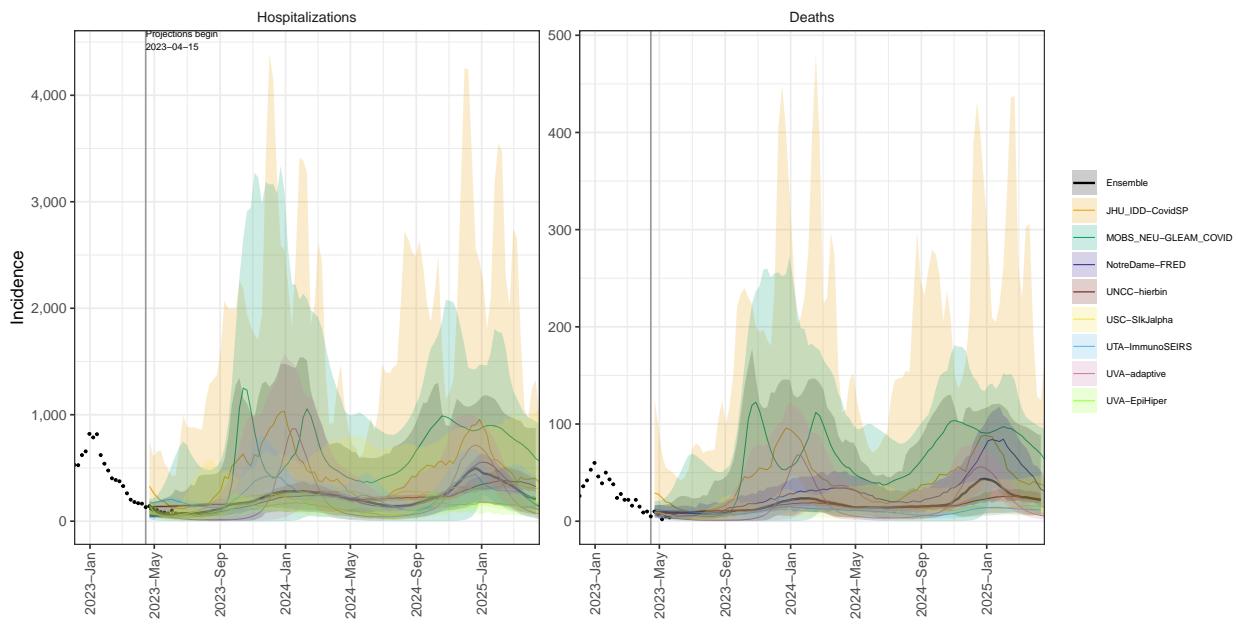
CA model variance & 95% projection intervals – No booster, High immune escape



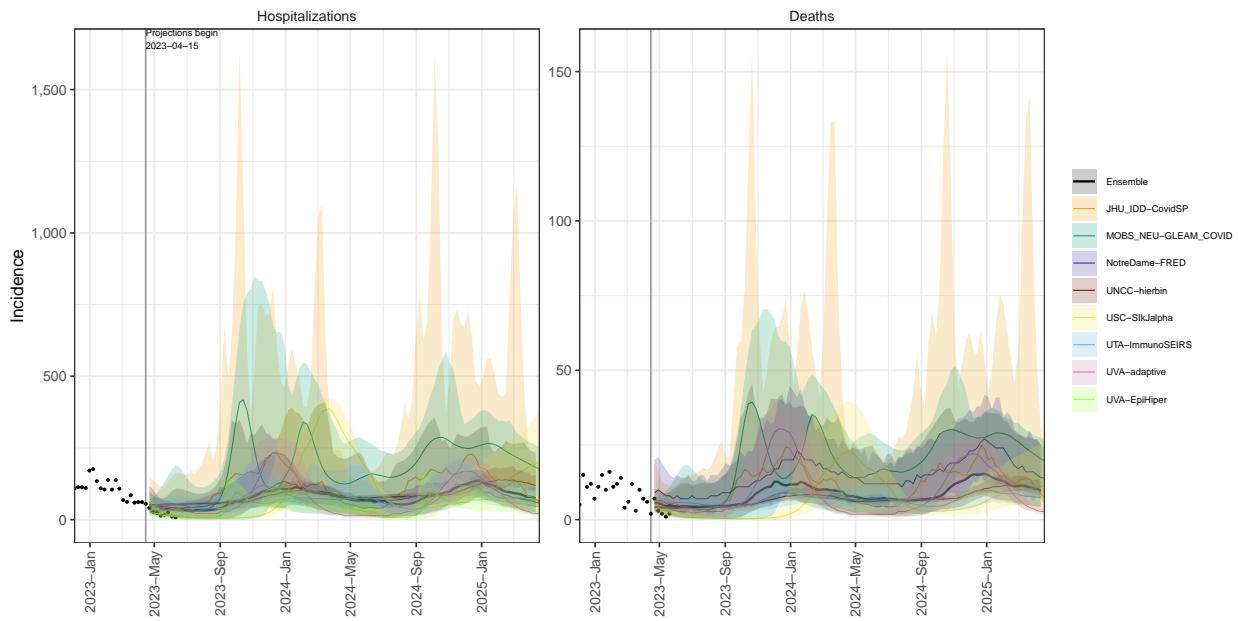
CO model variance & 95% projection intervals – No booster, High immune escape



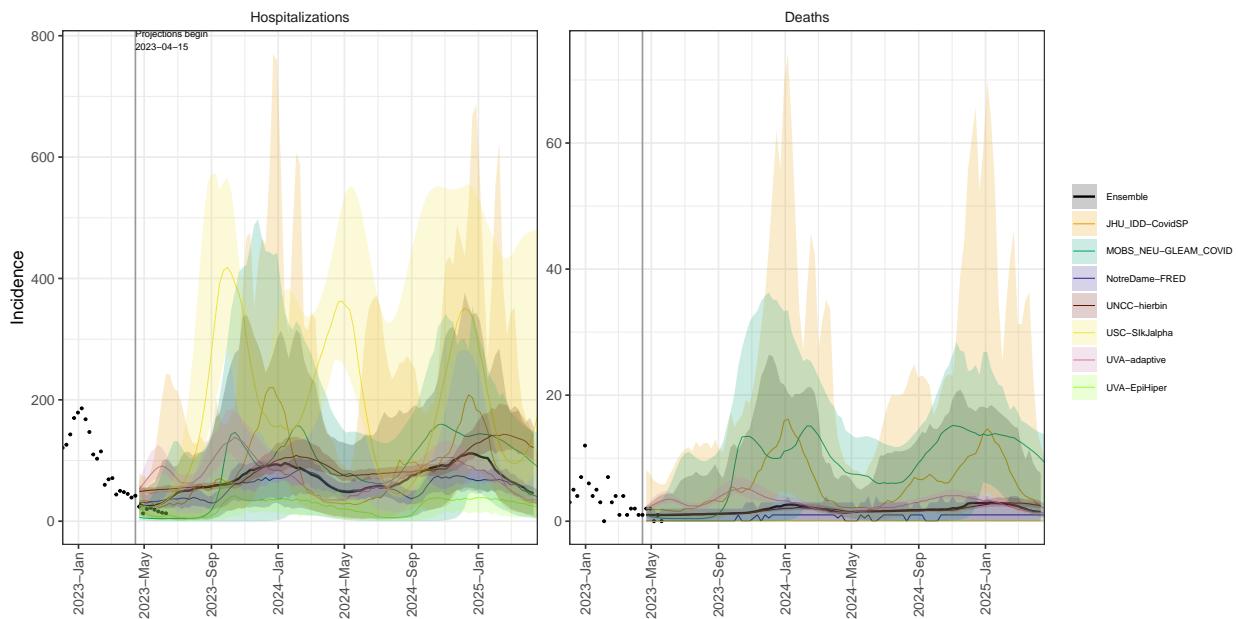
CT model variance & 95% projection intervals – No booster, High immune escape



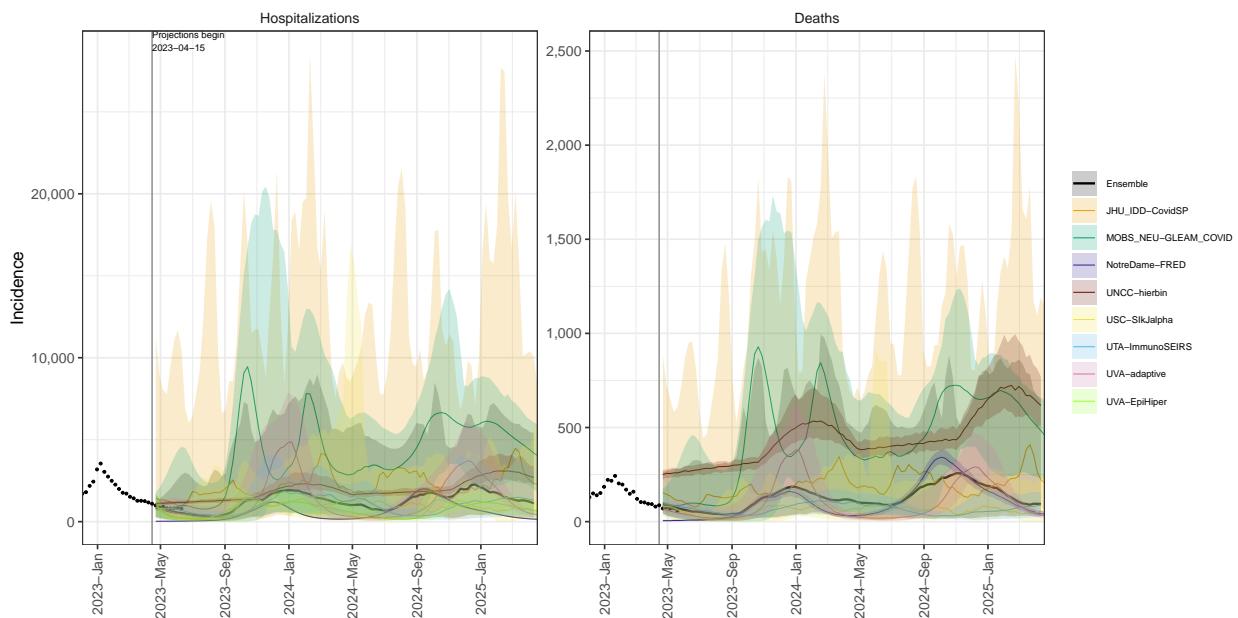
DE model variance & 95% projection intervals – No booster, High immune escape



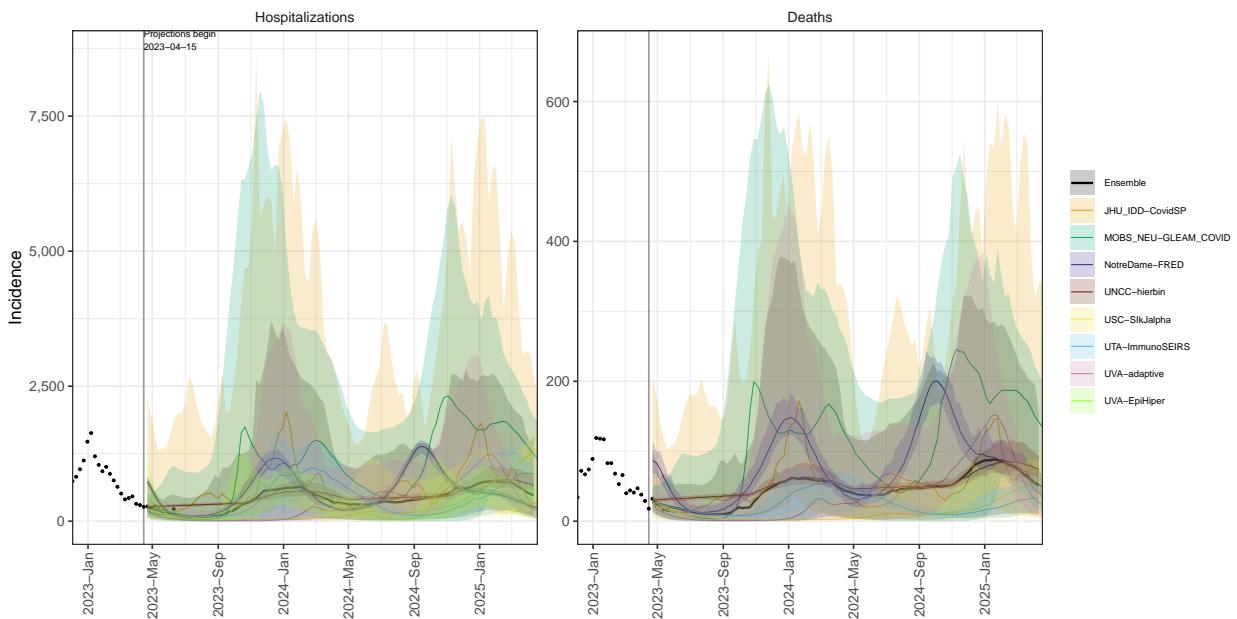
DC model variance & 95% projection intervals – No booster, High immune escape



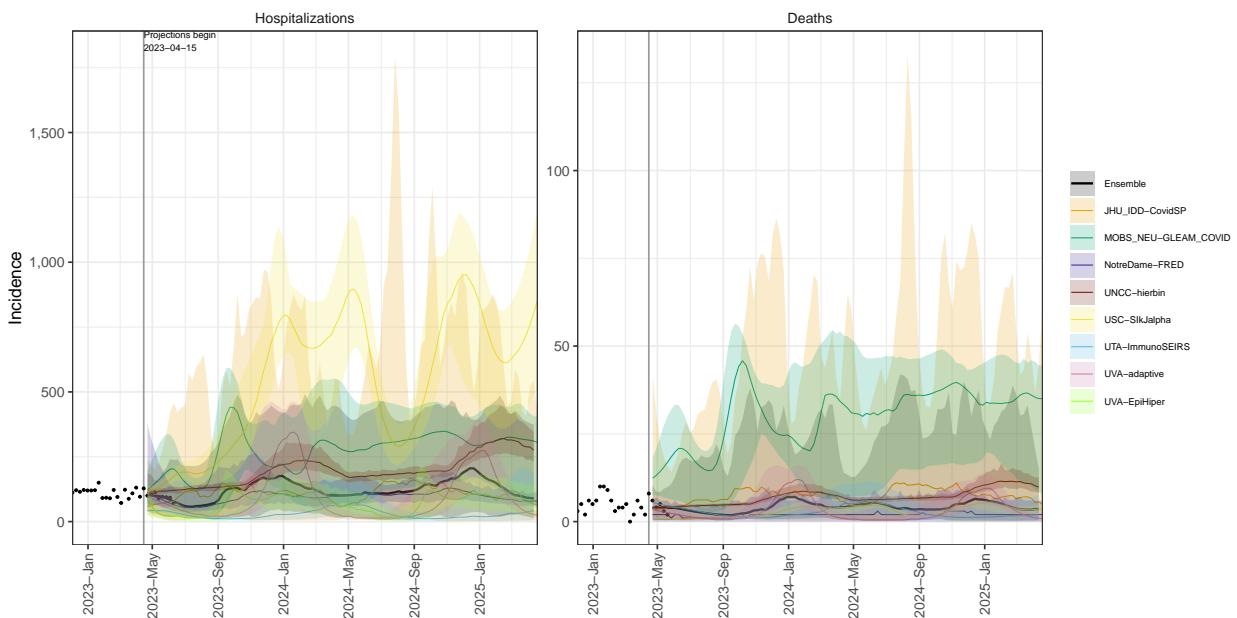
FL model variance & 95% projection intervals – No booster, High immune escape



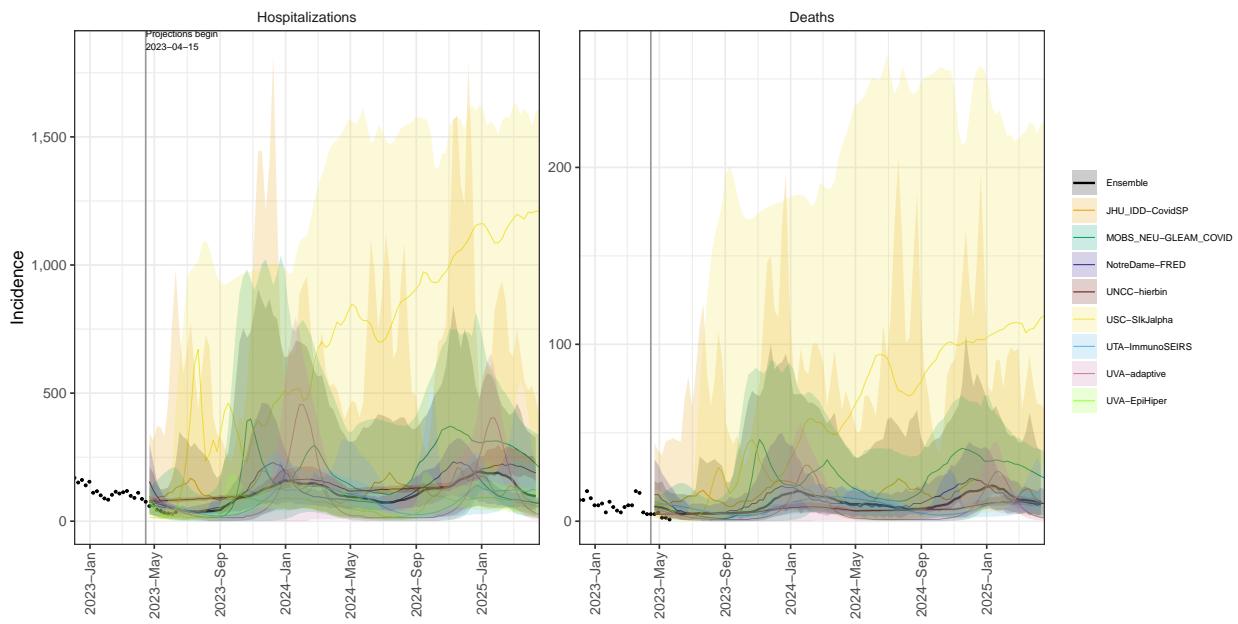
GA model variance & 95% projection intervals – No booster, High immune escape



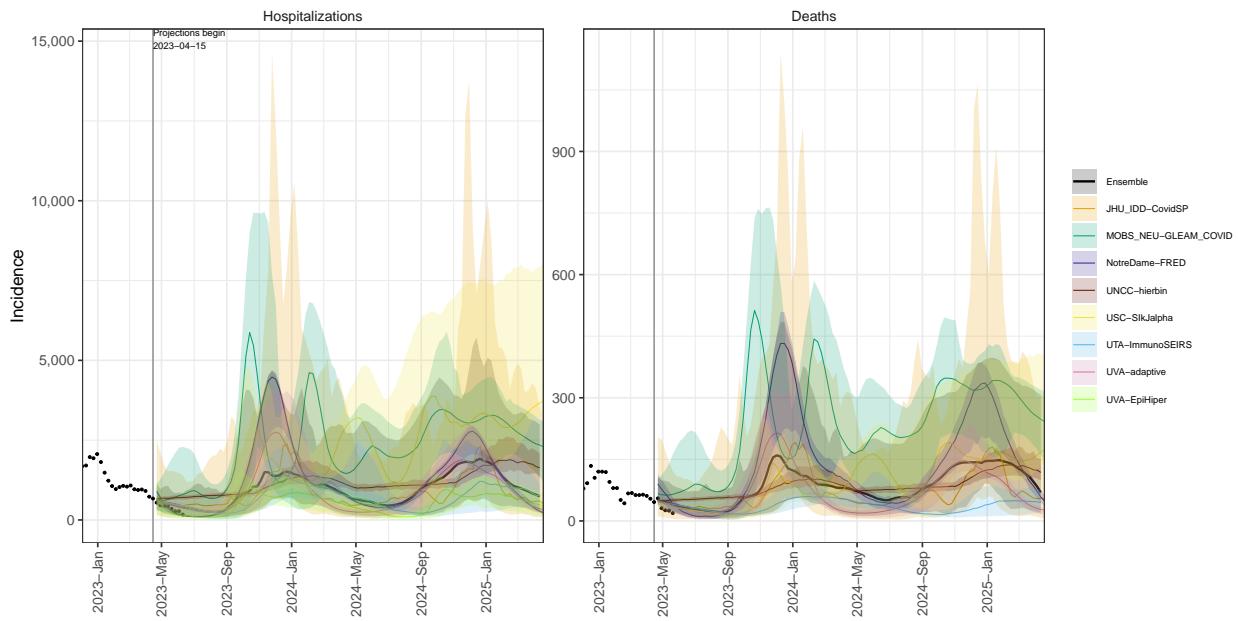
HI model variance & 95% projection intervals – No booster, High immune escape



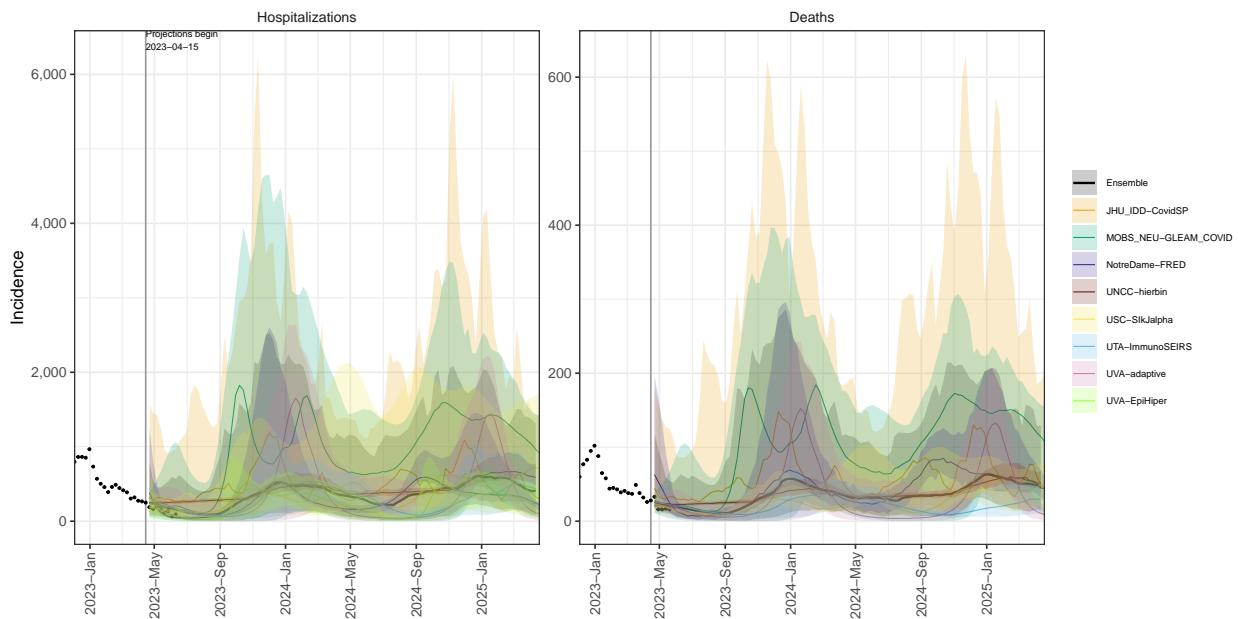
ID model variance & 95% projection intervals – No booster, High immune escape



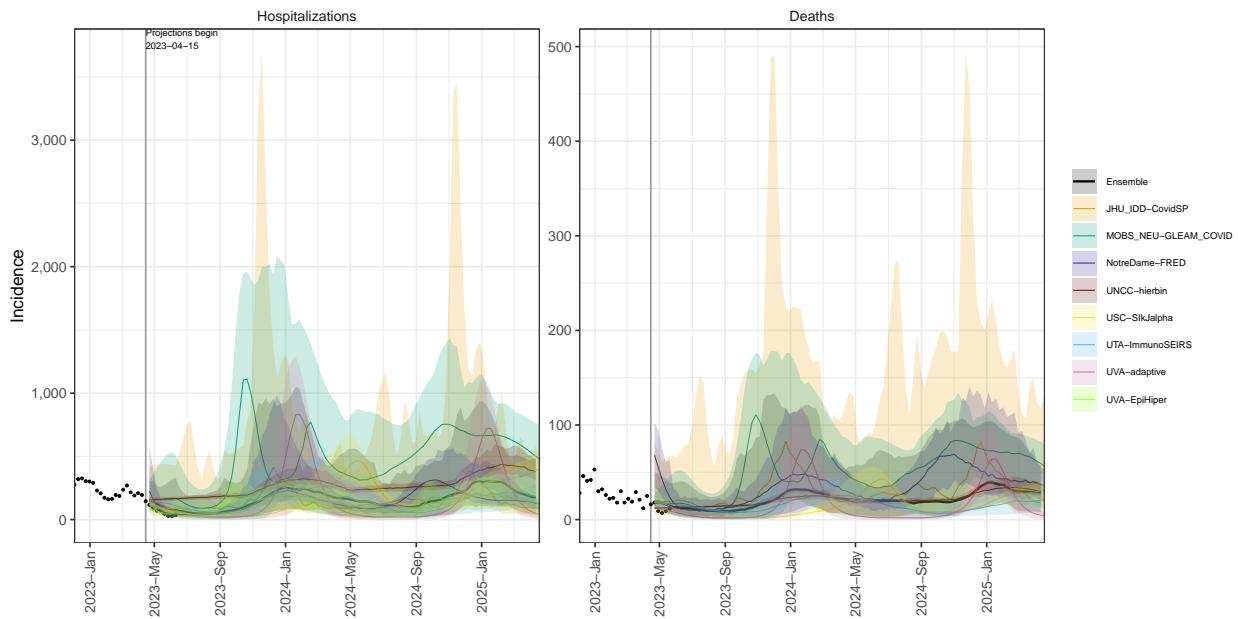
IL model variance & 95% projection intervals – No booster, High immune escape



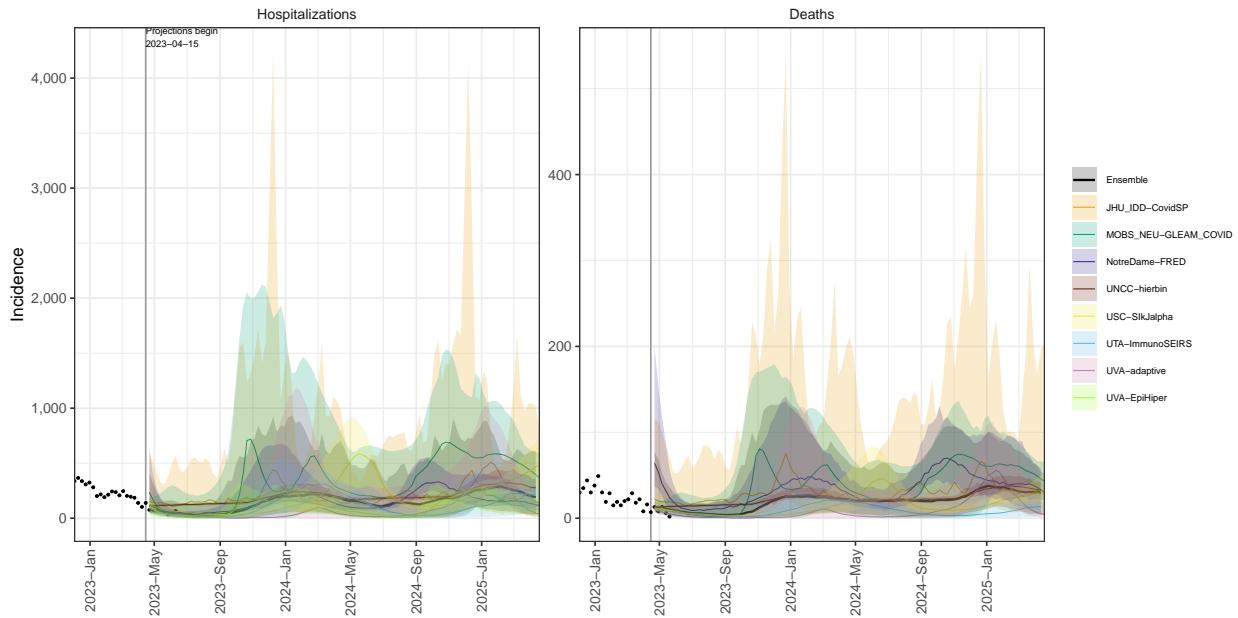
IN model variance & 95% projection intervals – No booster, High immune escape



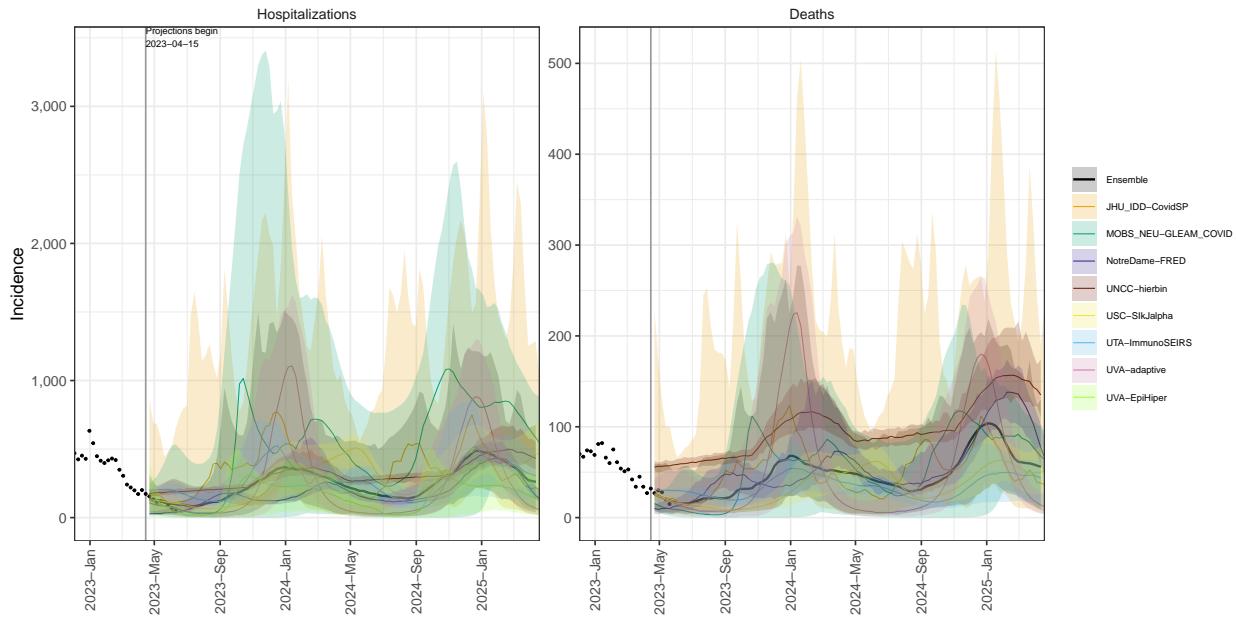
IA model variance & 95% projection intervals – No booster, High immune escape



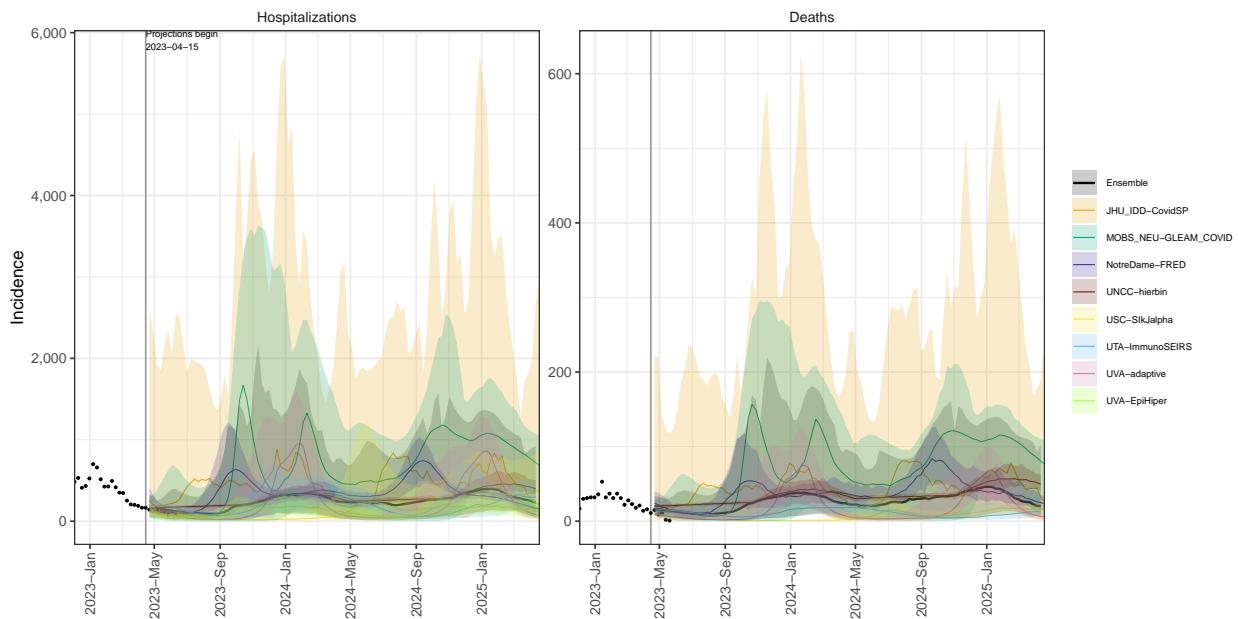
KS model variance & 95% projection intervals – No booster, High immune escape



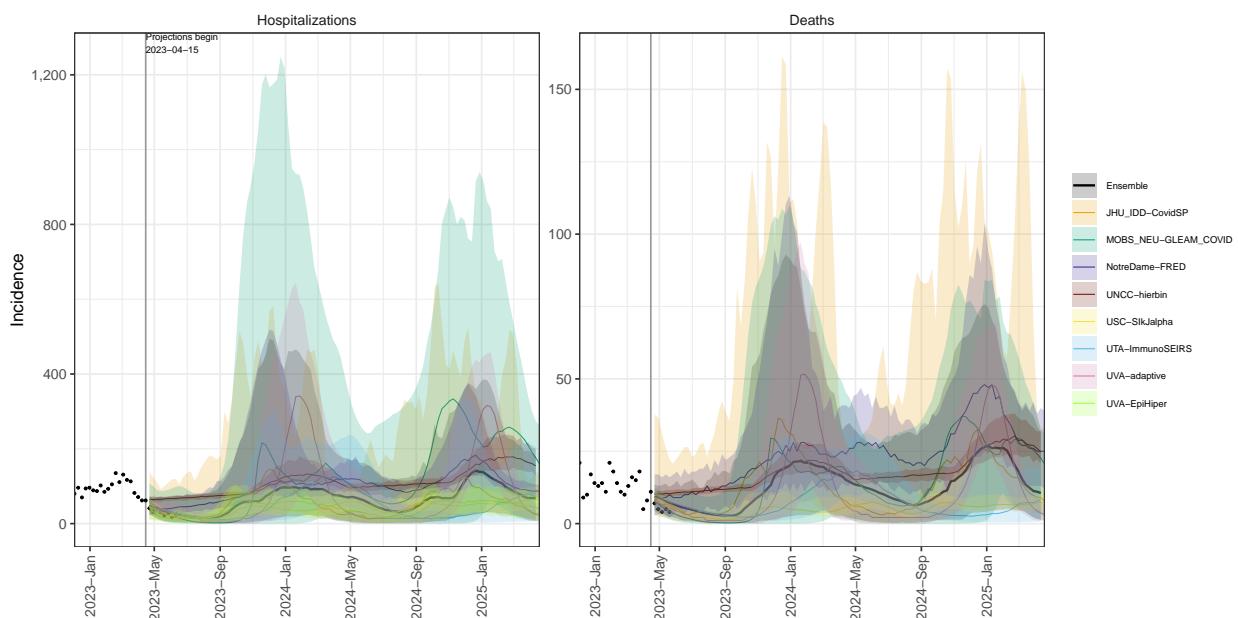
KY model variance & 95% projection intervals – No booster, High immune escape



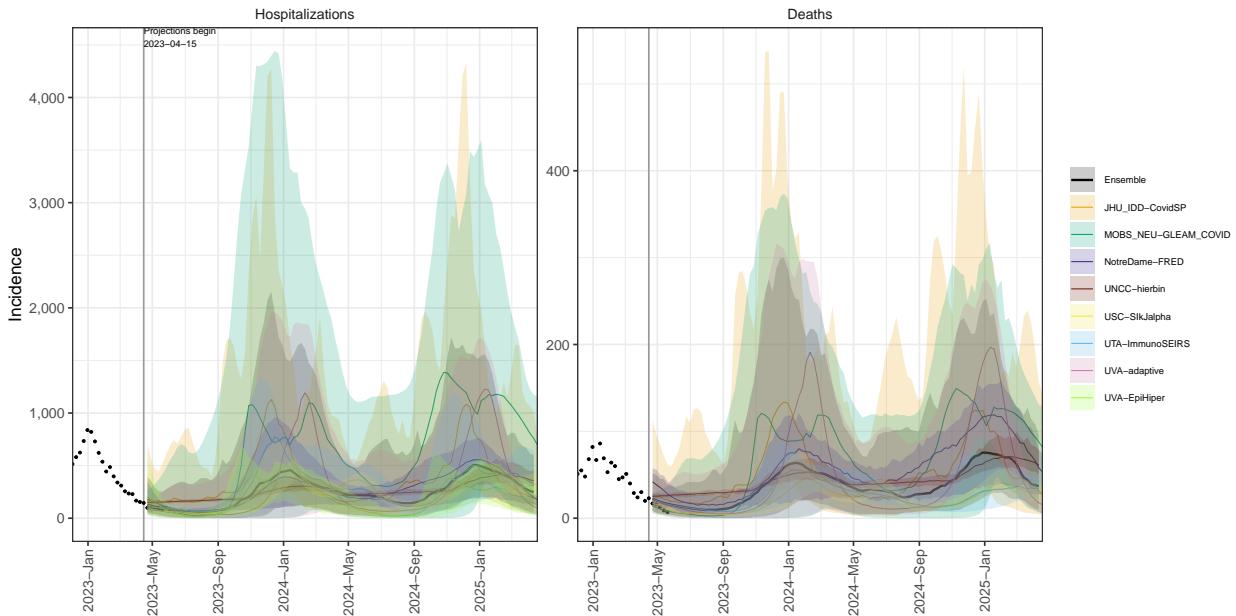
LA model variance & 95% projection intervals – No booster, High immune escape



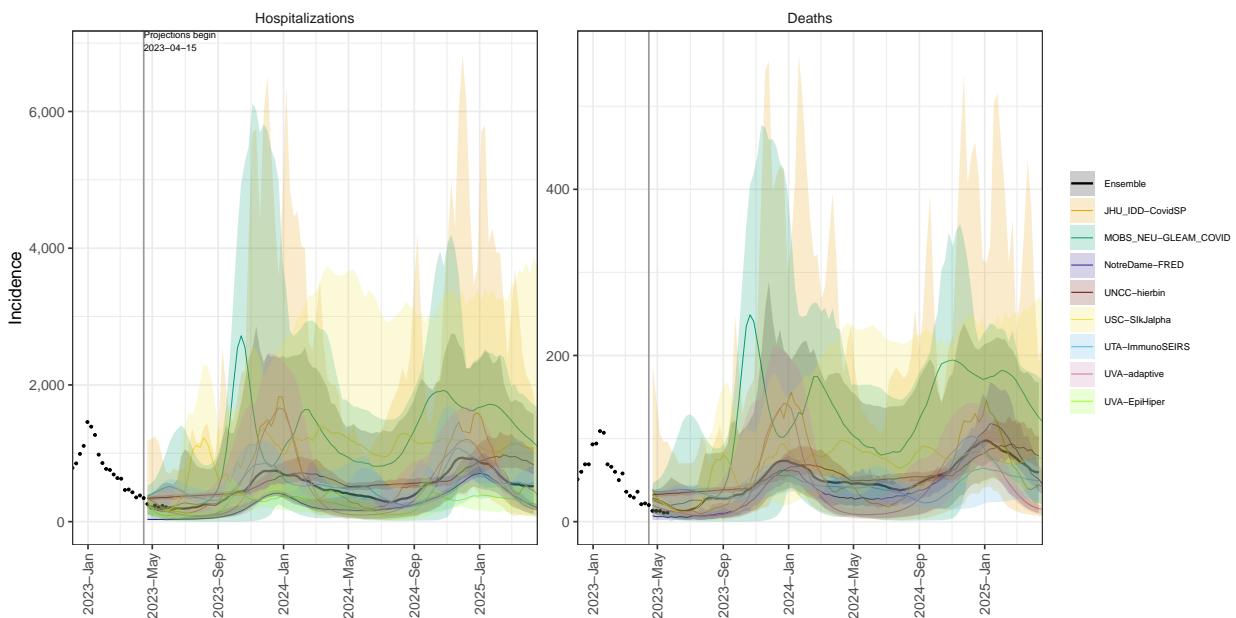
ME model variance & 95% projection intervals – No booster, High immune escape



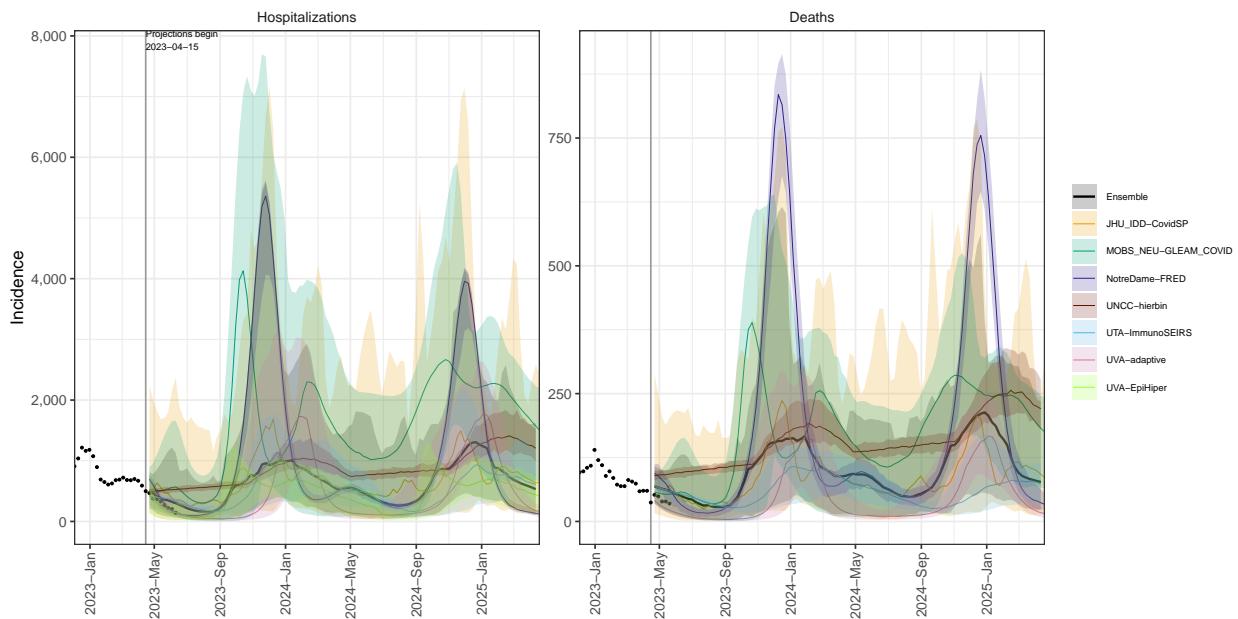
MD model variance & 95% projection intervals – No booster, High immune escape



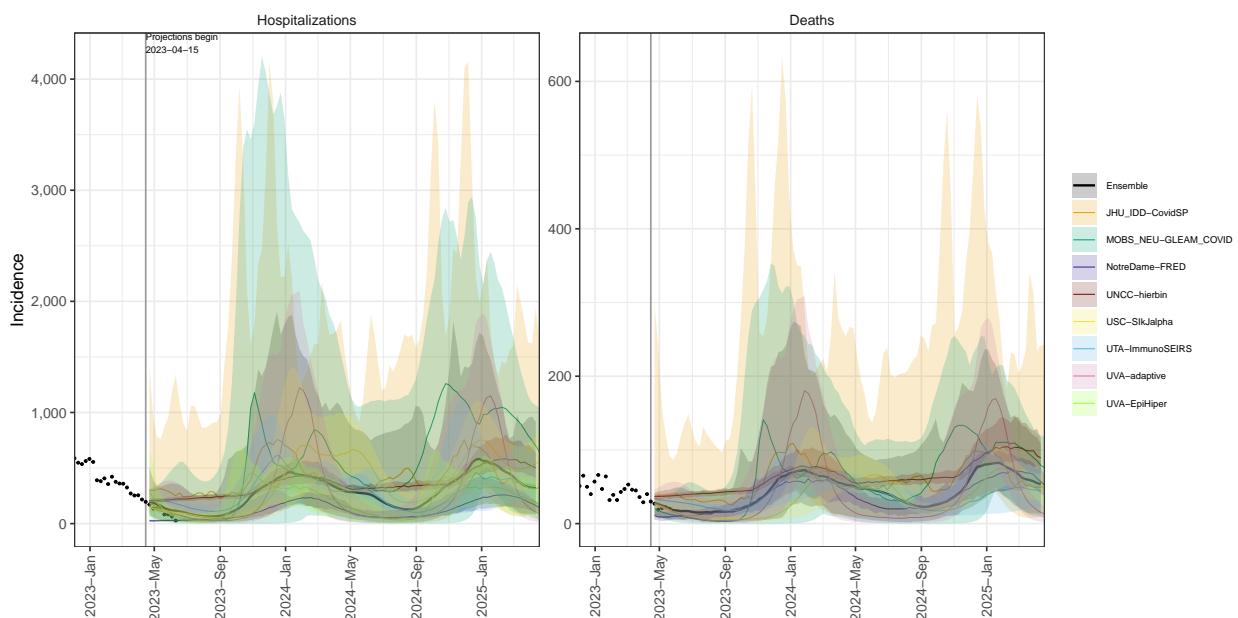
MA model variance & 95% projection intervals – No booster, High immune escape



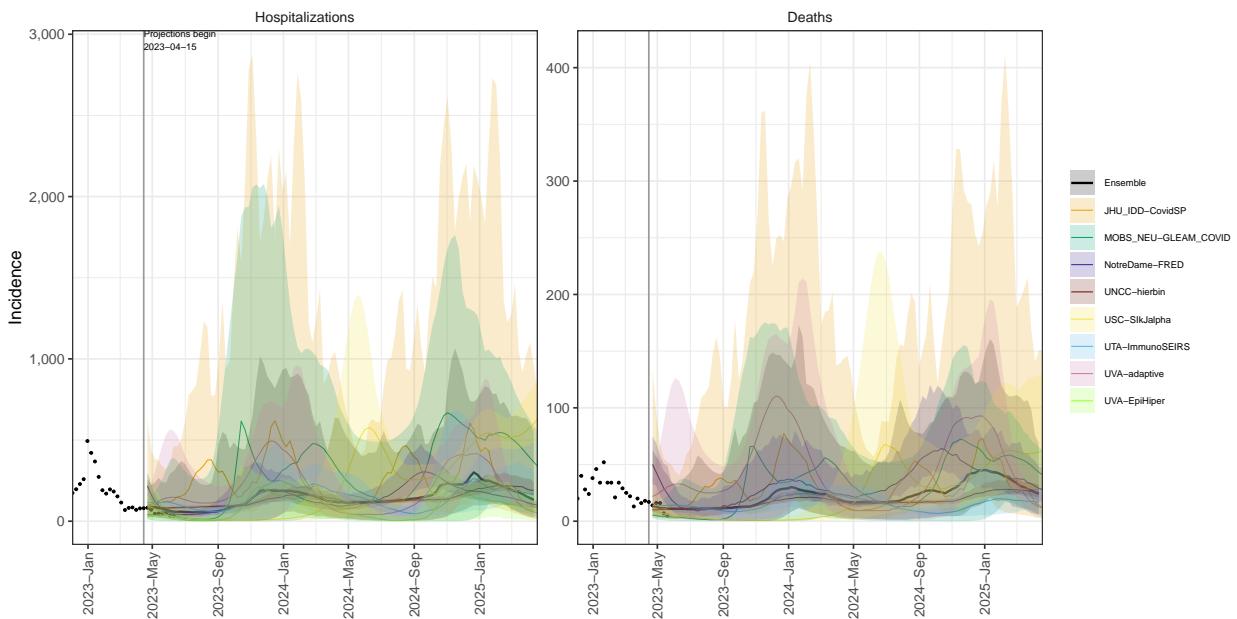
MI model variance & 95% projection intervals – No booster, High immune escape



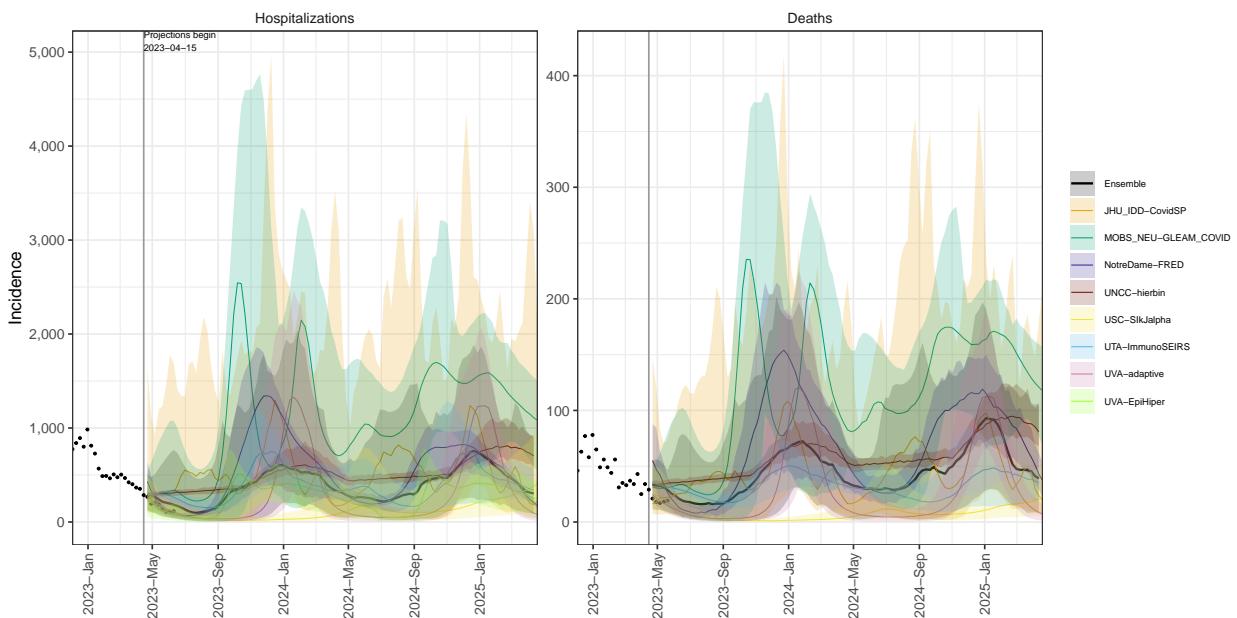
MN model variance & 95% projection intervals – No booster, High immune escape



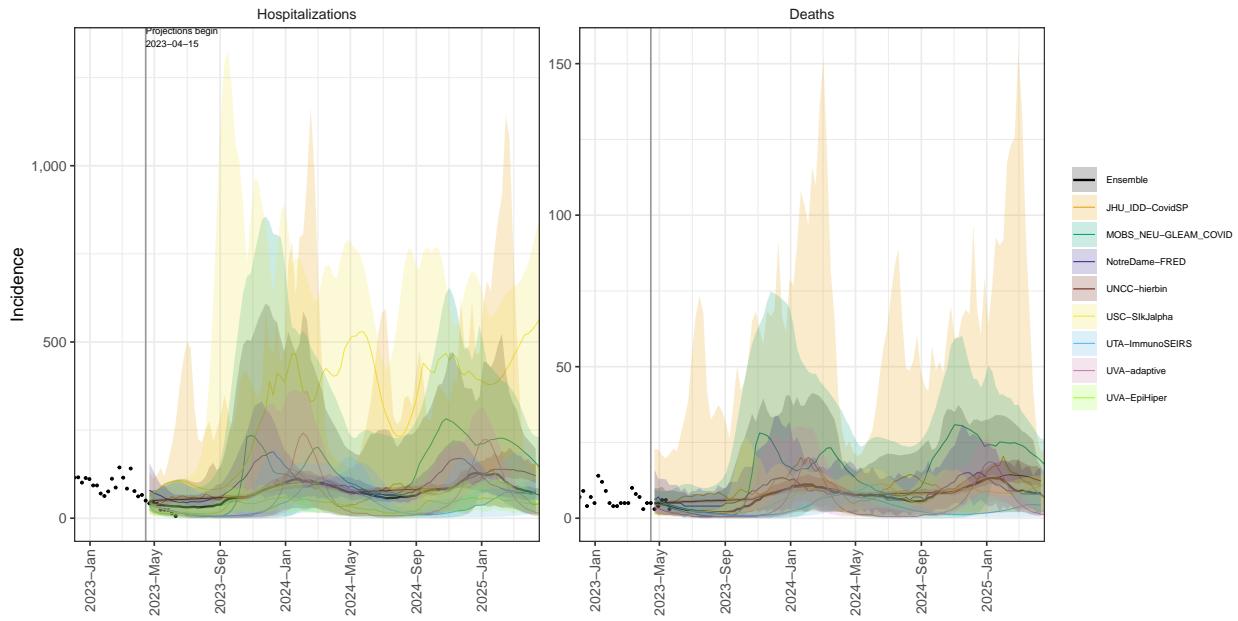
MS model variance & 95% projection intervals – No booster, High immune escape



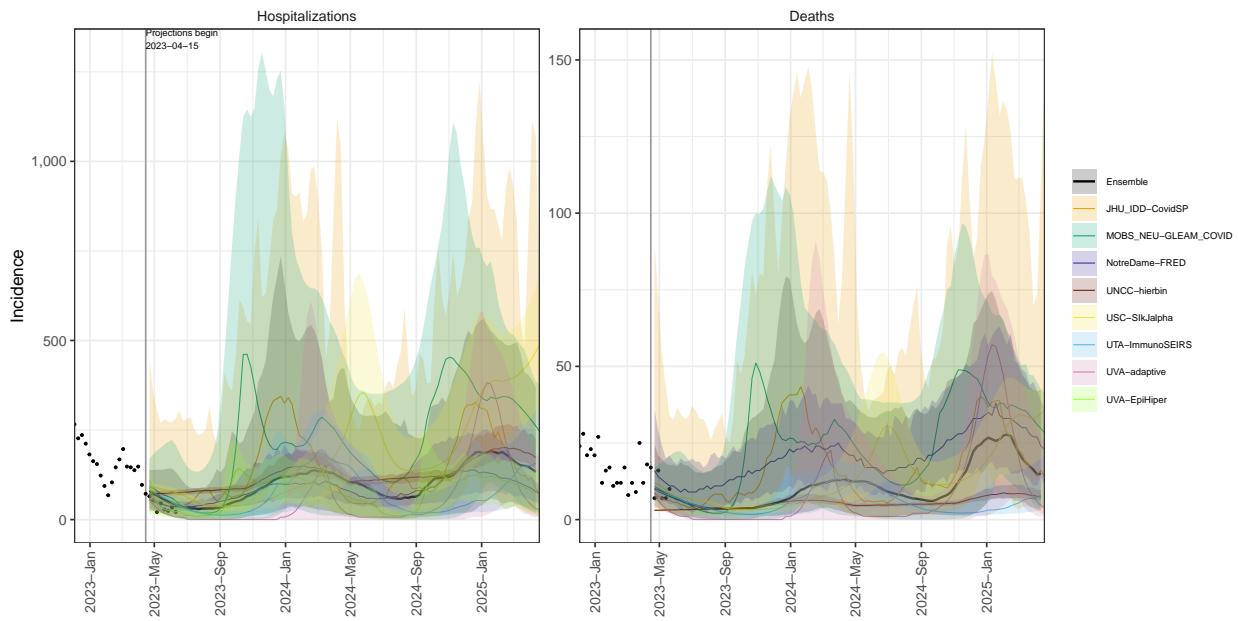
MO model variance & 95% projection intervals – No booster, High immune escape



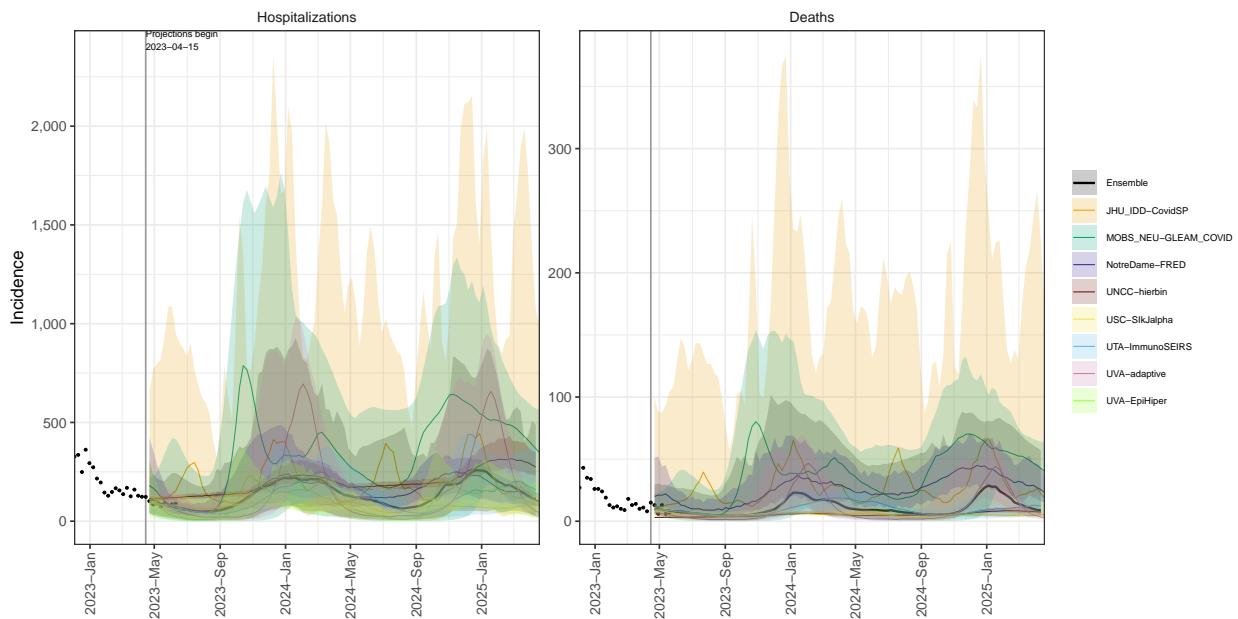
MT model variance & 95% projection intervals – No booster, High immune escape



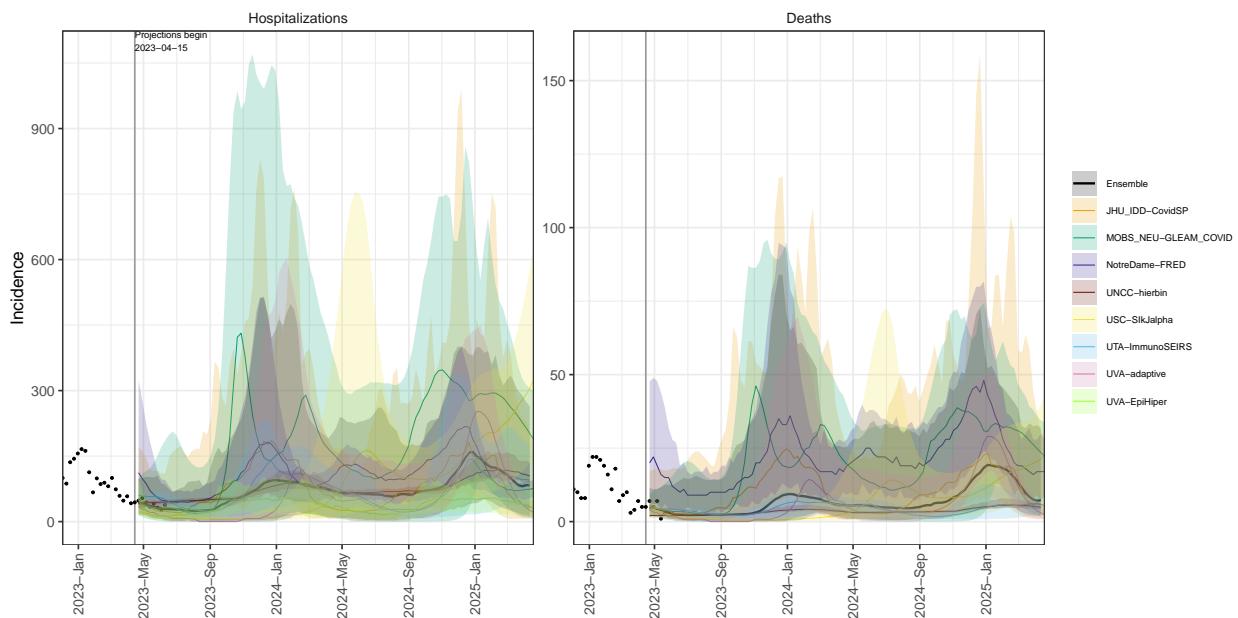
NE model variance & 95% projection intervals – No booster, High immune escape



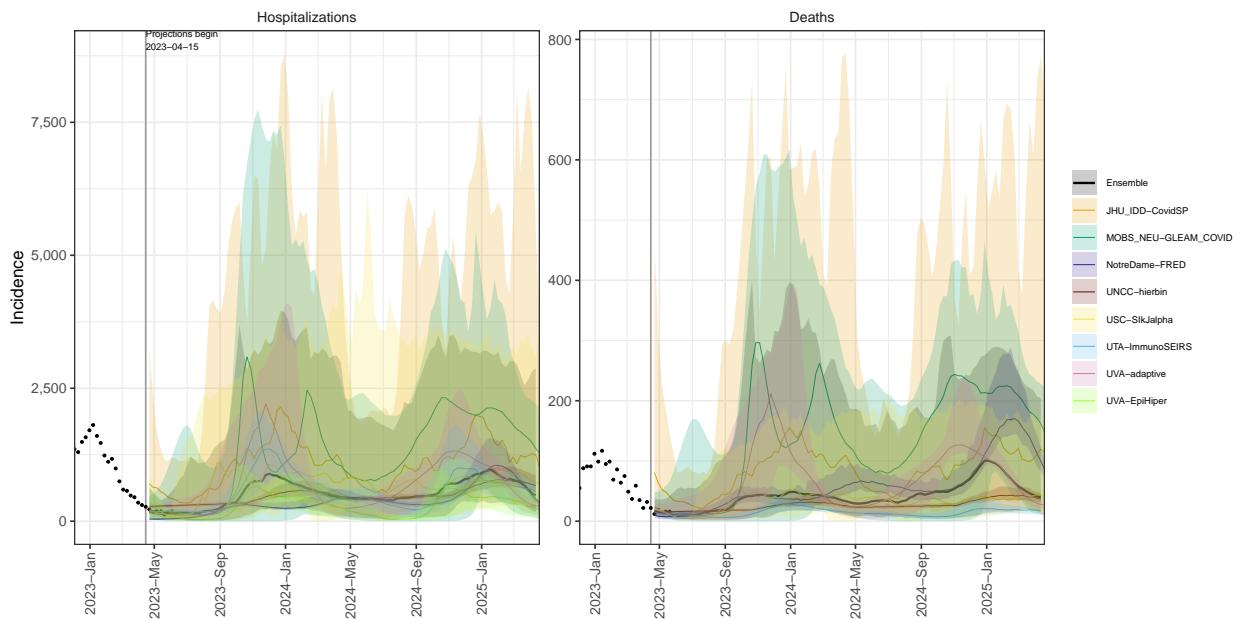
NV model variance & 95% projection intervals – No booster, High immune escape



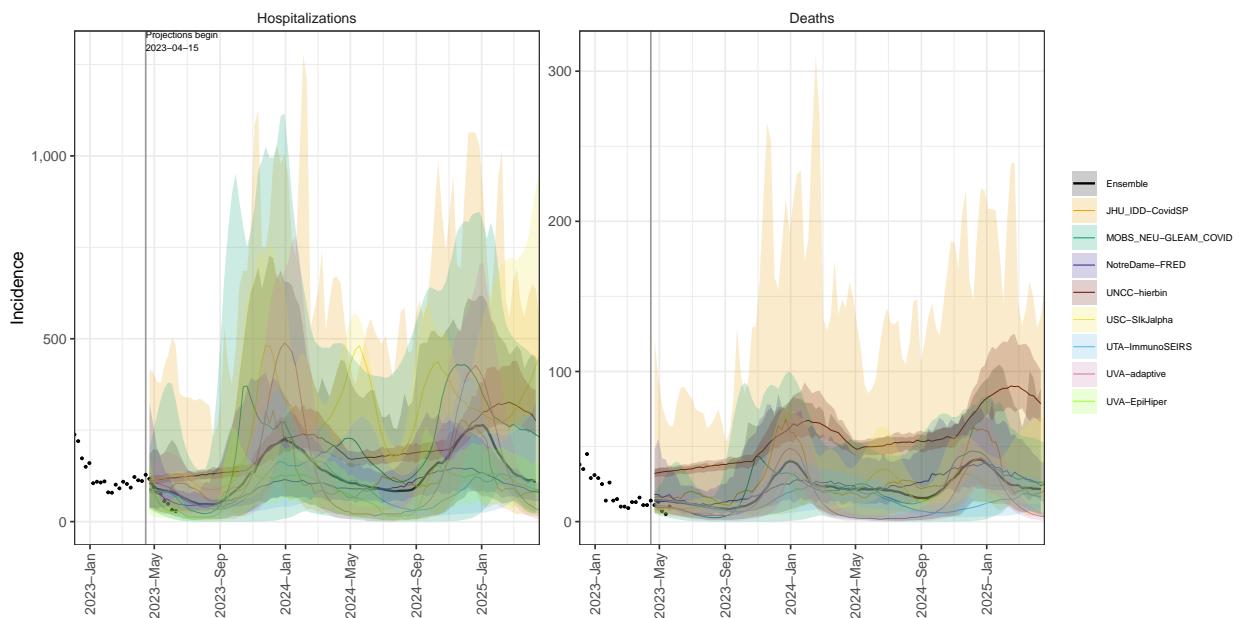
NH model variance & 95% projection intervals – No booster, High immune escape



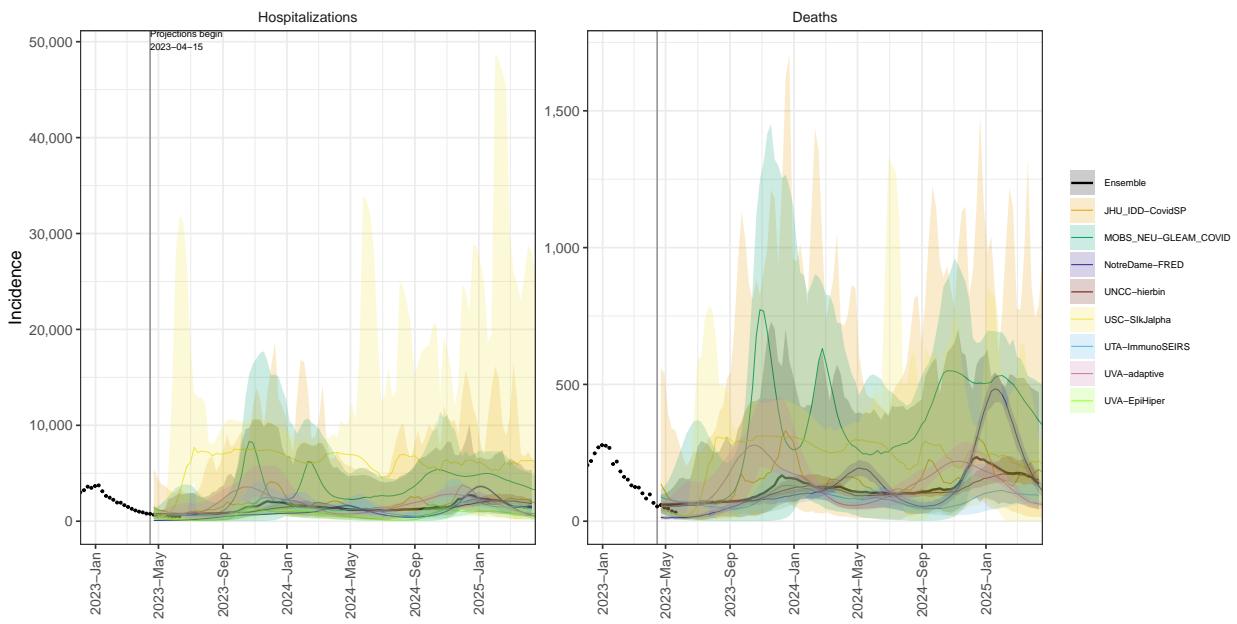
### NJ model variance & 95% projection intervals – No booster, High immune escape



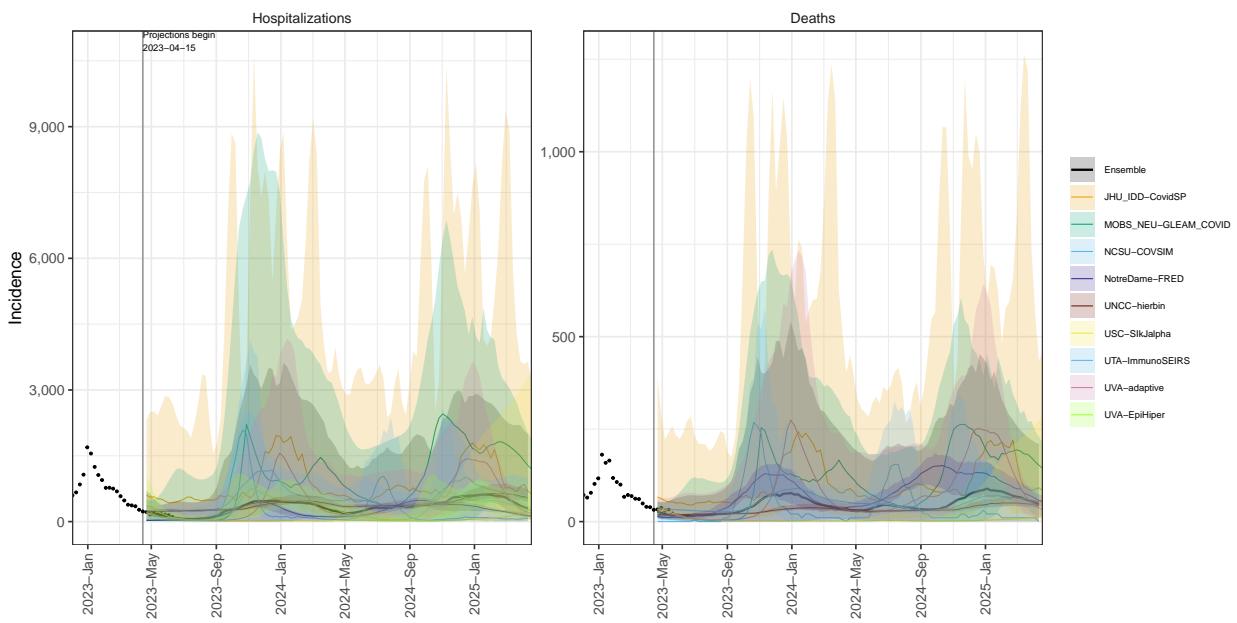
### NM model variance & 95% projection intervals – No booster, High immune escape



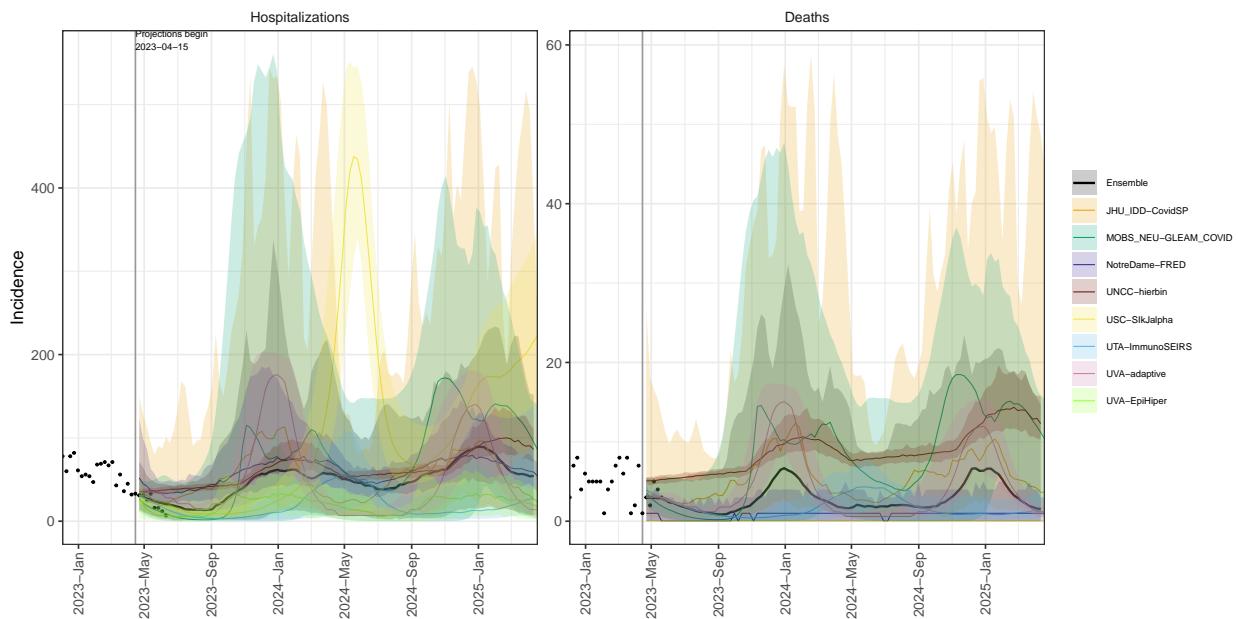
NY model variance & 95% projection intervals – No booster, High immune escape



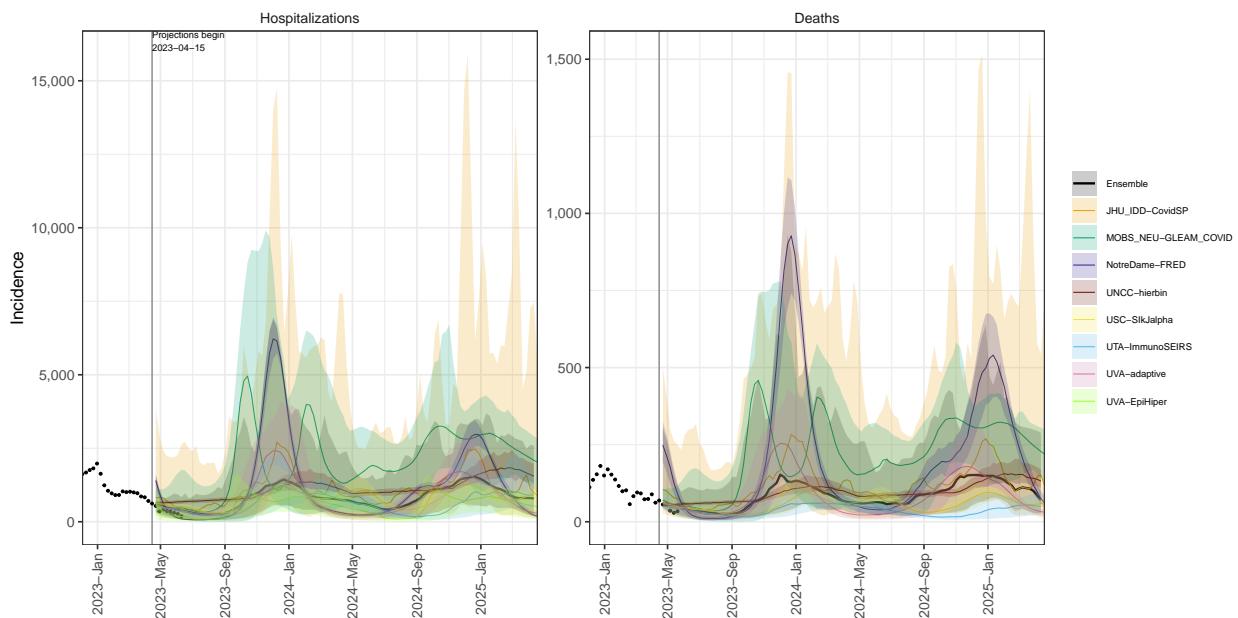
NC model variance & 95% projection intervals – No booster, High immune escape



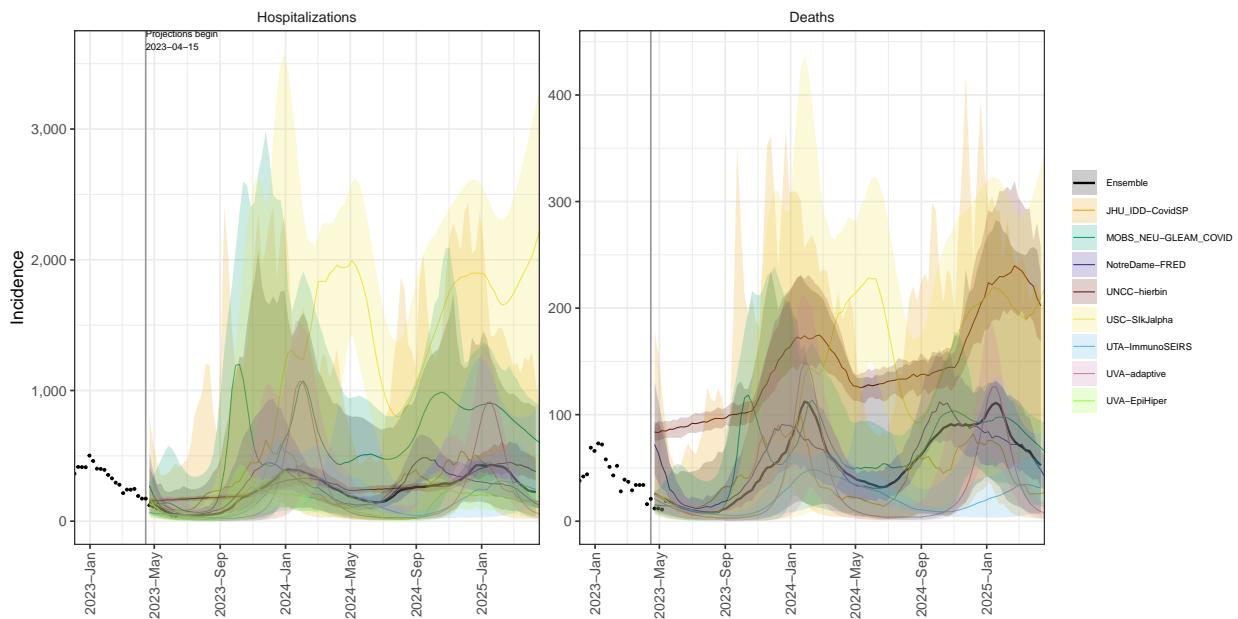
ND model variance & 95% projection intervals – No booster, High immune escape



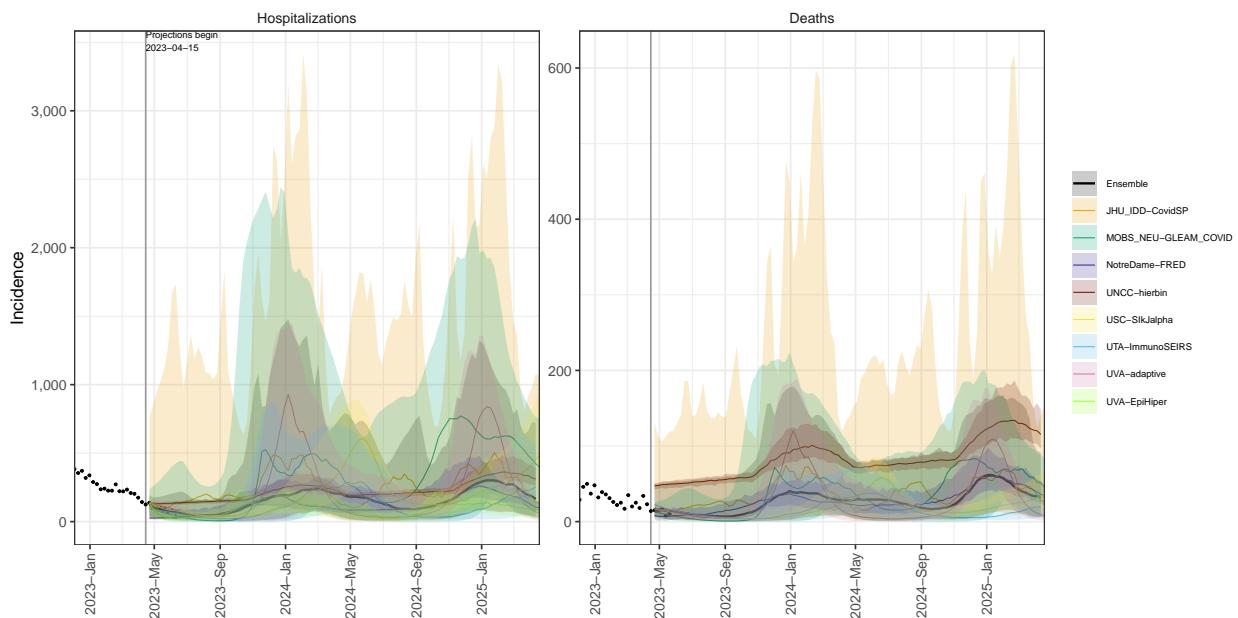
OH model variance & 95% projection intervals – No booster, High immune escape



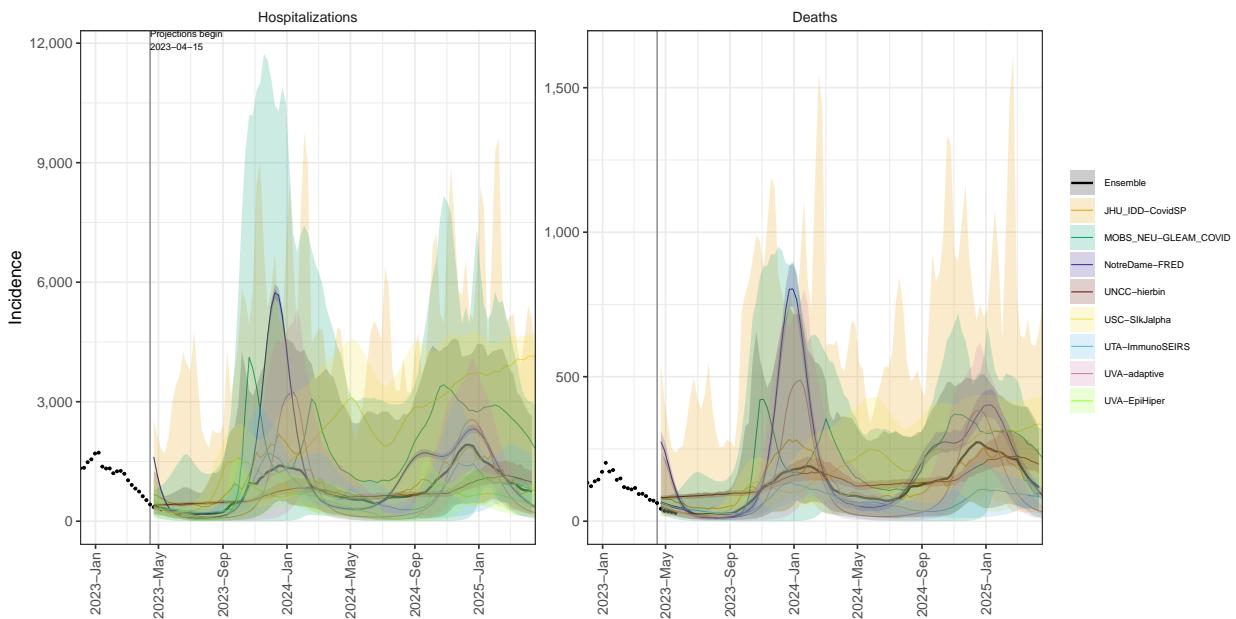
OK model variance & 95% projection intervals – No booster, High immune escape



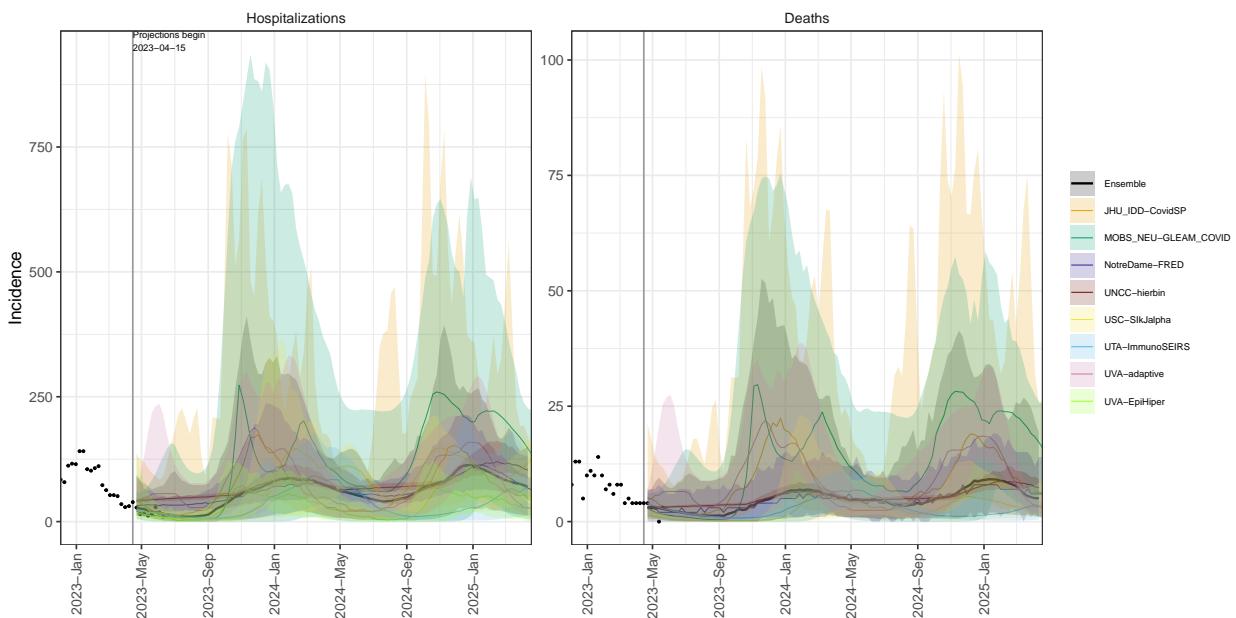
OR model variance & 95% projection intervals – No booster, High immune escape



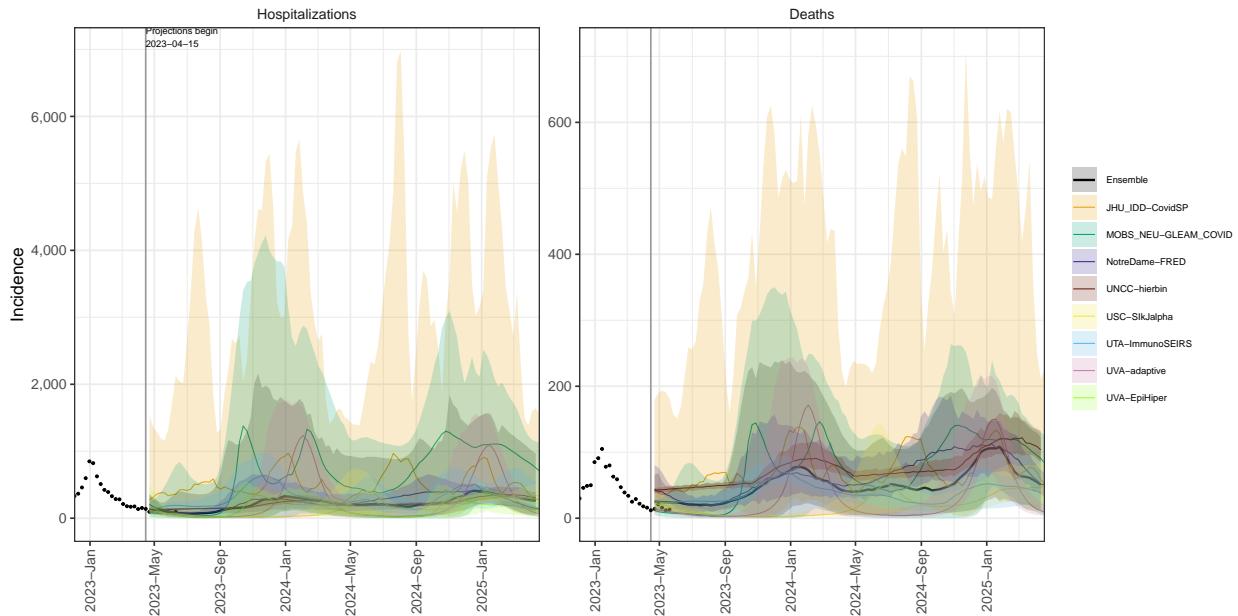
PA model variance & 95% projection intervals – No booster, High immune escape



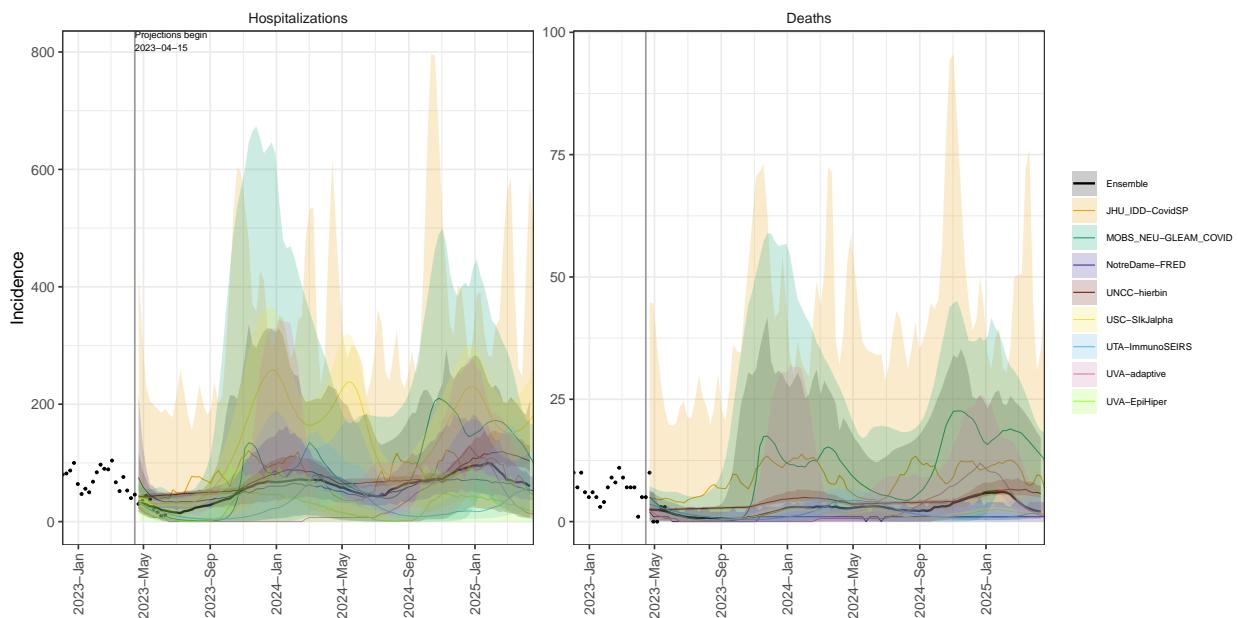
RI model variance & 95% projection intervals – No booster, High immune escape



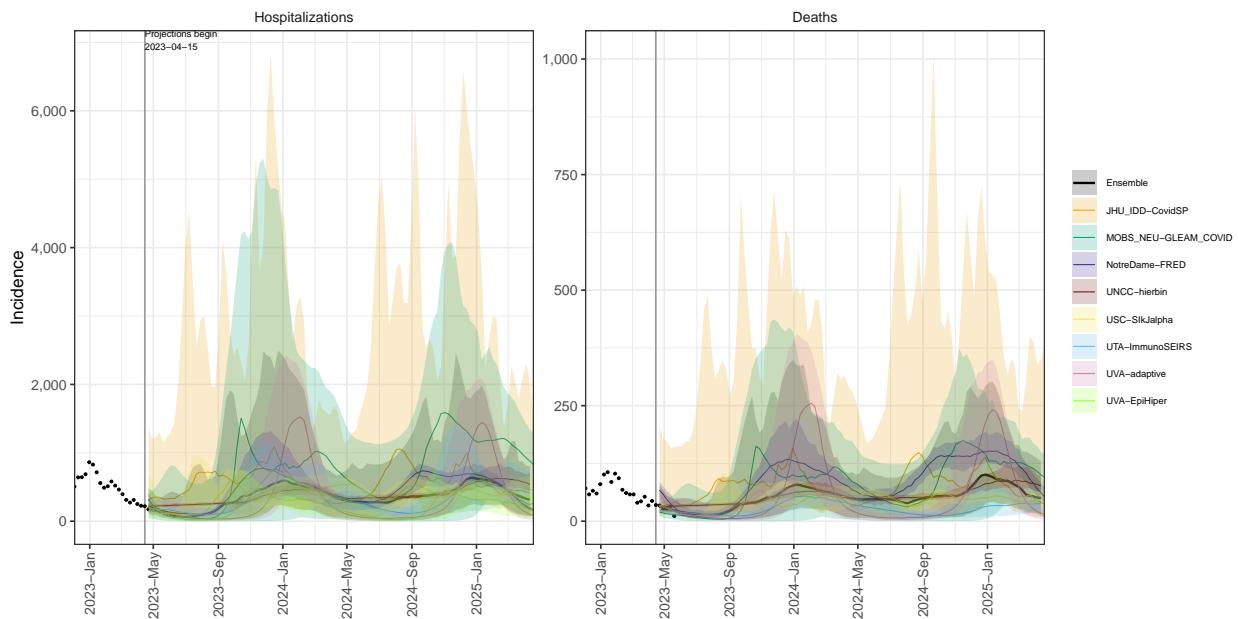
SC model variance & 95% projection intervals – No booster, High immune escape



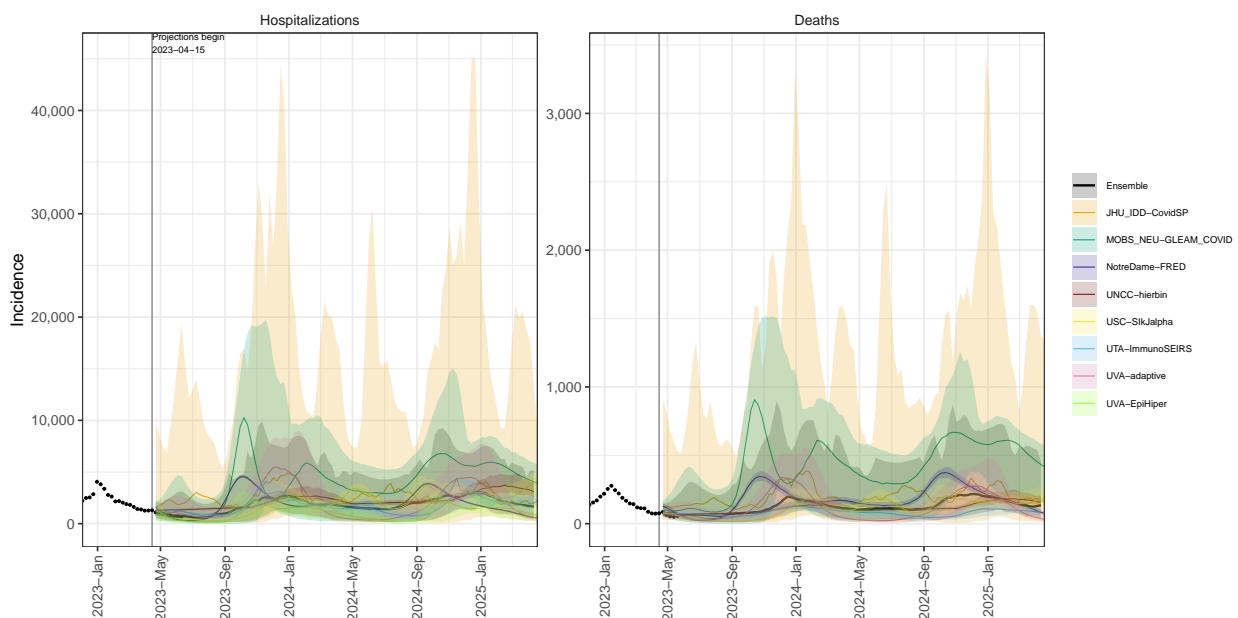
SD model variance & 95% projection intervals – No booster, High immune escape



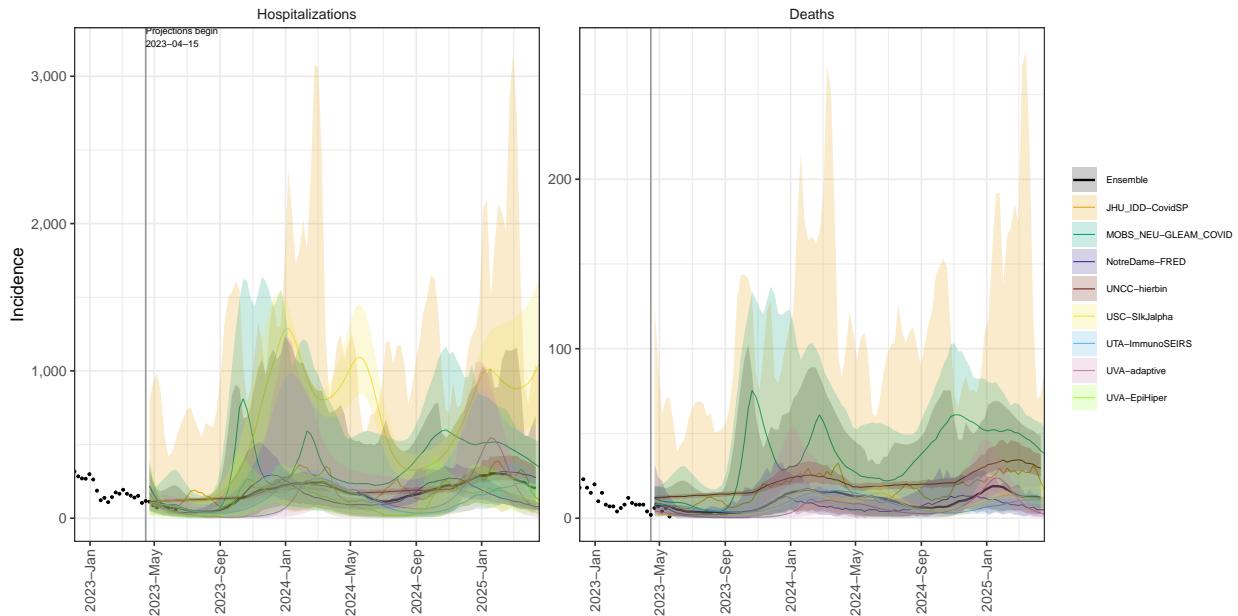
TN model variance & 95% projection intervals – No booster, High immune escape



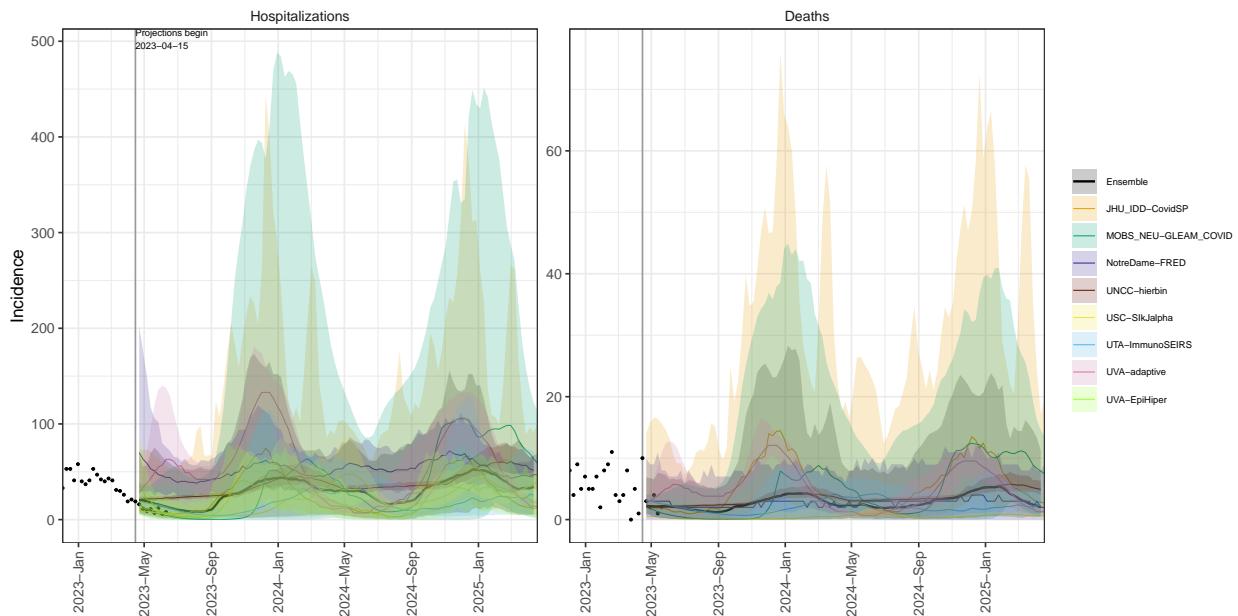
TX model variance & 95% projection intervals – No booster, High immune escape



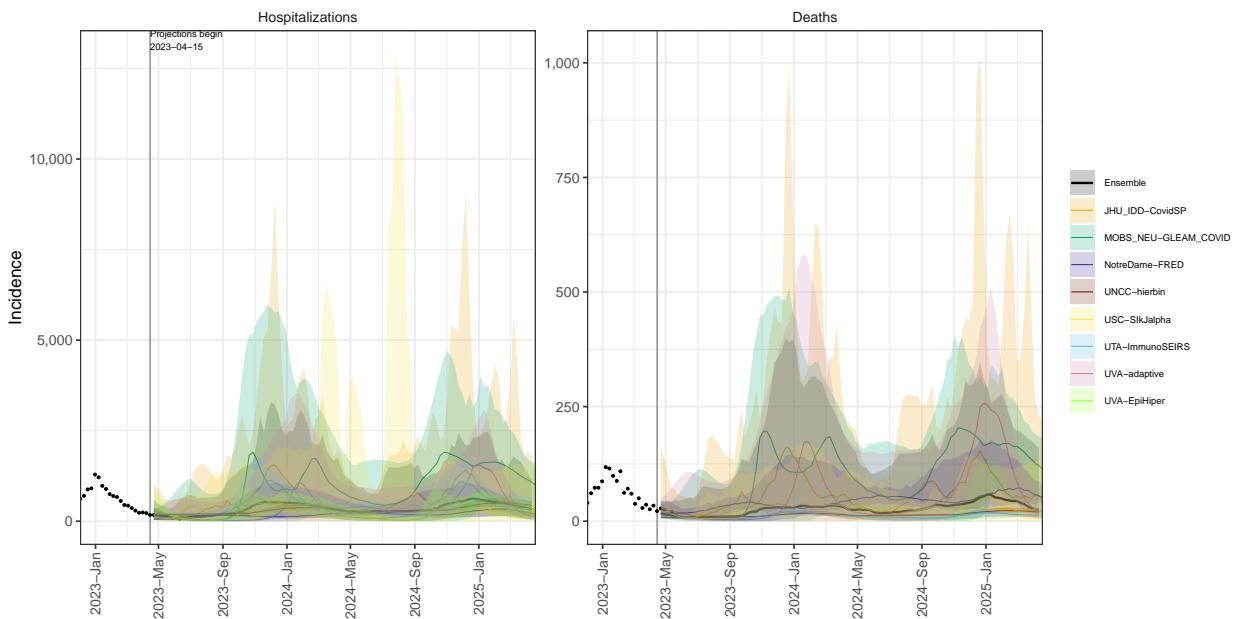
UT model variance & 95% projection intervals – No booster, High immune escape



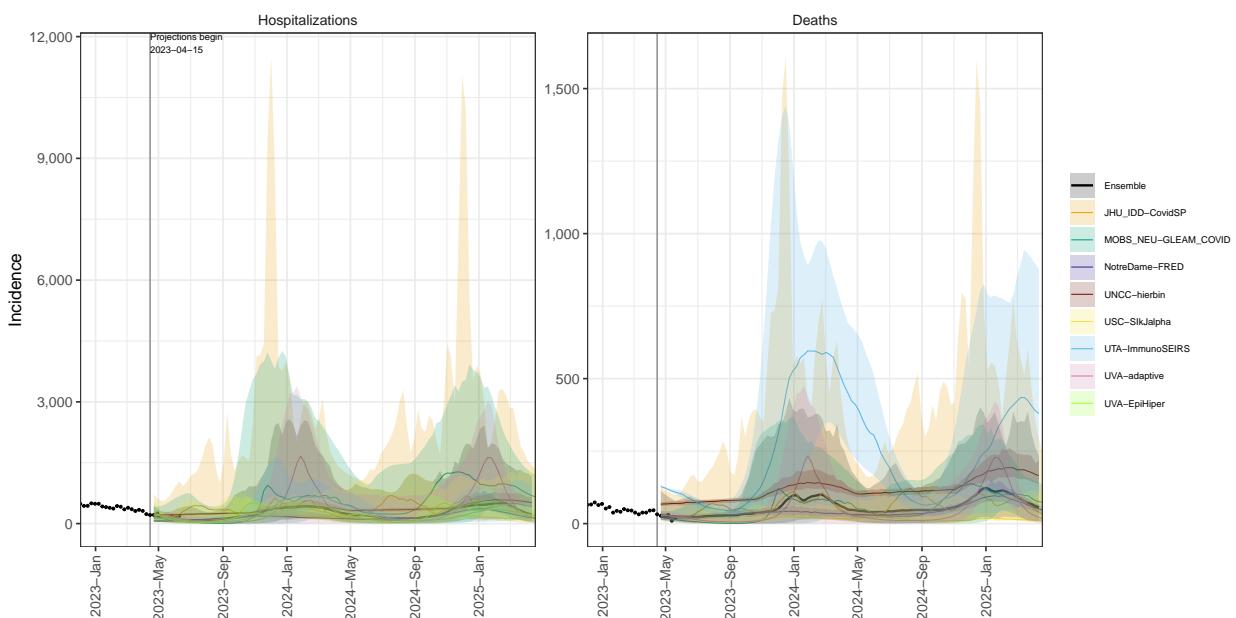
VT model variance & 95% projection intervals – No booster, High immune escape



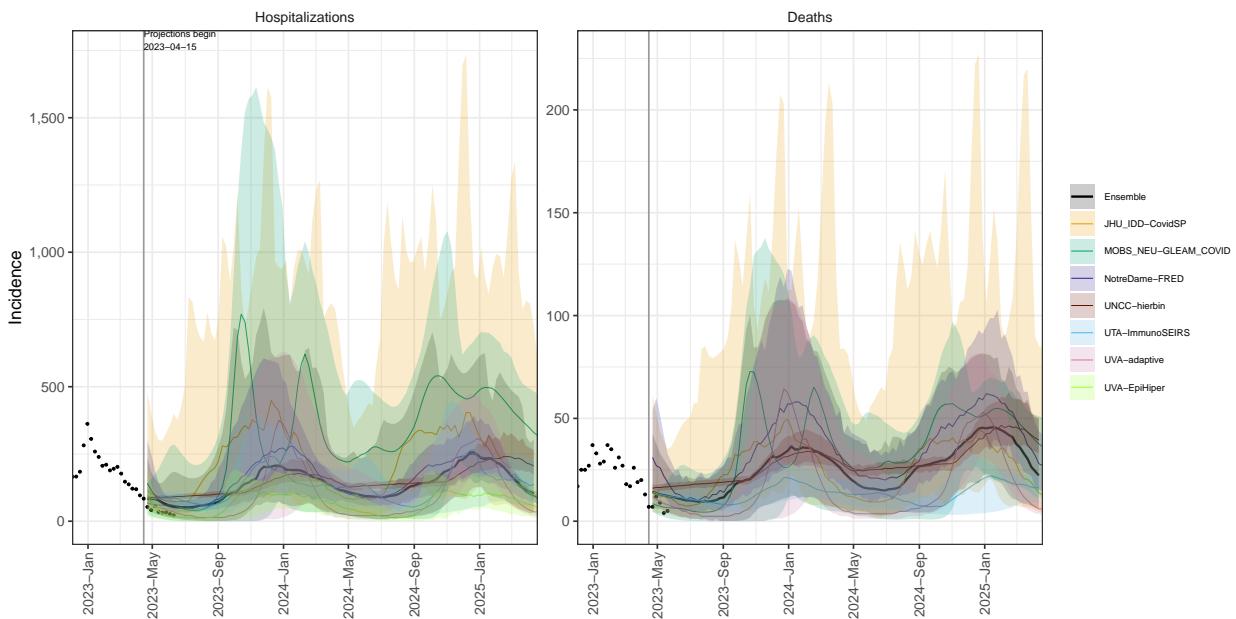
VA model variance & 95% projection intervals – No booster, High immune escape



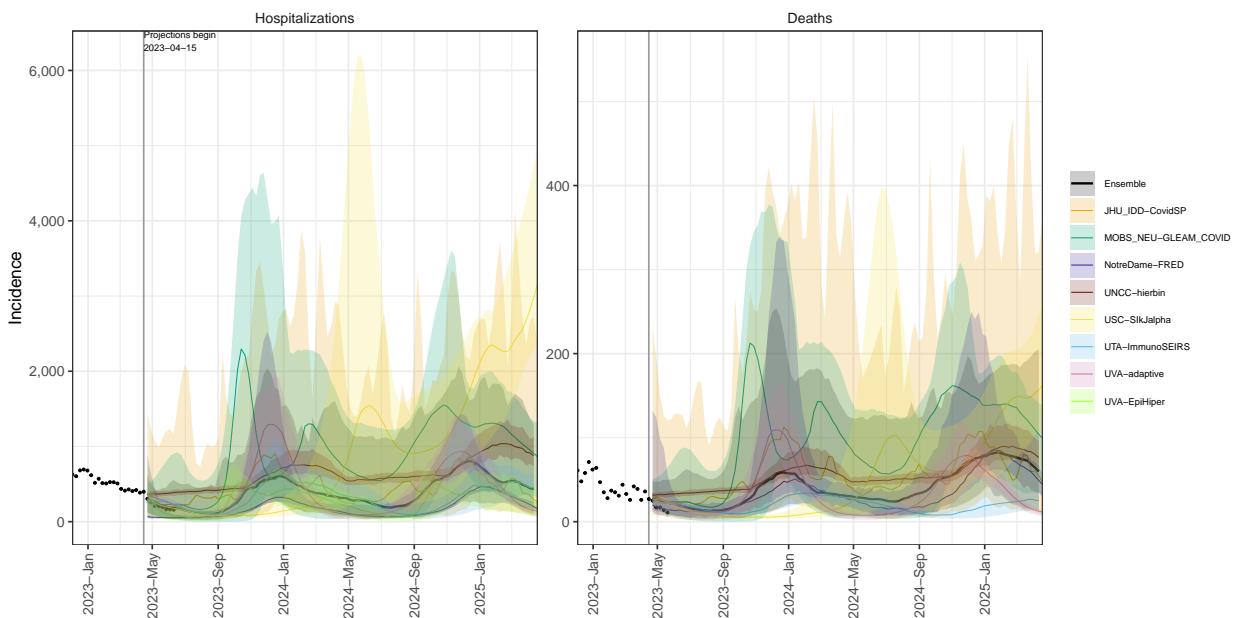
WA model variance & 95% projection intervals – No booster, High immune escape



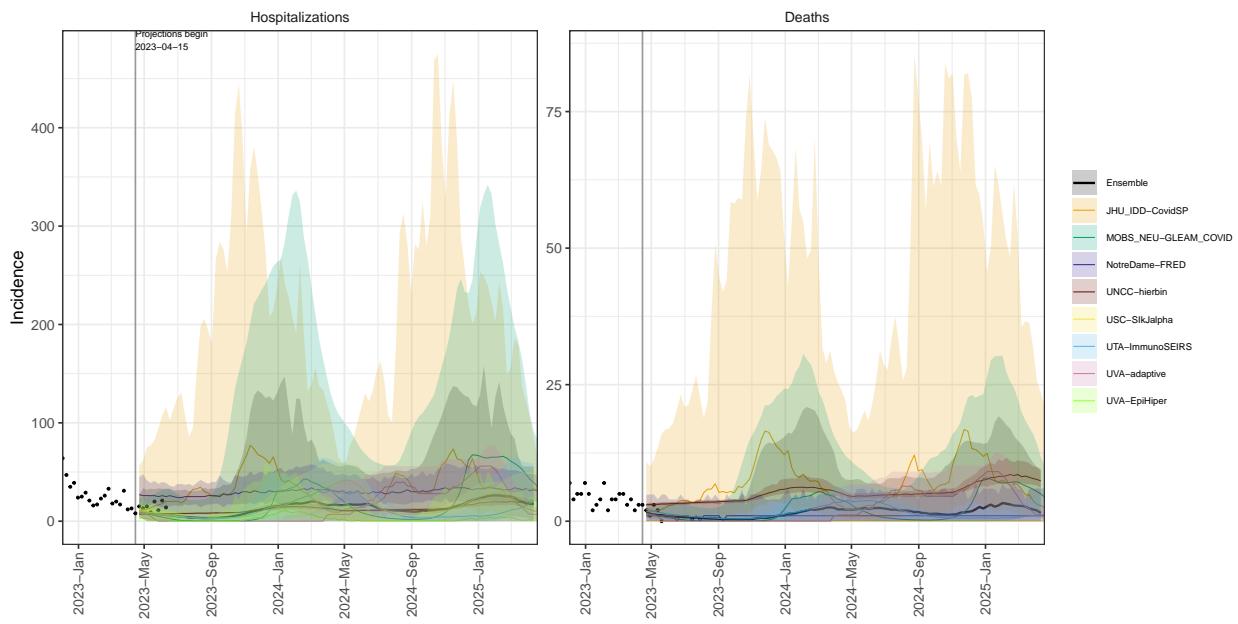
WV model variance & 95% projection intervals – No booster, High immune escape



WI model variance & 95% projection intervals – No booster, High immune escape

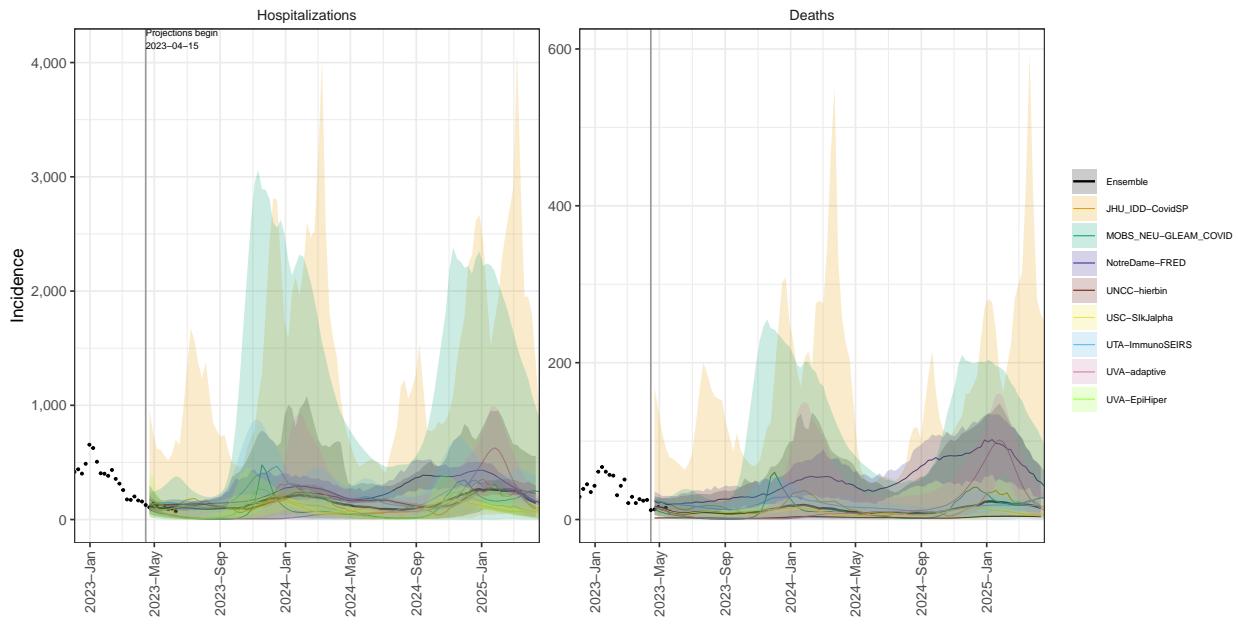


WY model variance & 95% projection intervals – No booster, High immune escape

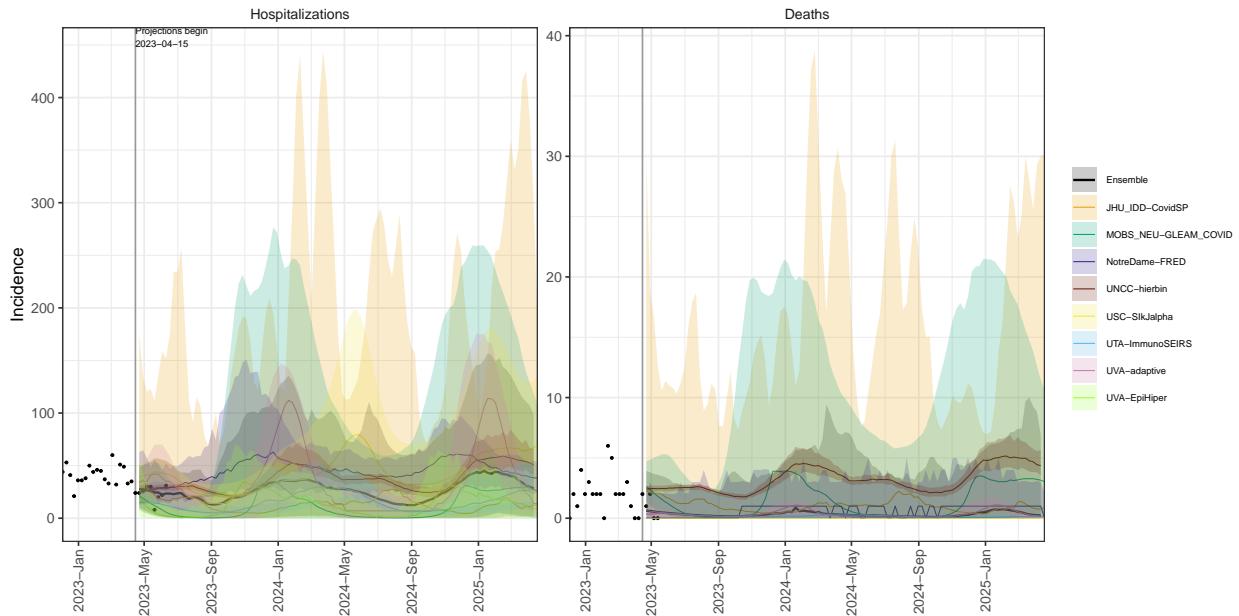


Model variation for the Booster for 65+, Low immune escape scenario

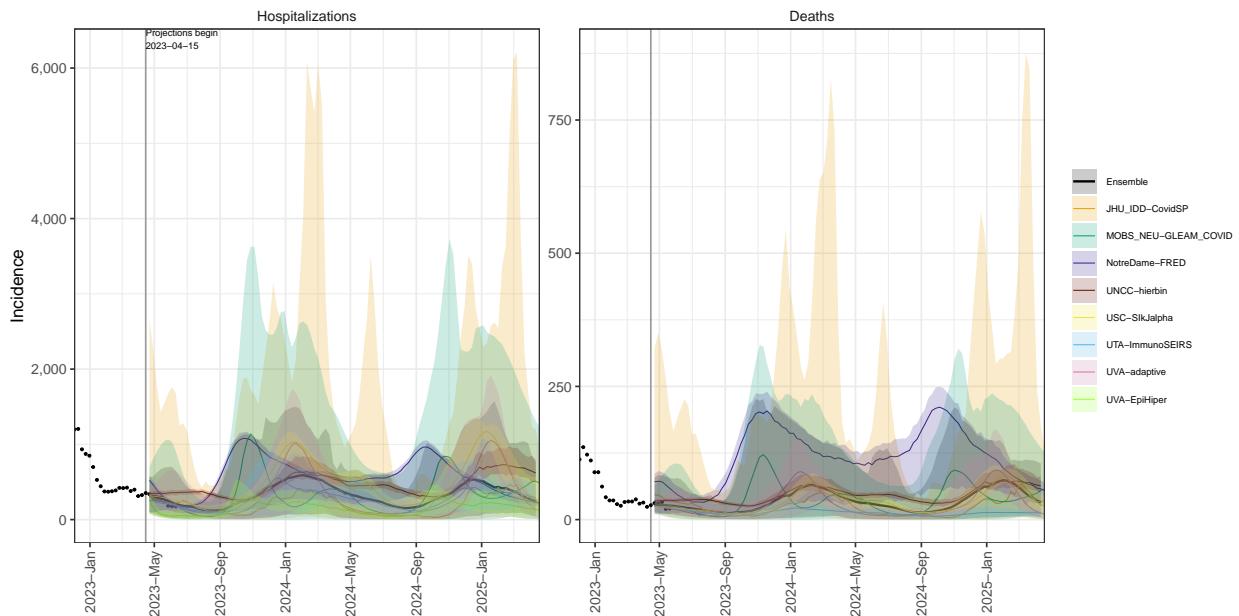
AL model variance & 95% projection intervals – Booster for 65+, Low immune escape



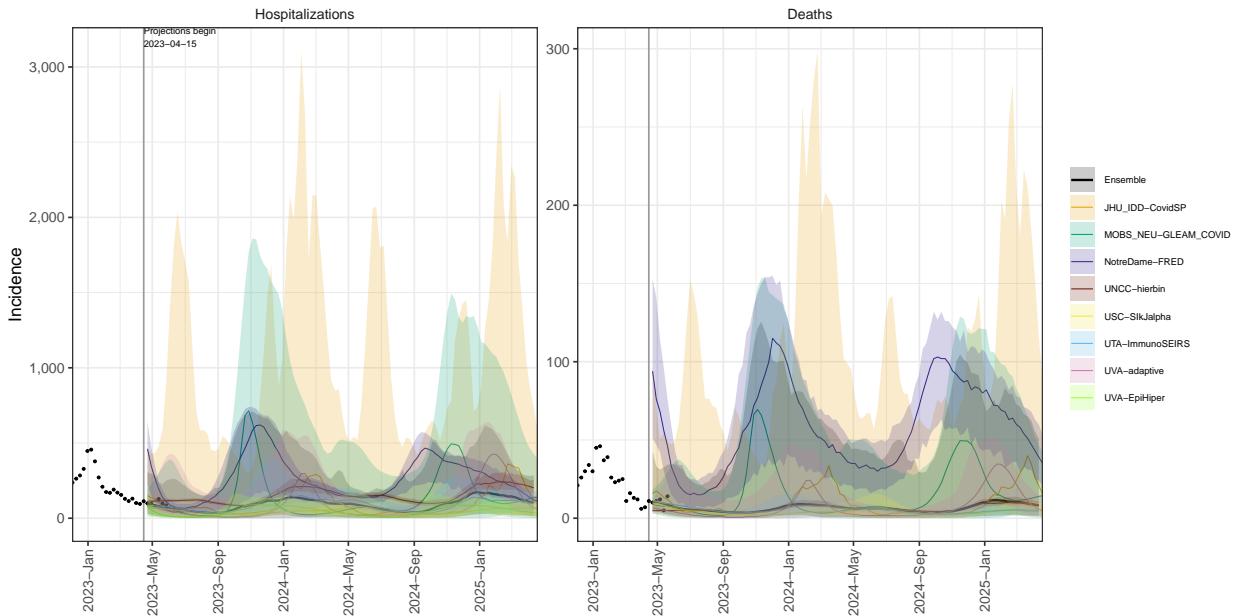
### AK model variance & 95% projection intervals – Booster for 65+, Low immune escape



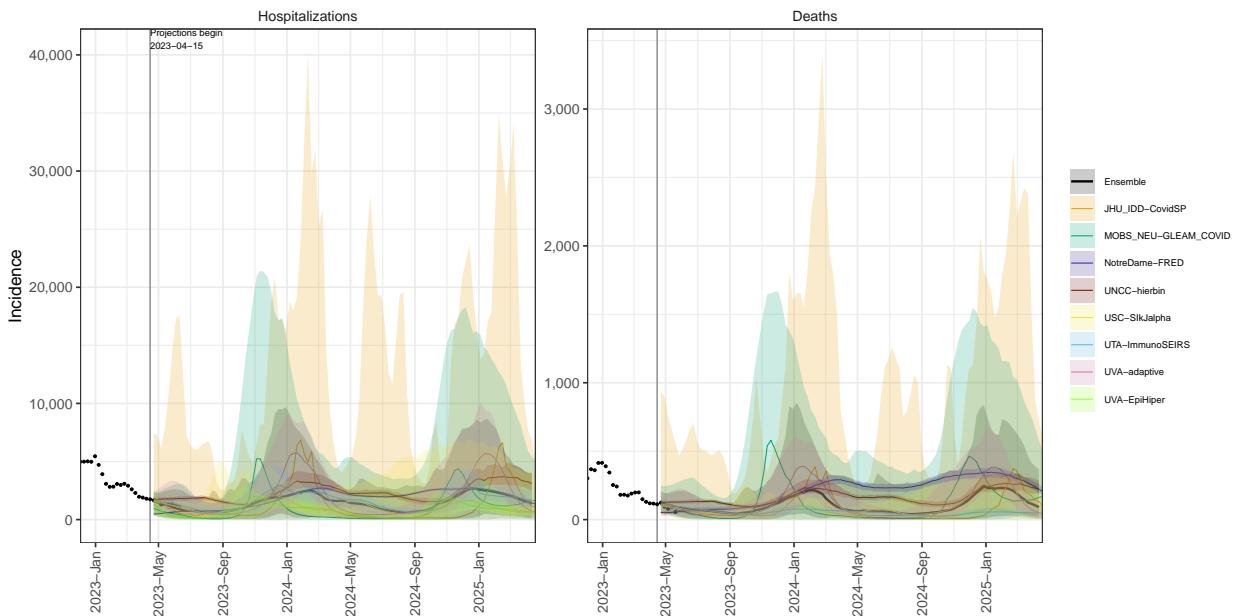
### AZ model variance & 95% projection intervals – Booster for 65+, Low immune escape



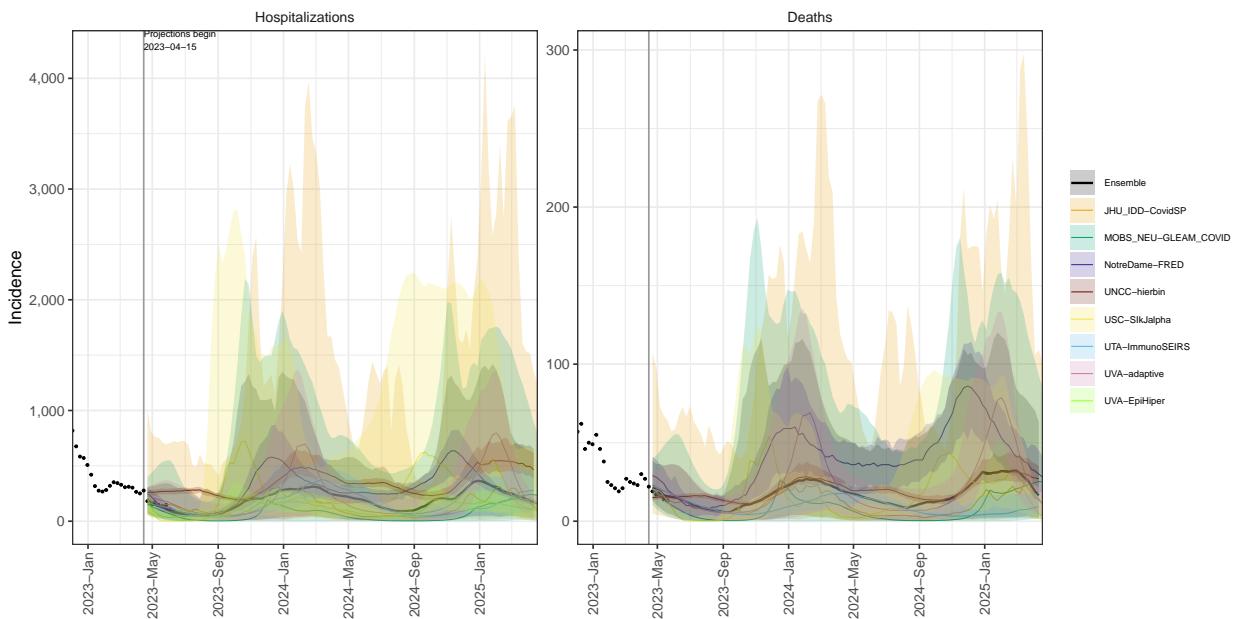
AR model variance & 95% projection intervals – Booster for 65+, Low immune escape



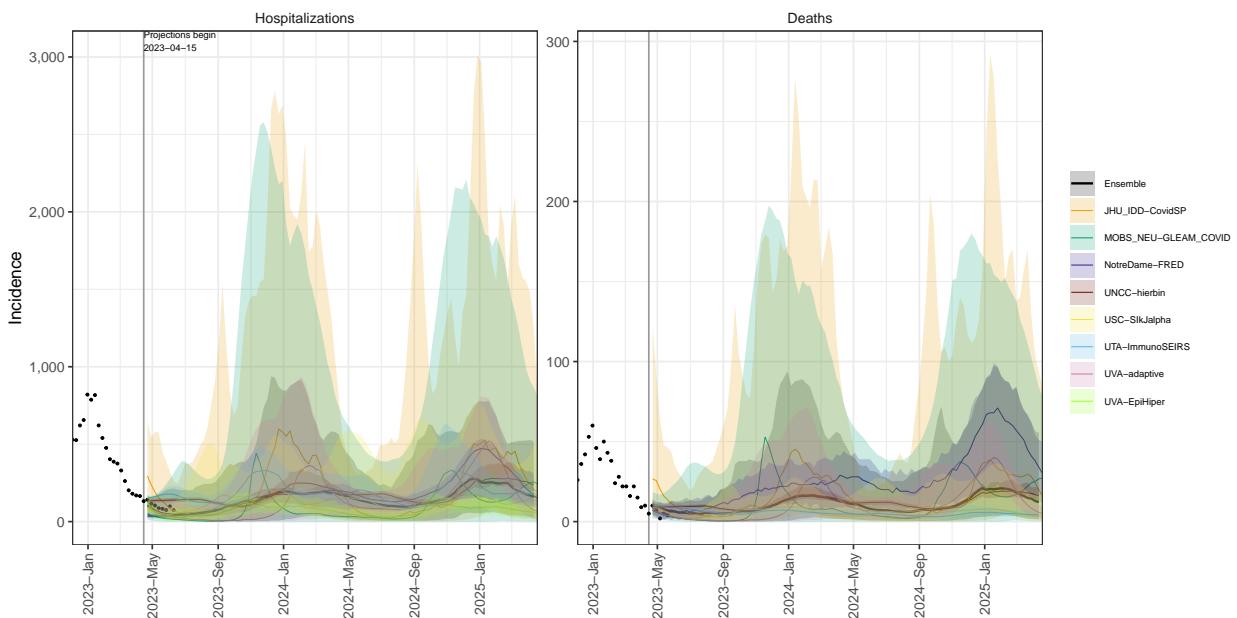
CA model variance & 95% projection intervals – Booster for 65+, Low immune escape



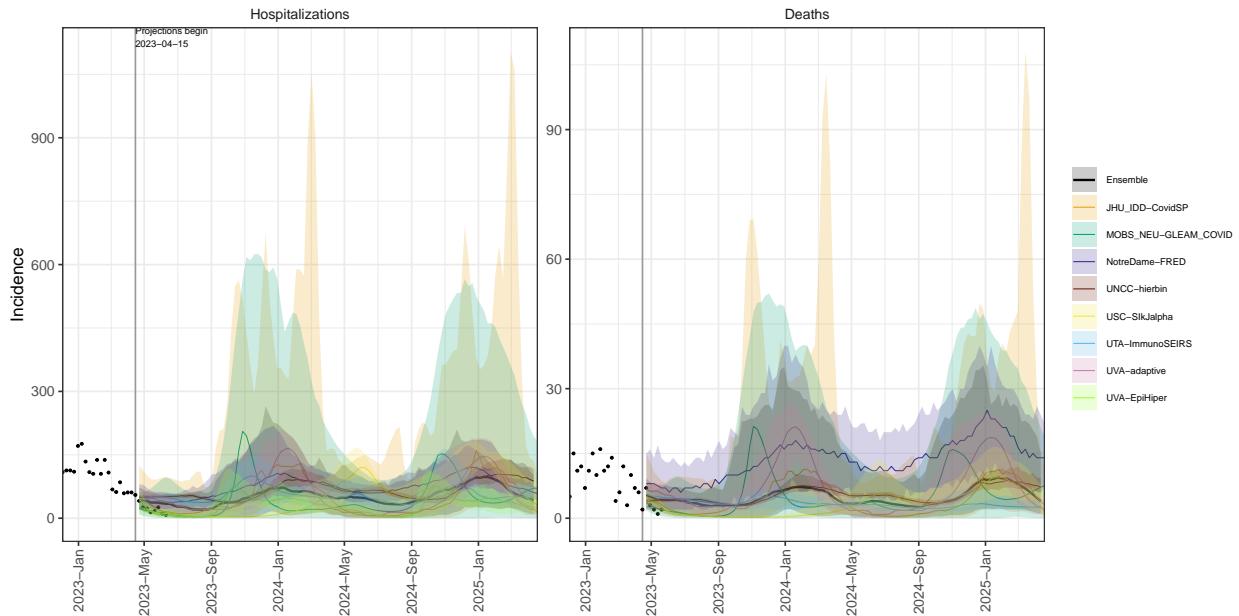
CO model variance & 95% projection intervals – Booster for 65+, Low immune escape



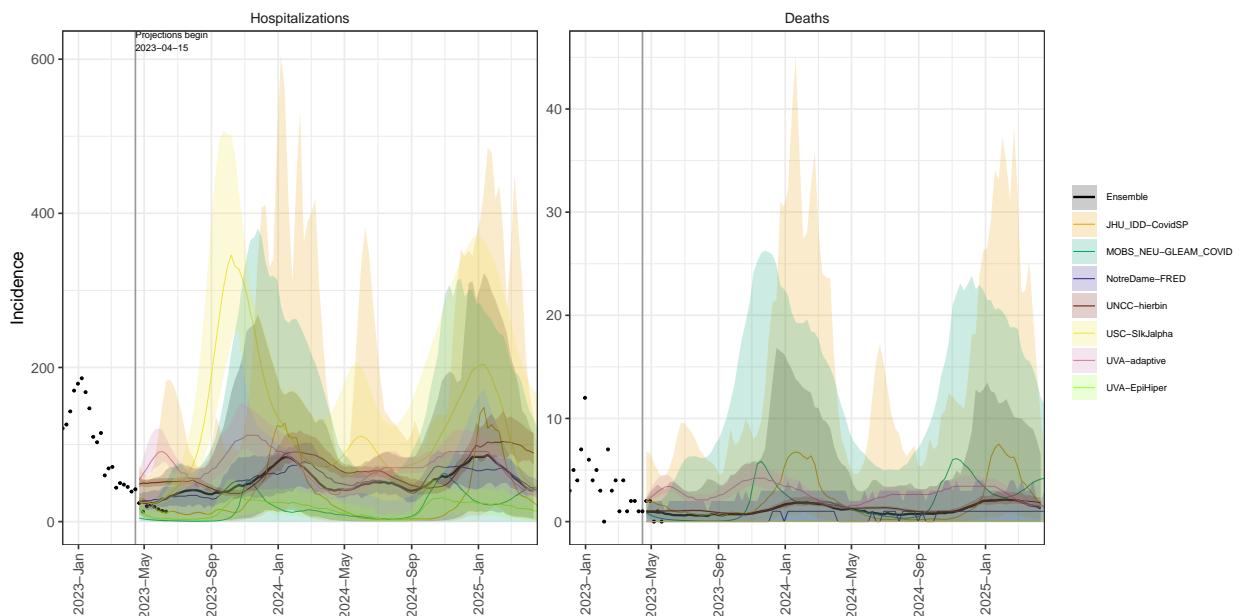
CT model variance & 95% projection intervals – Booster for 65+, Low immune escape



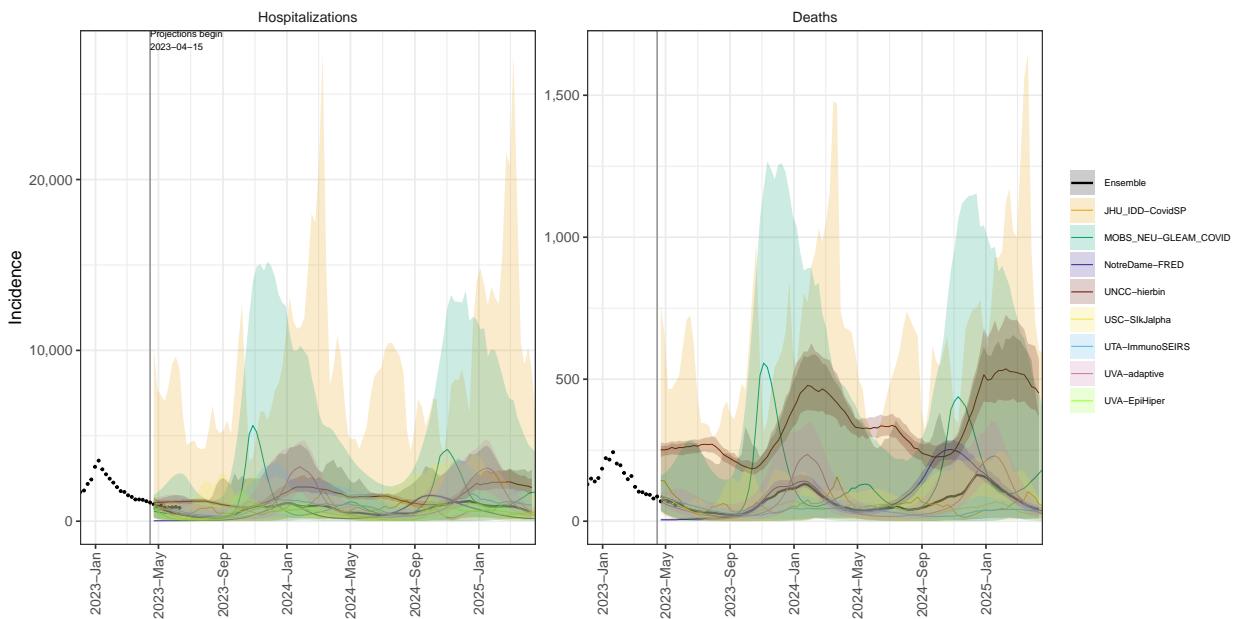
DE model variance & 95% projection intervals – Booster for 65+, Low immune escape



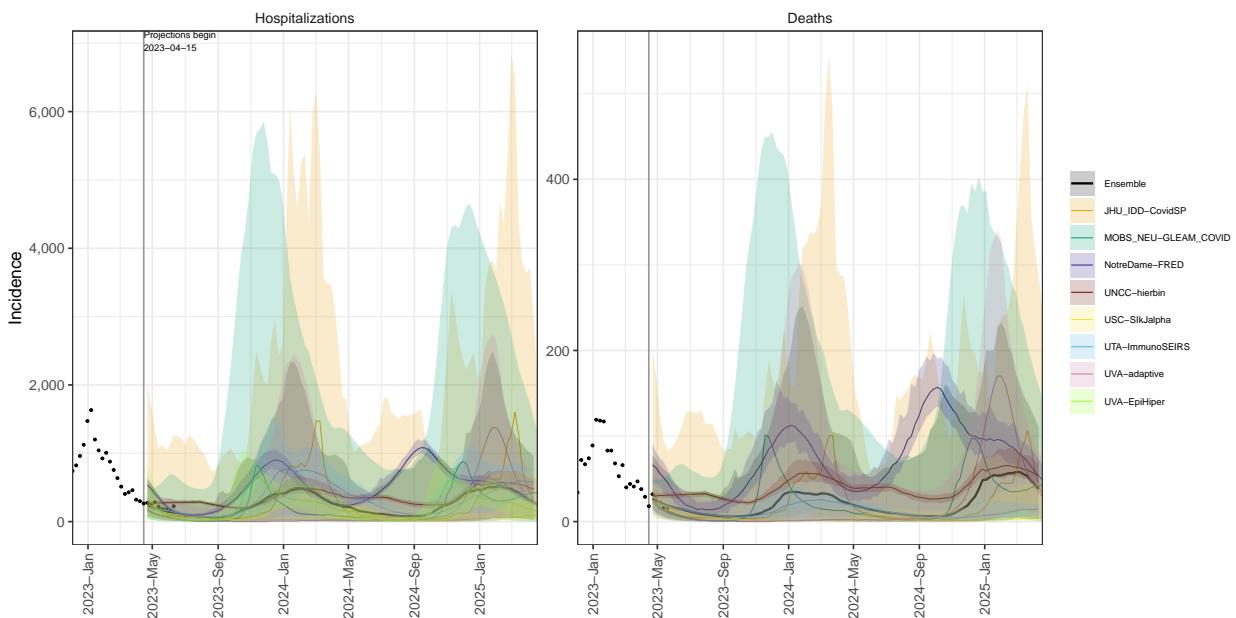
DC model variance & 95% projection intervals – Booster for 65+, Low immune escape



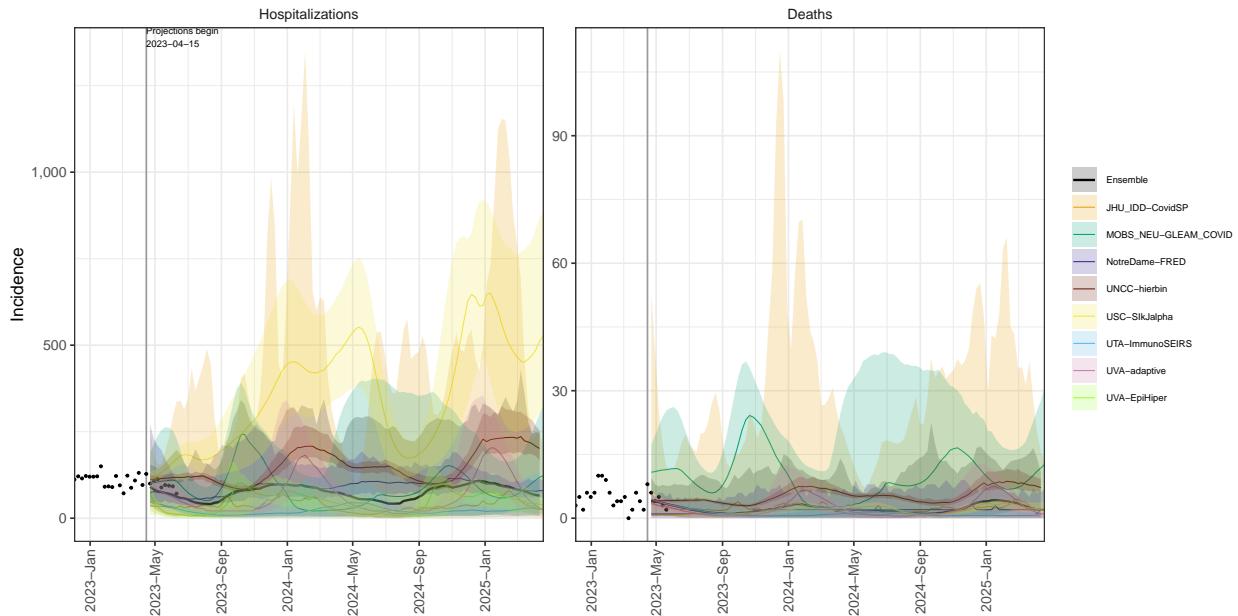
FL model variance & 95% projection intervals – Booster for 65+, Low immune escape



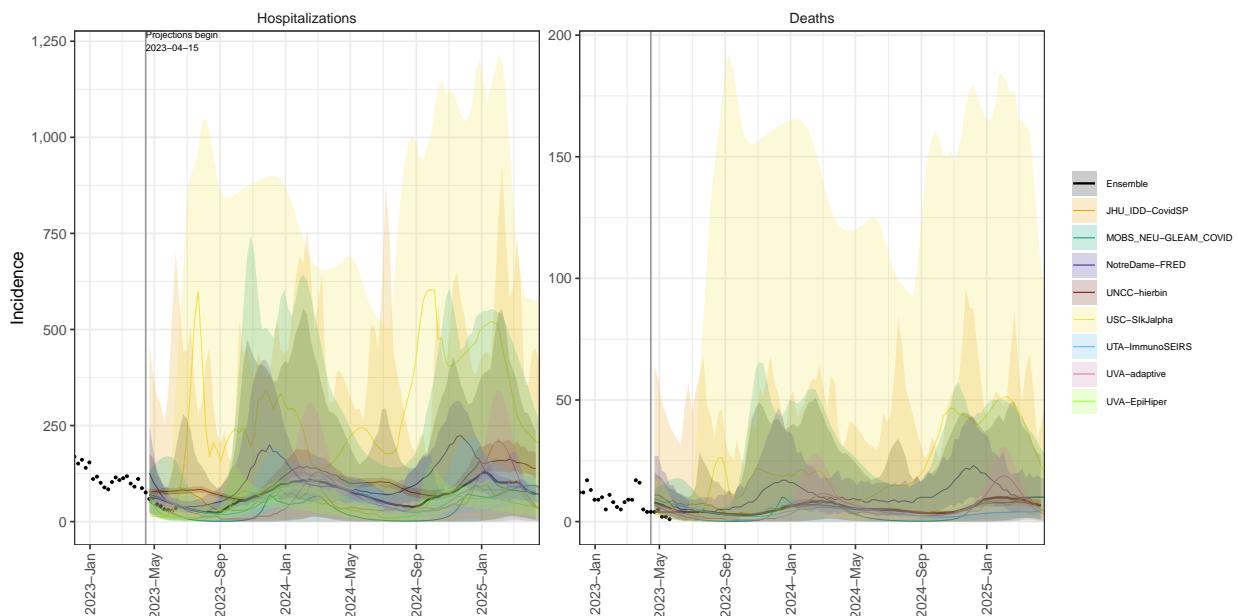
GA model variance & 95% projection intervals – Booster for 65+, Low immune escape



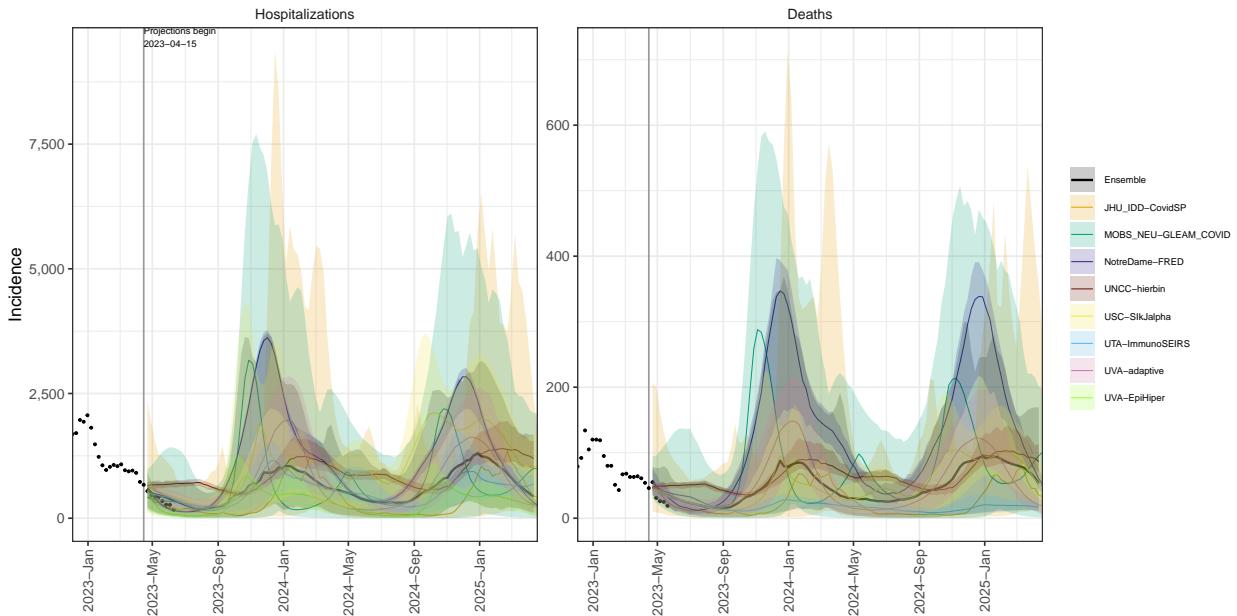
HI model variance & 95% projection intervals – Booster for 65+, Low immune escape



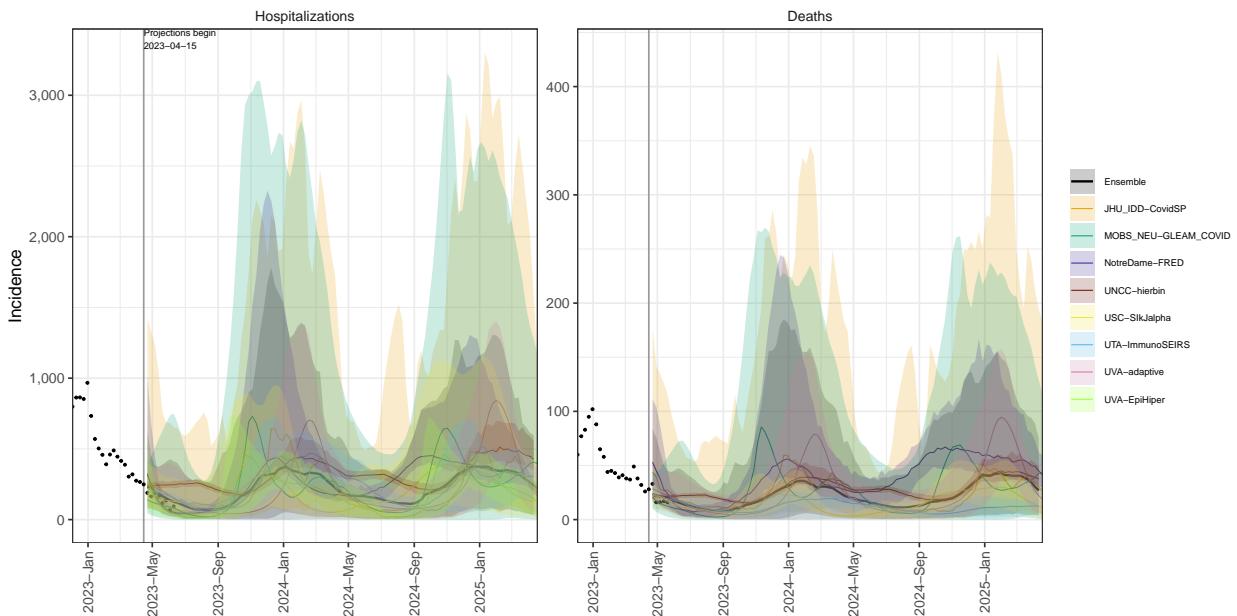
ID model variance & 95% projection intervals – Booster for 65+, Low immune escape



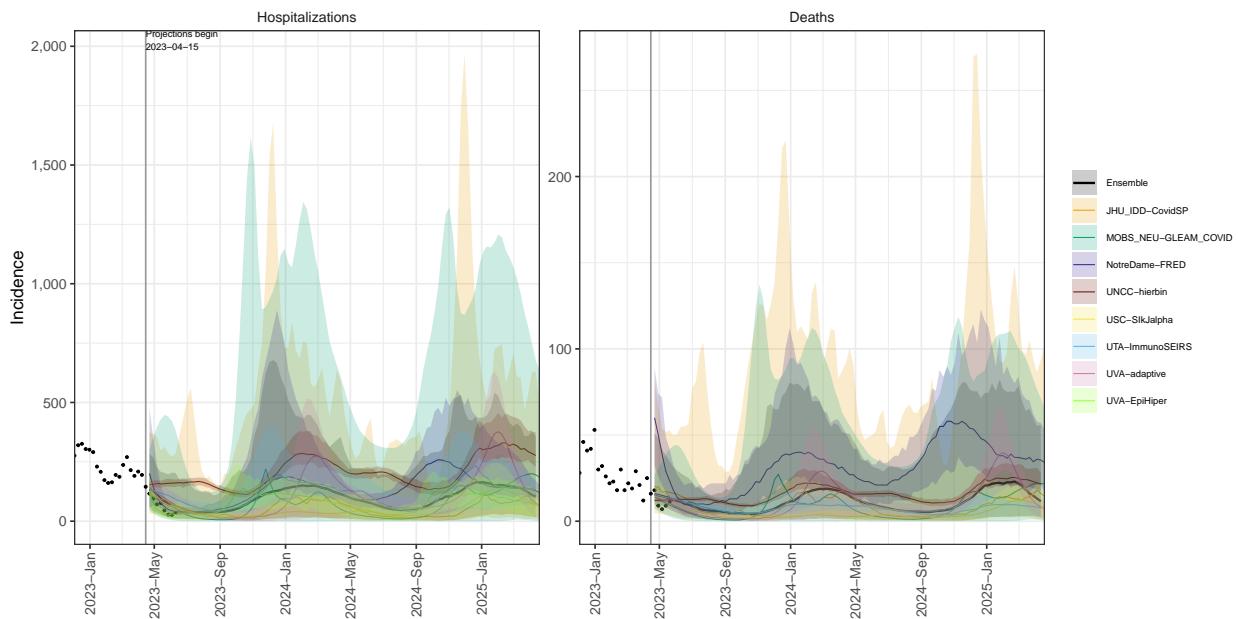
IL model variance & 95% projection intervals – Booster for 65+, Low immune escape



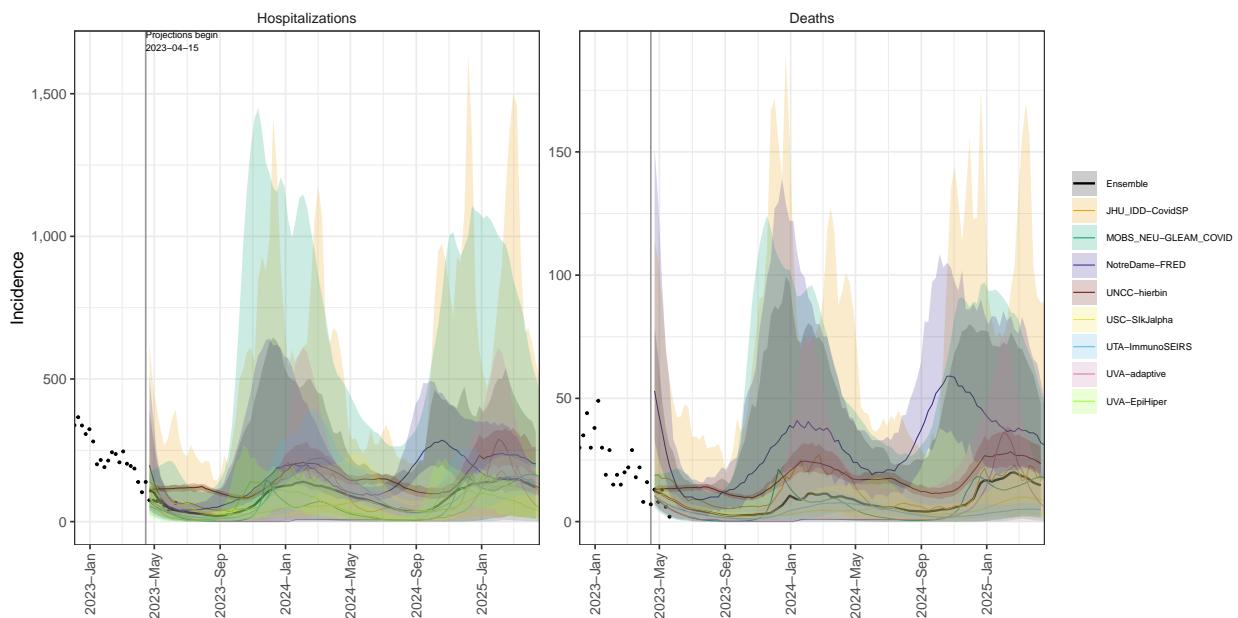
IN model variance & 95% projection intervals – Booster for 65+, Low immune escape



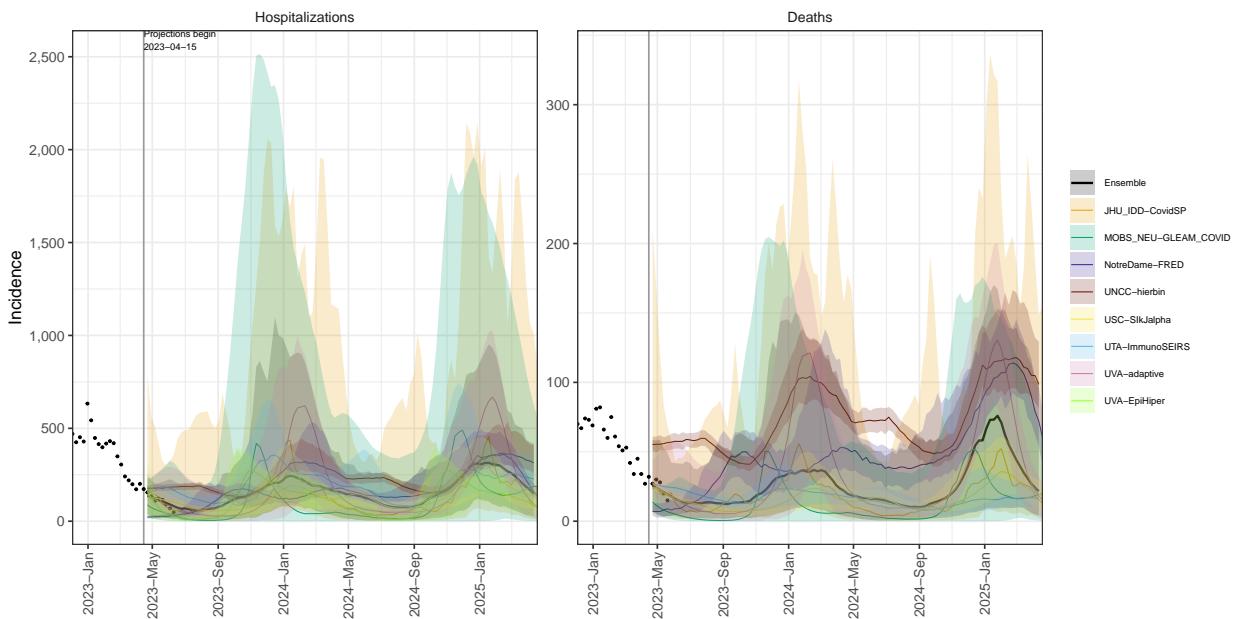
IA model variance & 95% projection intervals – Booster for 65+, Low immune escape



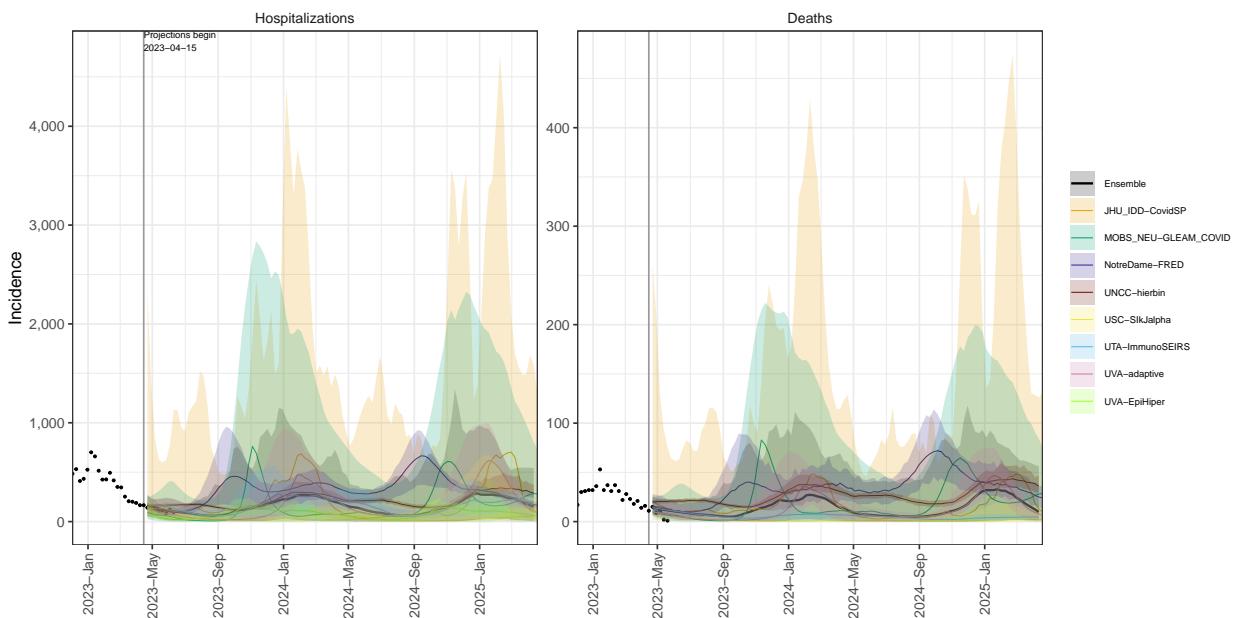
KS model variance & 95% projection intervals – Booster for 65+, Low immune escape



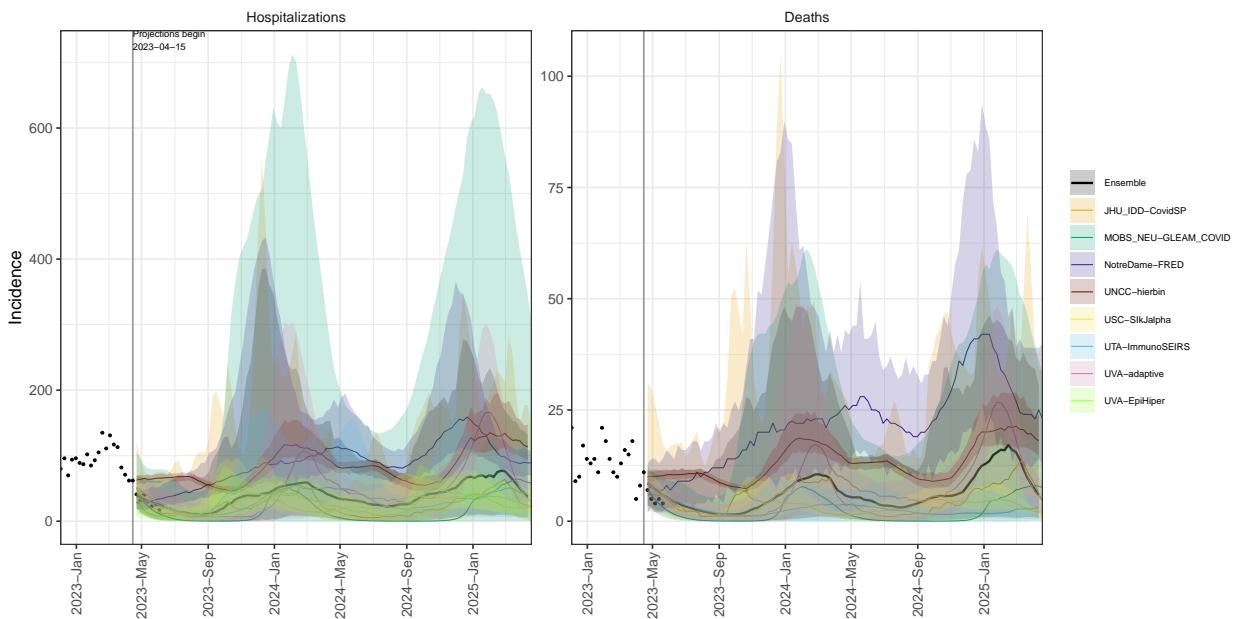
KY model variance & 95% projection intervals – Booster for 65+, Low immune escape



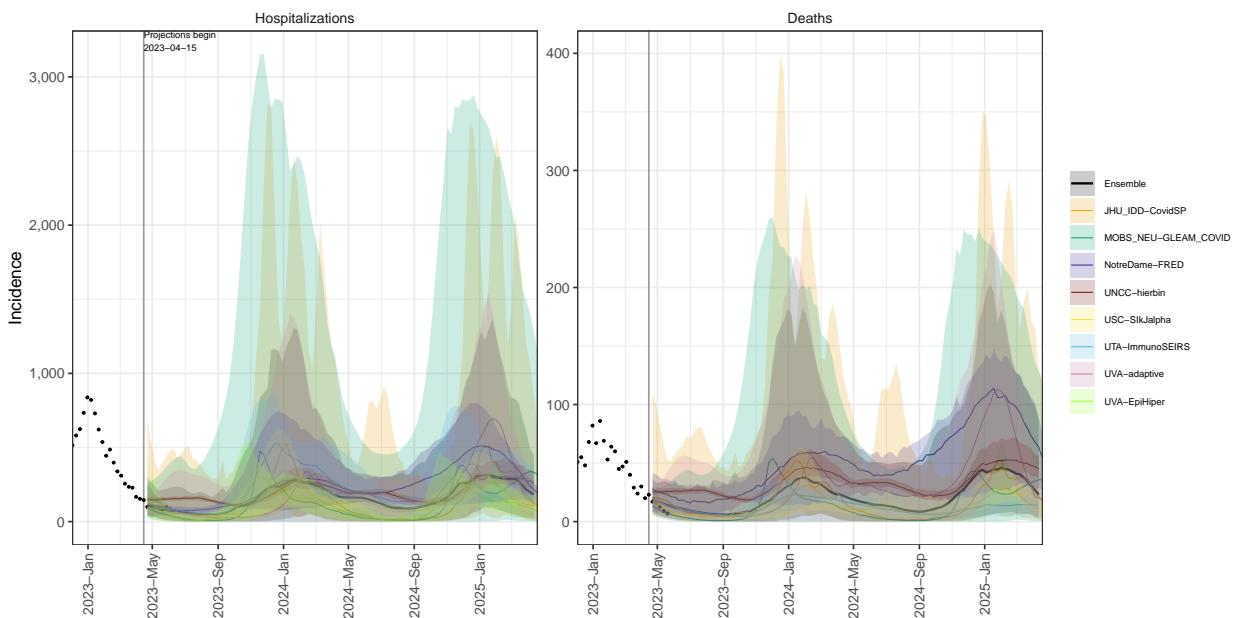
LA model variance & 95% projection intervals – Booster for 65+, Low immune escape



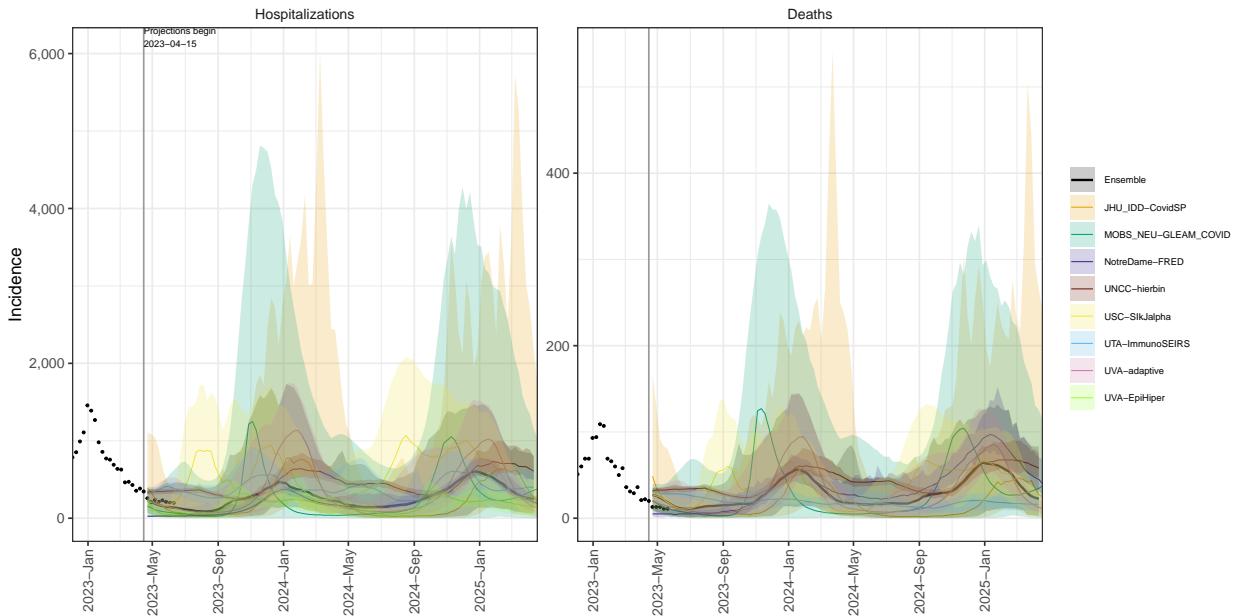
ME model variance & 95% projection intervals – Booster for 65+, Low immune escape



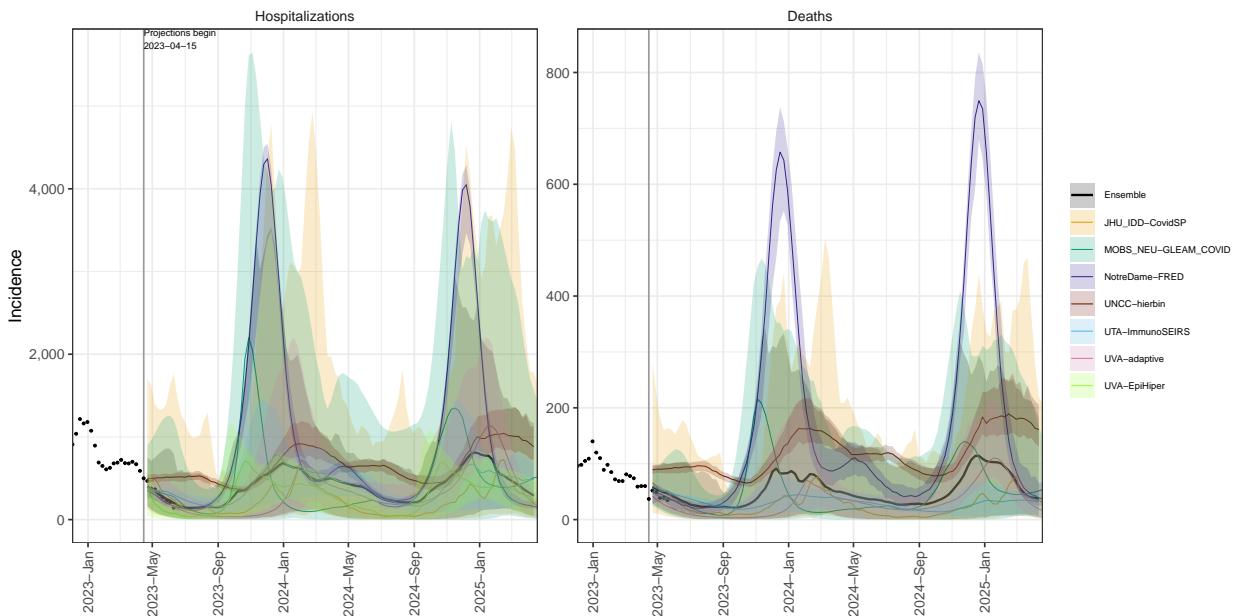
MD model variance & 95% projection intervals – Booster for 65+, Low immune escape



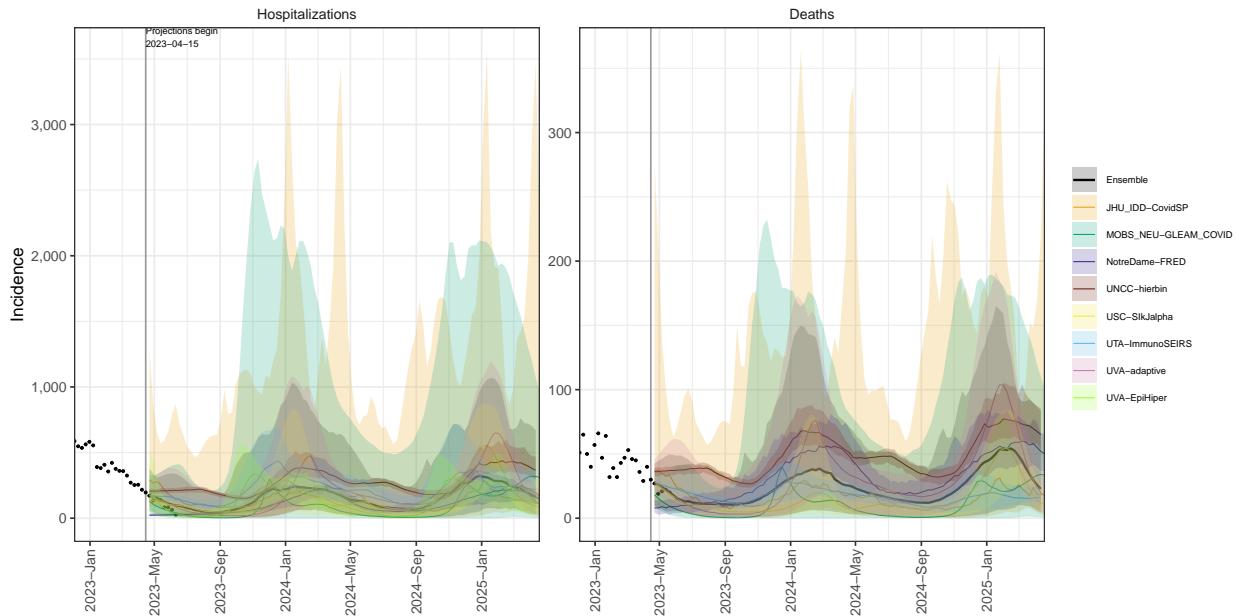
MA model variance & 95% projection intervals – Booster for 65+, Low immune escape



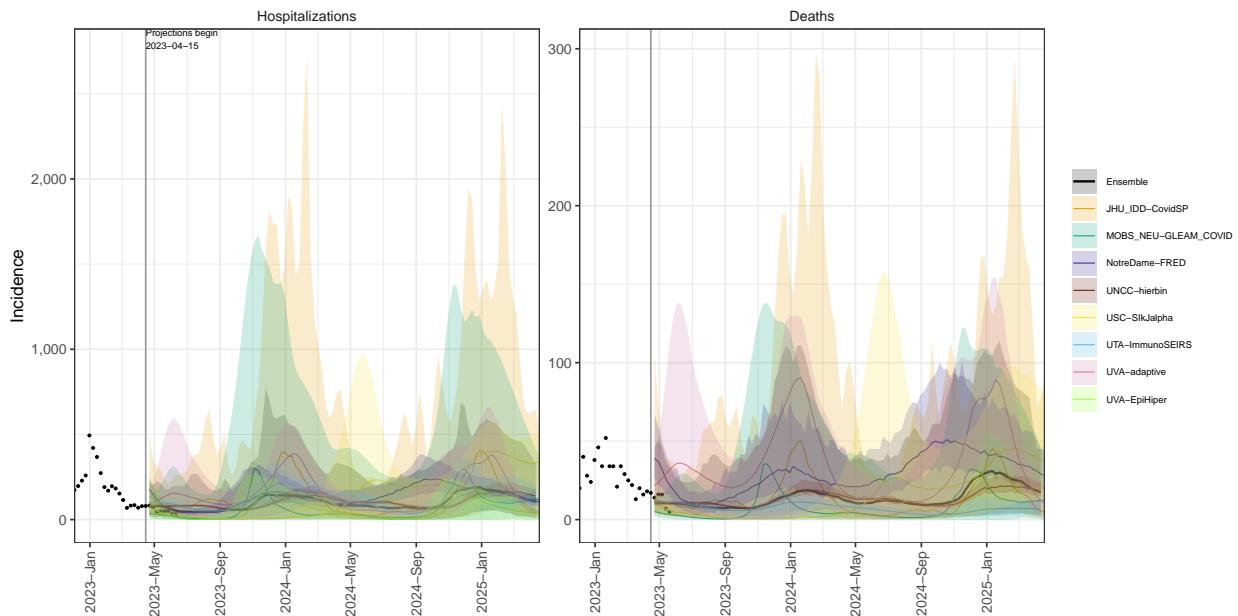
MI model variance & 95% projection intervals – Booster for 65+, Low immune escape



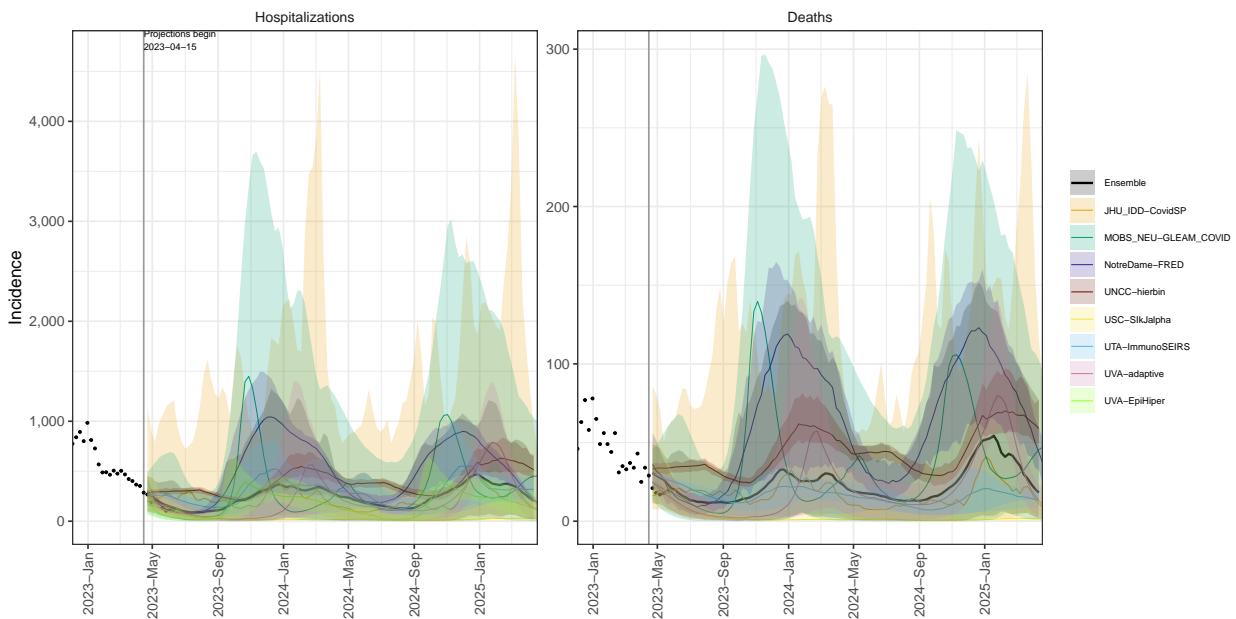
MN model variance & 95% projection intervals – Booster for 65+, Low immune escape



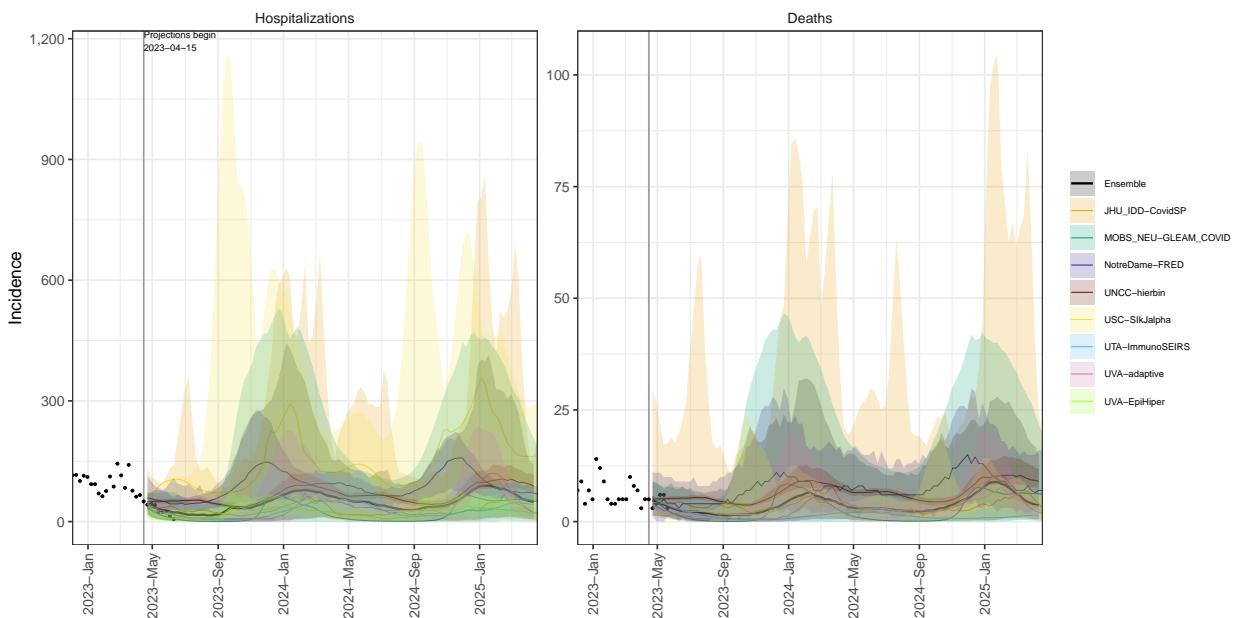
MS model variance & 95% projection intervals – Booster for 65+, Low immune escape



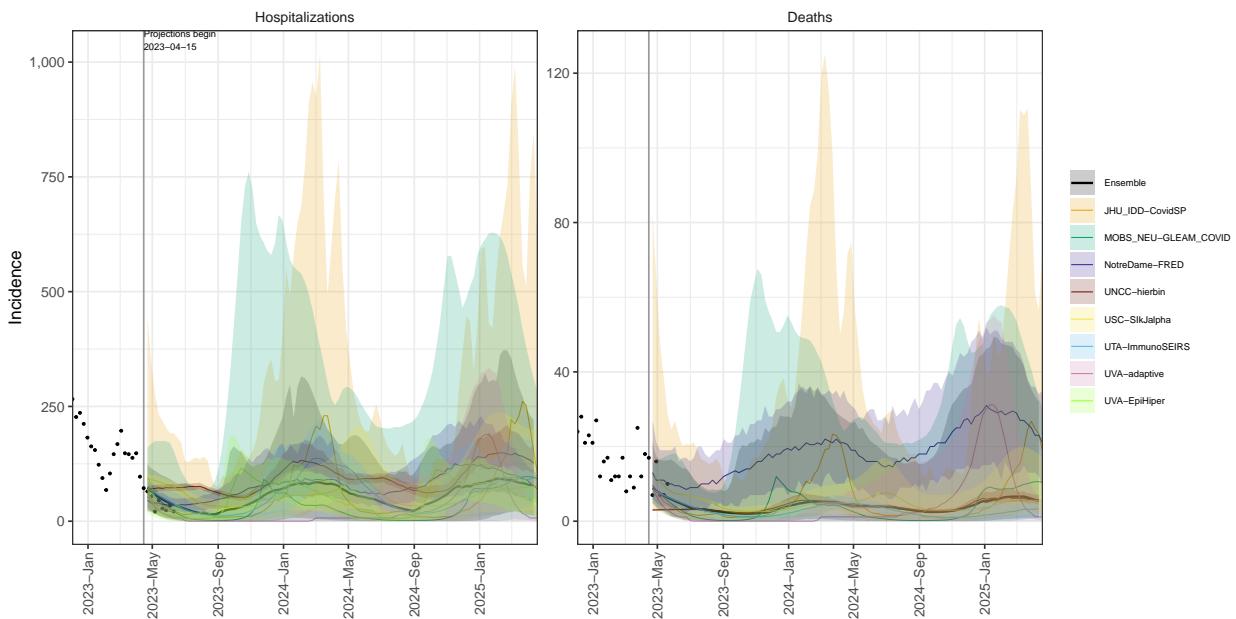
### MO model variance & 95% projection intervals – Booster for 65+, Low immune escape



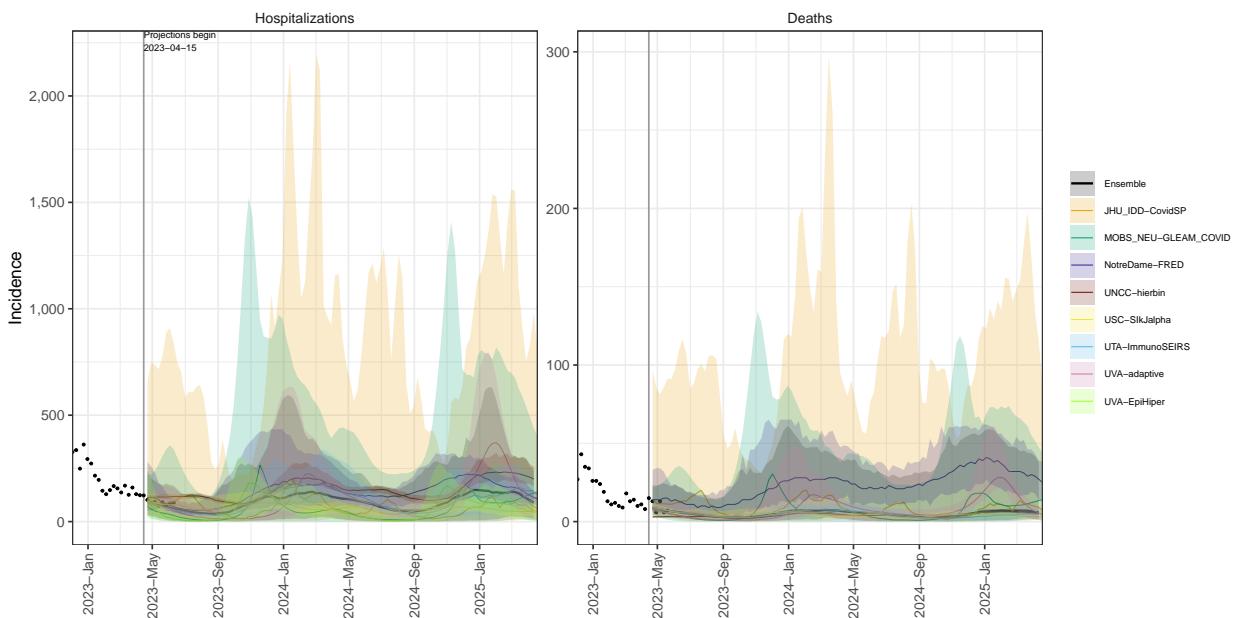
### MT model variance & 95% projection intervals – Booster for 65+, Low immune escape



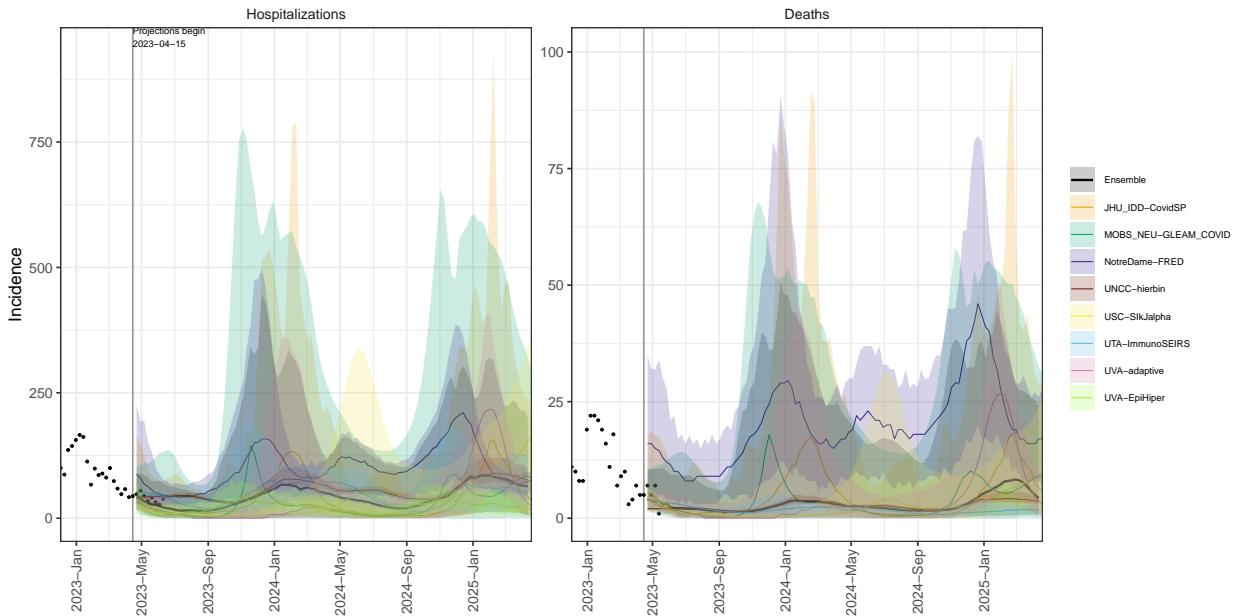
NE model variance & 95% projection intervals – Booster for 65+, Low immune escape



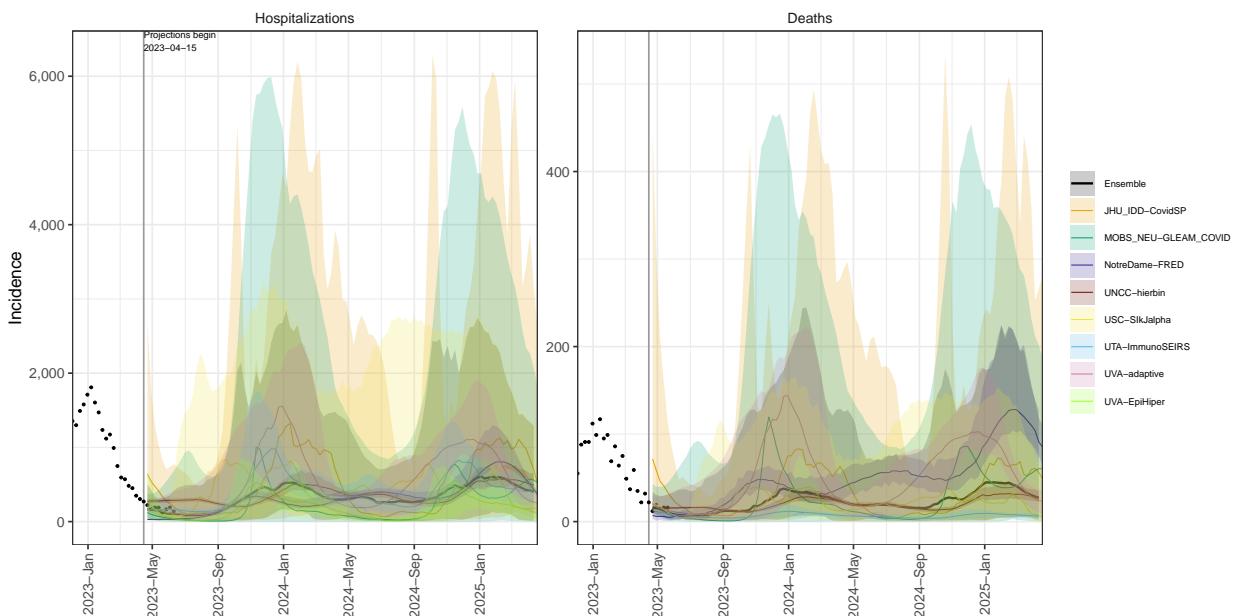
NV model variance & 95% projection intervals – Booster for 65+, Low immune escape



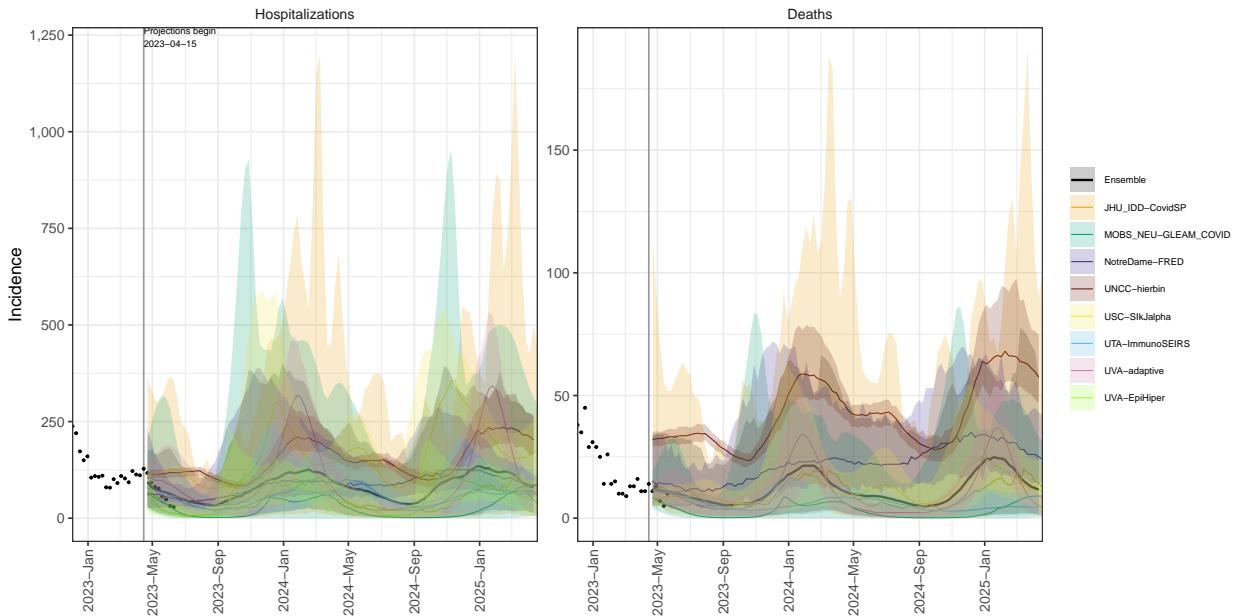
### NH model variance & 95% projection intervals – Booster for 65+, Low immune escape



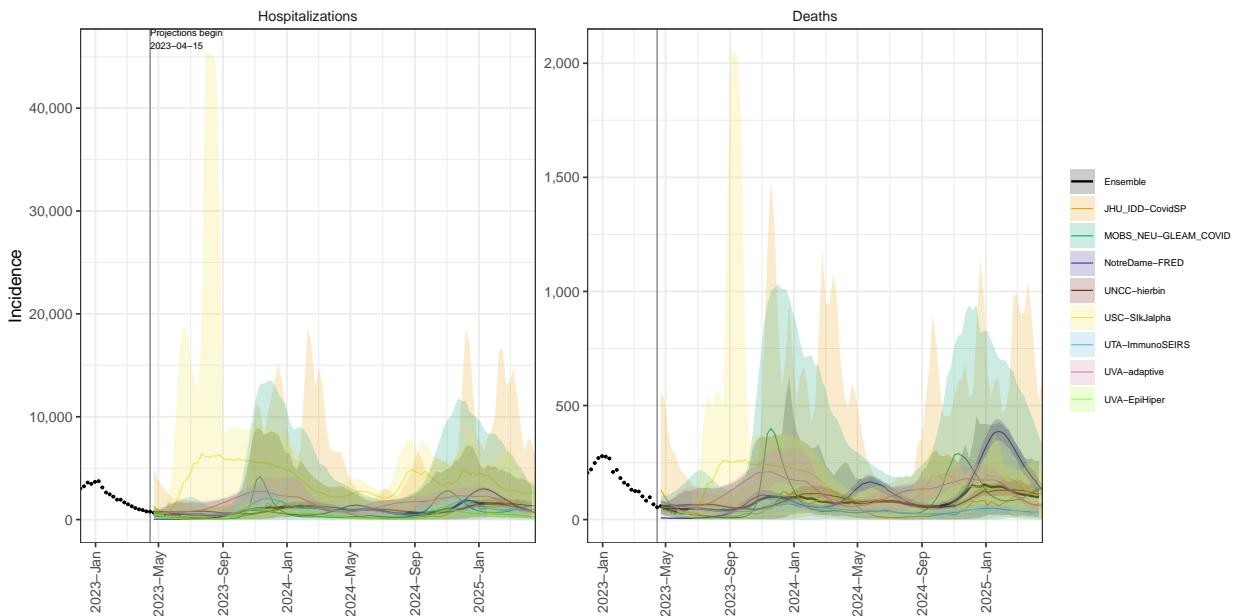
### NJ model variance & 95% projection intervals – Booster for 65+, Low immune escape



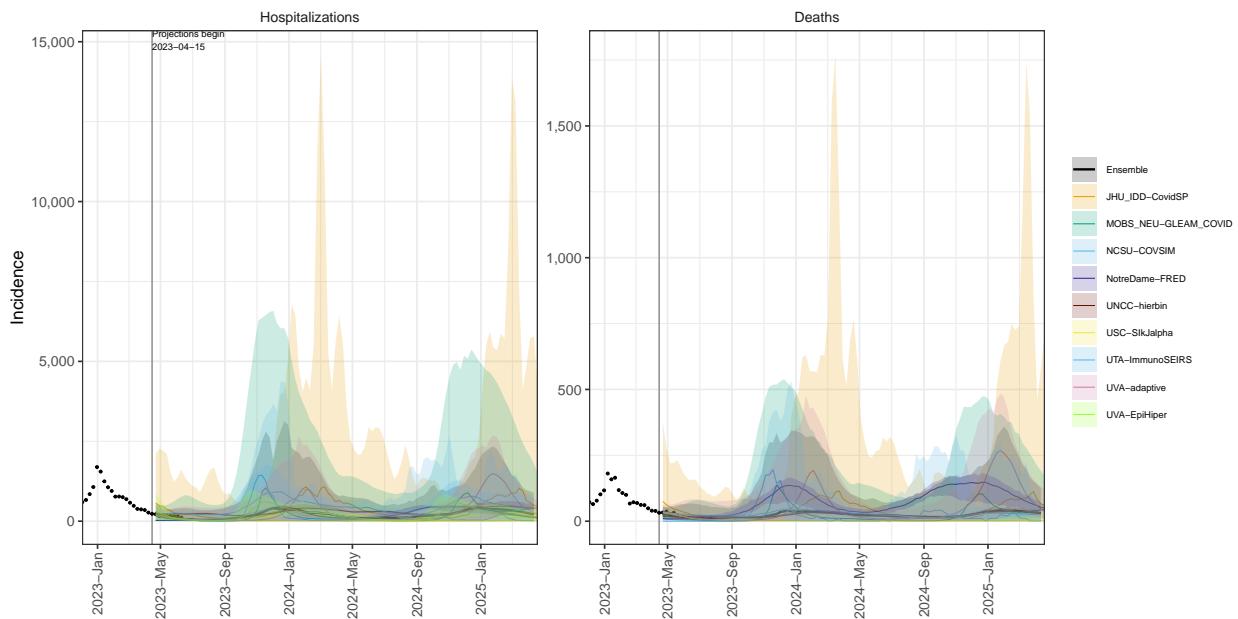
### NM model variance & 95% projection intervals – Booster for 65+, Low immune escape



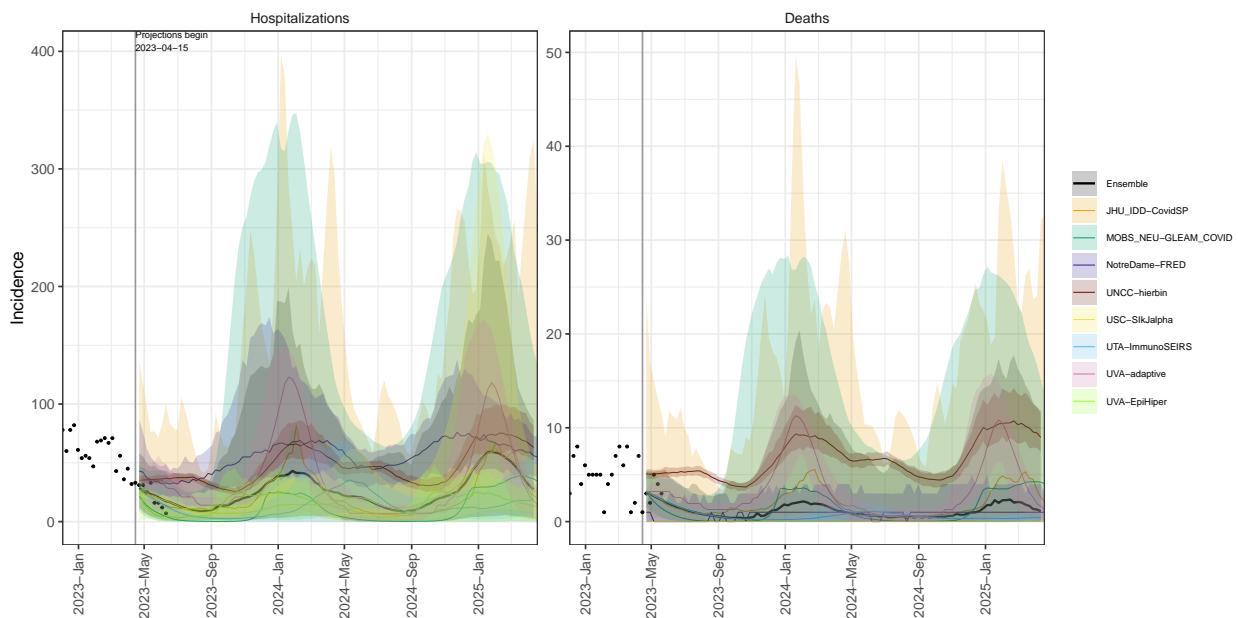
### NY model variance & 95% projection intervals – Booster for 65+, Low immune escape



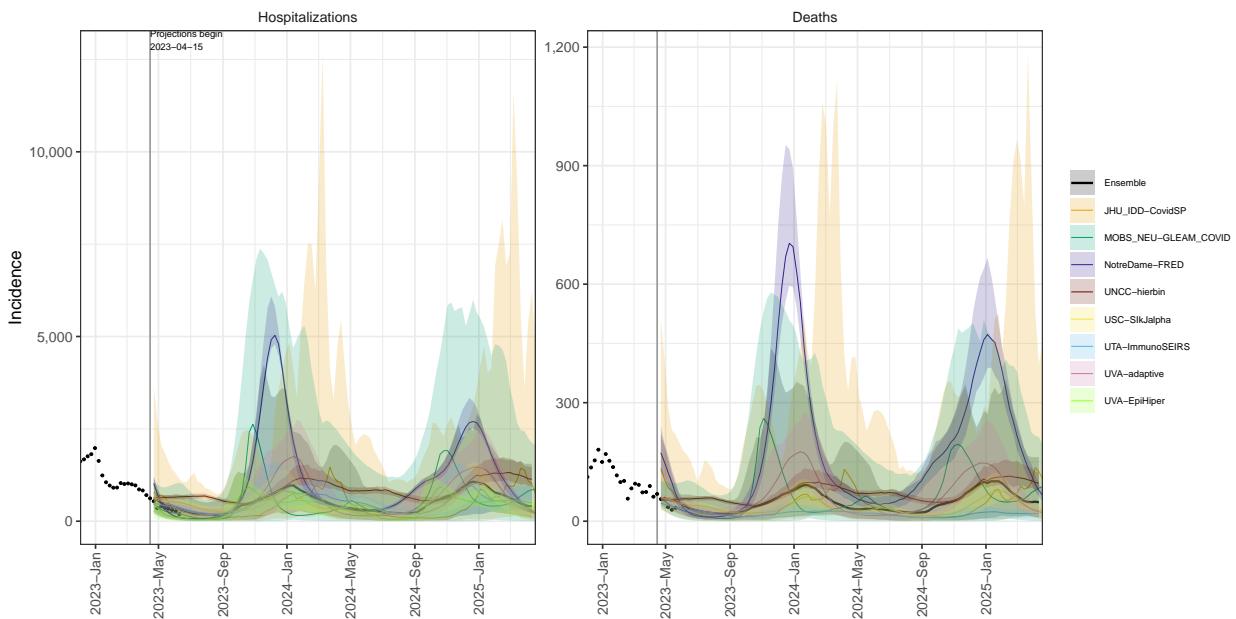
### NC model variance & 95% projection intervals – Booster for 65+, Low immune escape



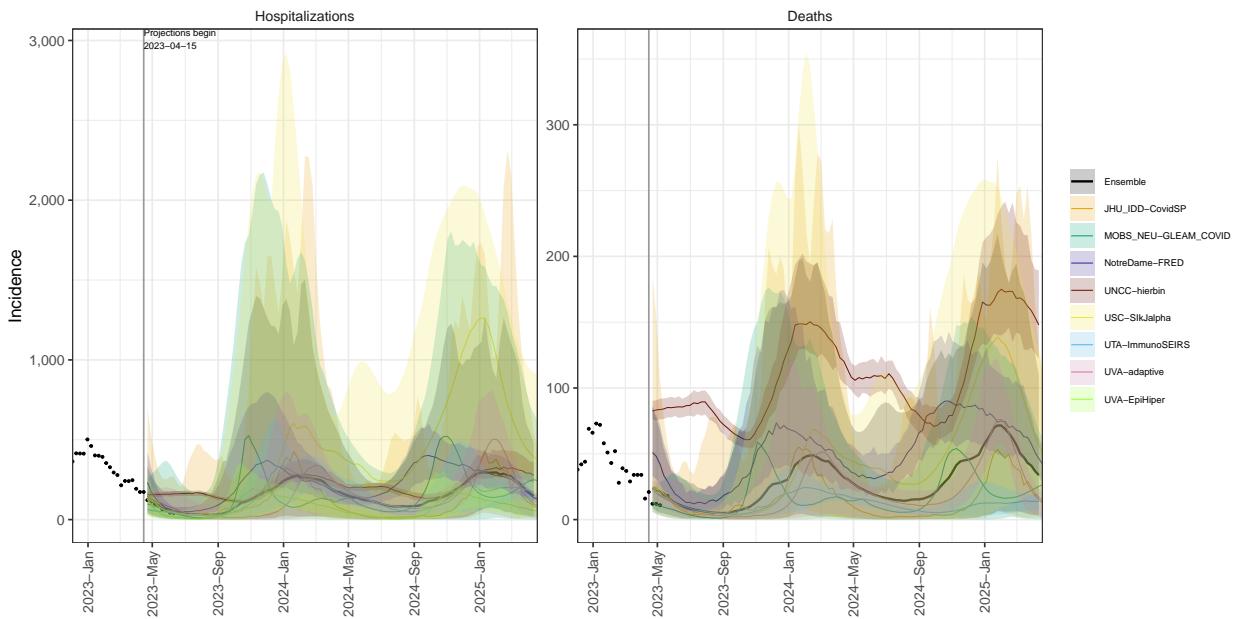
### ND model variance & 95% projection intervals – Booster for 65+, Low immune escape



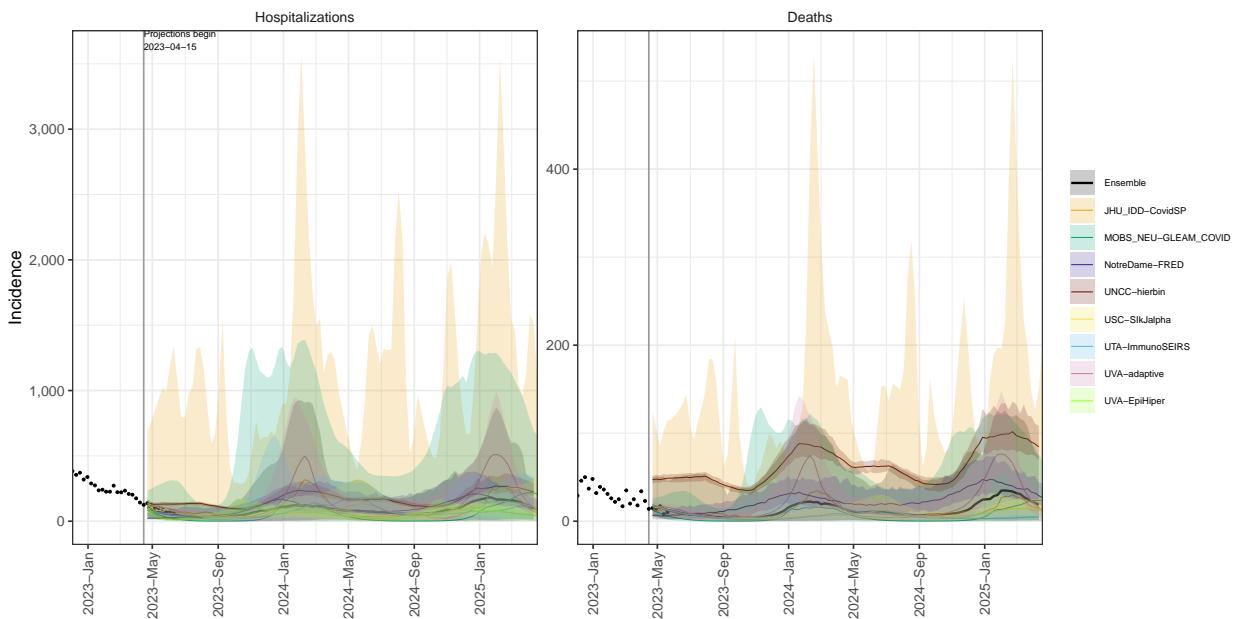
OH model variance & 95% projection intervals – Booster for 65+, Low immune escape



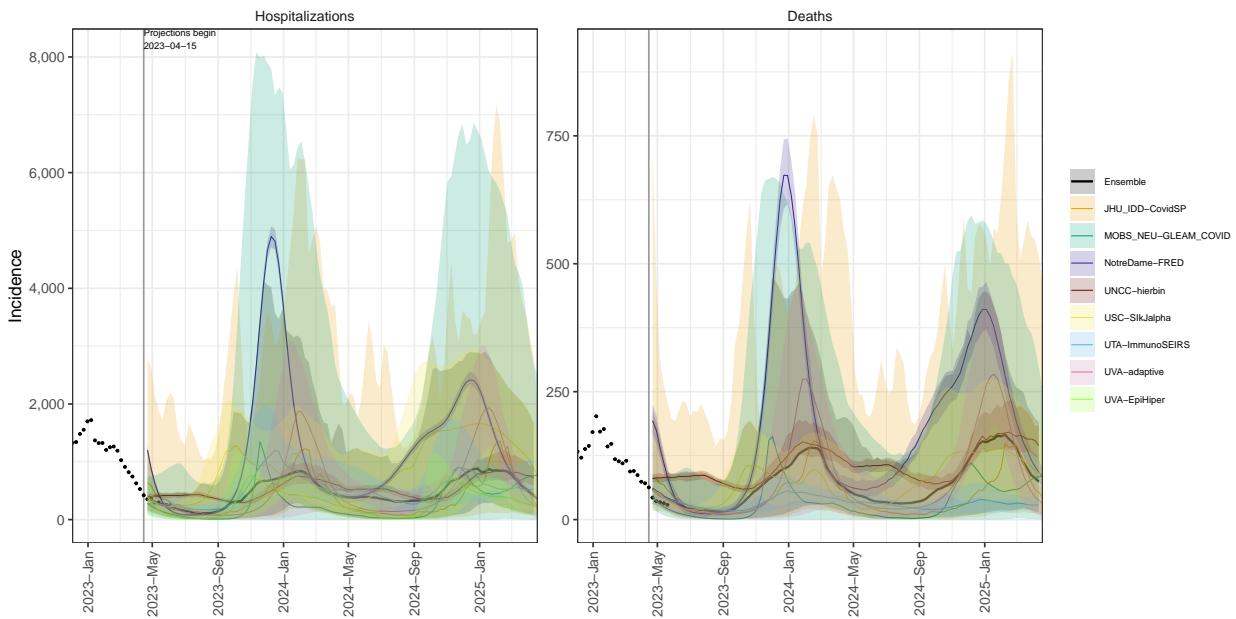
OK model variance & 95% projection intervals – Booster for 65+, Low immune escape



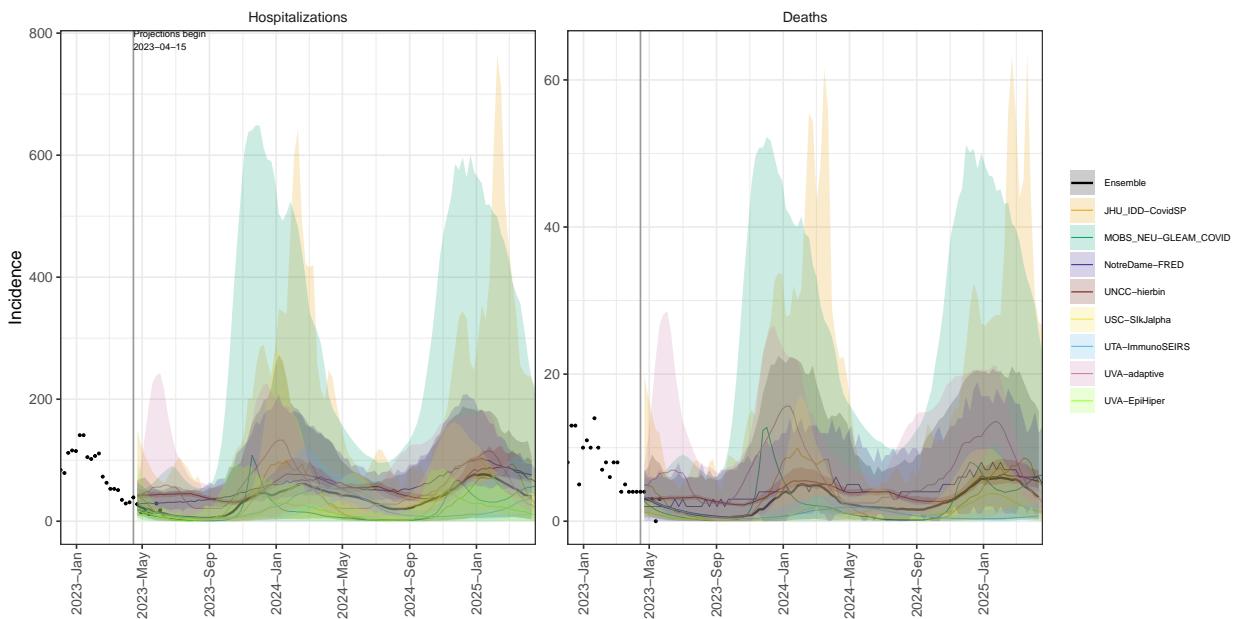
OR model variance & 95% projection intervals – Booster for 65+, Low immune escape



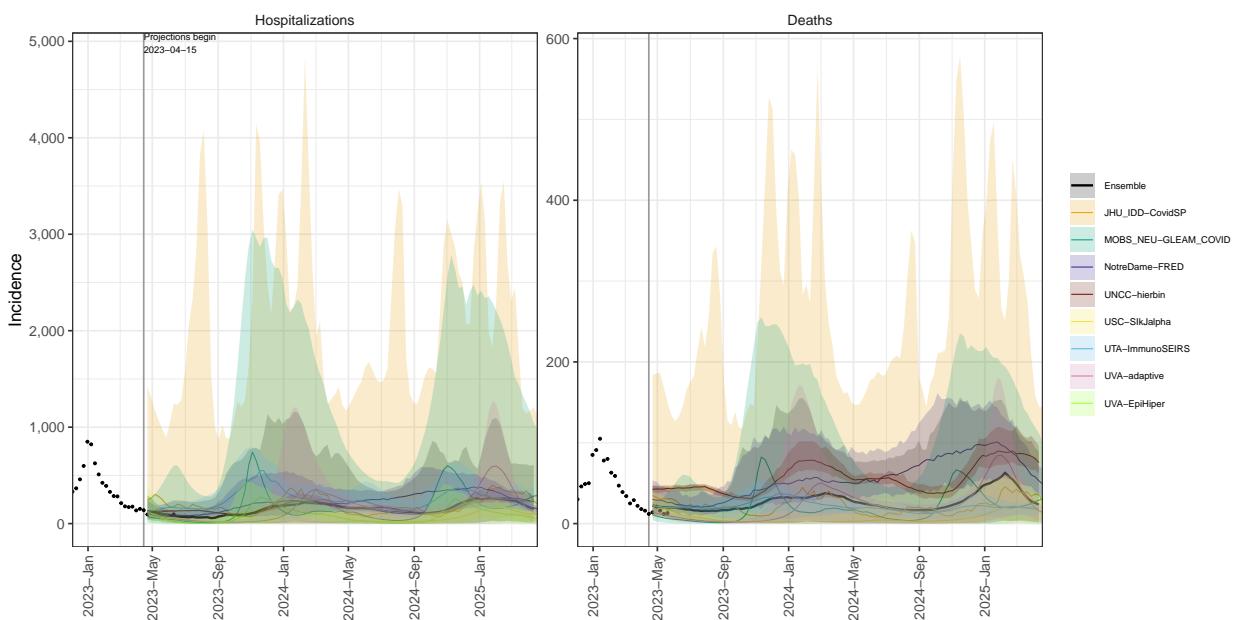
PA model variance & 95% projection intervals – Booster for 65+, Low immune escape



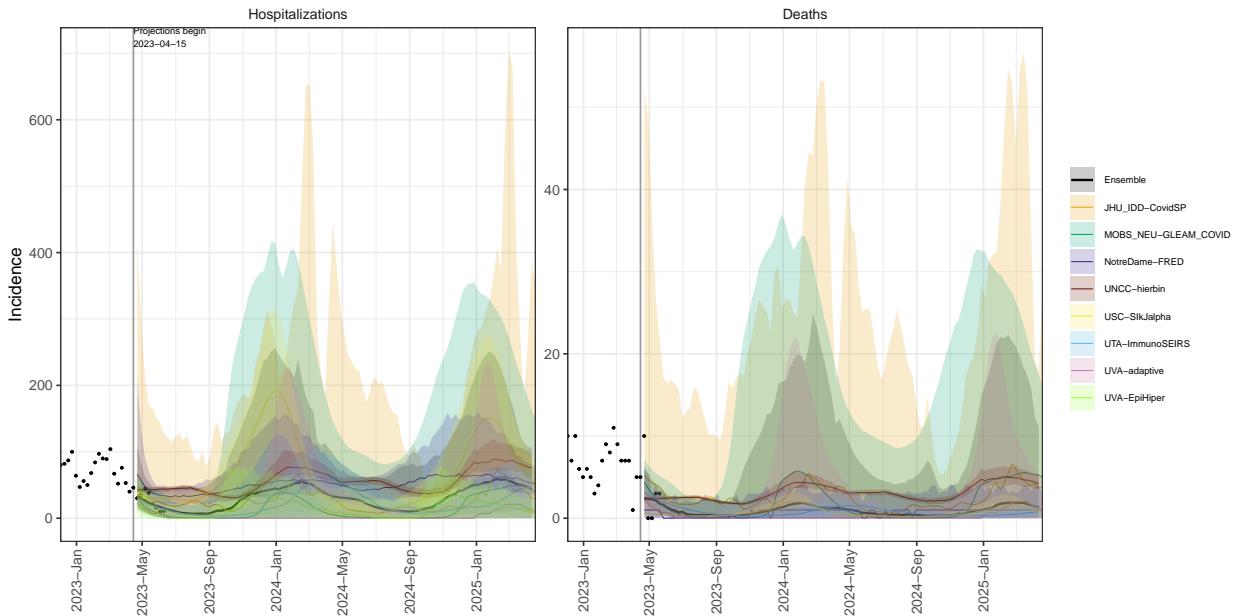
### RI model variance & 95% projection intervals – Booster for 65+, Low immune escape



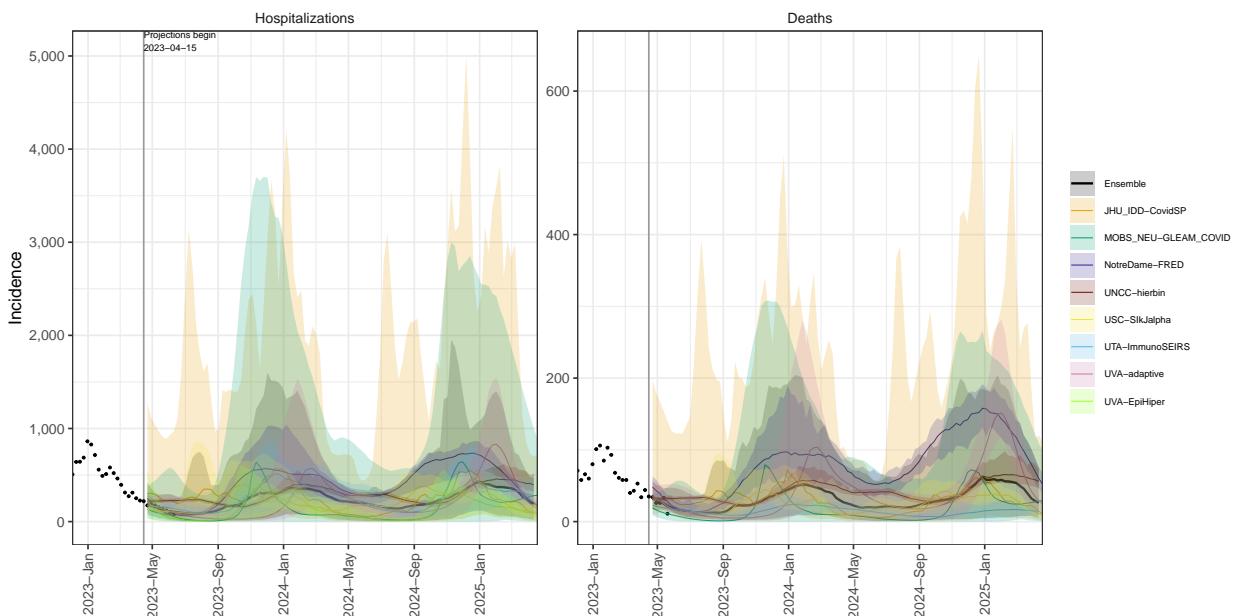
### SC model variance & 95% projection intervals – Booster for 65+, Low immune escape



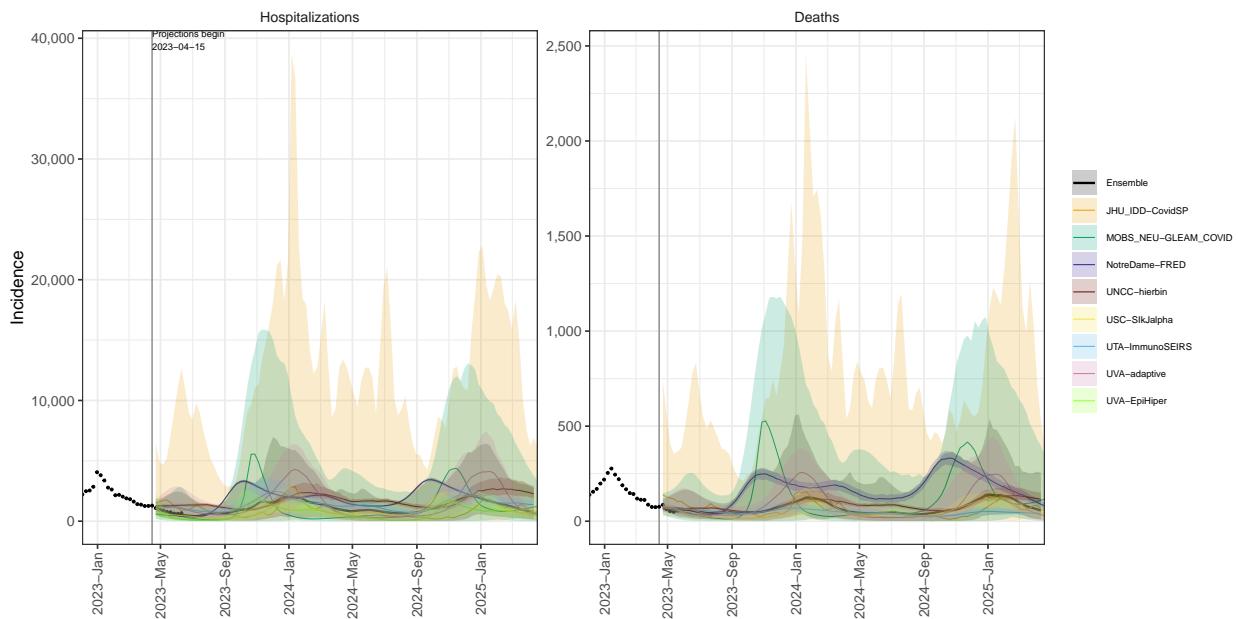
SD model variance & 95% projection intervals – Booster for 65+, Low immune escape



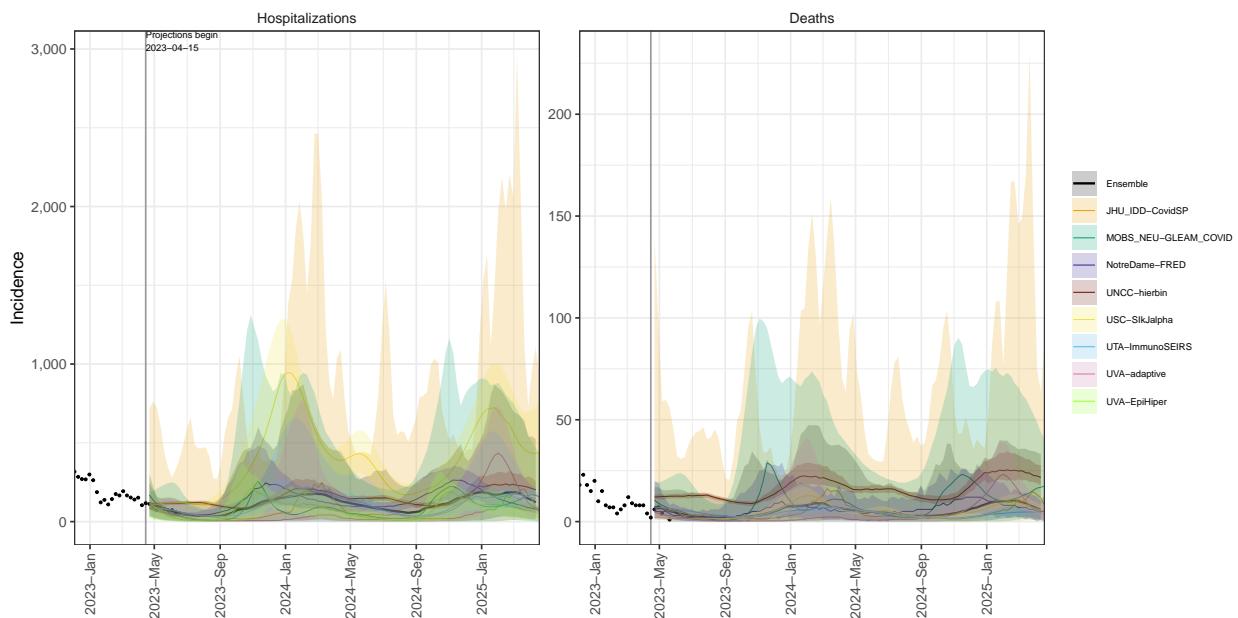
TN model variance & 95% projection intervals – Booster for 65+, Low immune escape



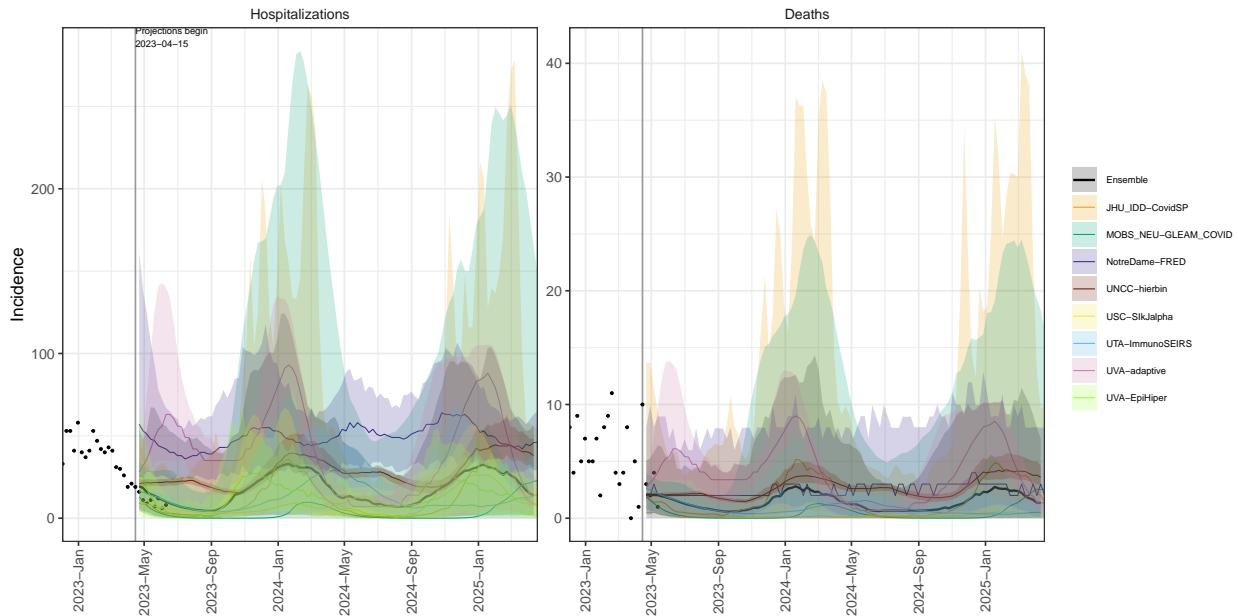
**TX model variance & 95% projection intervals – Booster for 65+, Low immune escape**



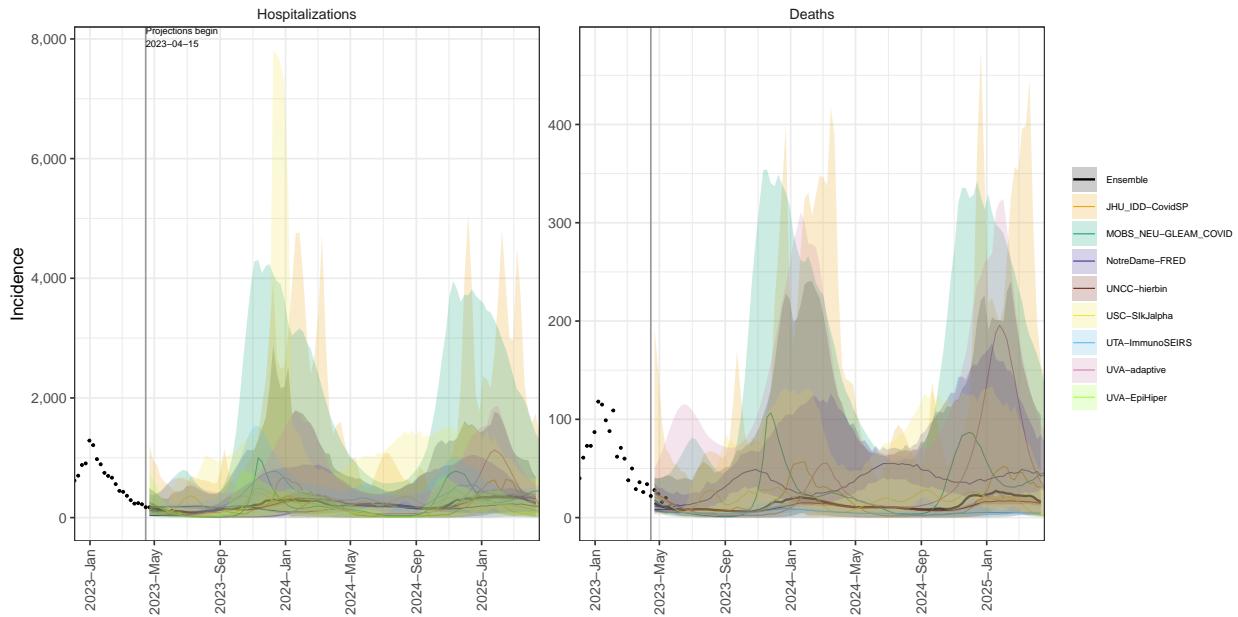
**UT model variance & 95% projection intervals – Booster for 65+, Low immune escape**



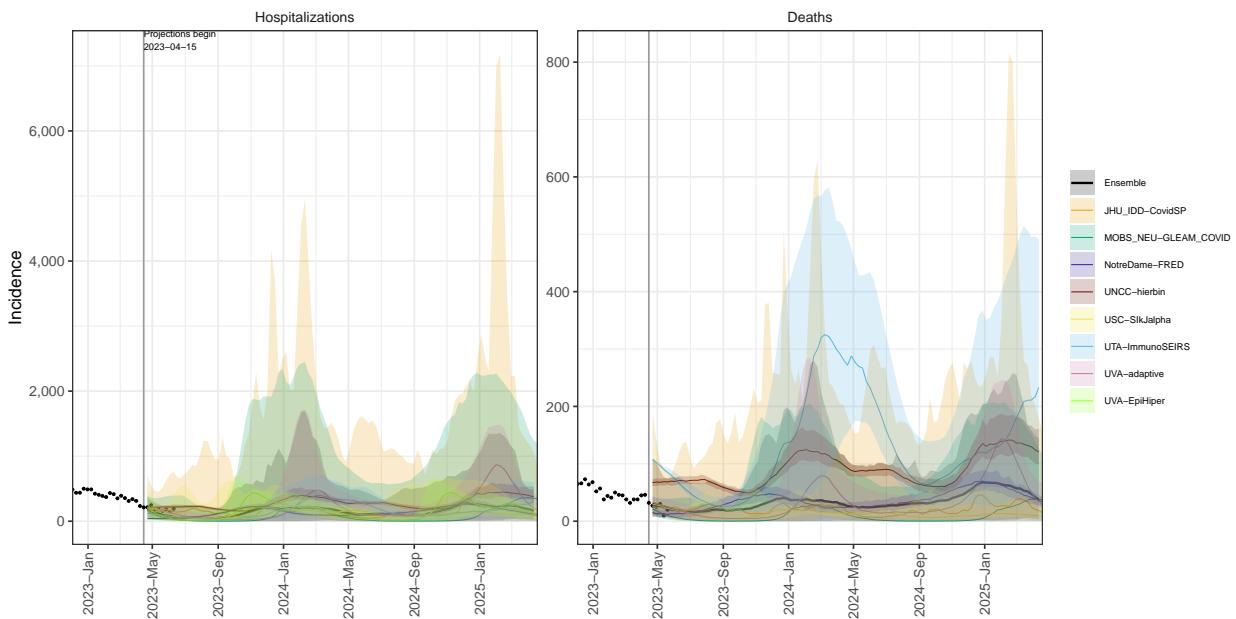
VT model variance & 95% projection intervals – Booster for 65+, Low immune escape



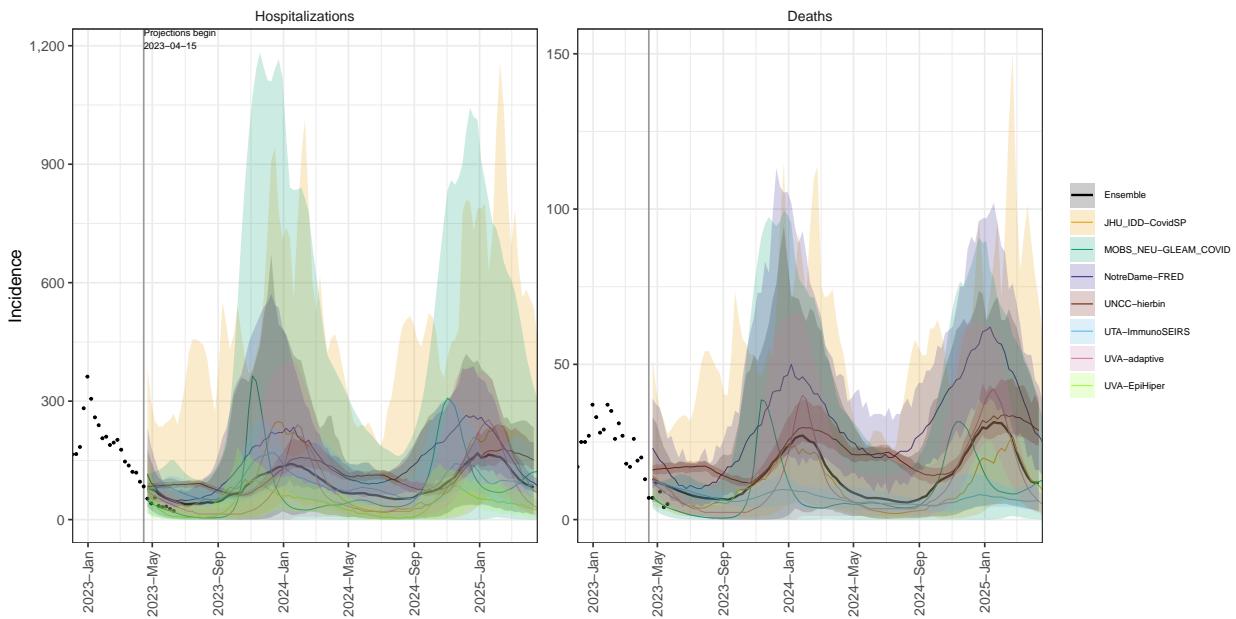
VA model variance & 95% projection intervals – Booster for 65+, Low immune escape



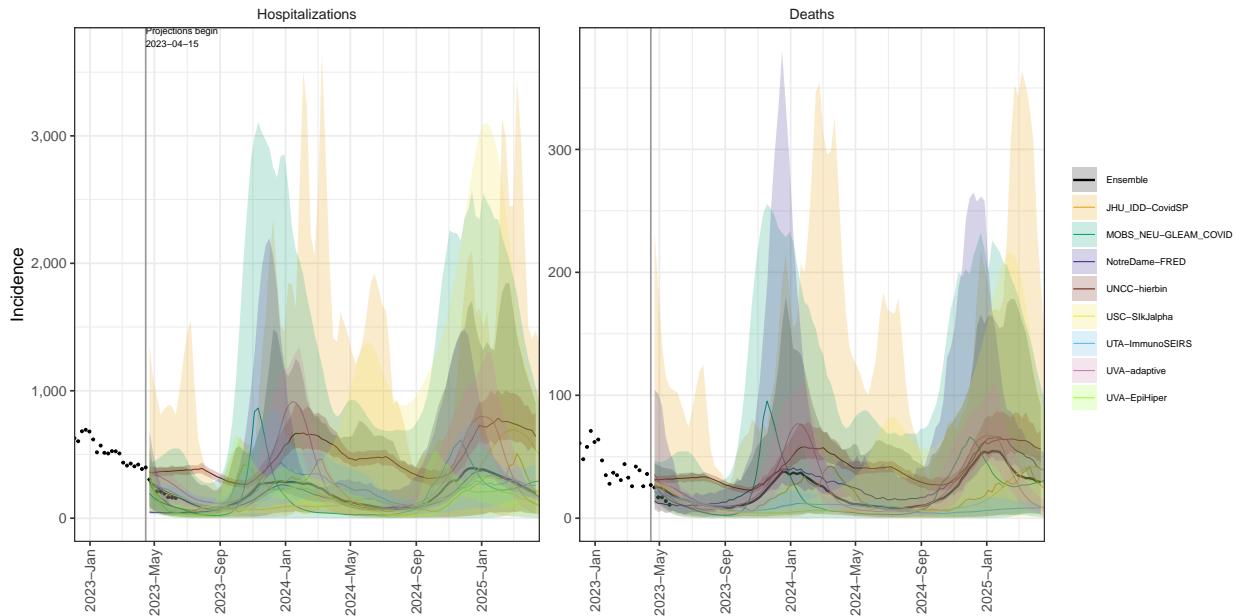
WA model variance & 95% projection intervals – Booster for 65+, Low immune escape



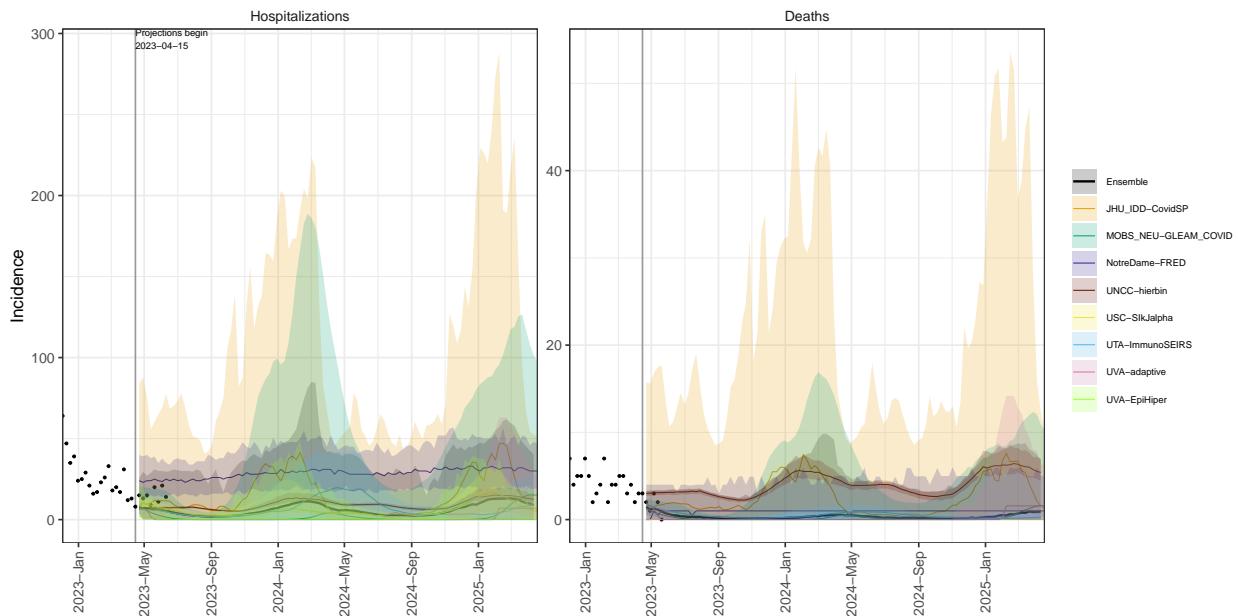
WV model variance & 95% projection intervals – Booster for 65+, Low immune escape



WI model variance & 95% projection intervals – Booster for 65+, Low immune escape

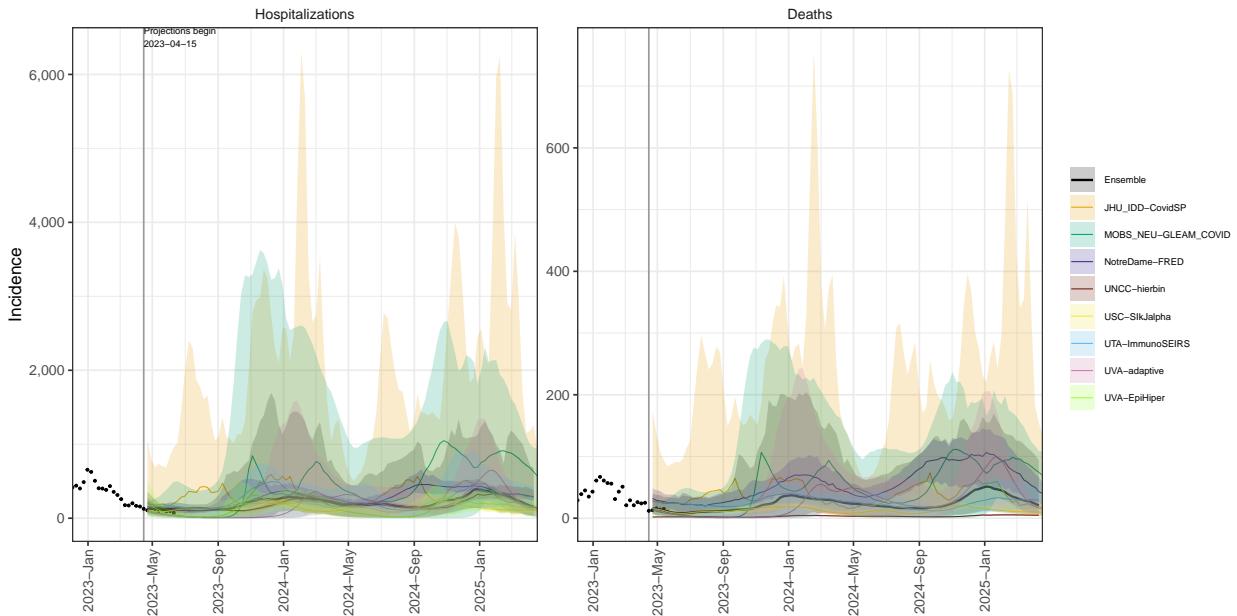


WY model variance & 95% projection intervals – Booster for 65+, Low immune escape

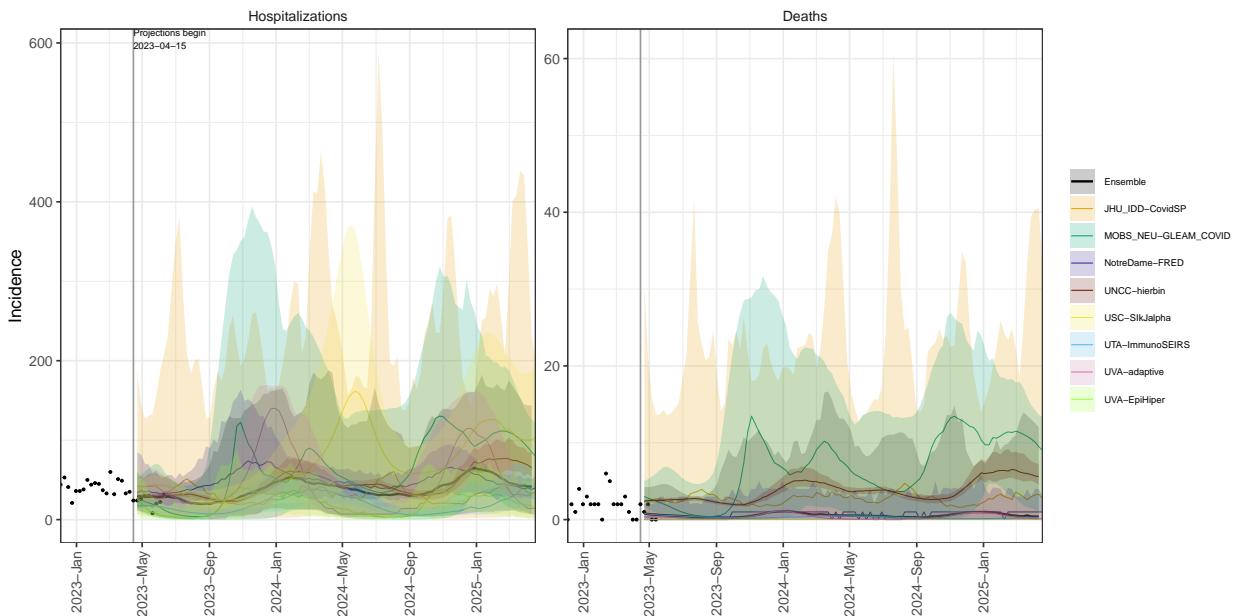


Model variation for the Booster for 65+, High immune escape scenario.

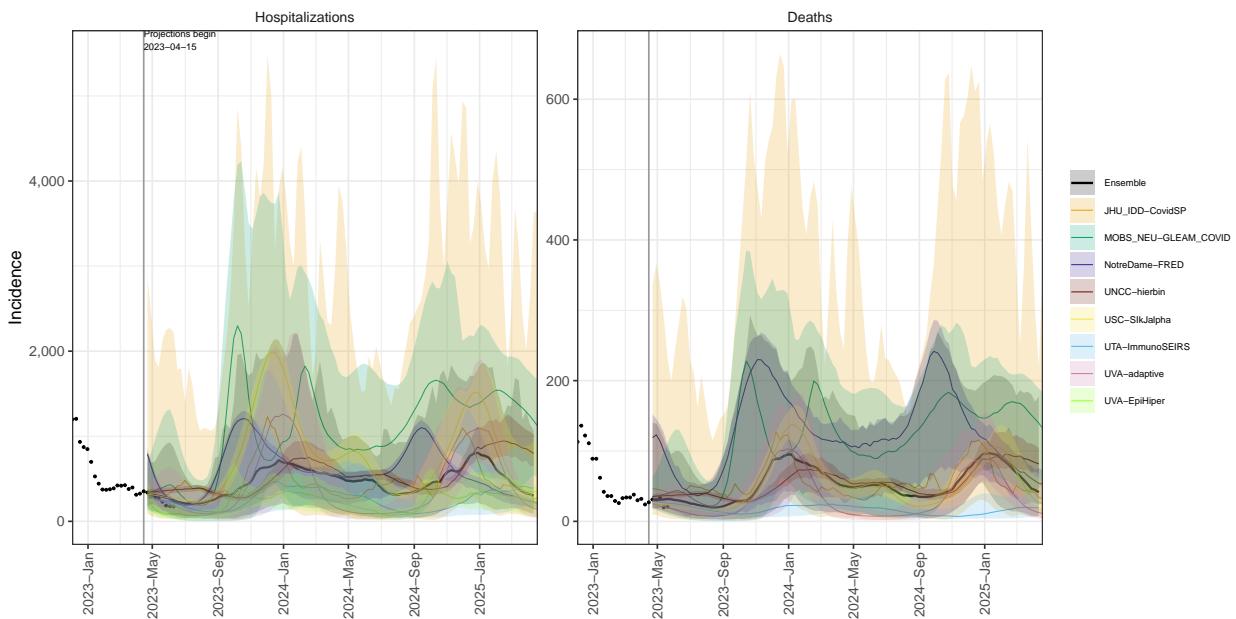
AL model variance & 95% projection intervals – Booster for 65+, High immune escape



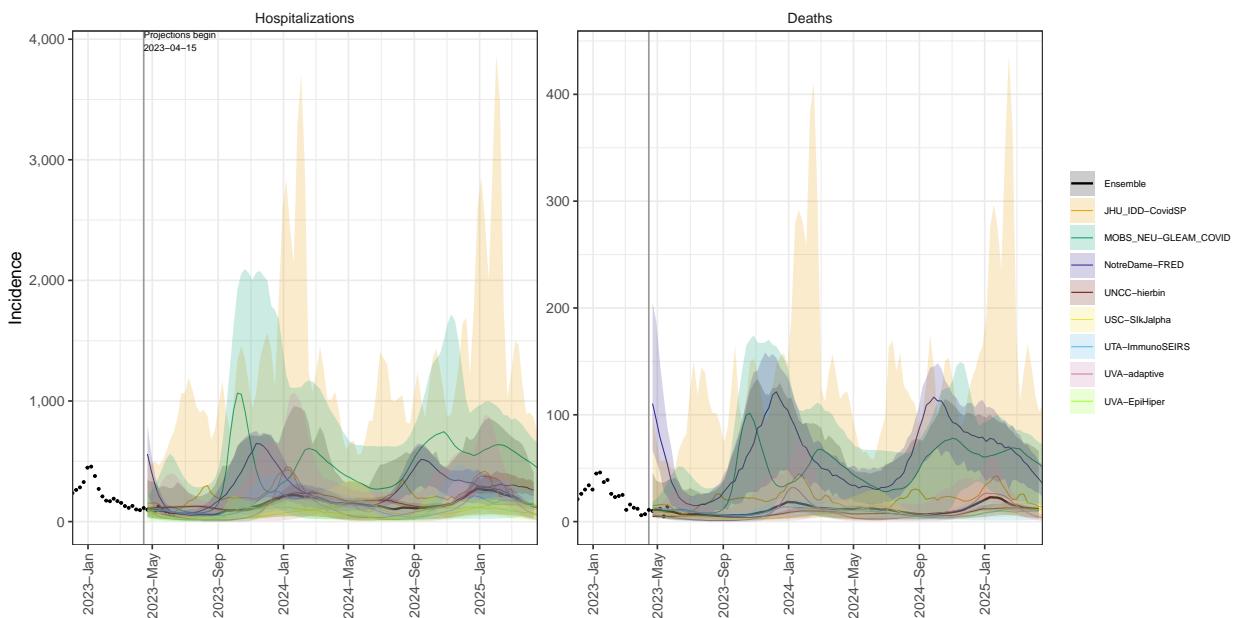
AK model variance & 95% projection intervals – Booster for 65+, High immune escape



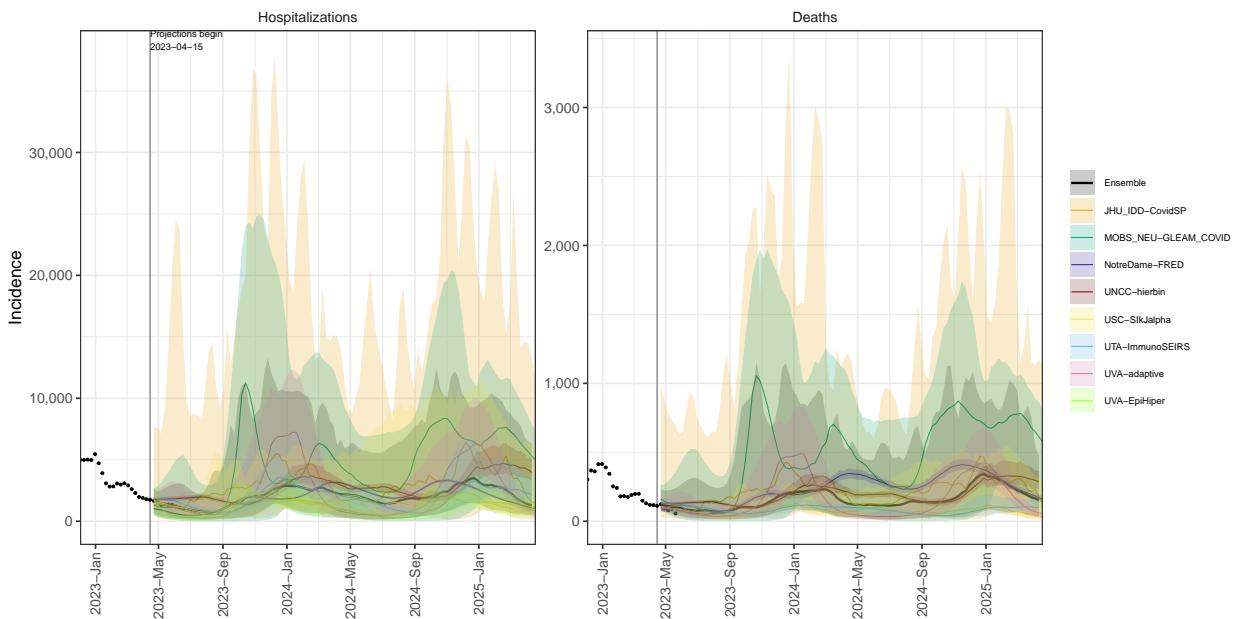
AZ model variance & 95% projection intervals – Booster for 65+, High immune escape



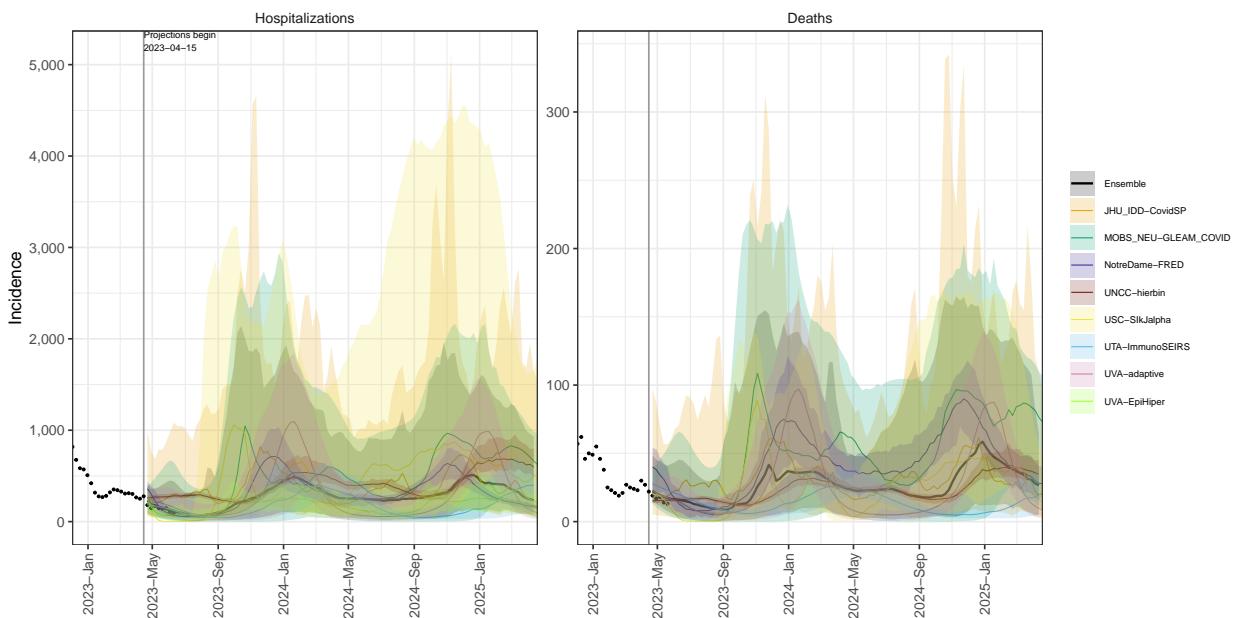
AR model variance & 95% projection intervals – Booster for 65+, High immune escape



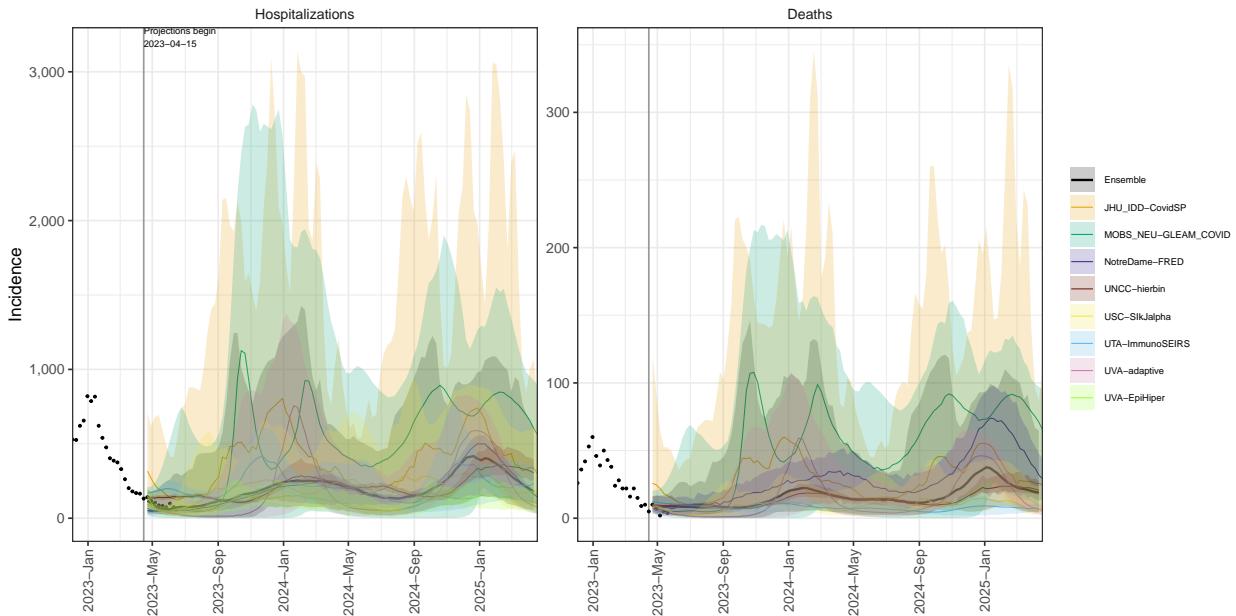
CA model variance & 95% projection intervals – Booster for 65+, High immune escape



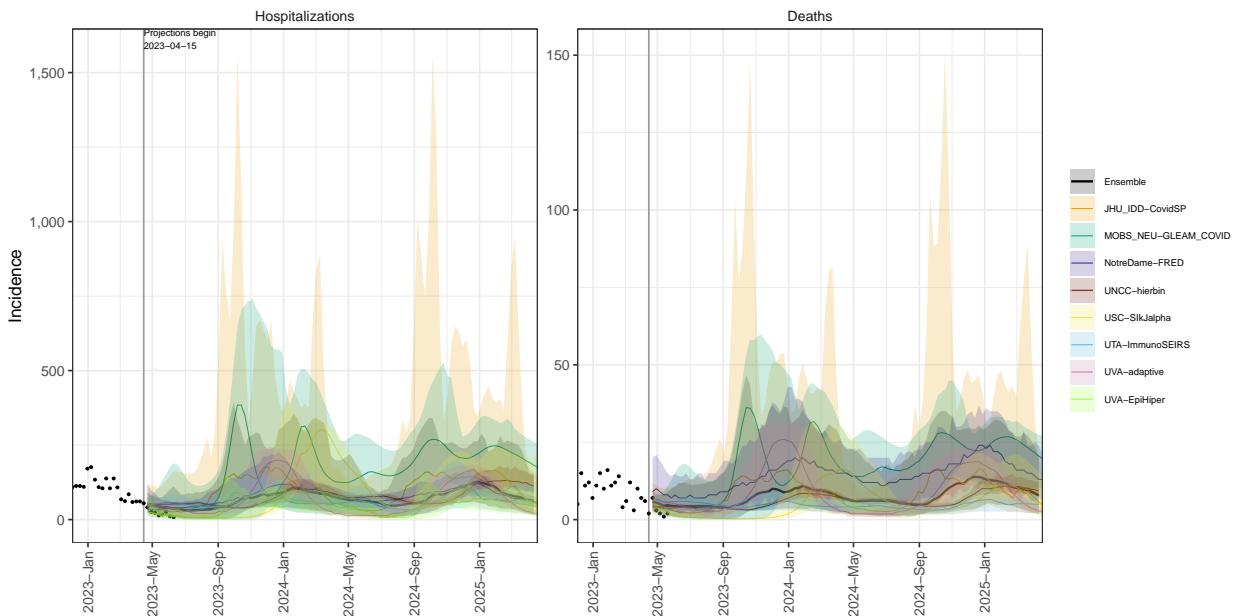
CO model variance & 95% projection intervals – Booster for 65+, High immune escape



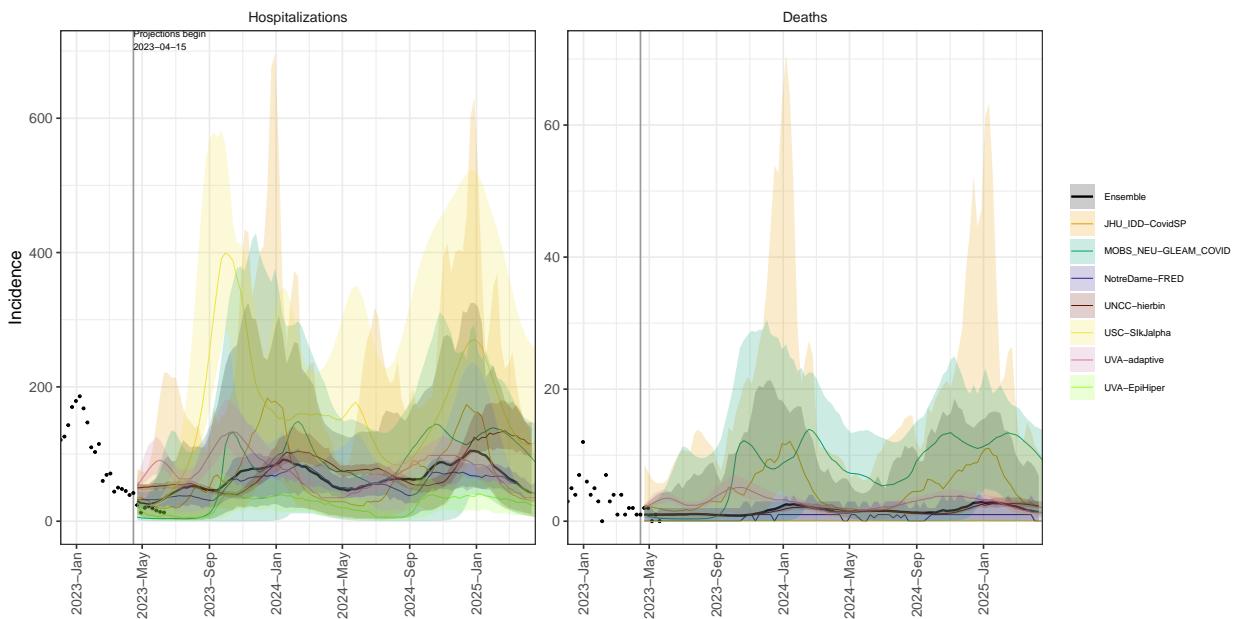
CT model variance & 95% projection intervals – Booster for 65+, High immune escape



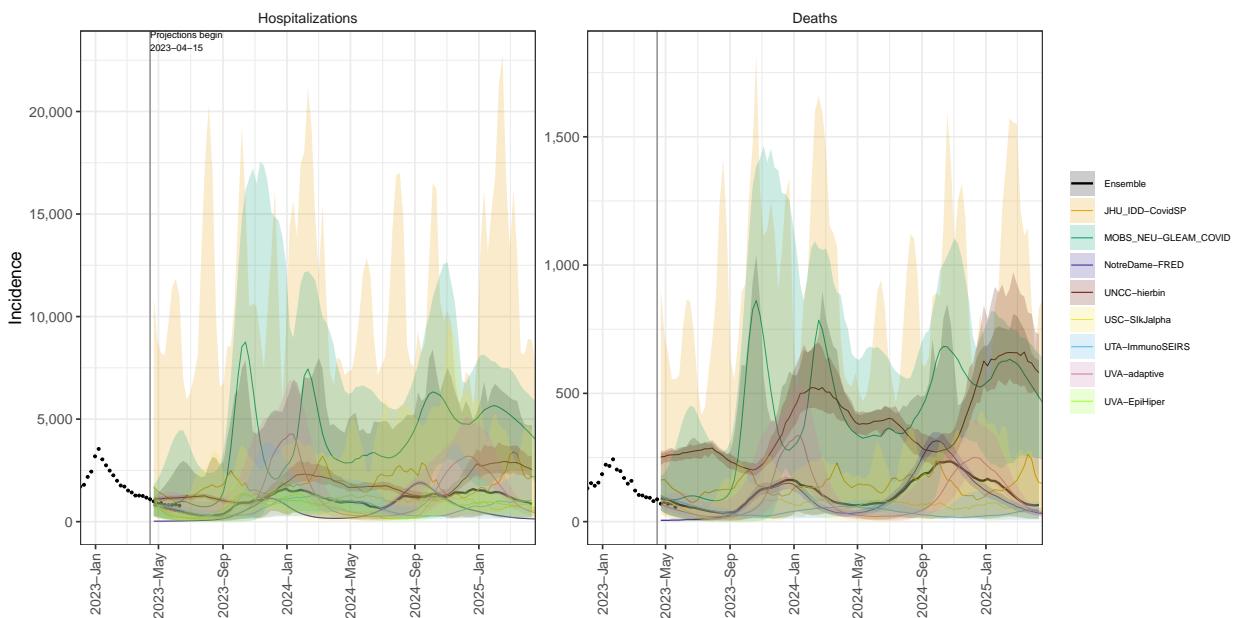
DE model variance & 95% projection intervals – Booster for 65+, High immune escape



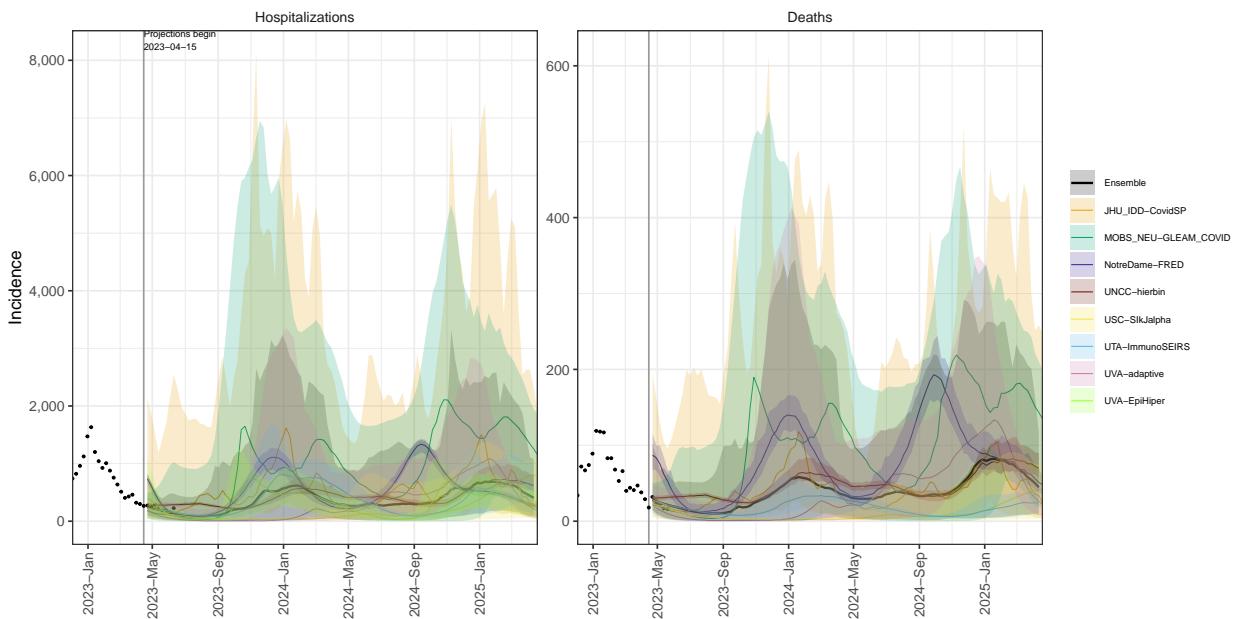
DC model variance & 95% projection intervals – Booster for 65+, High immune escape



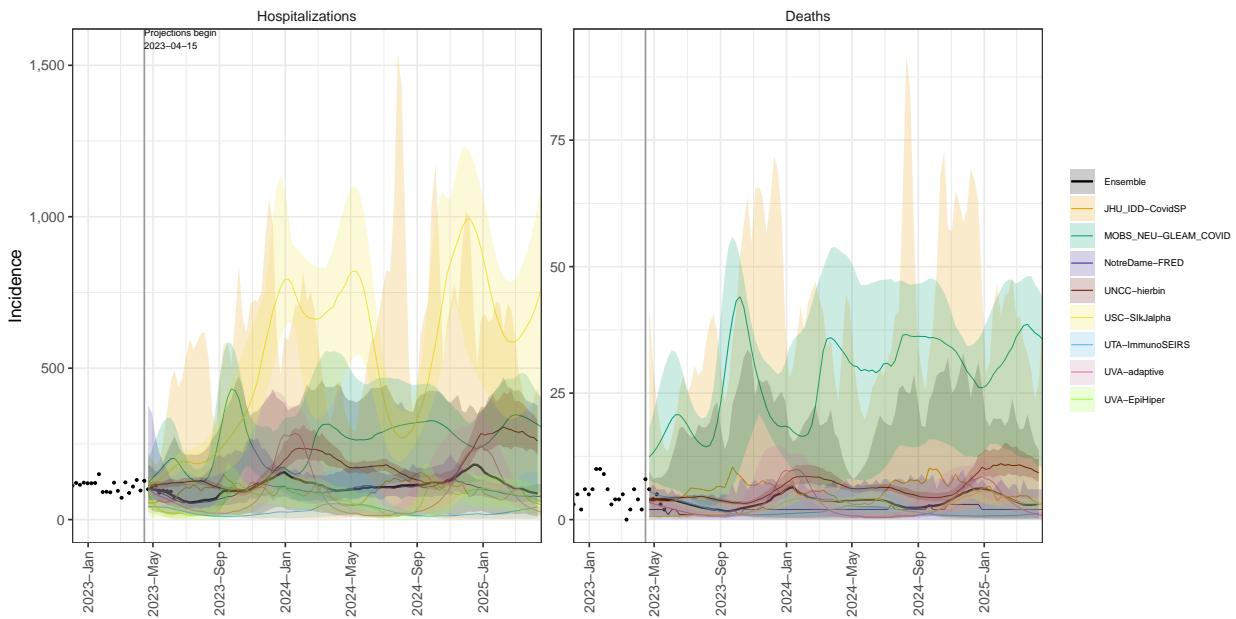
FL model variance & 95% projection intervals – Booster for 65+, High immune escape



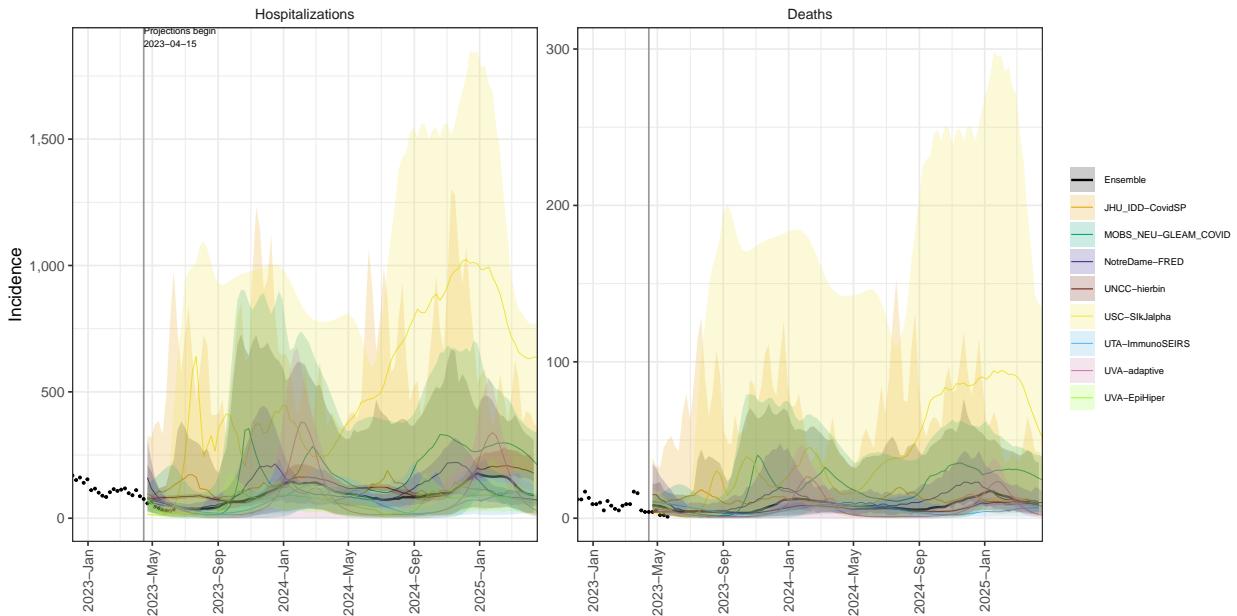
### GA model variance & 95% projection intervals – Booster for 65+, High immune escape



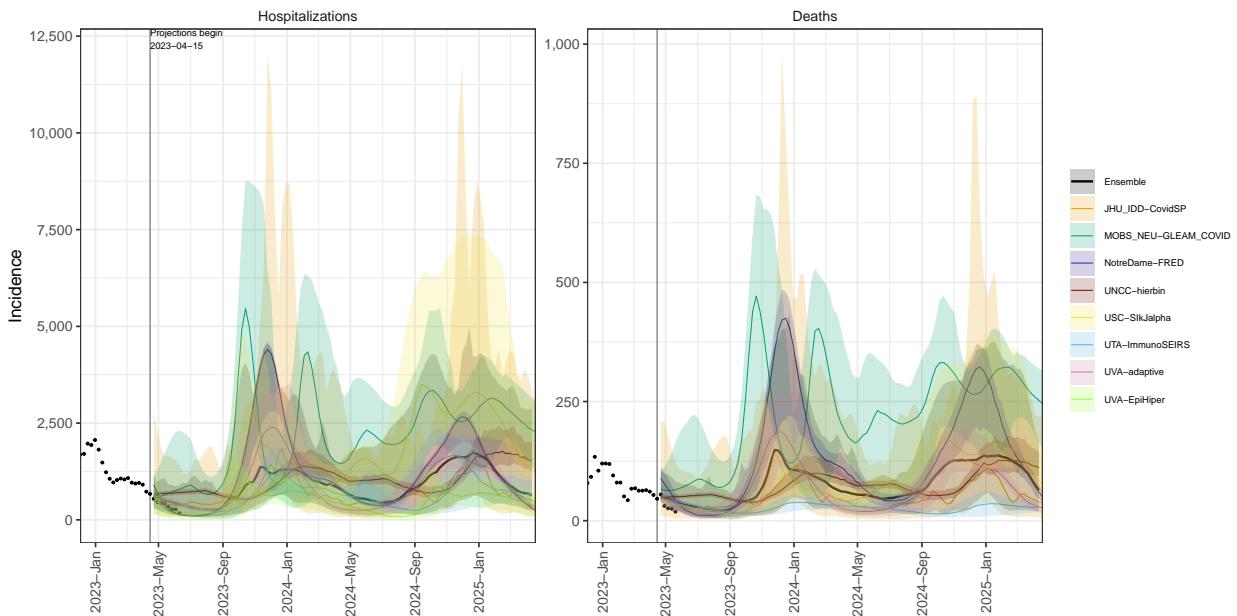
### HI model variance & 95% projection intervals – Booster for 65+, High immune escape



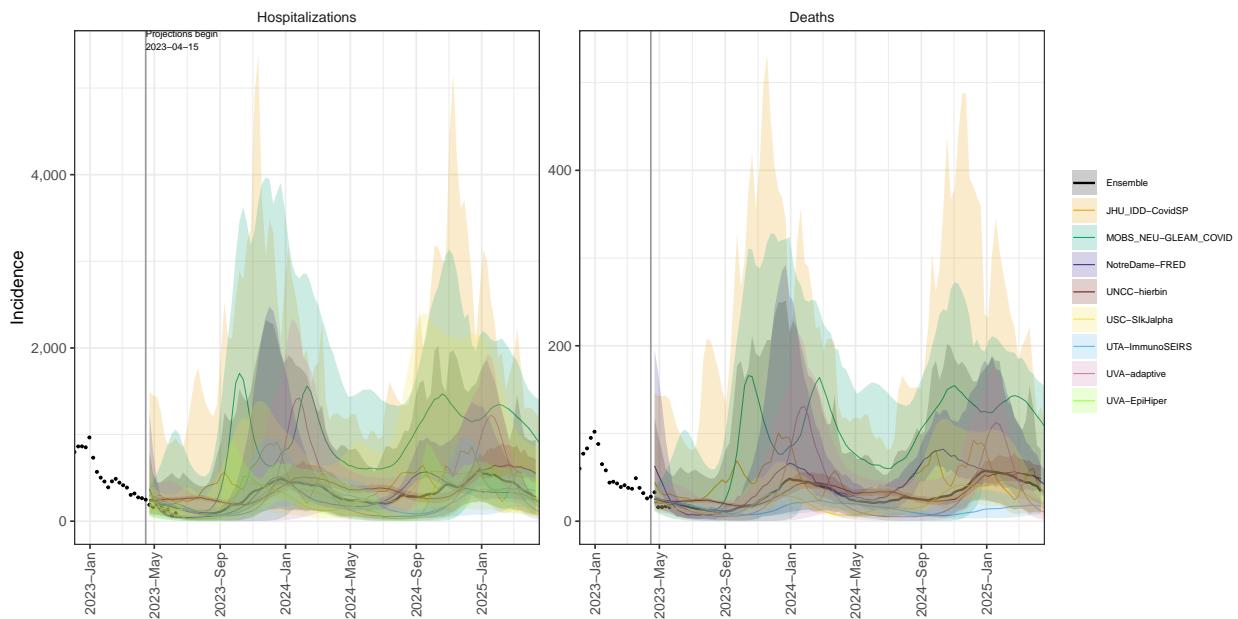
ID model variance & 95% projection intervals – Booster for 65+, High immune escape



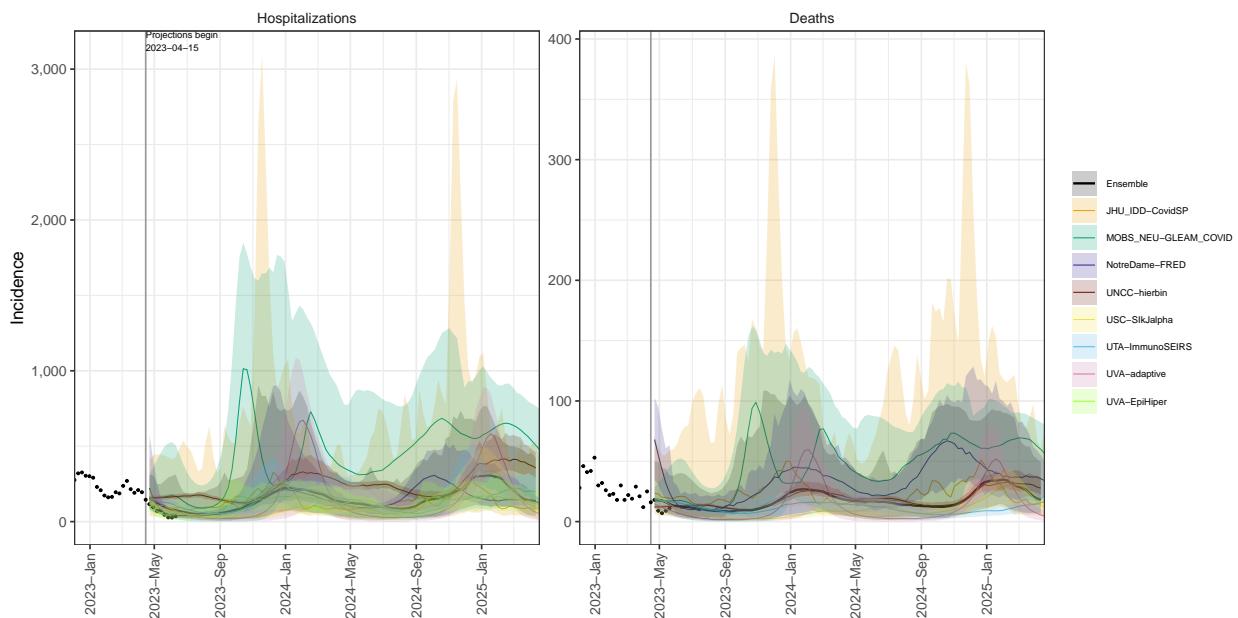
IL model variance & 95% projection intervals – Booster for 65+, High immune escape



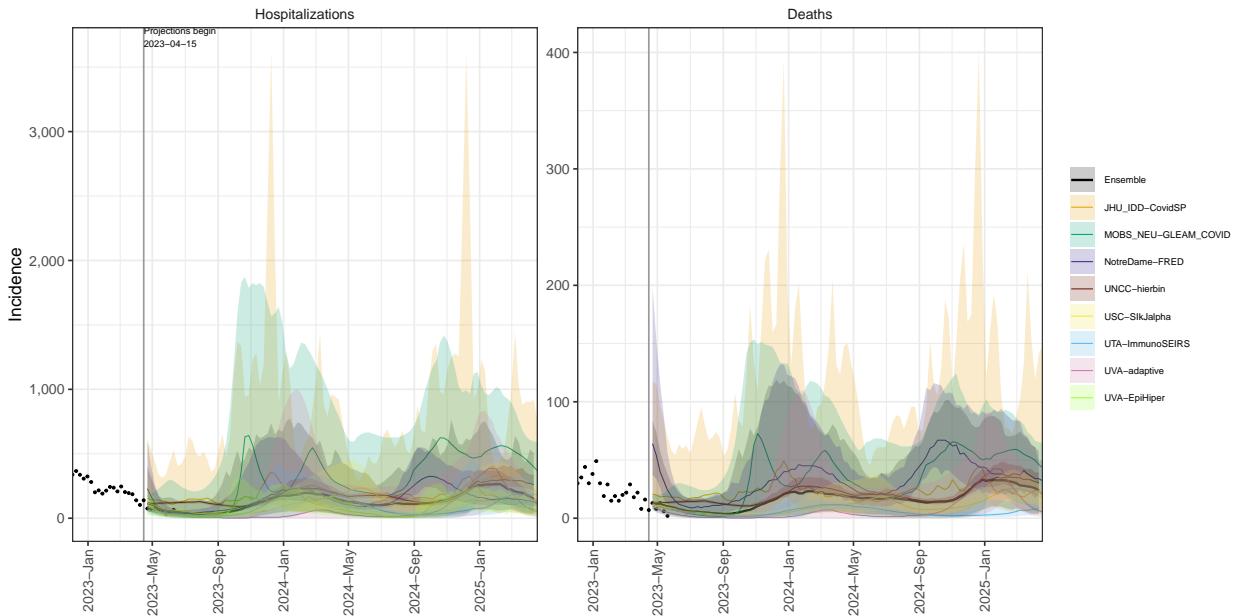
IN model variance & 95% projection intervals – Booster for 65+, High immune escape



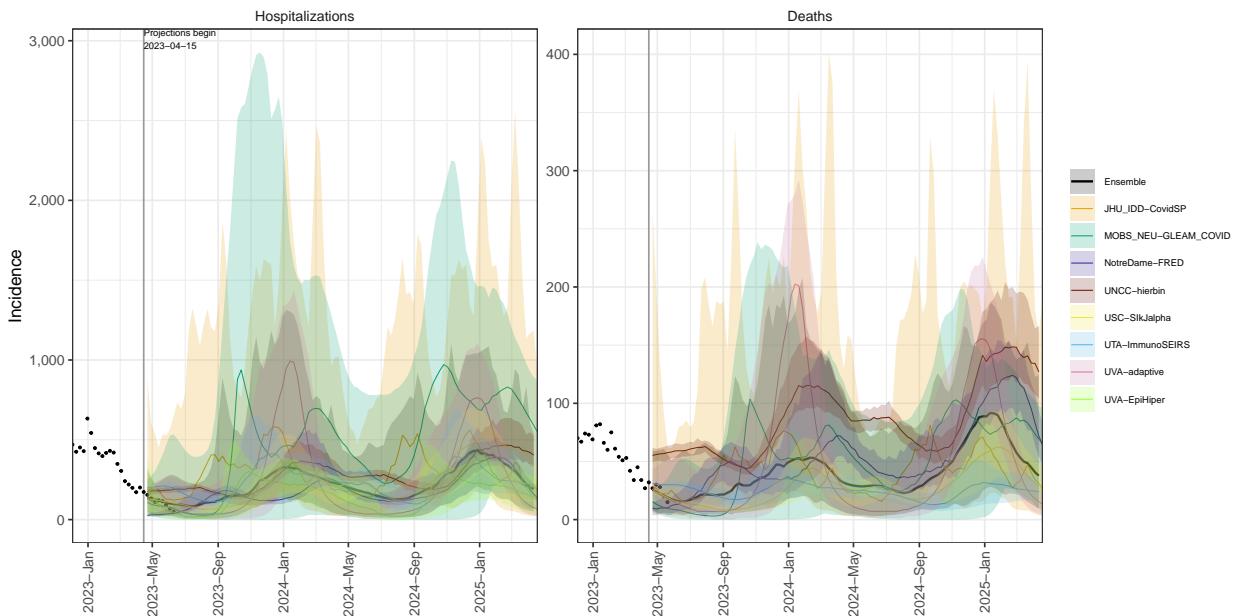
IA model variance & 95% projection intervals – Booster for 65+, High immune escape



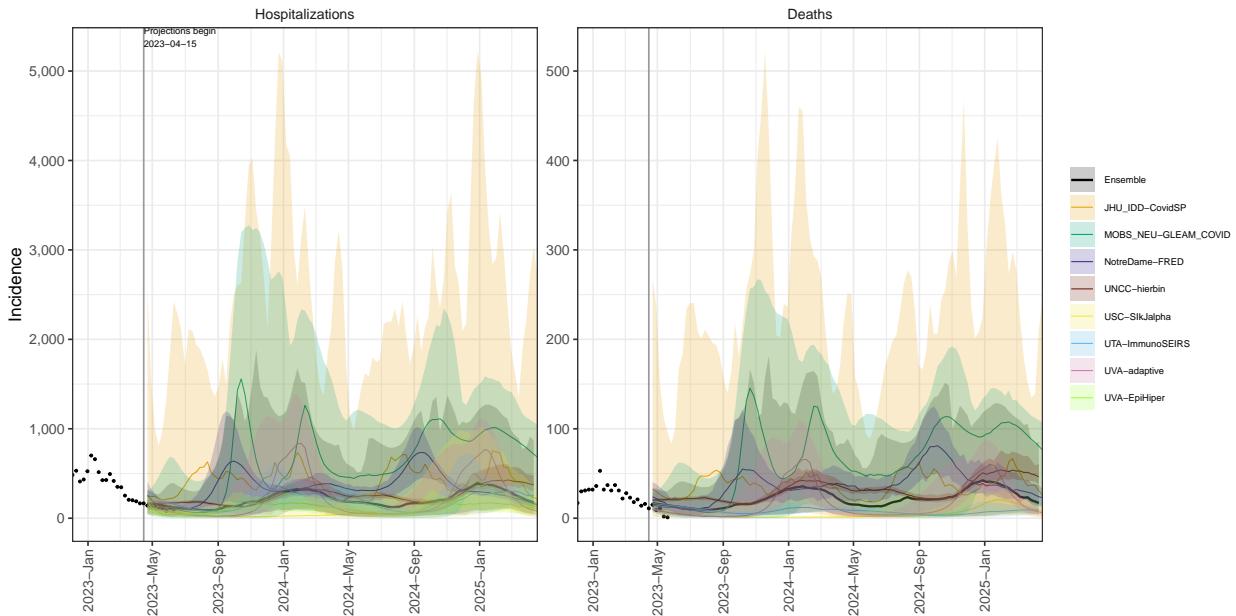
KS model variance & 95% projection intervals – Booster for 65+, High immune escape



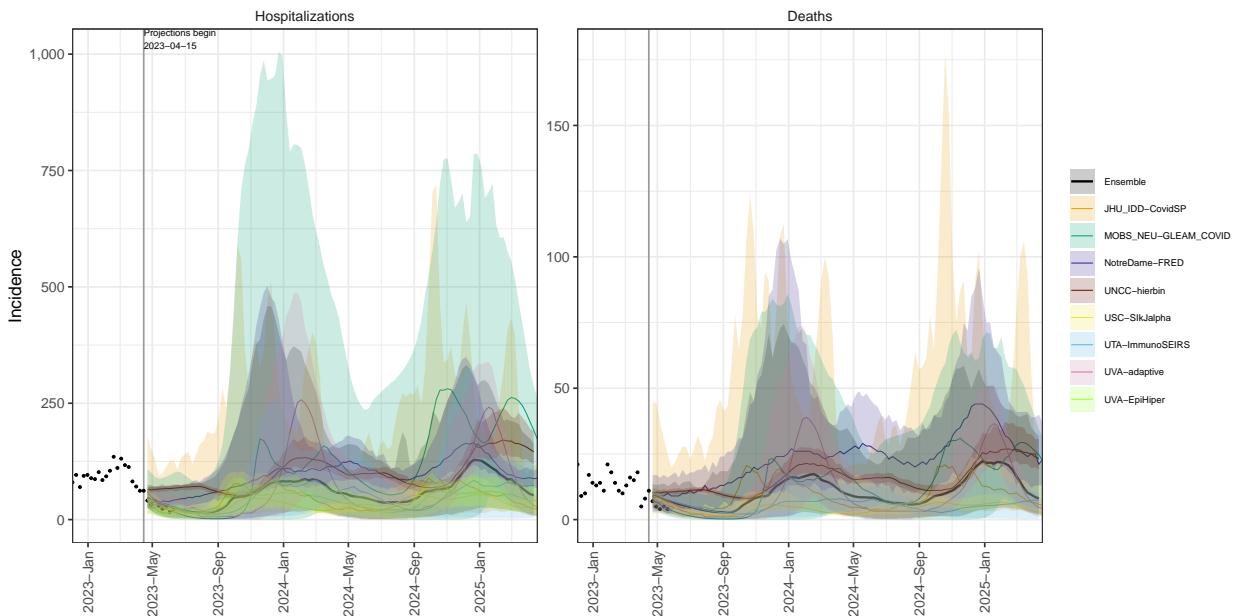
KY model variance & 95% projection intervals – Booster for 65+, High immune escape



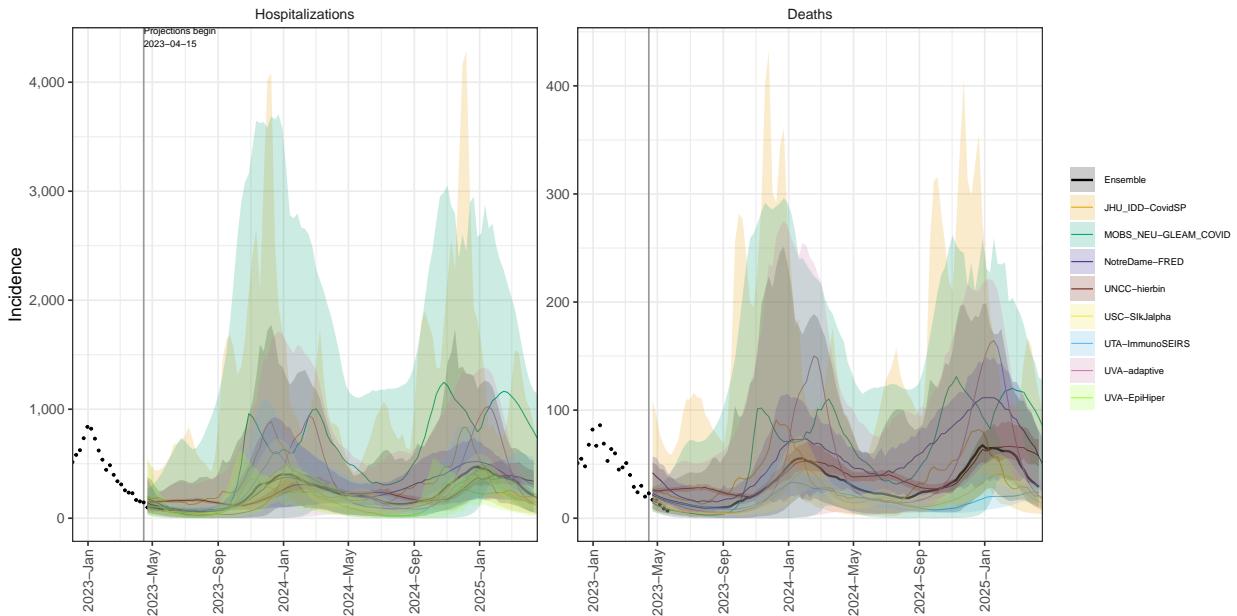
LA model variance & 95% projection intervals – Booster for 65+, High immune escape



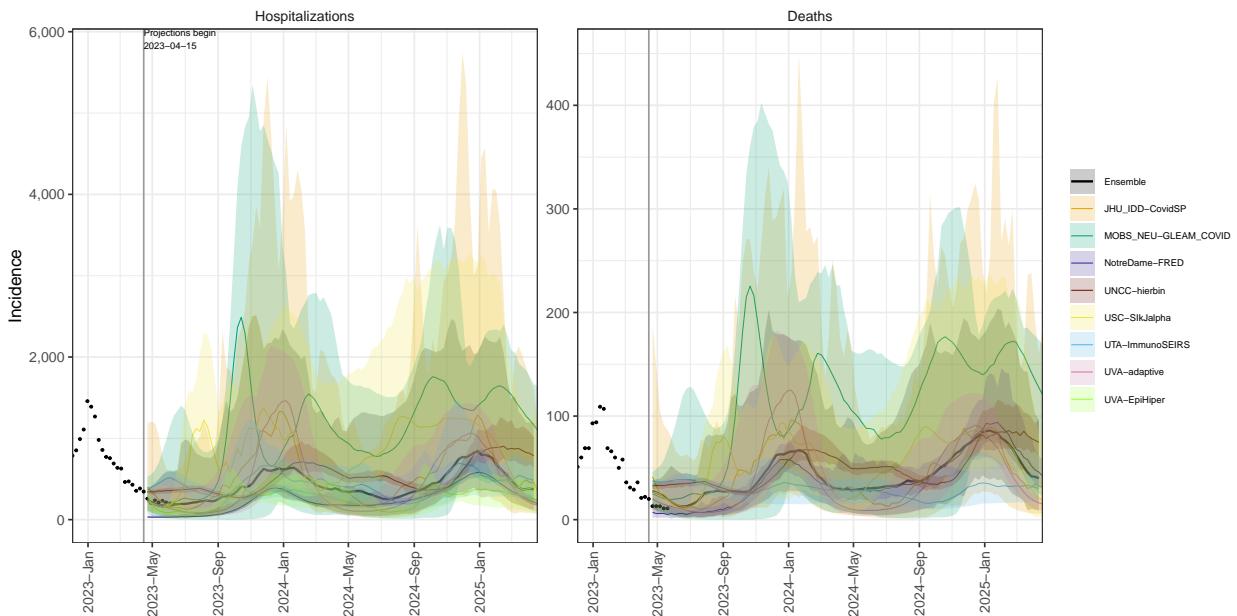
ME model variance & 95% projection intervals – Booster for 65+, High immune escape



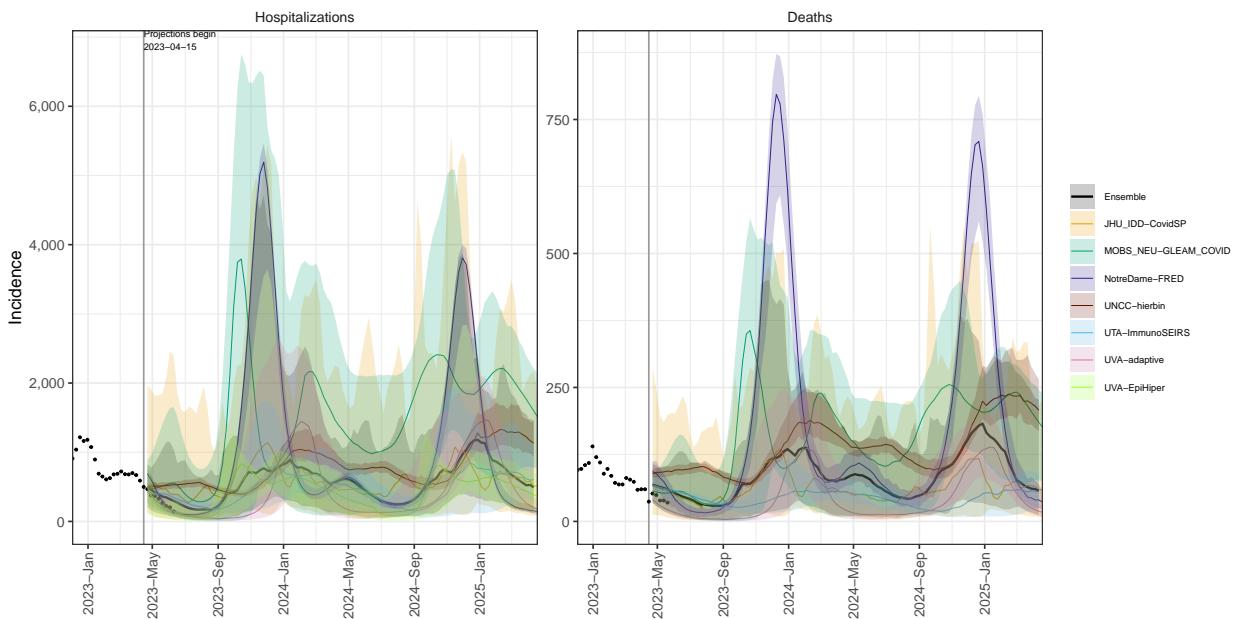
MD model variance & 95% projection intervals – Booster for 65+, High immune escape



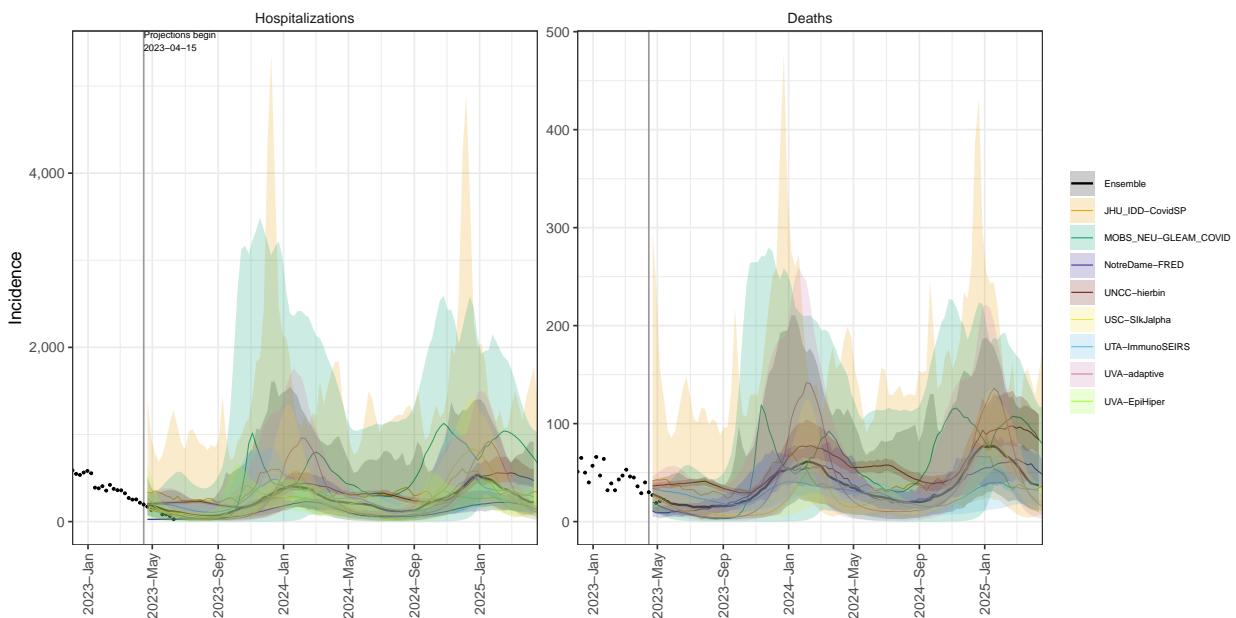
MA model variance & 95% projection intervals – Booster for 65+, High immune escape



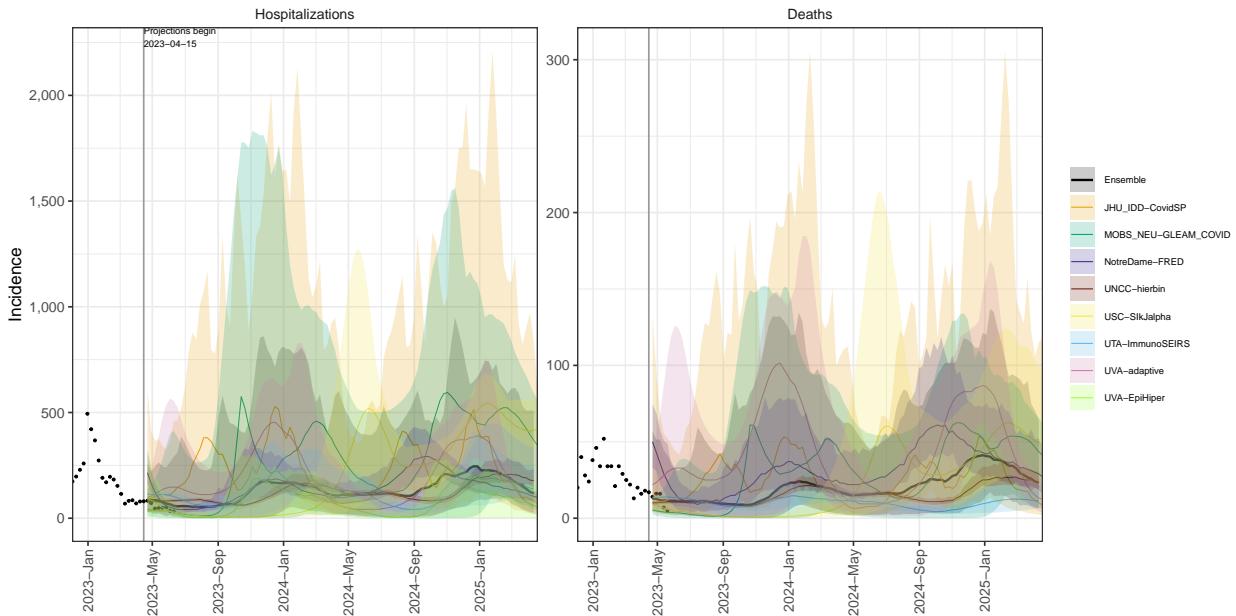
### MI model variance & 95% projection intervals – Booster for 65+, High immune escape



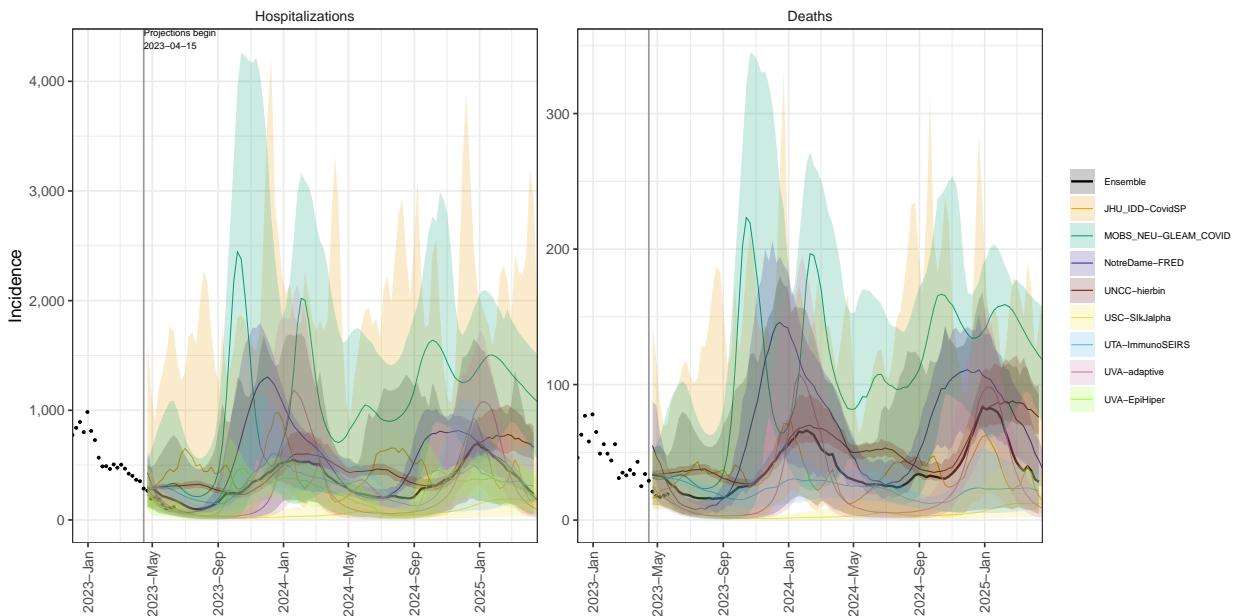
### MN model variance & 95% projection intervals – Booster for 65+, High immune escape



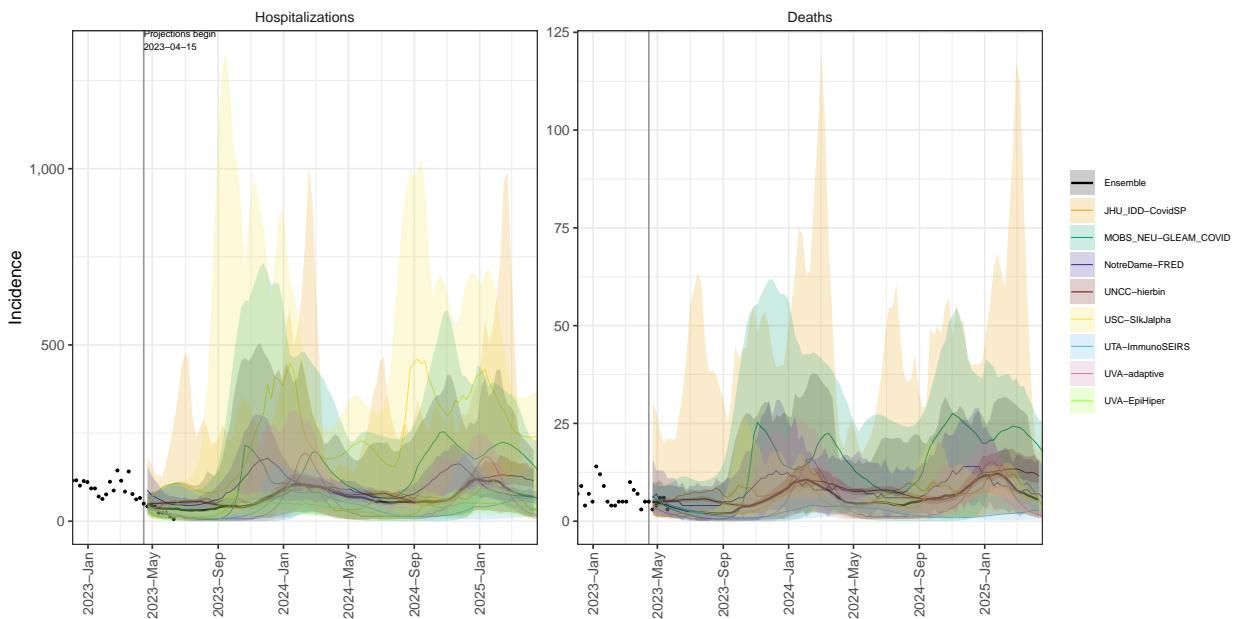
### MS model variance & 95% projection intervals – Booster for 65+, High immune escape



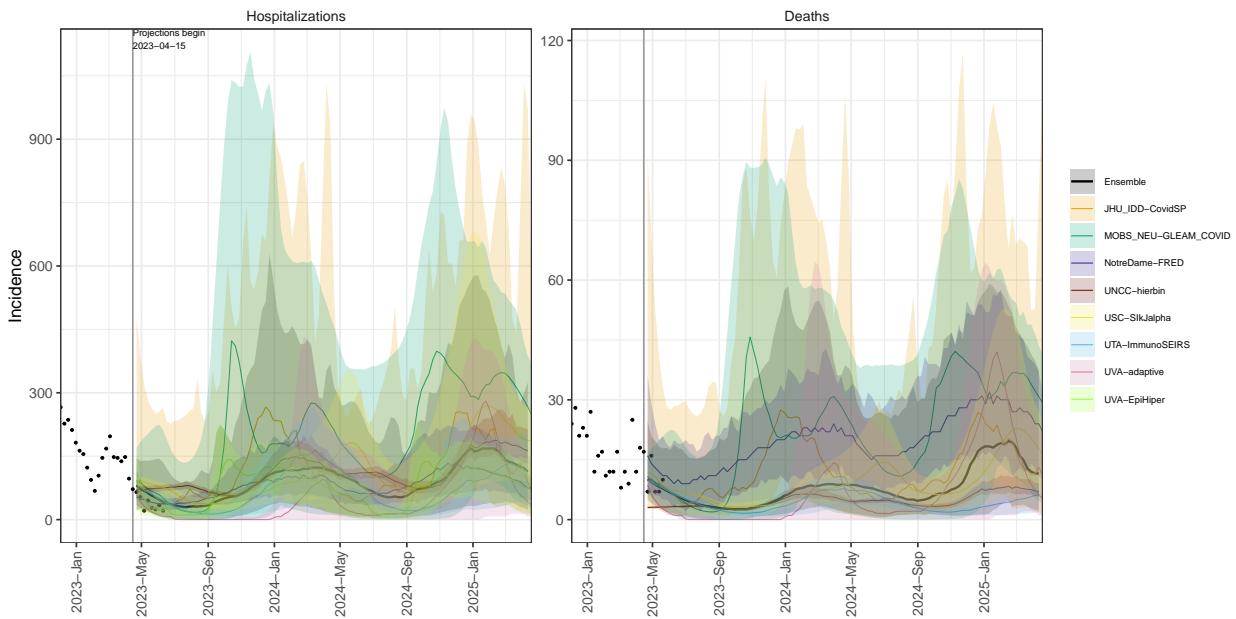
### MO model variance & 95% projection intervals – Booster for 65+, High immune escape



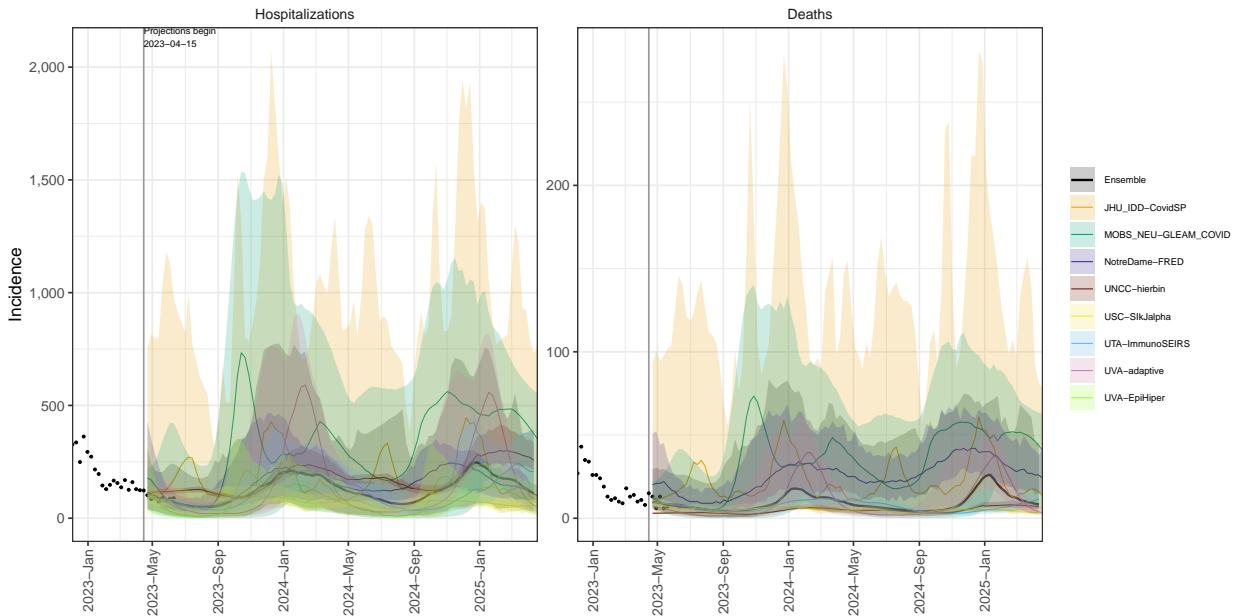
MT model variance & 95% projection intervals – Booster for 65+, High immune escape



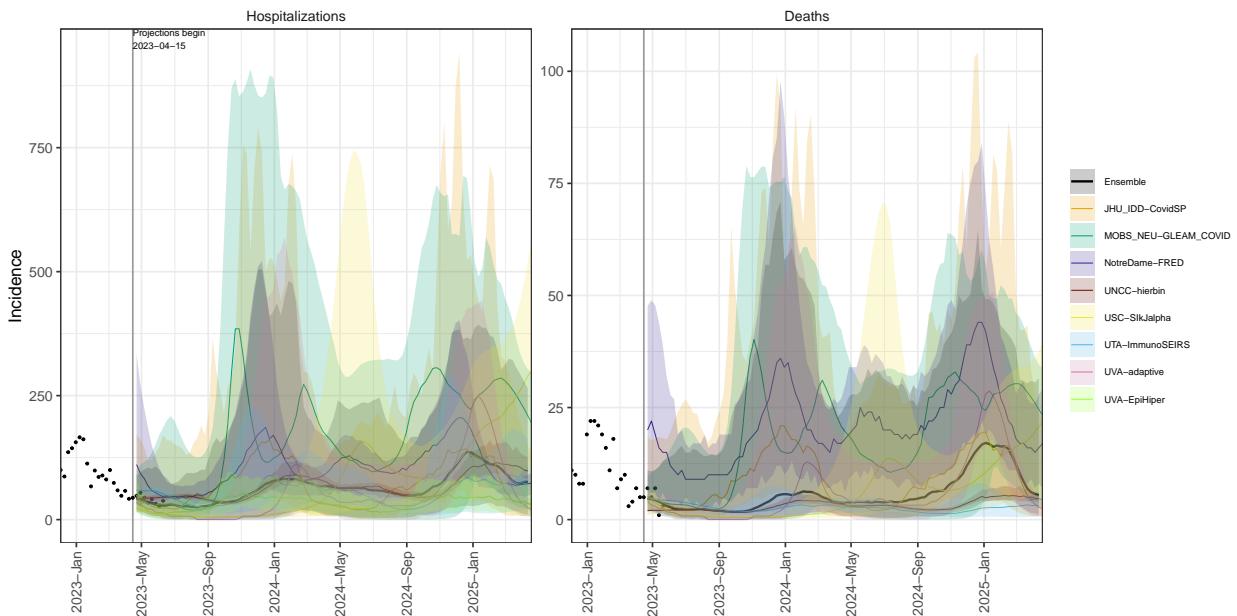
NE model variance & 95% projection intervals – Booster for 65+, High immune escape



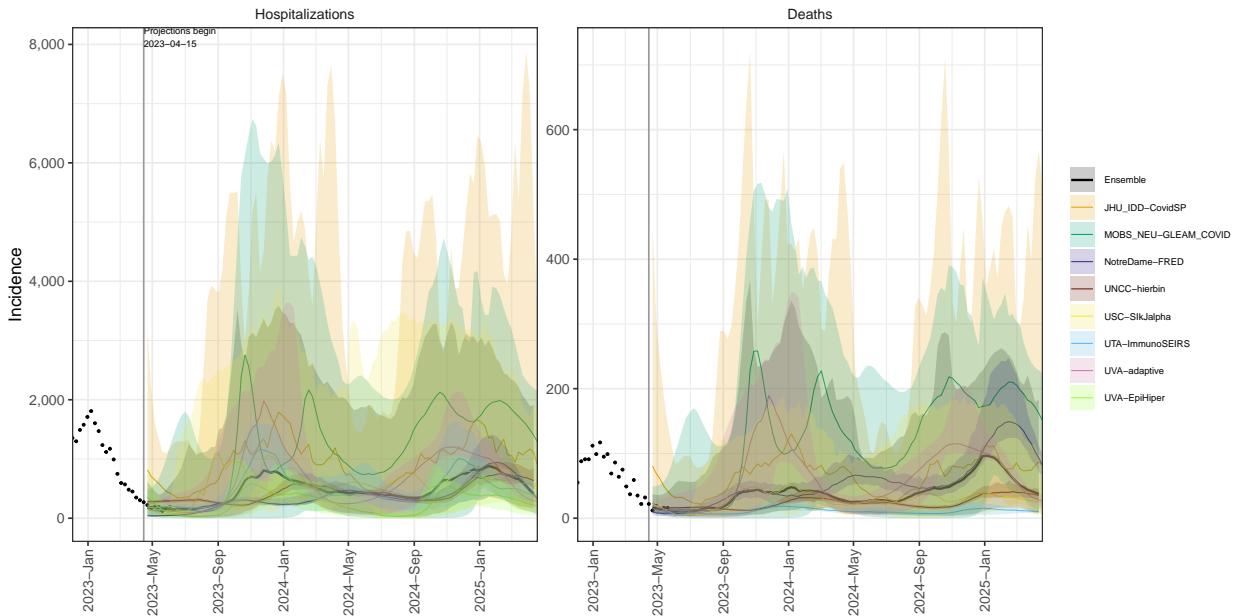
### NV model variance & 95% projection intervals – Booster for 65+, High immune escape



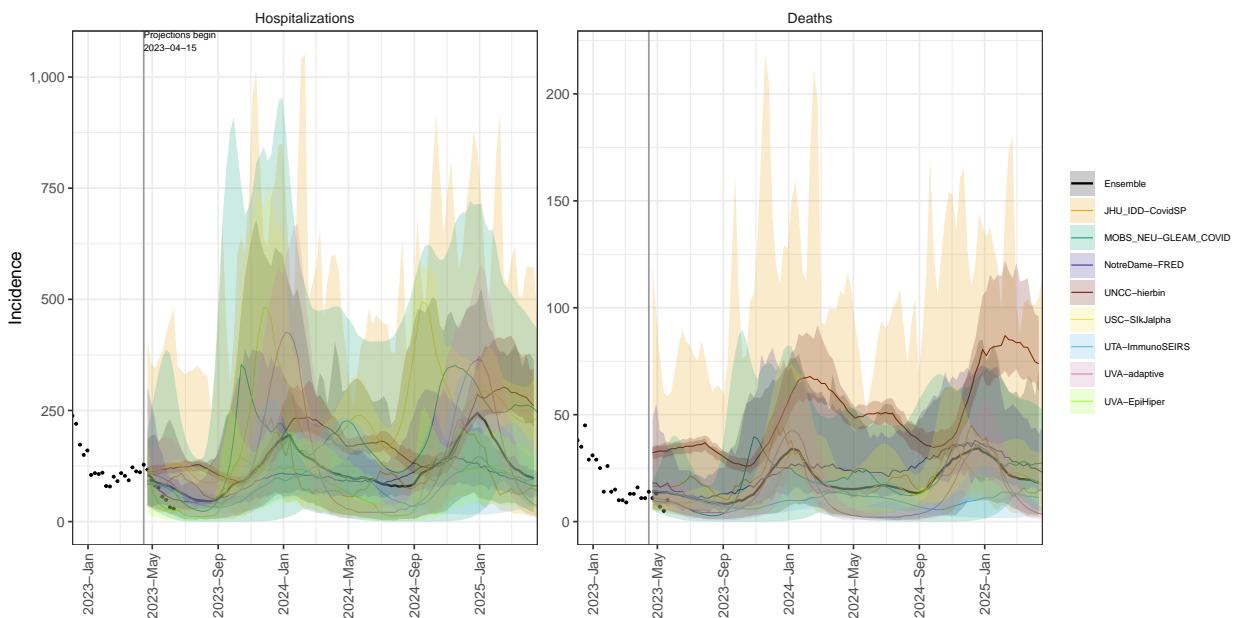
### NH model variance & 95% projection intervals – Booster for 65+, High immune escape



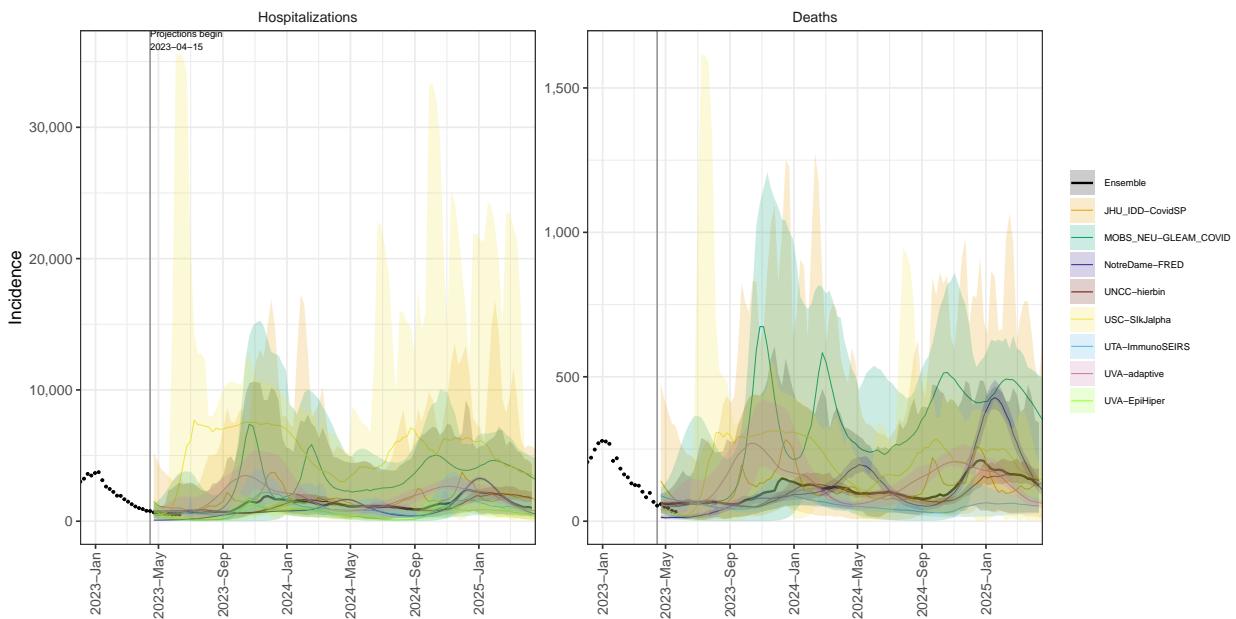
### NJ model variance & 95% projection intervals – Booster for 65+, High immune escape



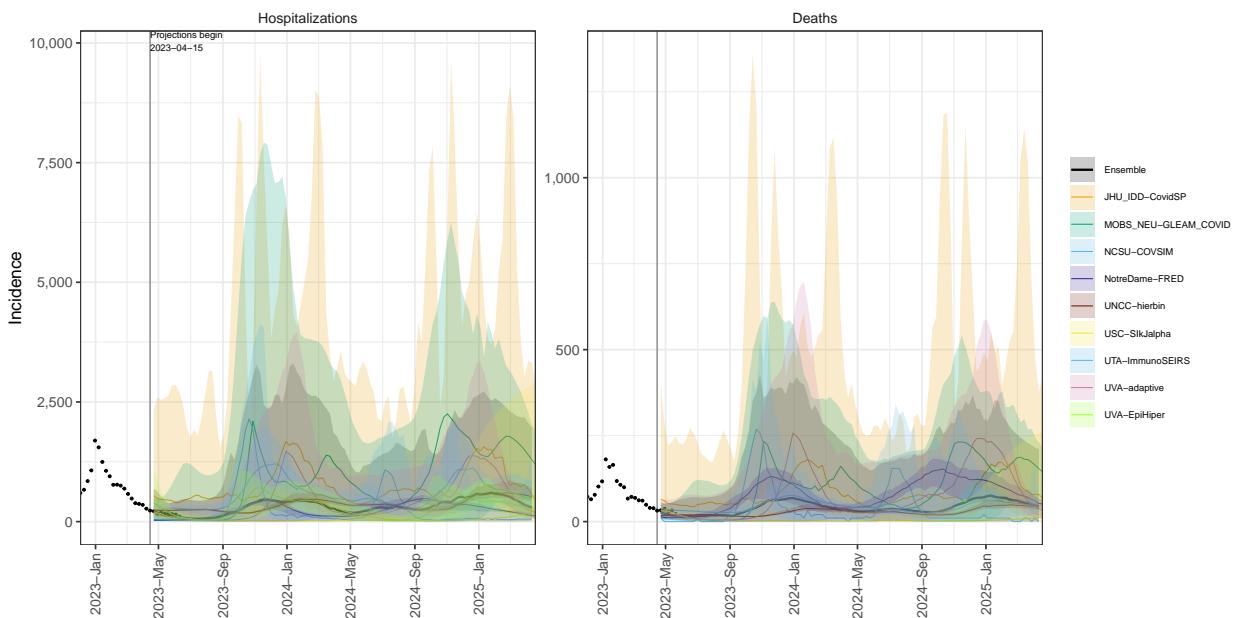
### NM model variance & 95% projection intervals – Booster for 65+, High immune escape



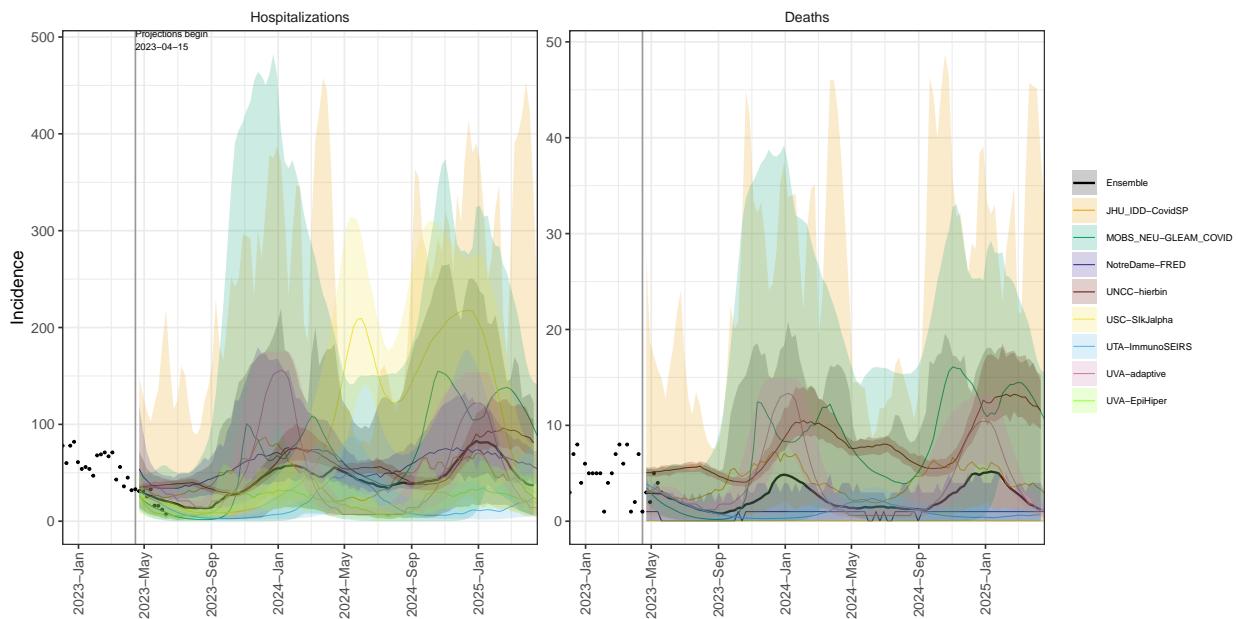
NY model variance & 95% projection intervals – Booster for 65+, High immune escape



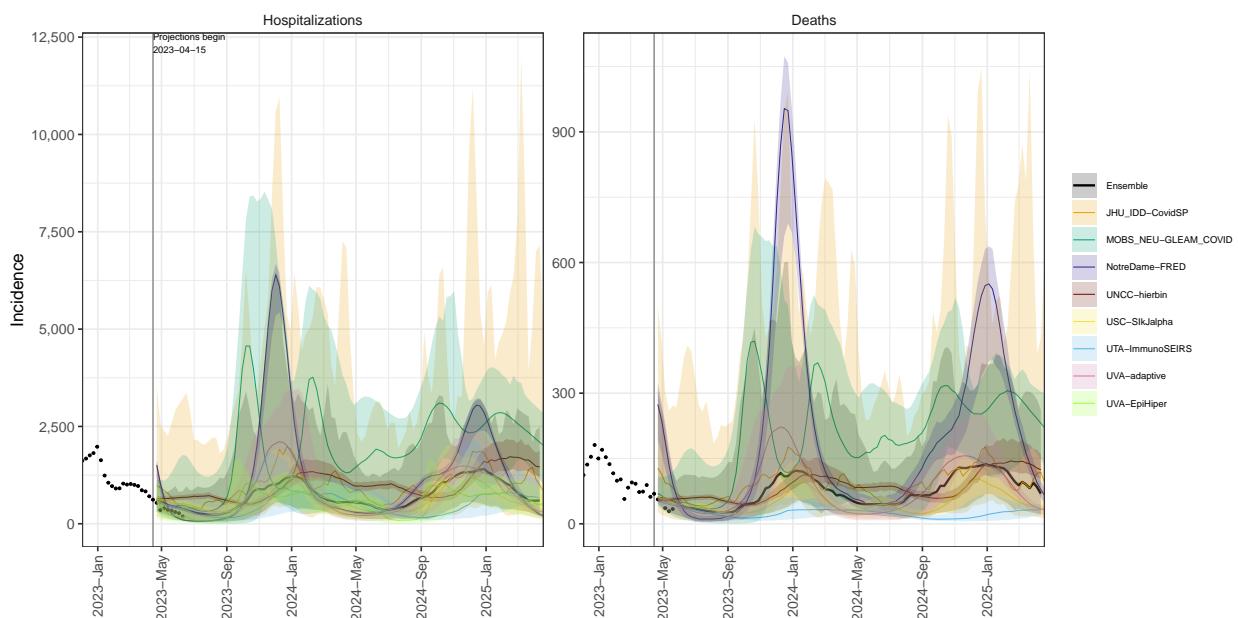
NC model variance & 95% projection intervals – Booster for 65+, High immune escape



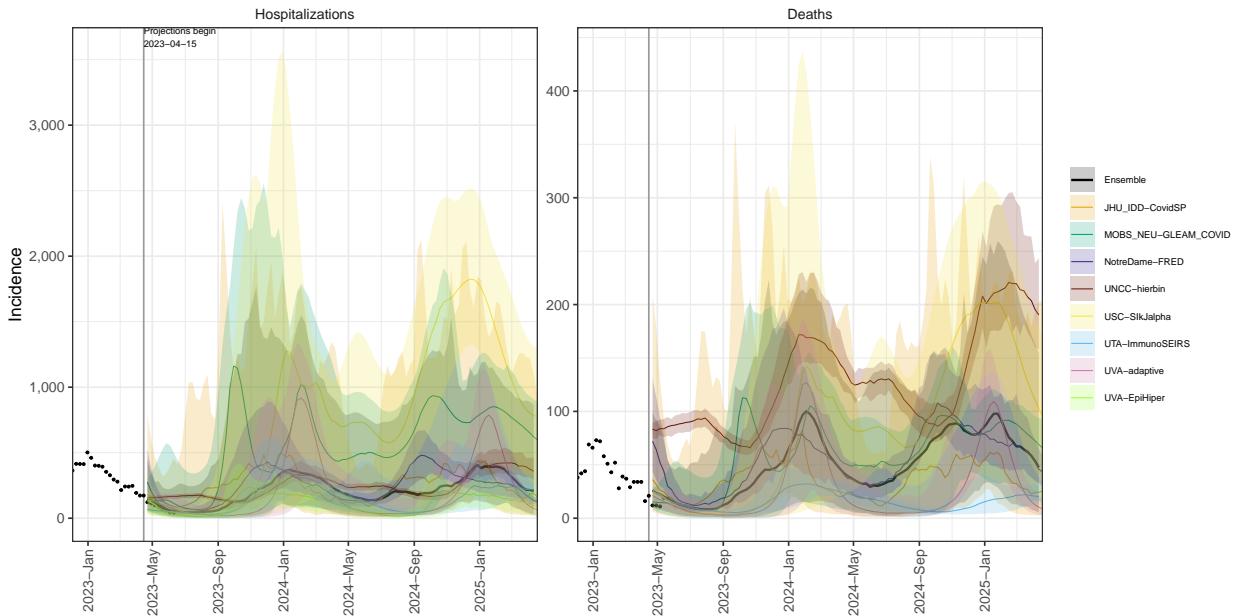
ND model variance & 95% projection intervals – Booster for 65+, High immune escape



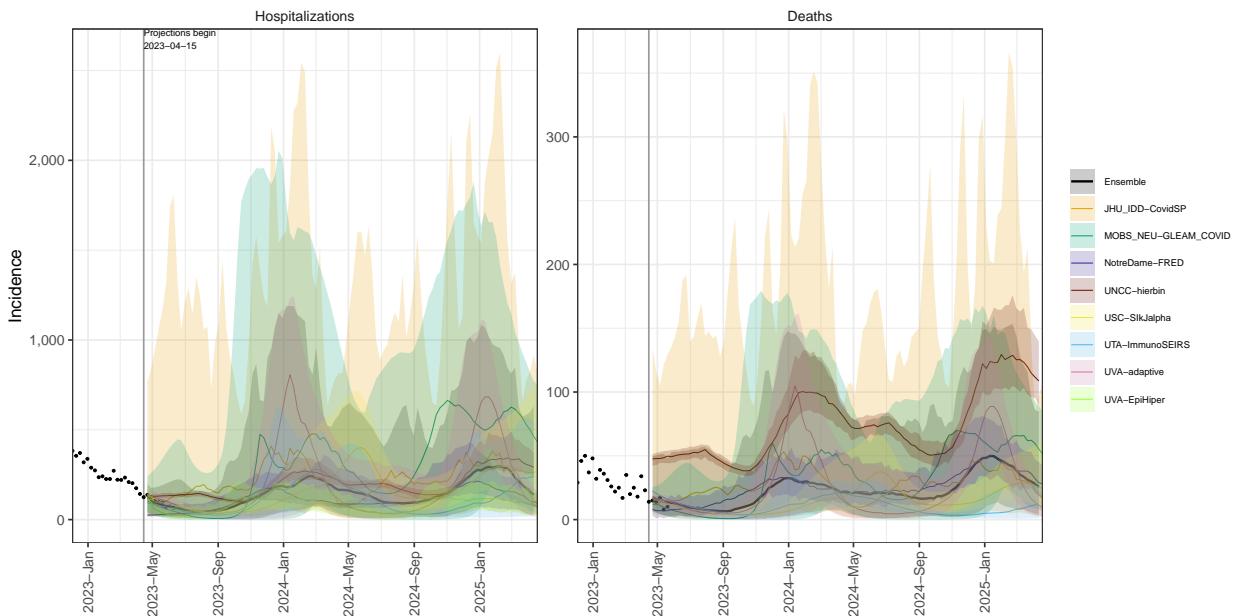
OH model variance & 95% projection intervals – Booster for 65+, High immune escape



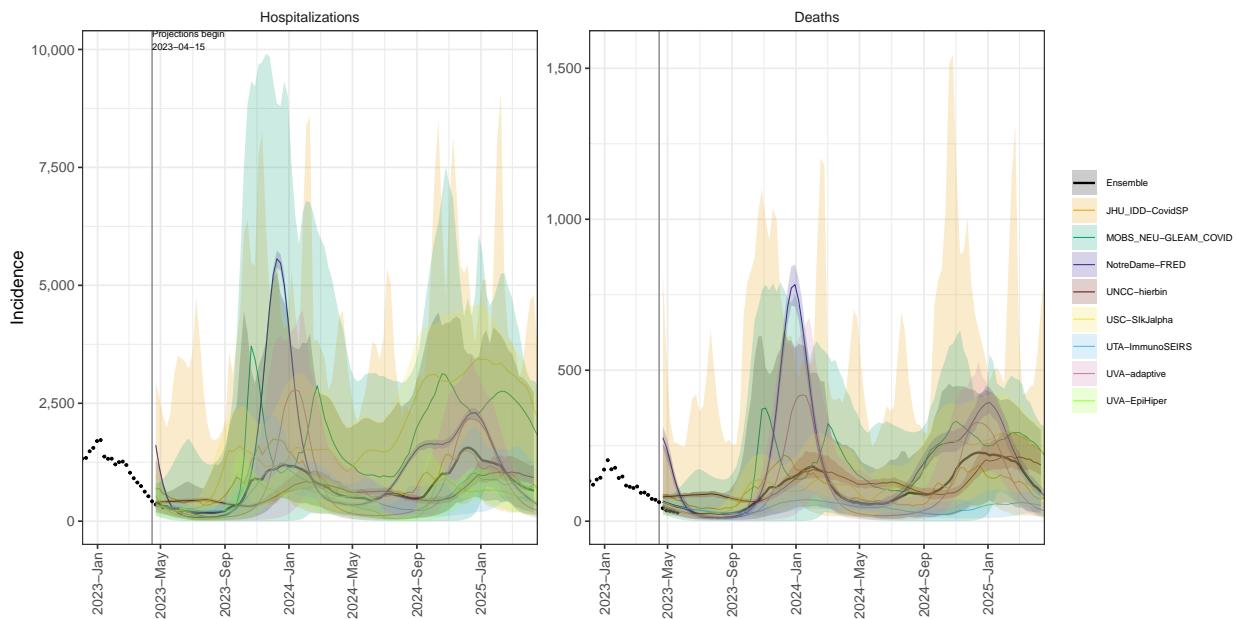
OK model variance & 95% projection intervals – Booster for 65+, High immune escape



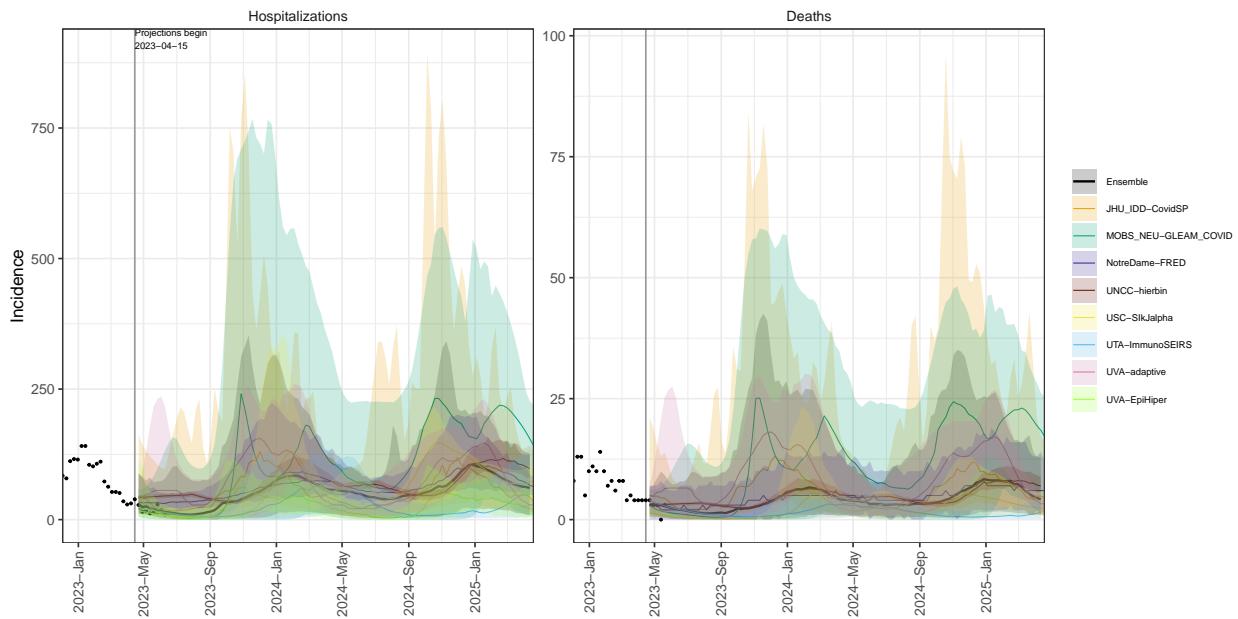
OR model variance & 95% projection intervals – Booster for 65+, High immune escape



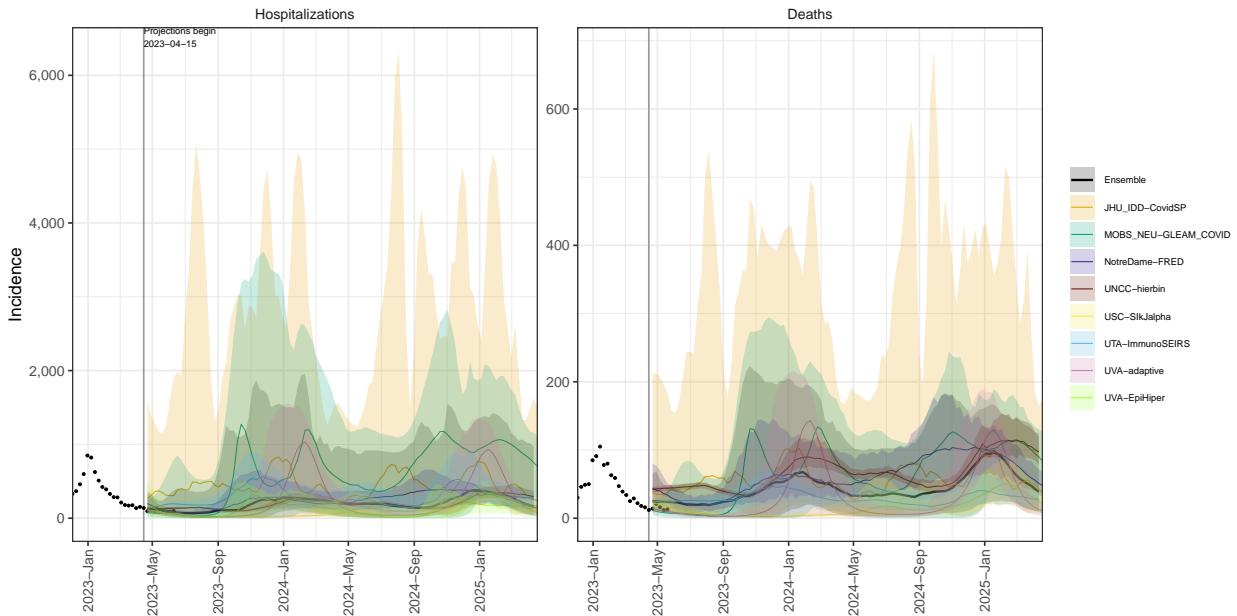
PA model variance & 95% projection intervals – Booster for 65+, High immune escape



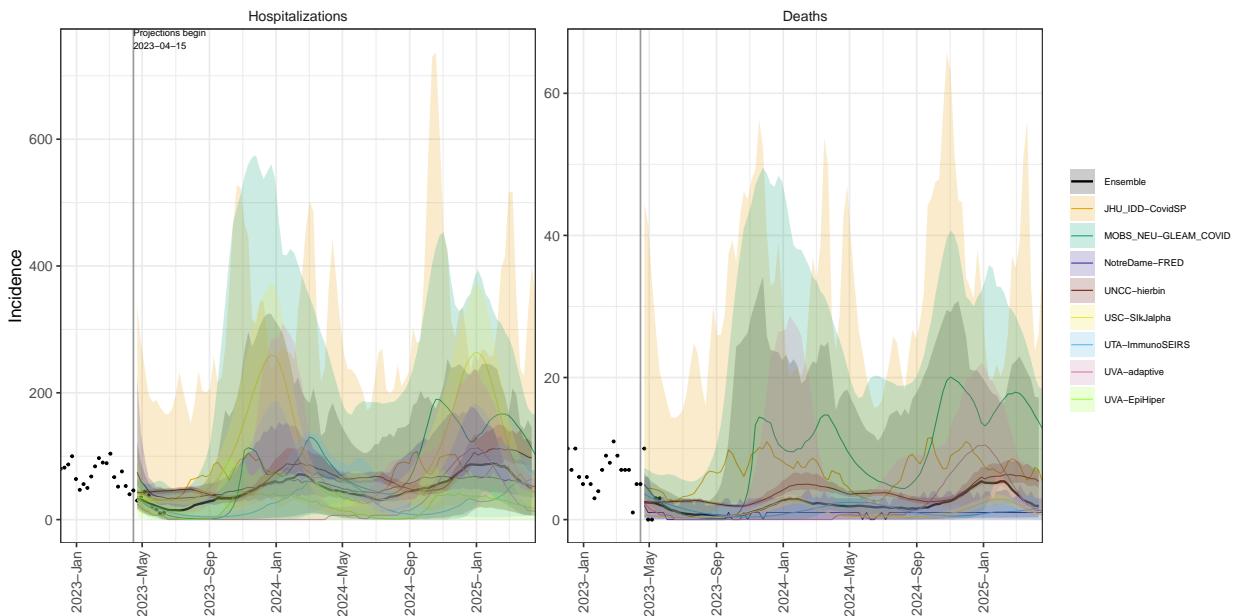
RI model variance & 95% projection intervals – Booster for 65+, High immune escape



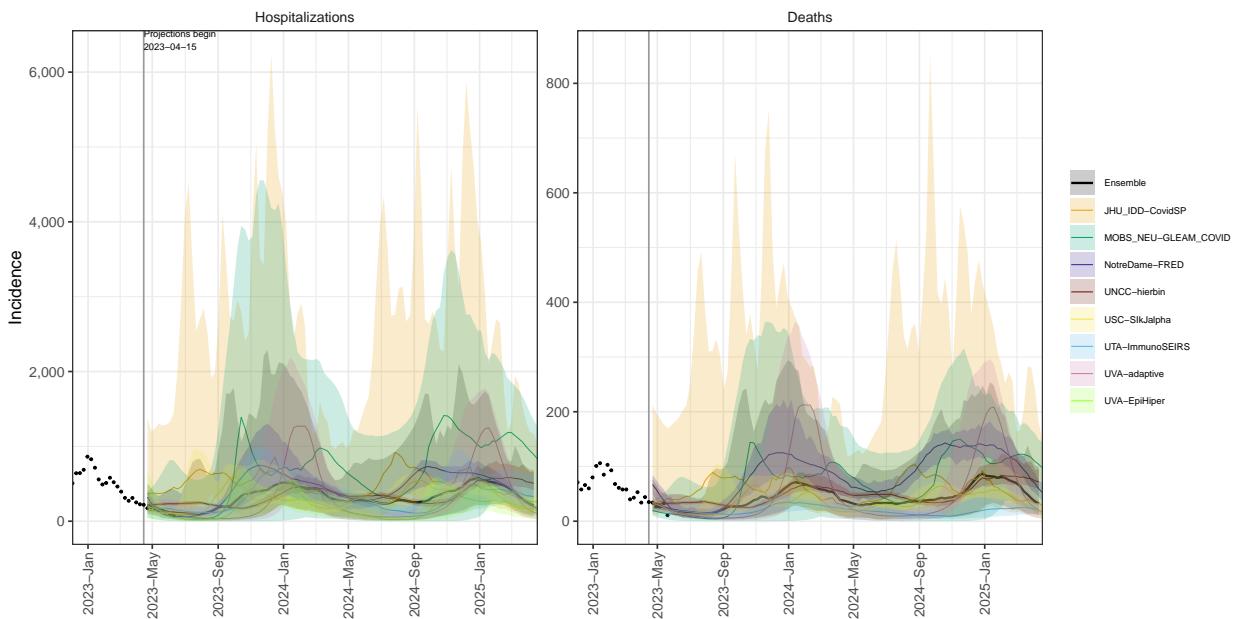
SC model variance & 95% projection intervals – Booster for 65+, High immune escape



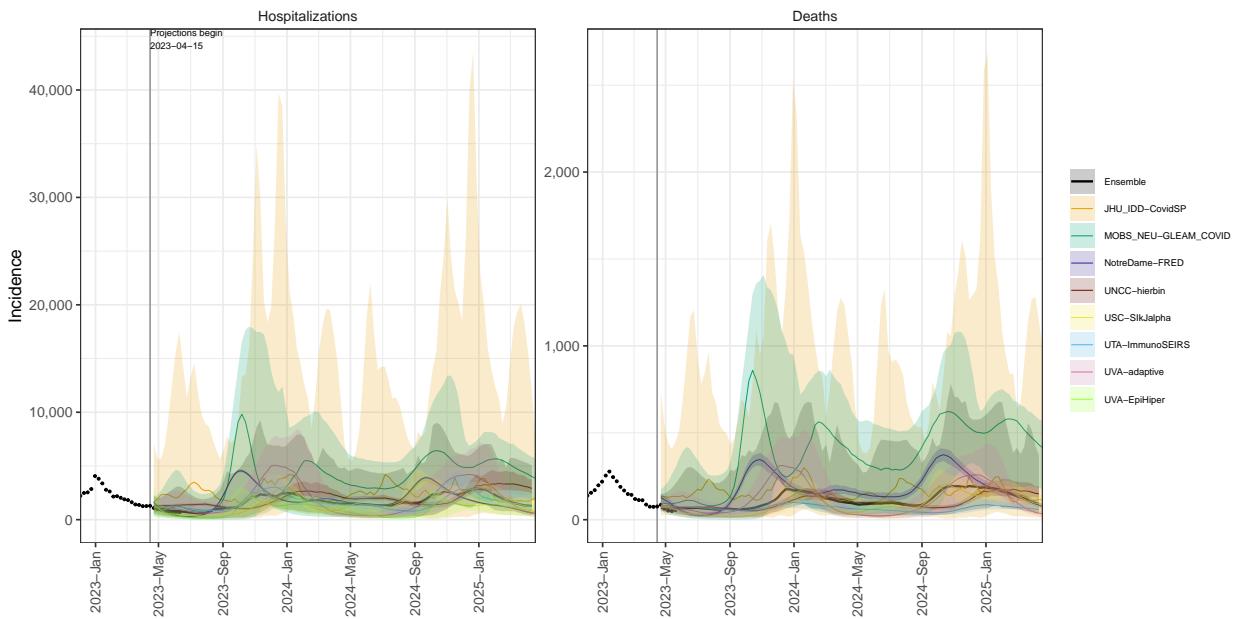
SD model variance & 95% projection intervals – Booster for 65+, High immune escape



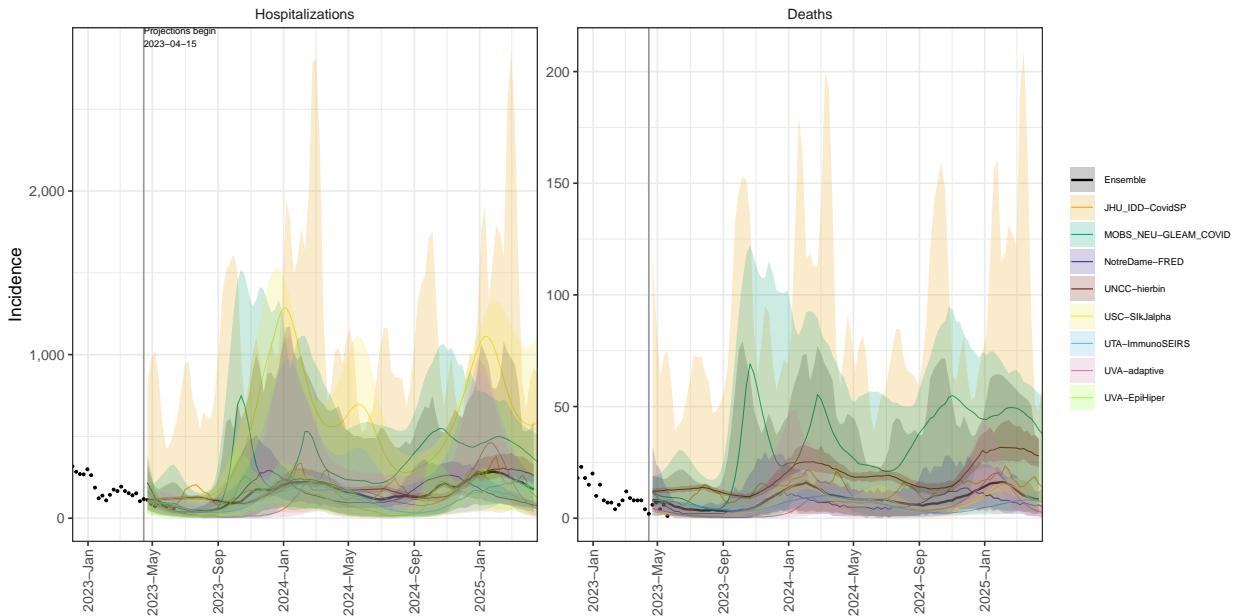
### TN model variance & 95% projection intervals – Booster for 65+, High immune escape



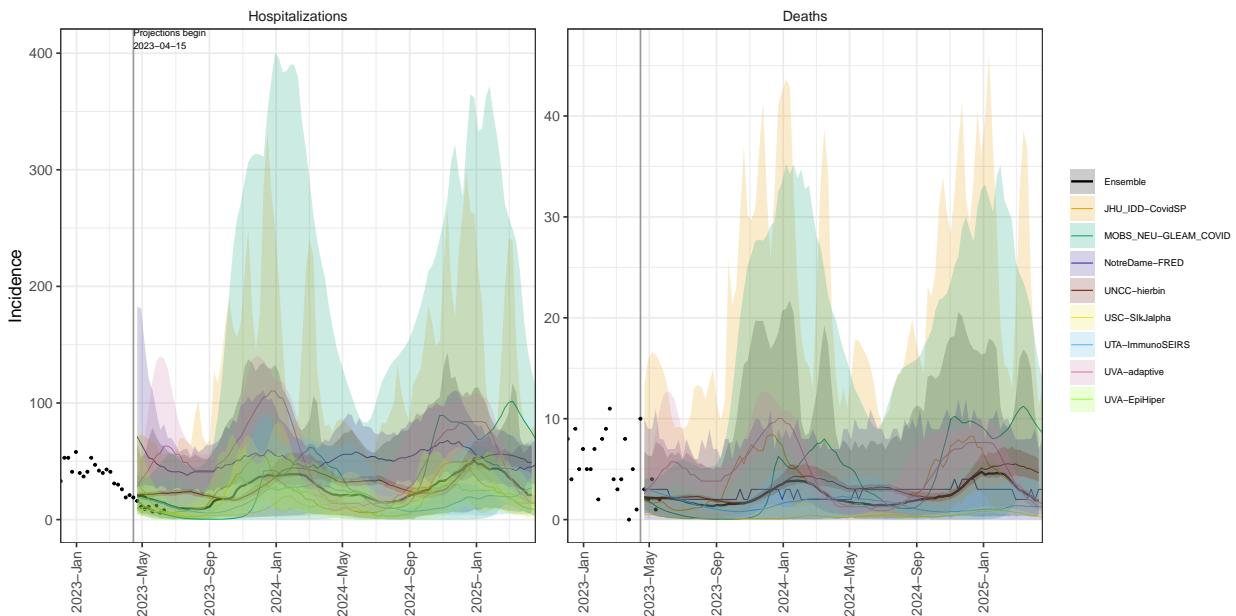
### TX model variance & 95% projection intervals – Booster for 65+, High immune escape



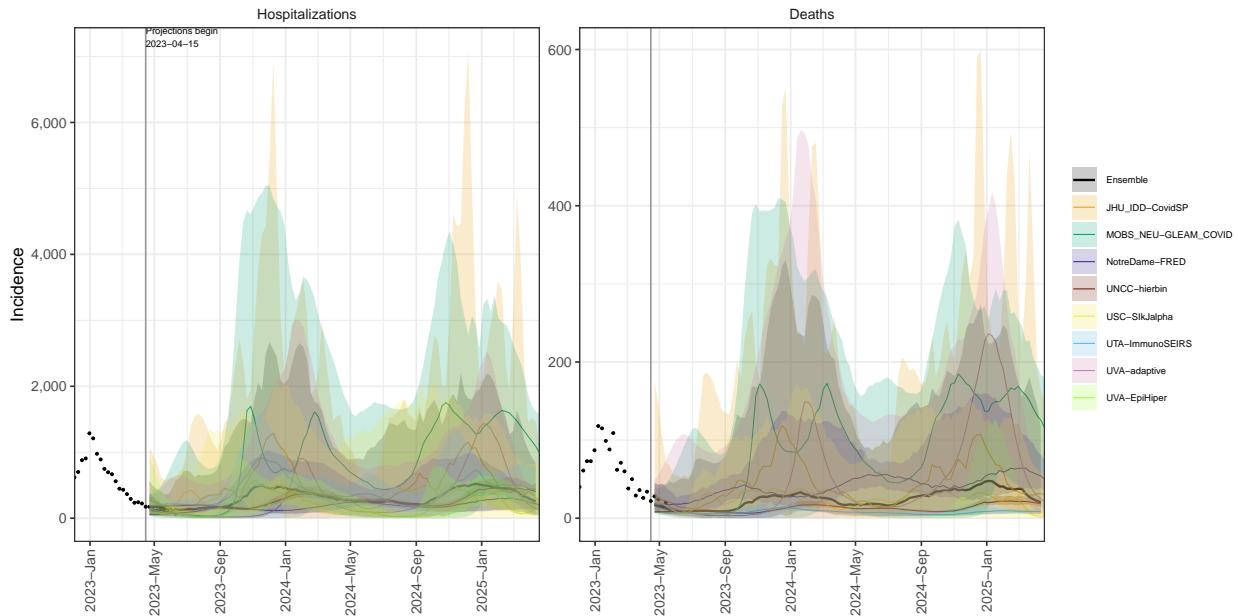
UT model variance & 95% projection intervals – Booster for 65+, High immune escape



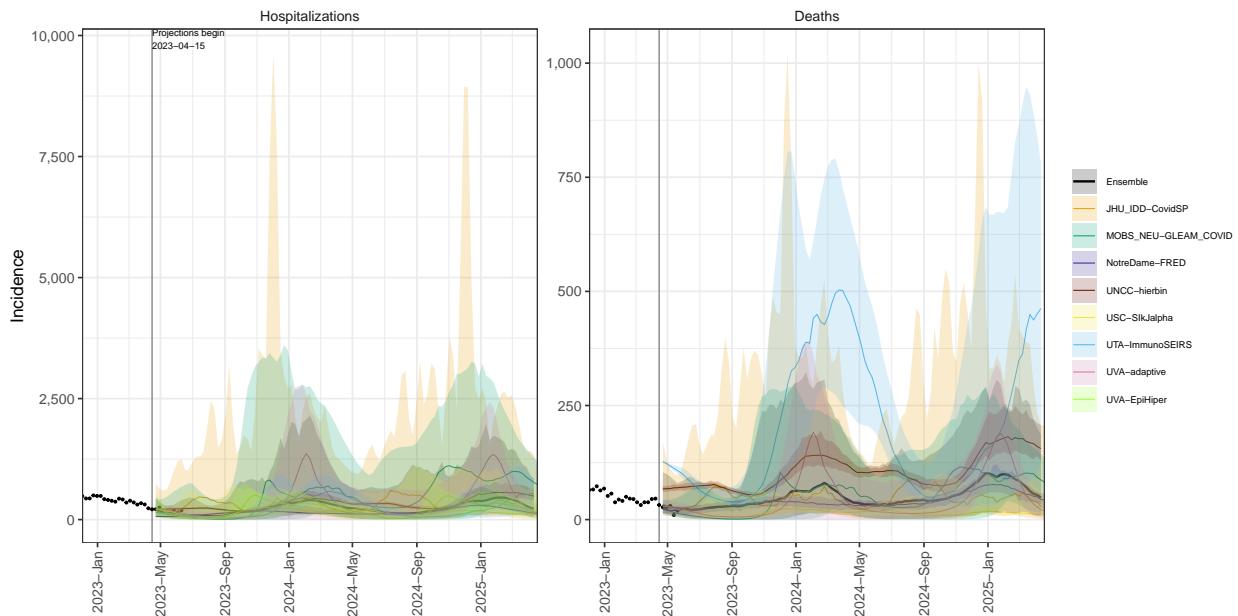
VT model variance & 95% projection intervals – Booster for 65+, High immune escape



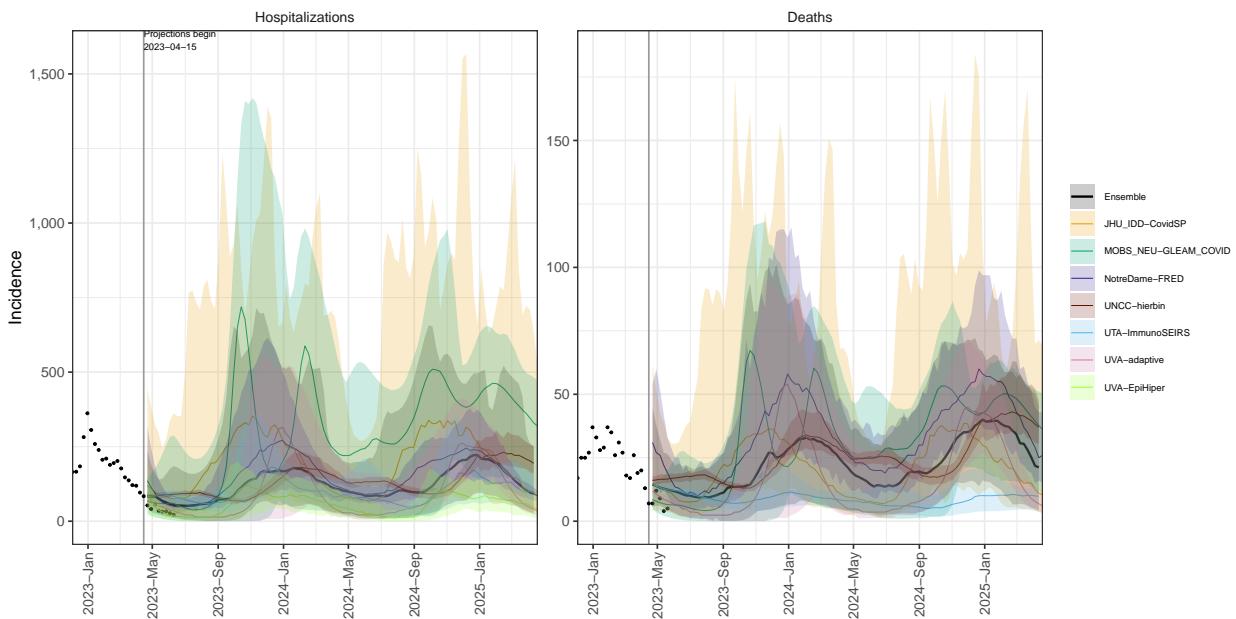
VA model variance & 95% projection intervals – Booster for 65+, High immune escape



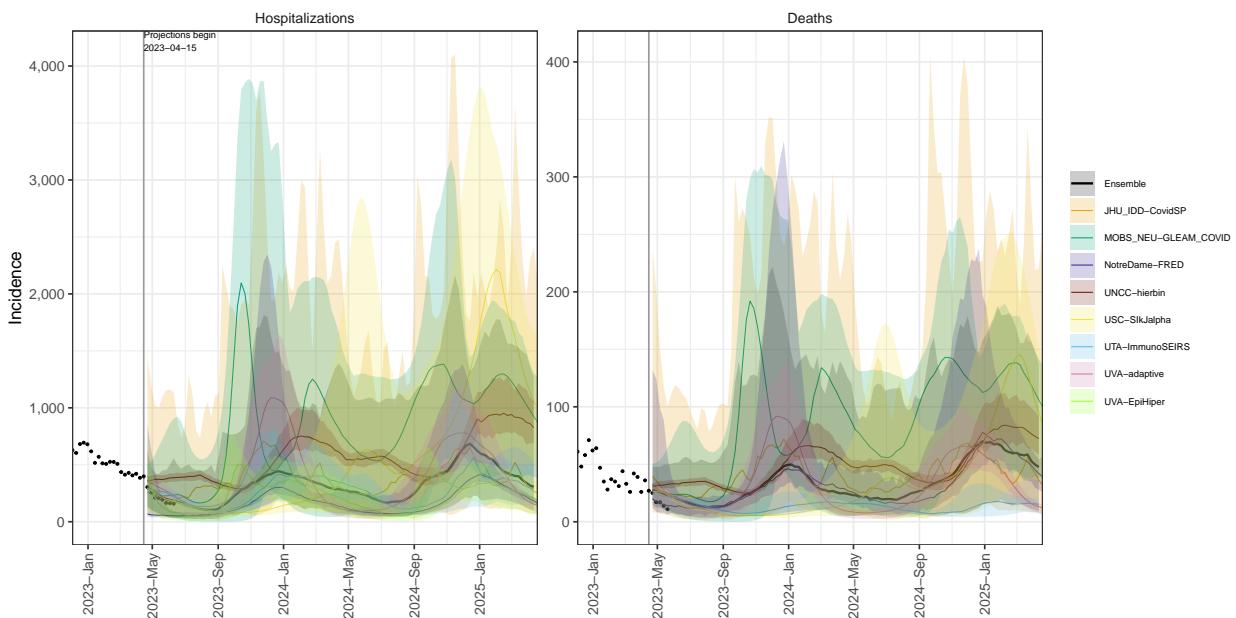
WA model variance & 95% projection intervals – Booster for 65+, High immune escape



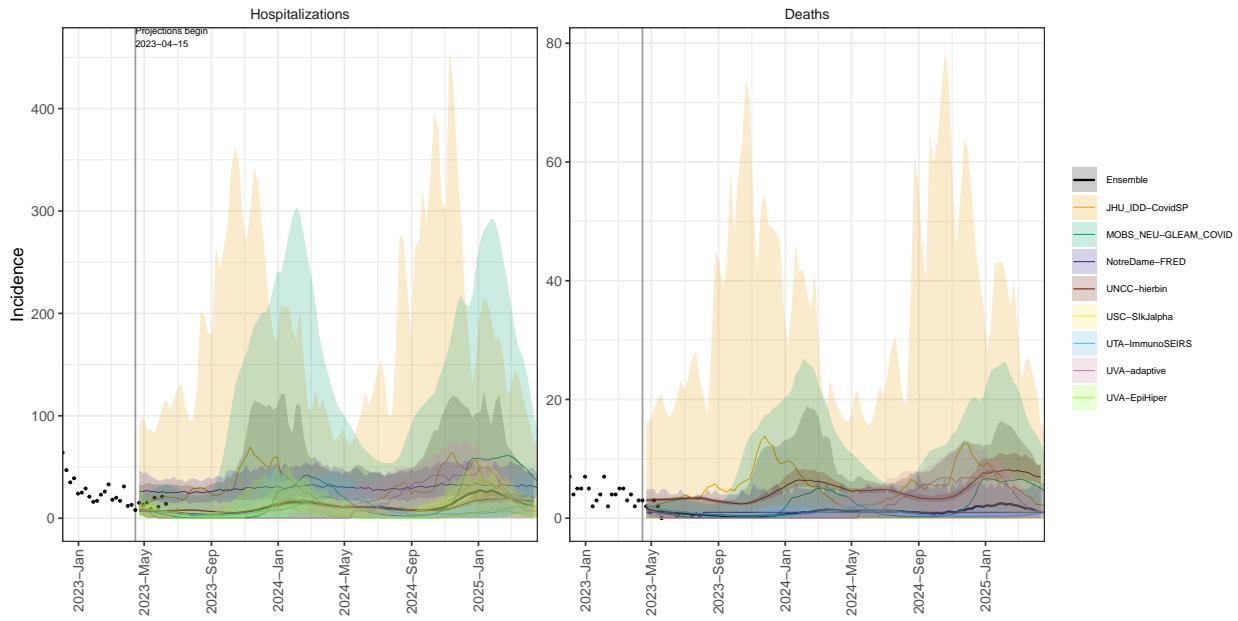
WV model variance & 95% projection intervals – Booster for 65+, High immune escape



WI model variance & 95% projection intervals – Booster for 65+, High immune escape

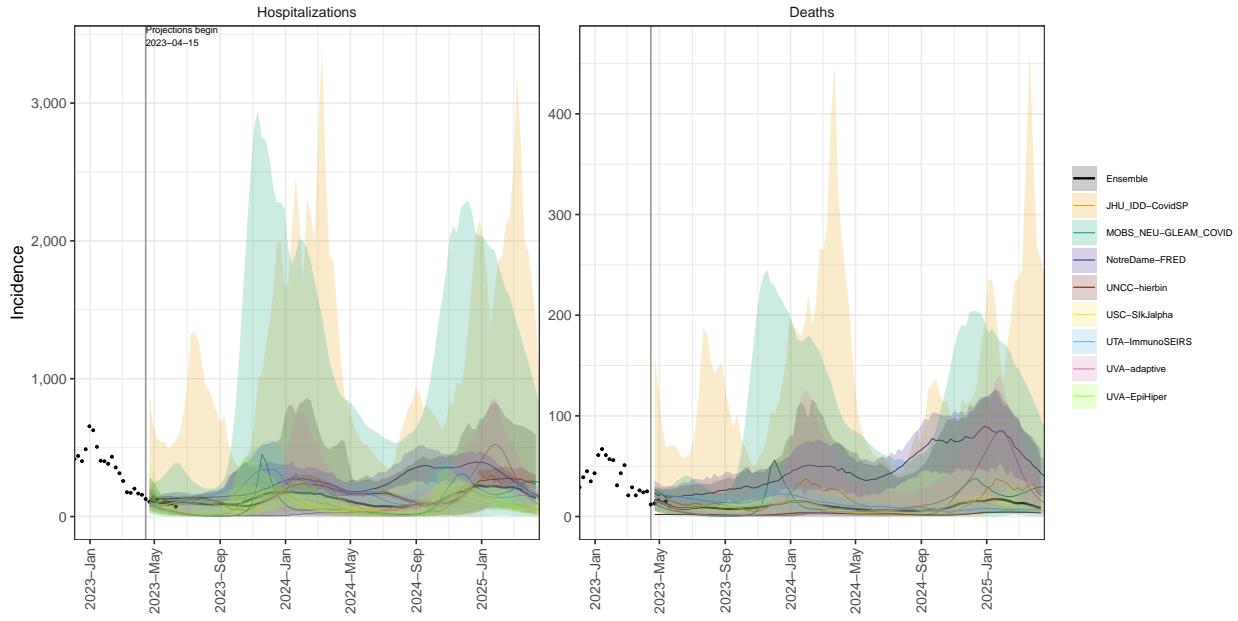


WY model variance & 95% projection intervals – Booster for 65+, High immune escape

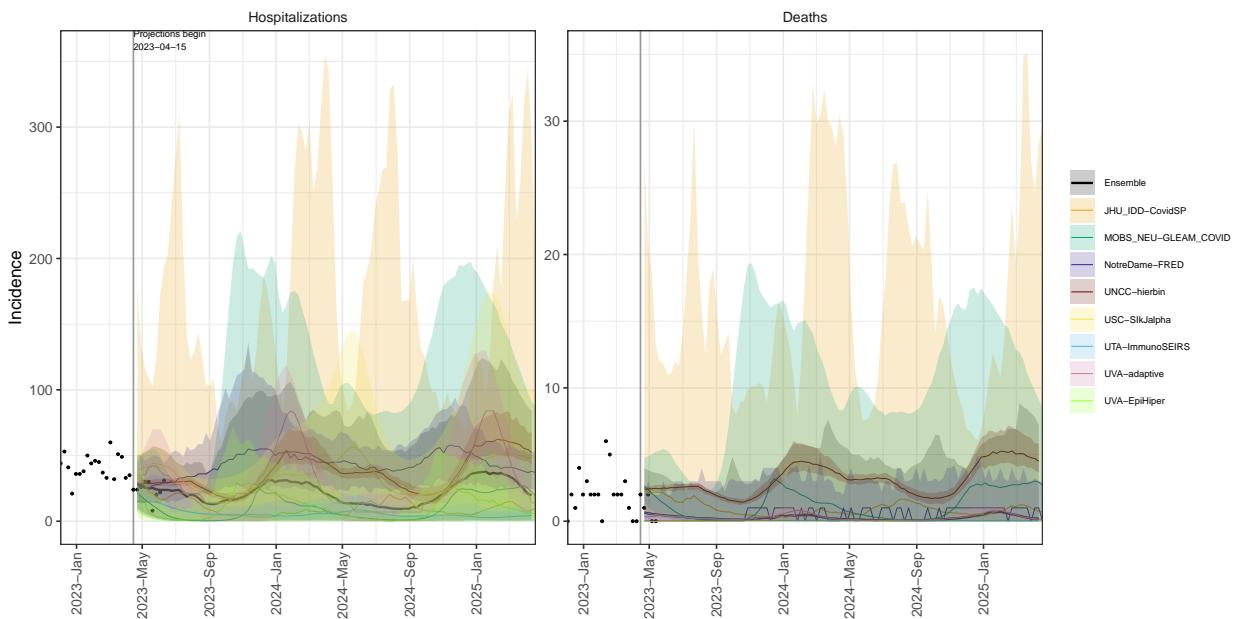


Model variation for Booster for all, Low immune escape scenario.

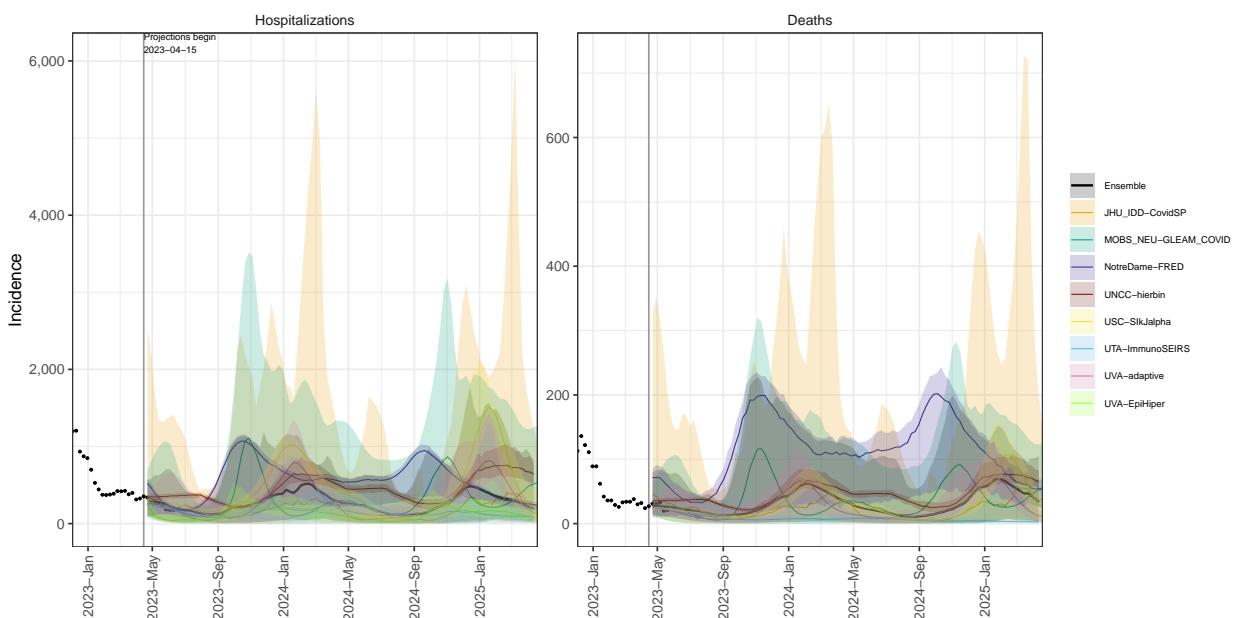
AL model variance & 95% projection intervals – Booster for all, Low immune escape



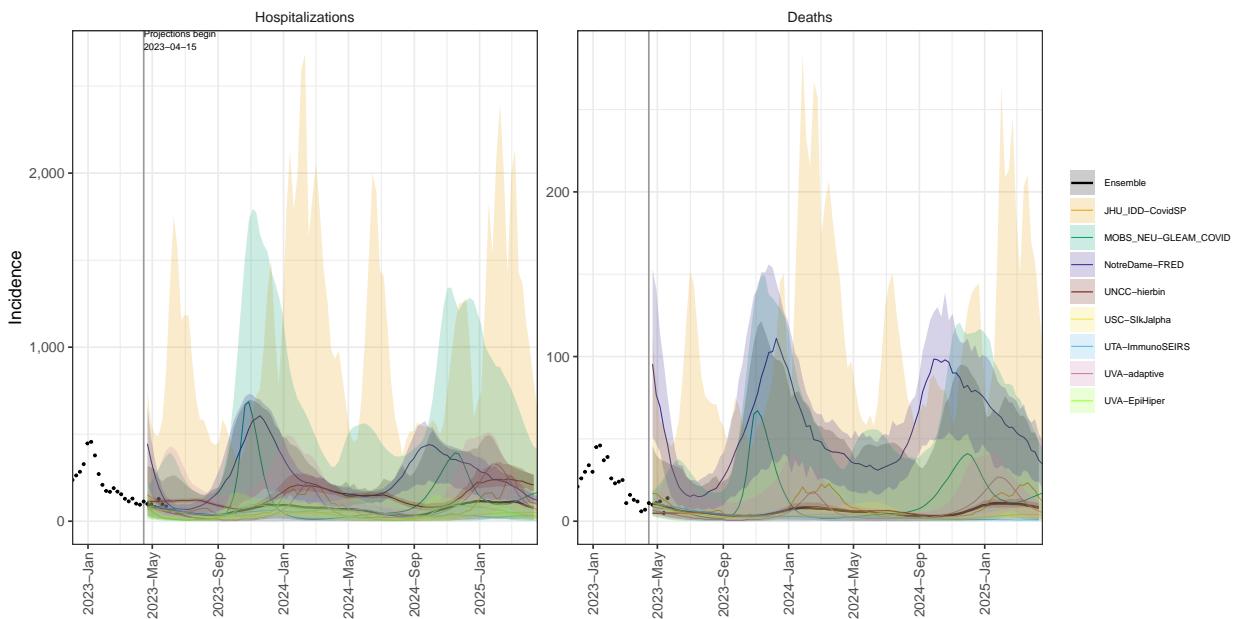
AK model variance & 95% projection intervals – Booster for all, Low immune escape



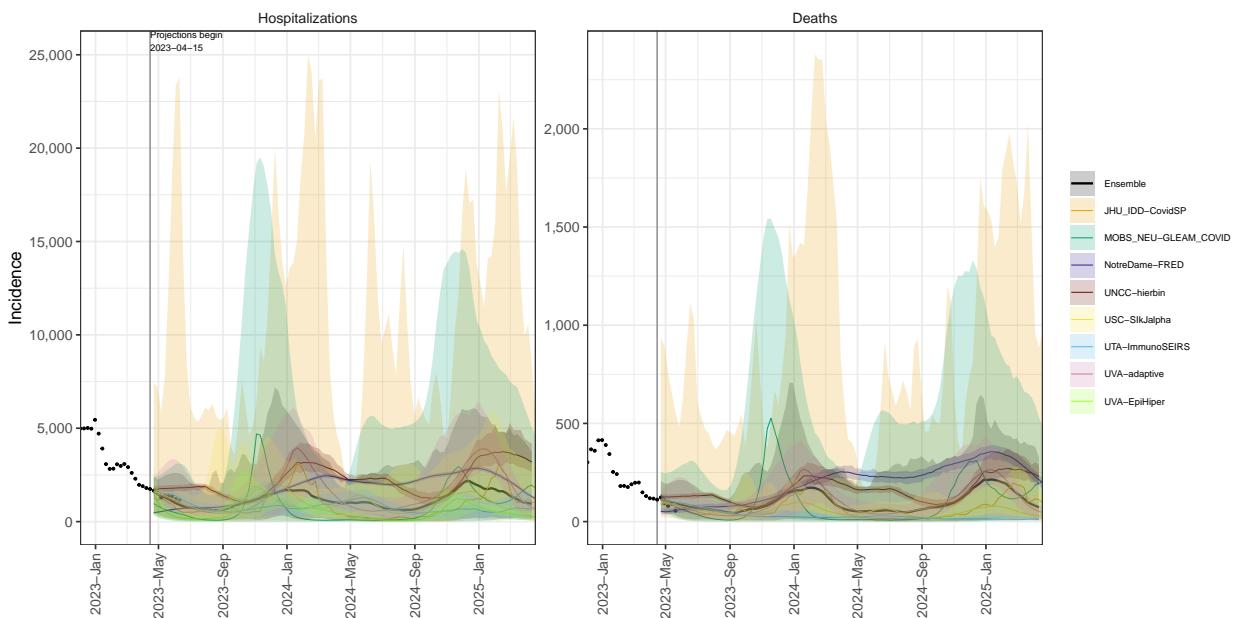
AZ model variance & 95% projection intervals – Booster for all, Low immune escape



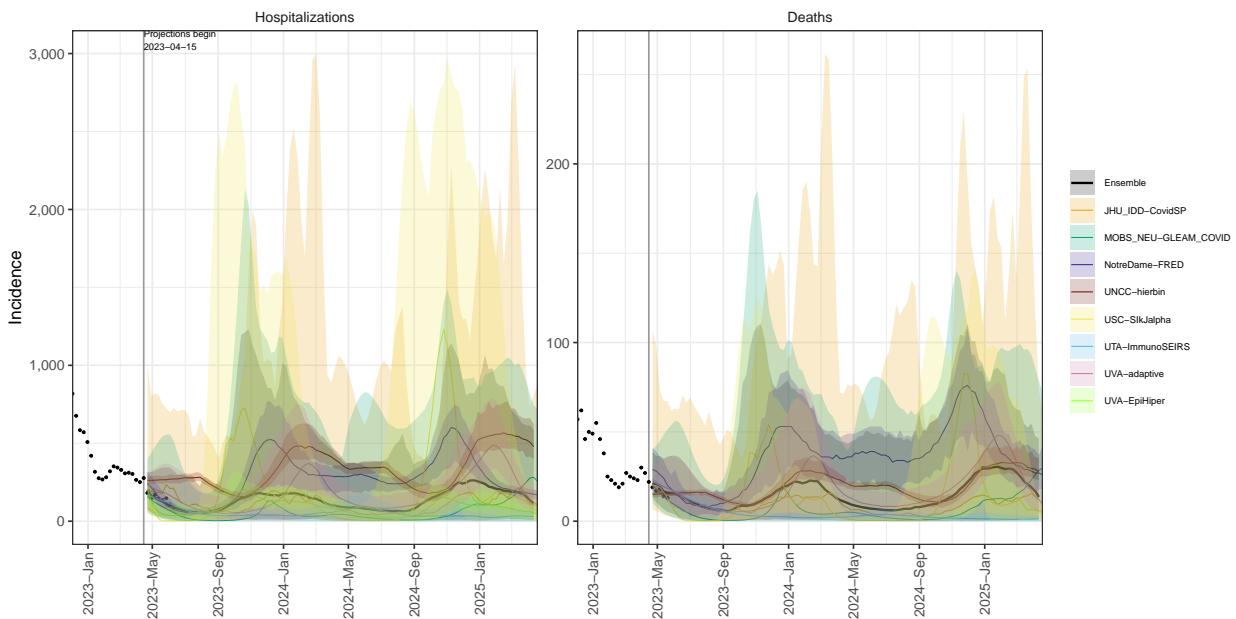
AR model variance & 95% projection intervals – Booster for all, Low immune escape



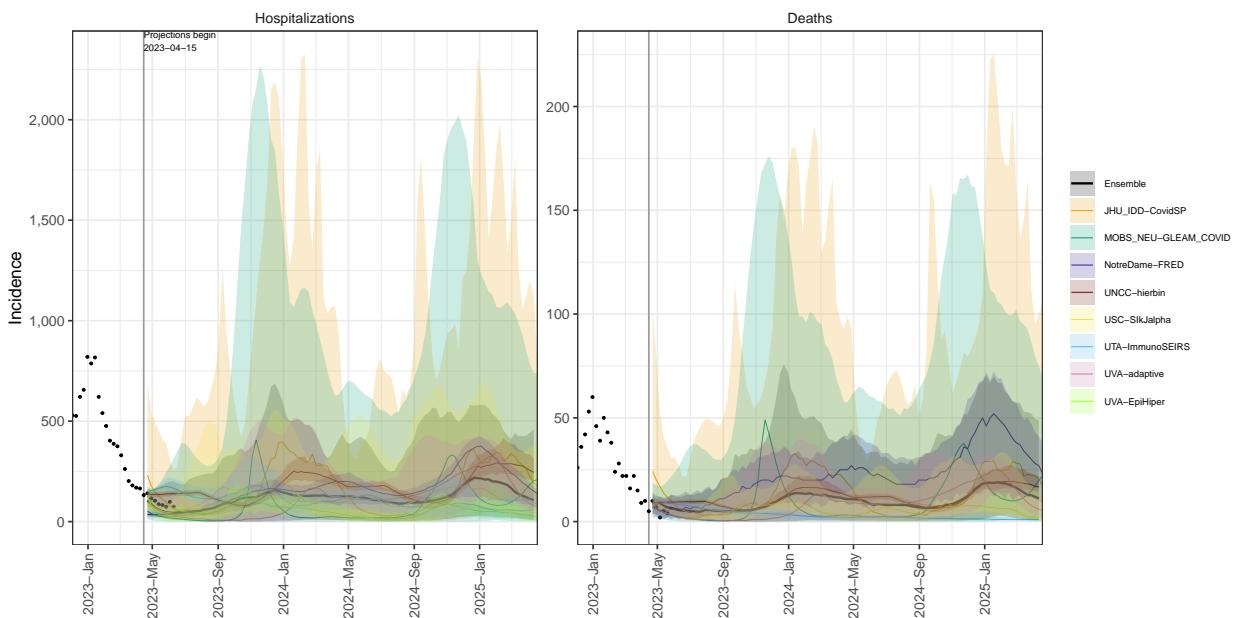
CA model variance & 95% projection intervals – Booster for all, Low immune escape



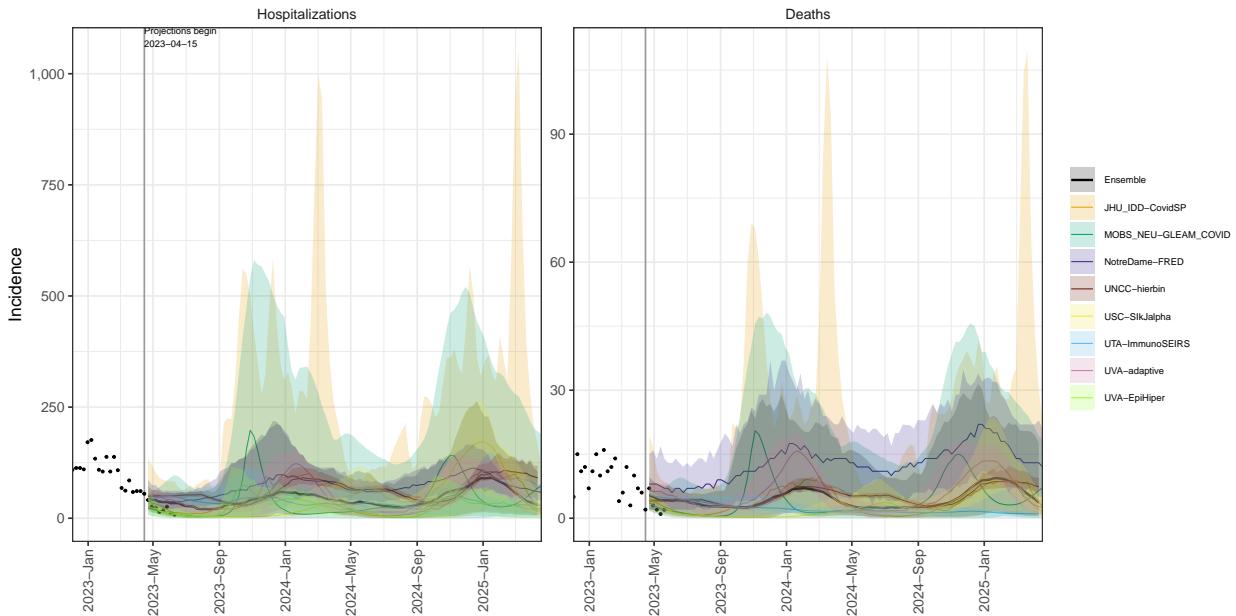
CO model variance & 95% projection intervals – Booster for all, Low immune escape



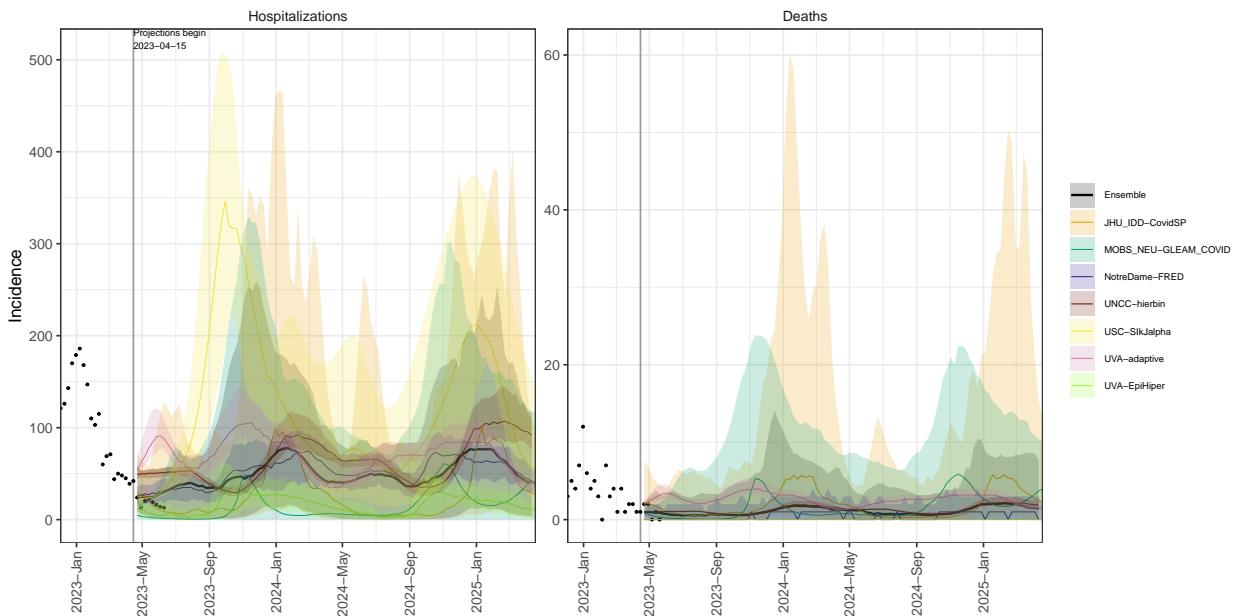
CT model variance & 95% projection intervals – Booster for all, Low immune escape



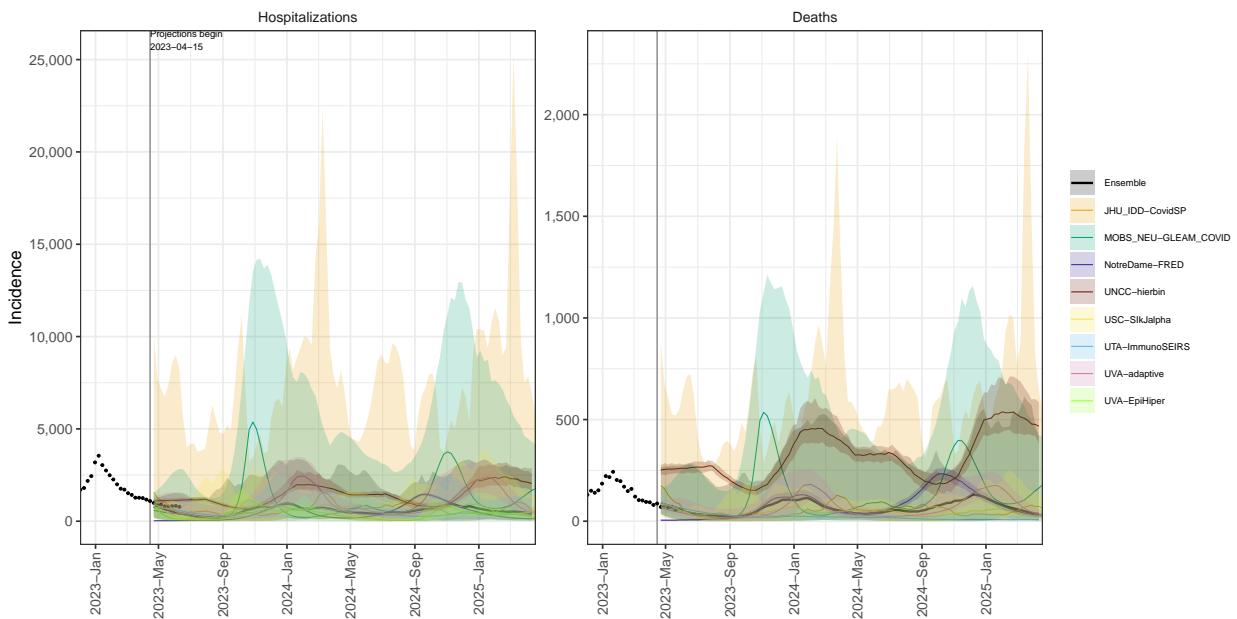
DE model variance & 95% projection intervals – Booster for all, Low immune escape



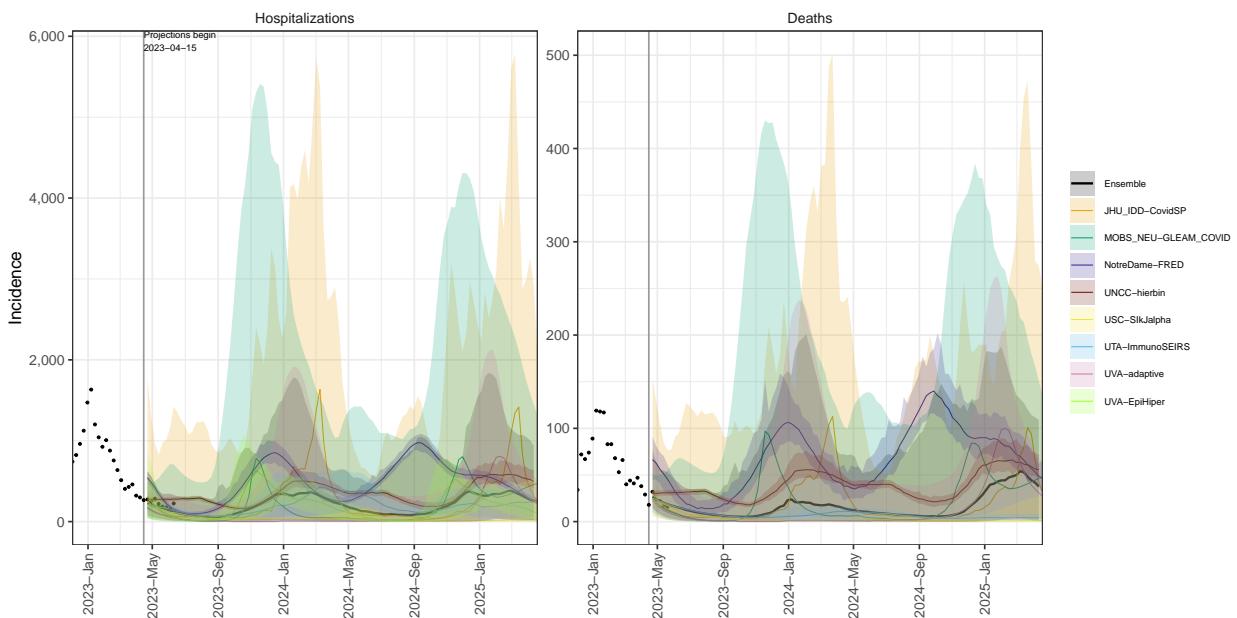
DC model variance & 95% projection intervals – Booster for all, Low immune escape



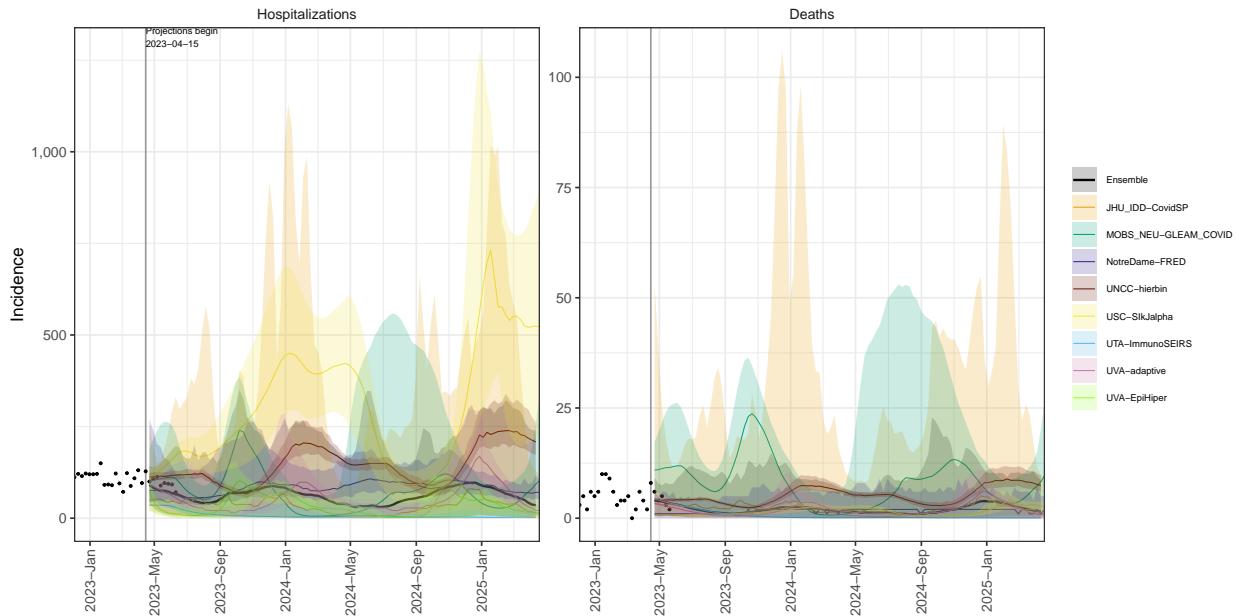
FL model variance & 95% projection intervals – Booster for all, Low immune escape



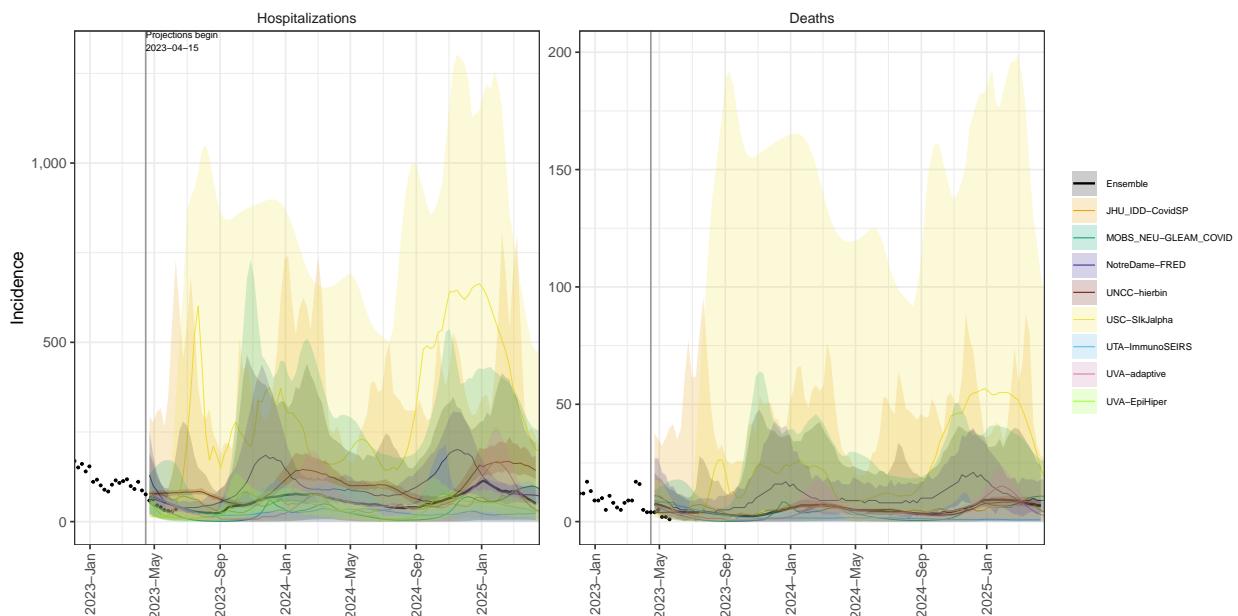
GA model variance & 95% projection intervals – Booster for all, Low immune escape



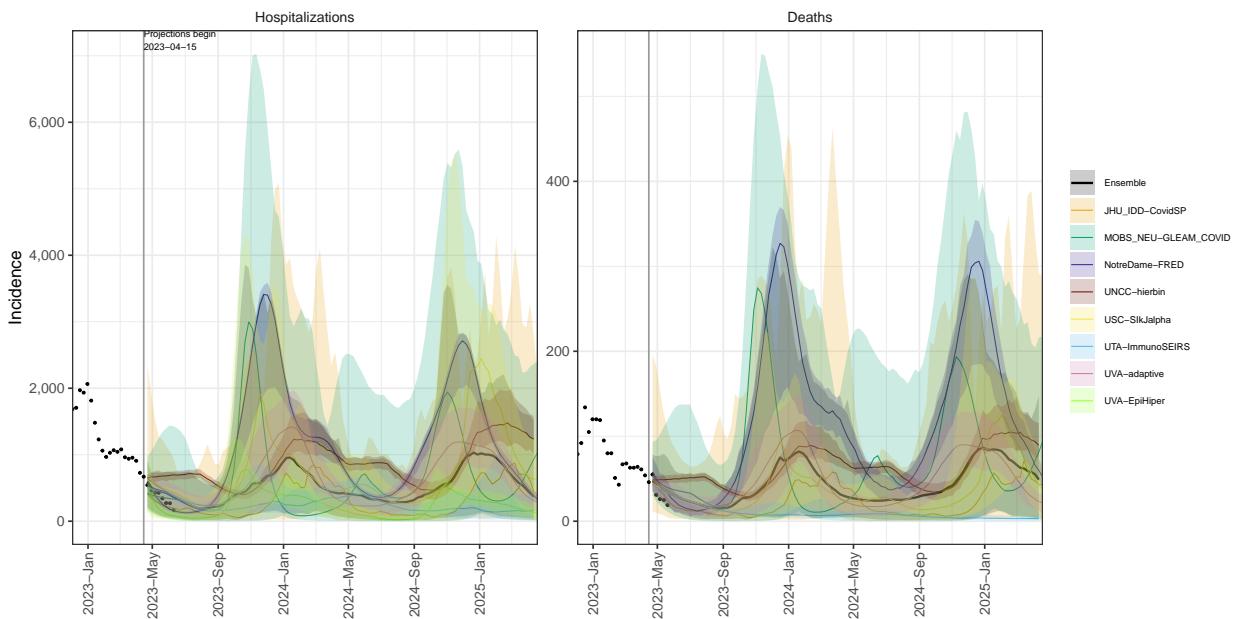
HI model variance & 95% projection intervals – Booster for all, Low immune escape



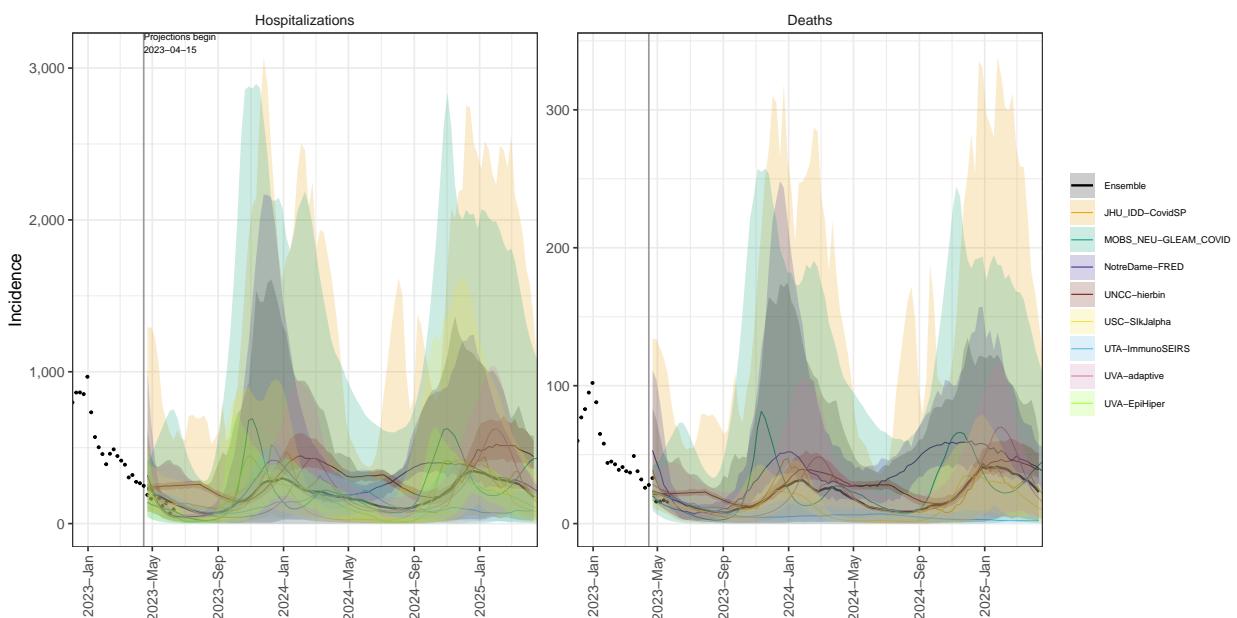
ID model variance & 95% projection intervals – Booster for all, Low immune escape



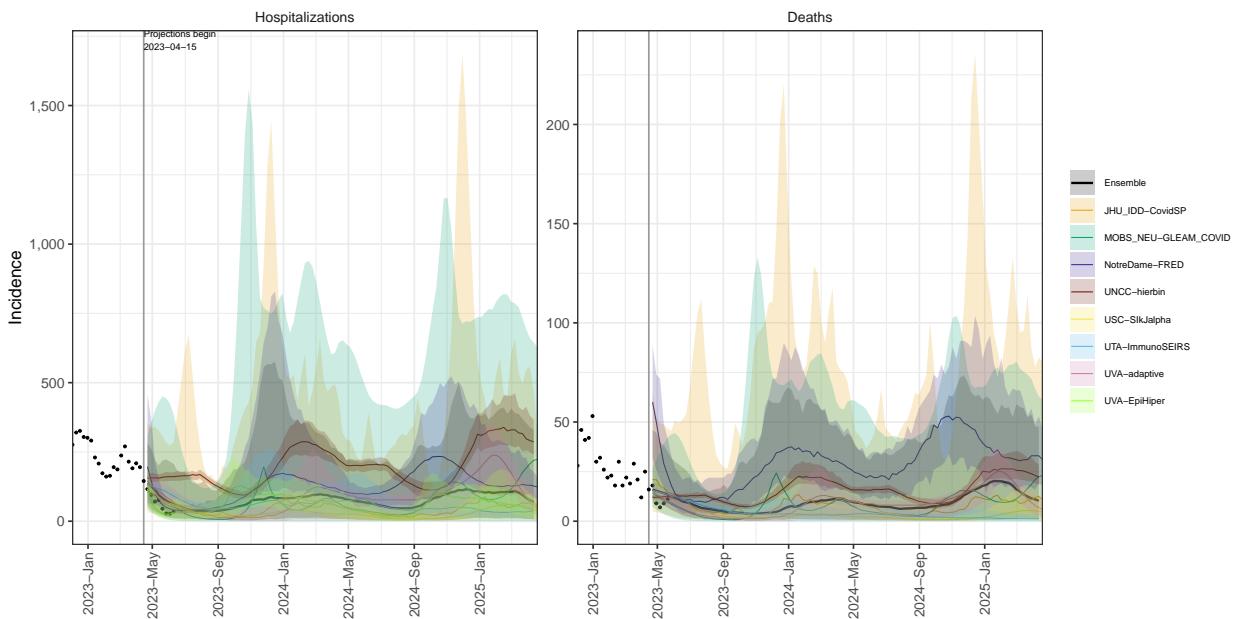
IL model variance & 95% projection intervals – Booster for all, Low immune escape



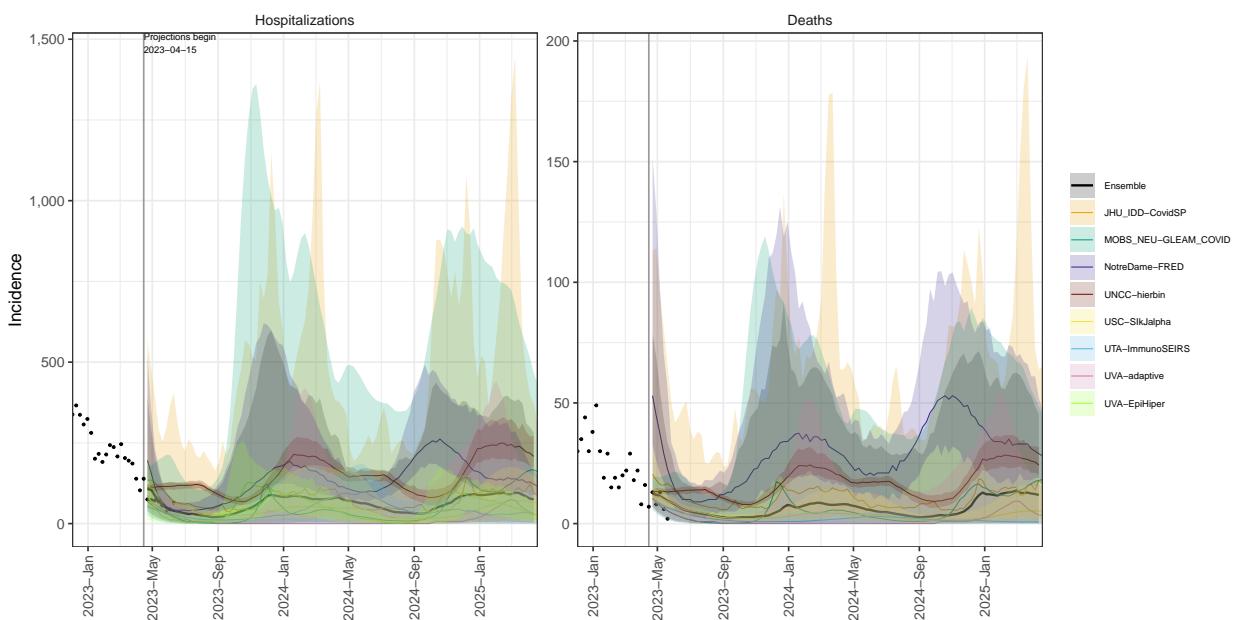
IN model variance & 95% projection intervals – Booster for all, Low immune escape



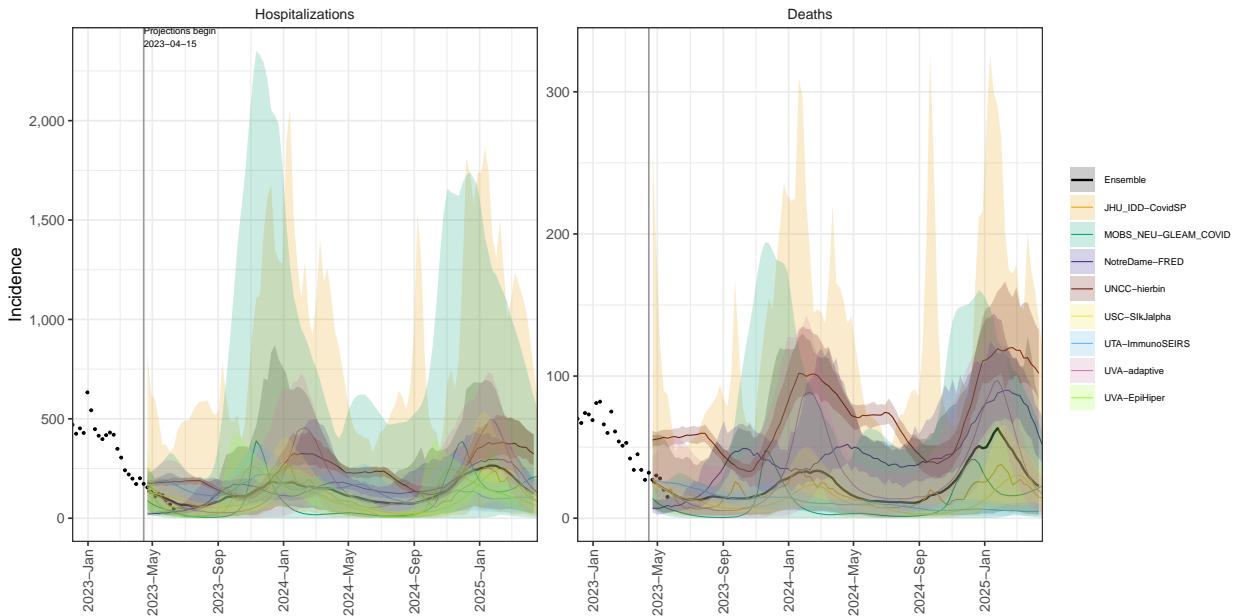
IA model variance & 95% projection intervals – Booster for all, Low immune escape



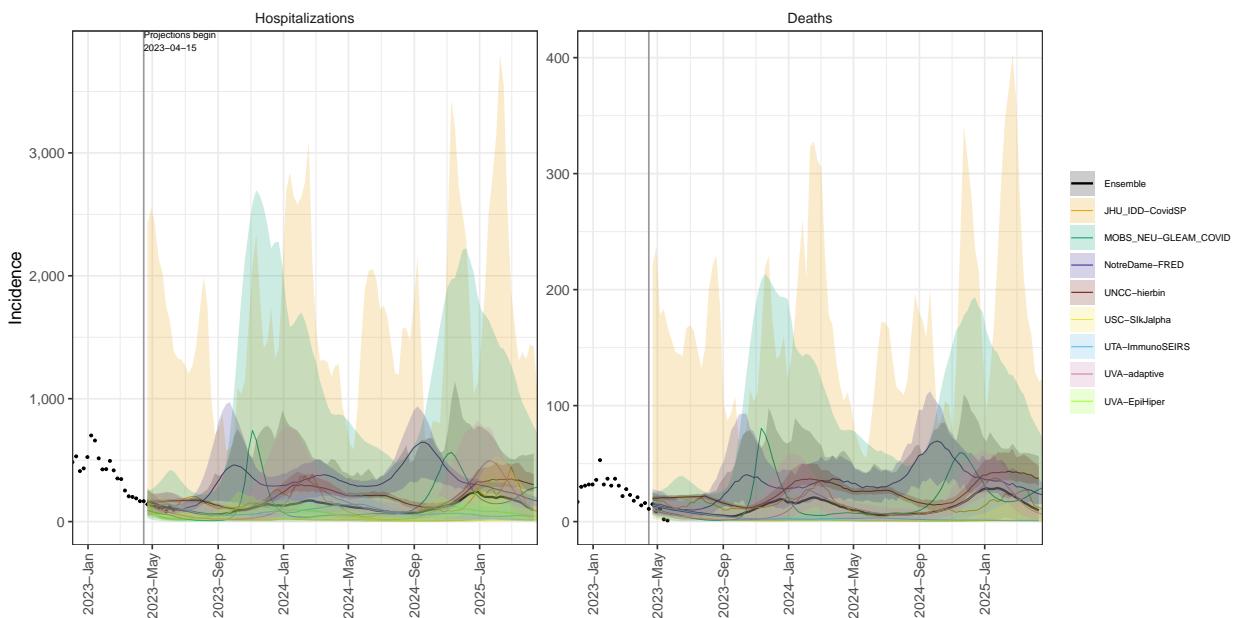
KS model variance & 95% projection intervals – Booster for all, Low immune escape



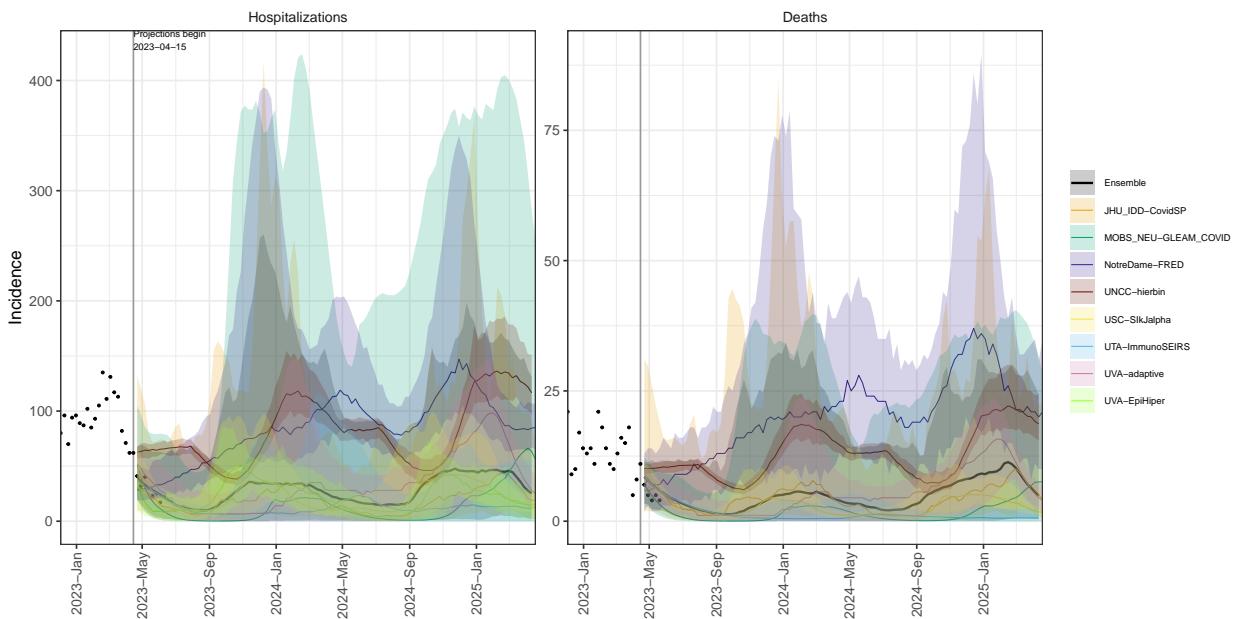
KY model variance & 95% projection intervals – Booster for all, Low immune escape



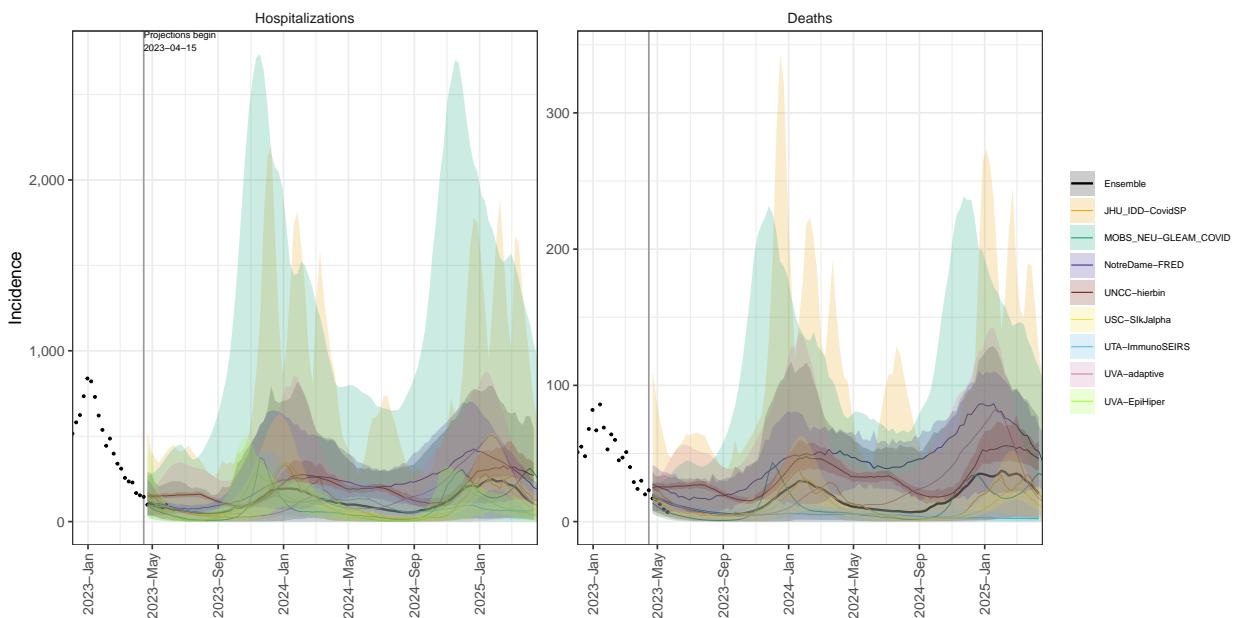
LA model variance & 95% projection intervals – Booster for all, Low immune escape



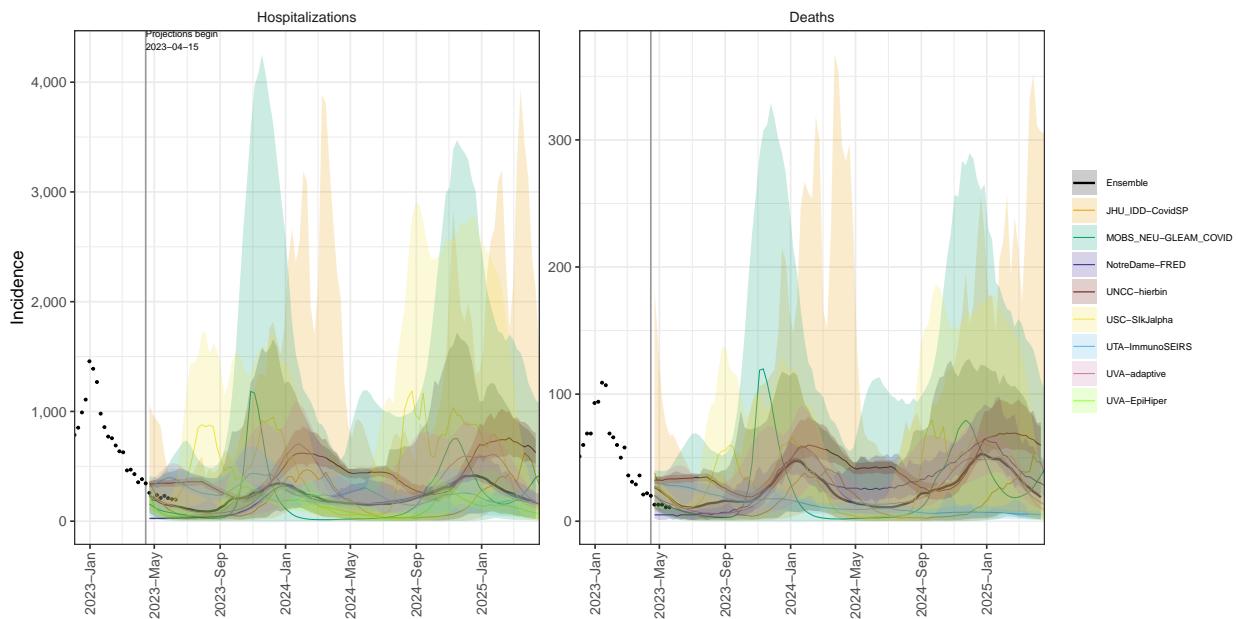
ME model variance & 95% projection intervals – Booster for all, Low immune escape



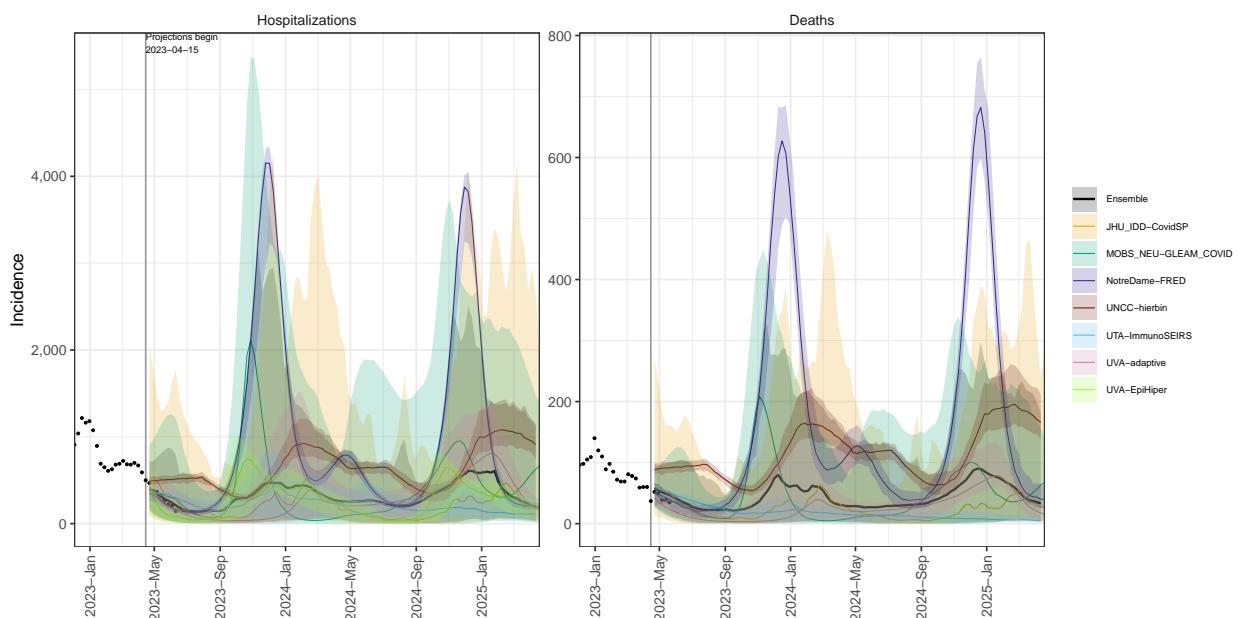
MD model variance & 95% projection intervals – Booster for all, Low immune escape



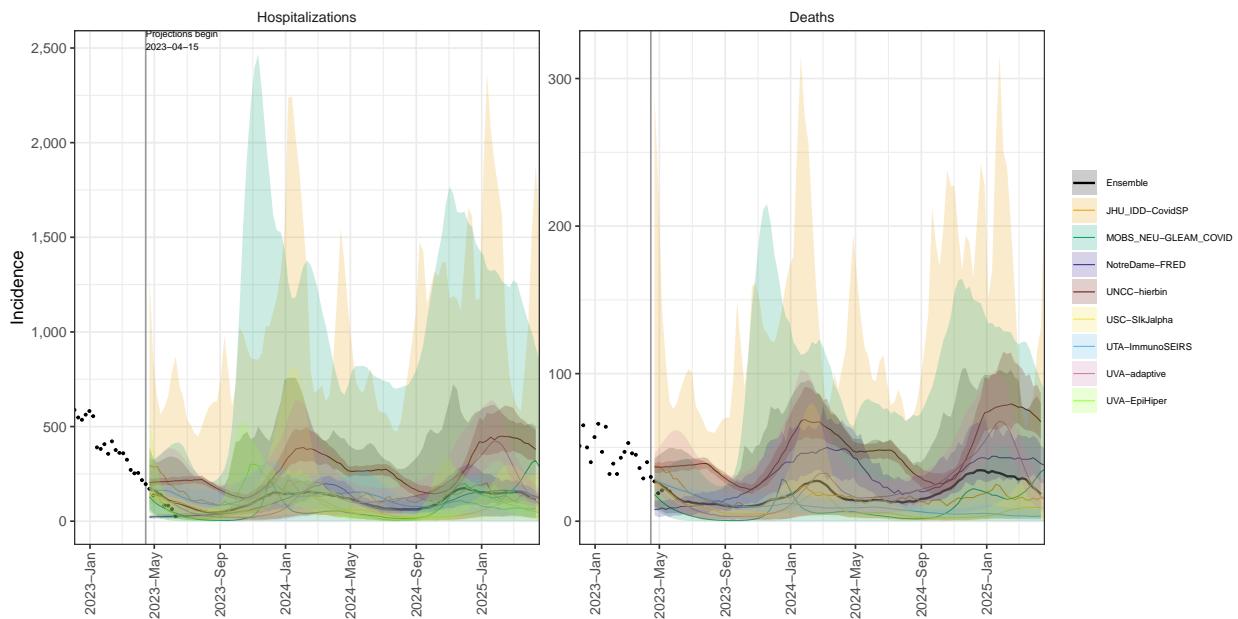
MA model variance & 95% projection intervals – Booster for all, Low immune escape



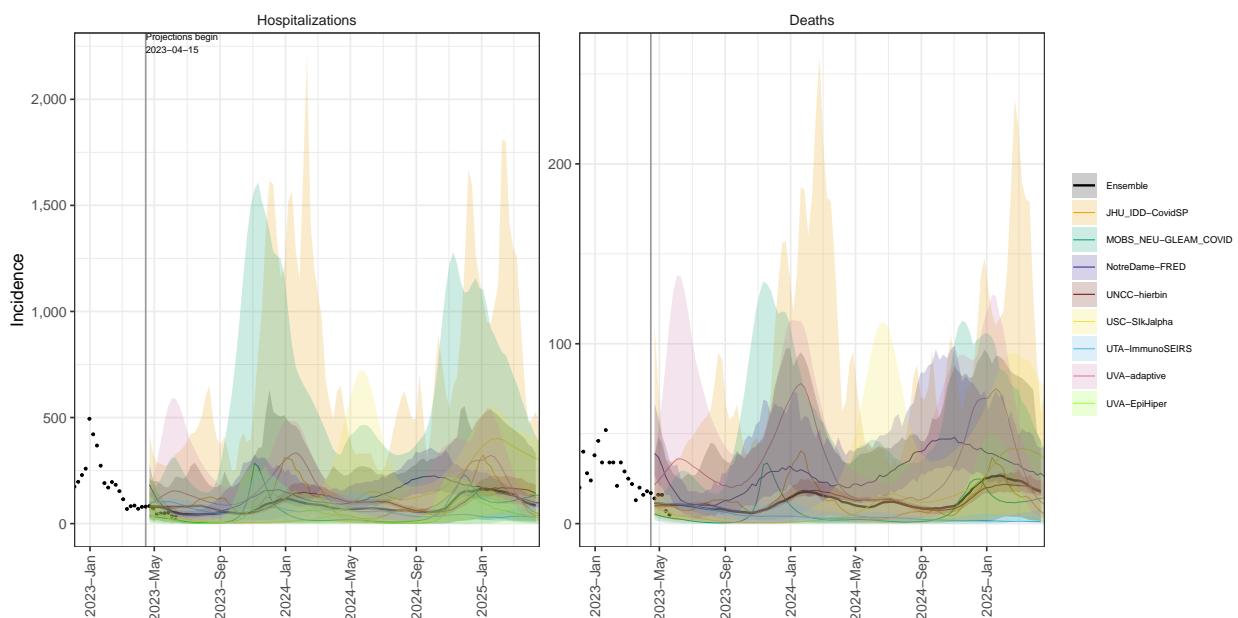
MI model variance & 95% projection intervals – Booster for all, Low immune escape



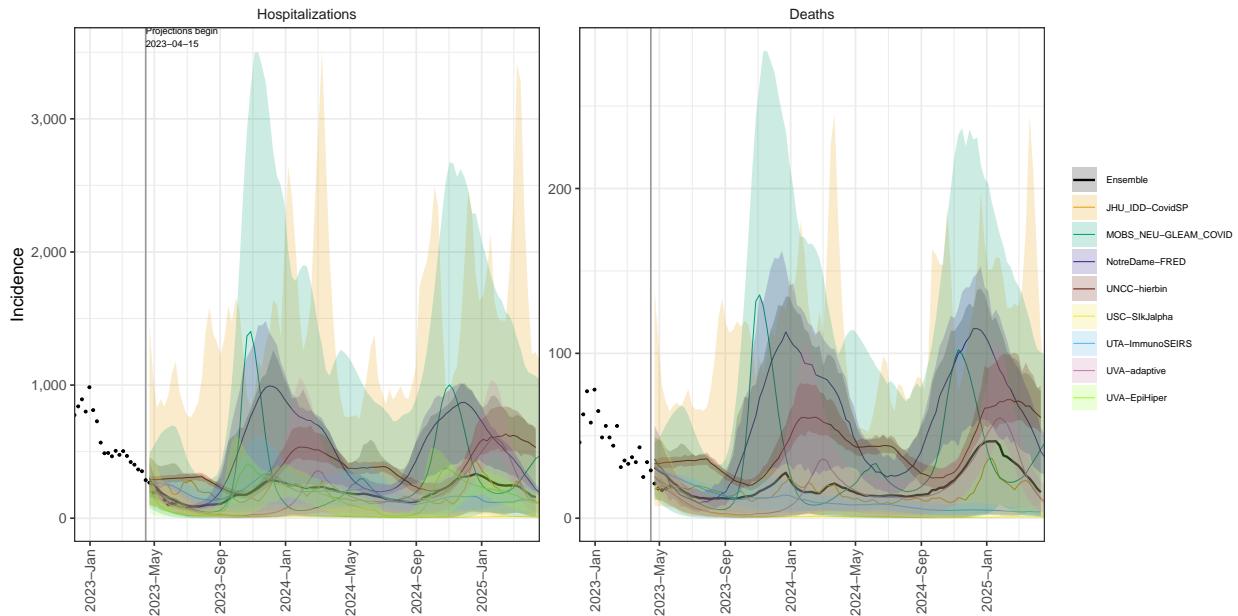
MN model variance & 95% projection intervals – Booster for all, Low immune escape



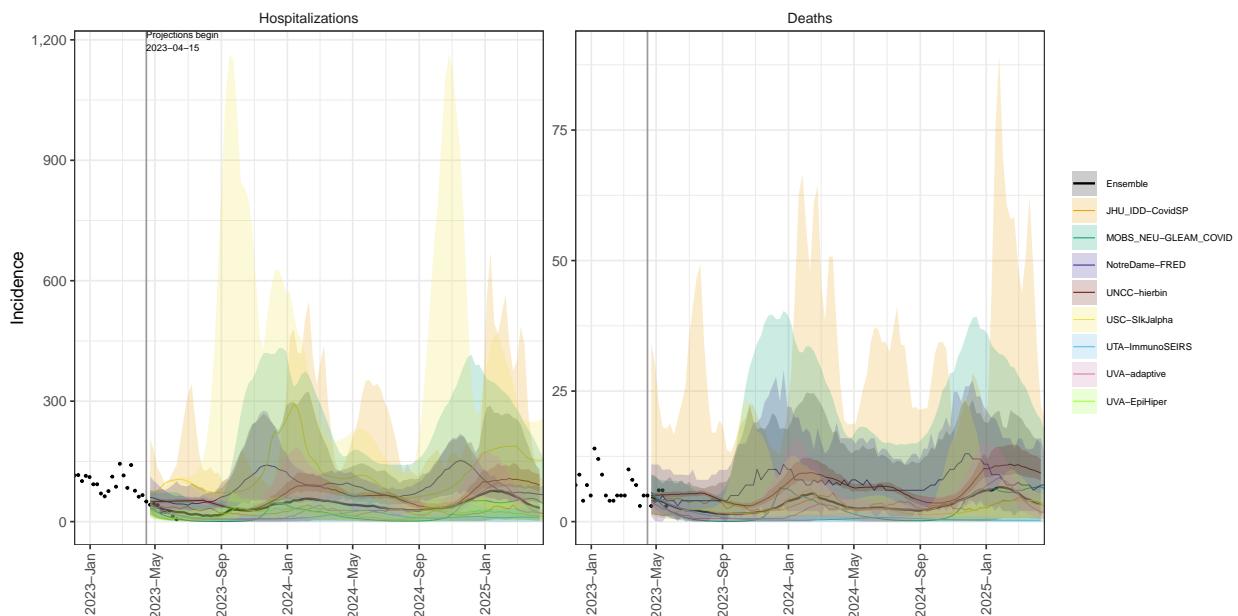
MS model variance & 95% projection intervals – Booster for all, Low immune escape



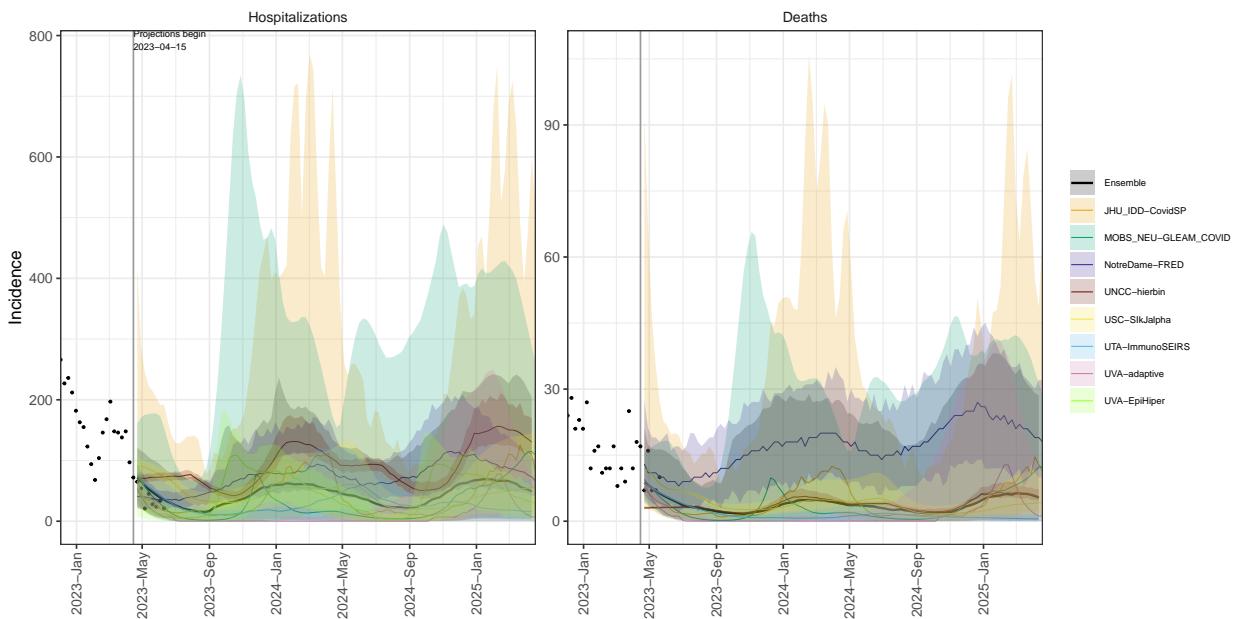
MO model variance & 95% projection intervals – Booster for all, Low immune escape



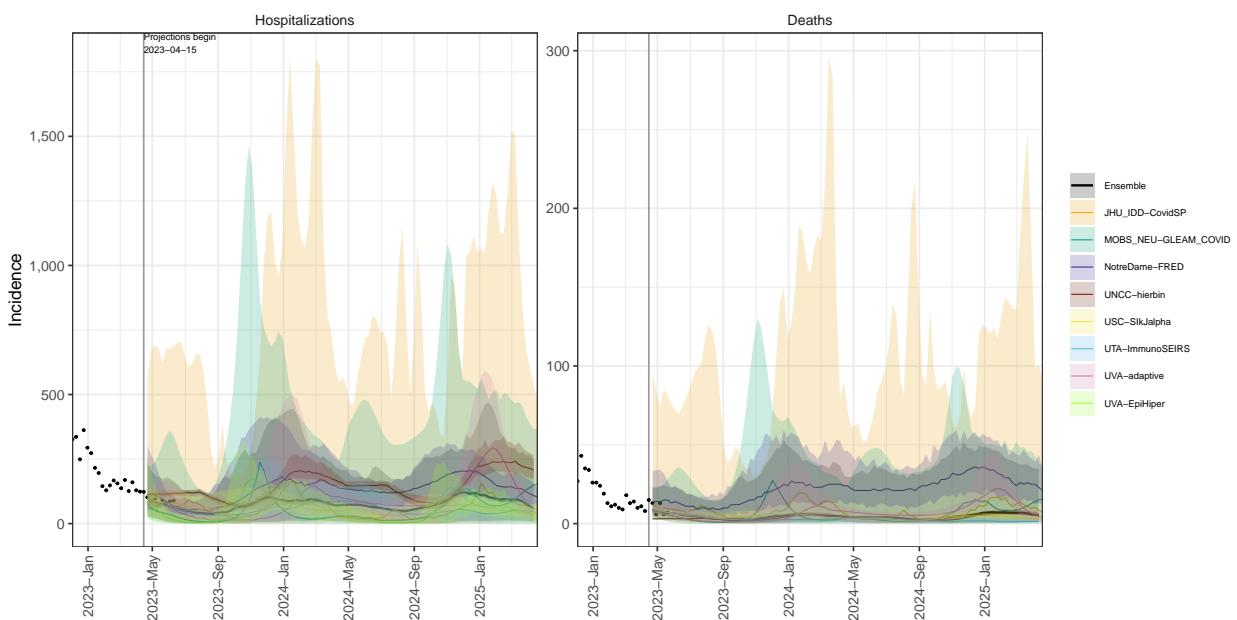
MT model variance & 95% projection intervals – Booster for all, Low immune escape



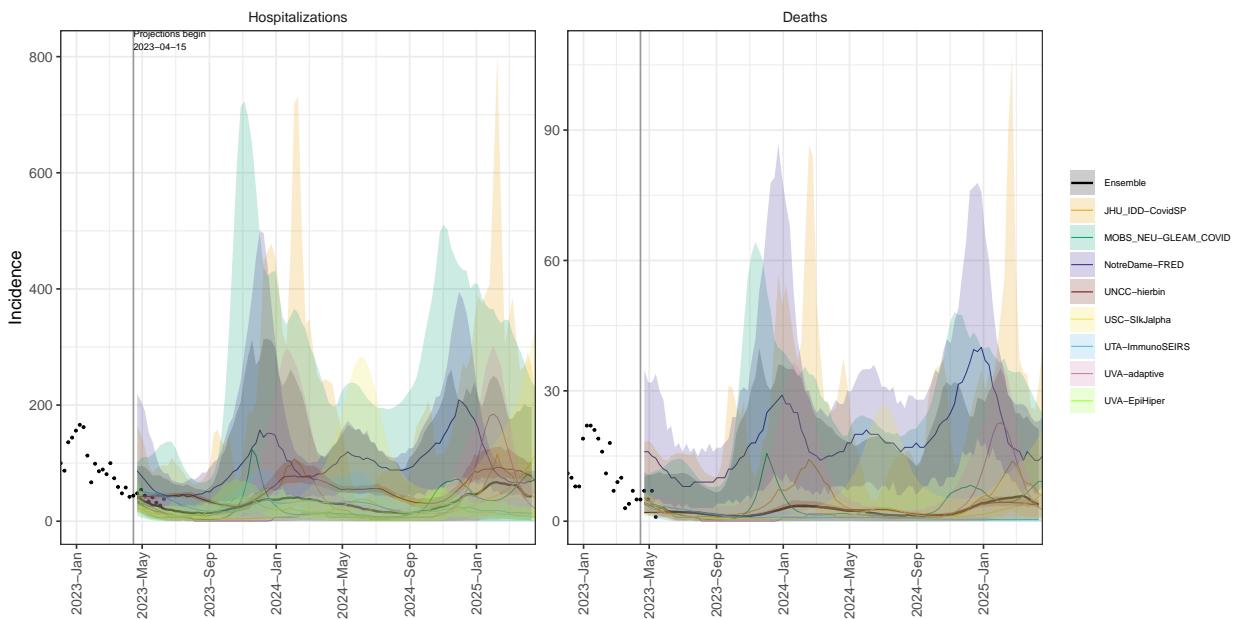
NE model variance & 95% projection intervals – Booster for all, Low immune escape



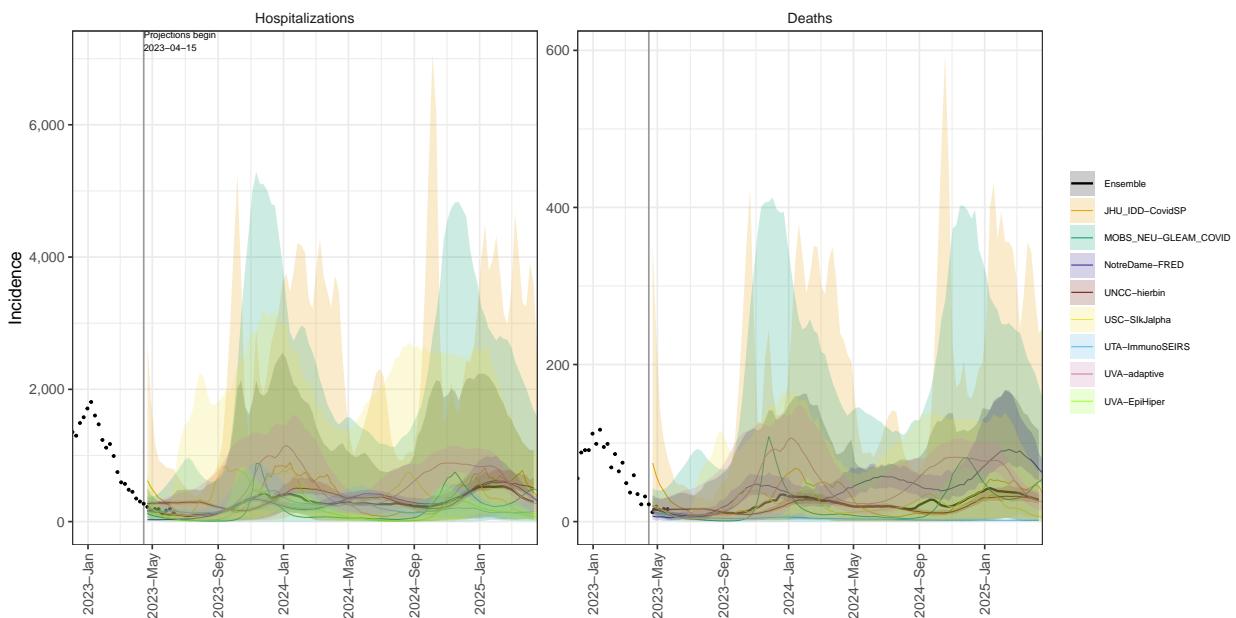
NV model variance & 95% projection intervals – Booster for all, Low immune escape



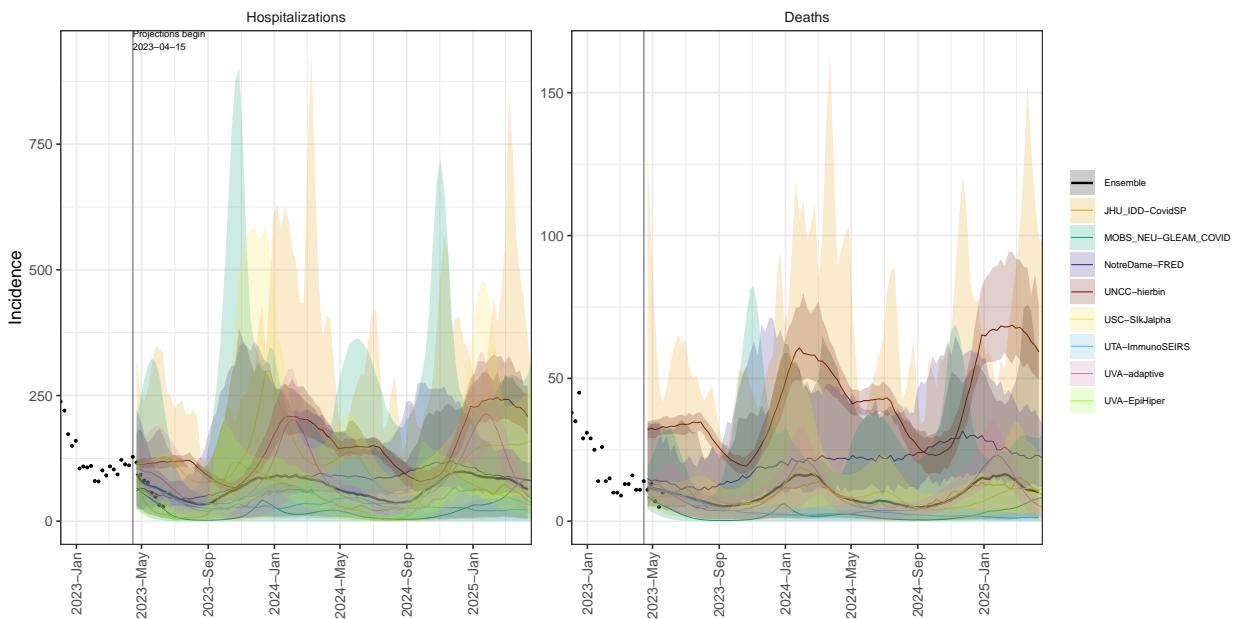
NH model variance & 95% projection intervals – Booster for all, Low immune escape



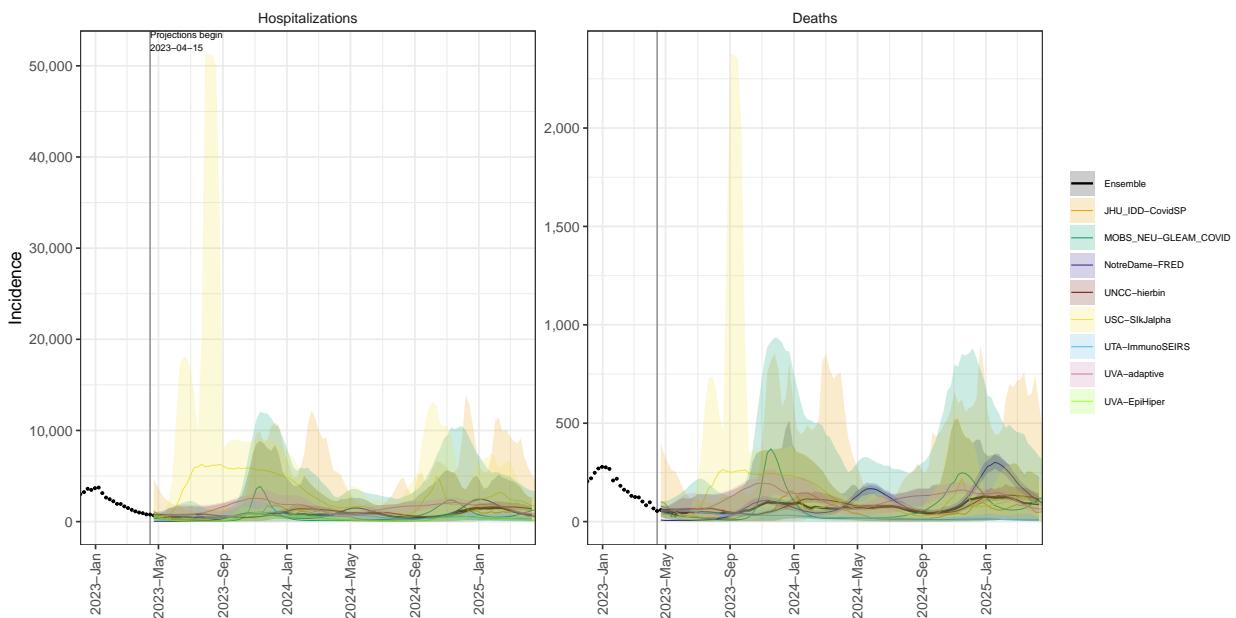
NJ model variance & 95% projection intervals – Booster for all, Low immune escape



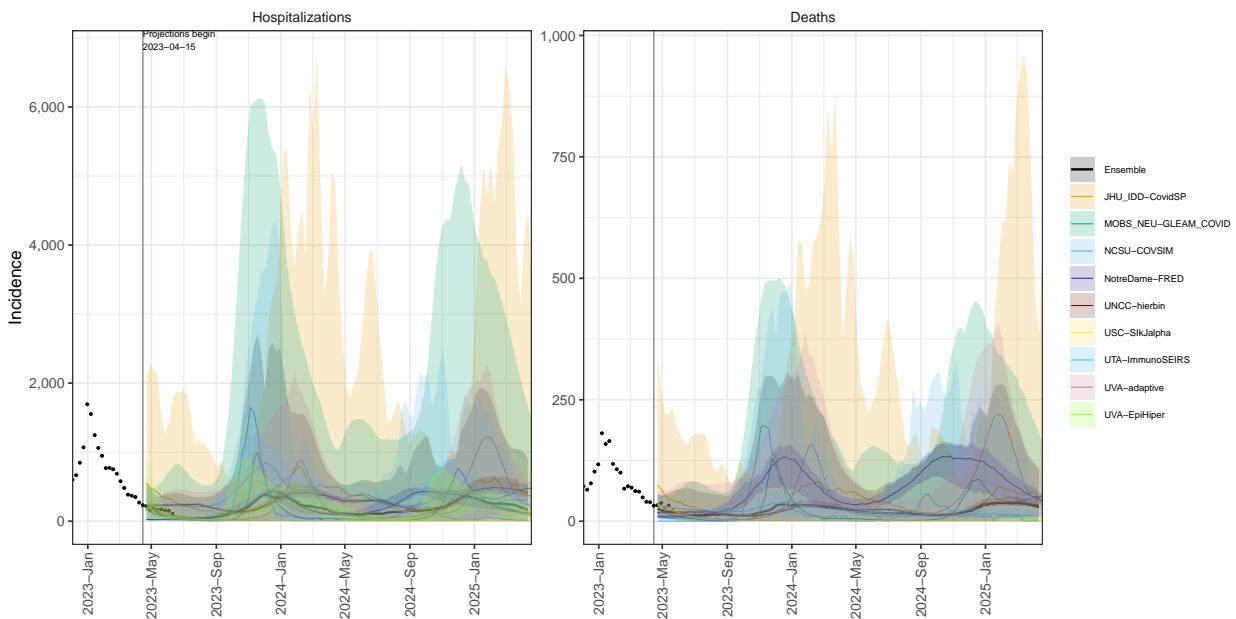
NM model variance & 95% projection intervals – Booster for all, Low immune escape



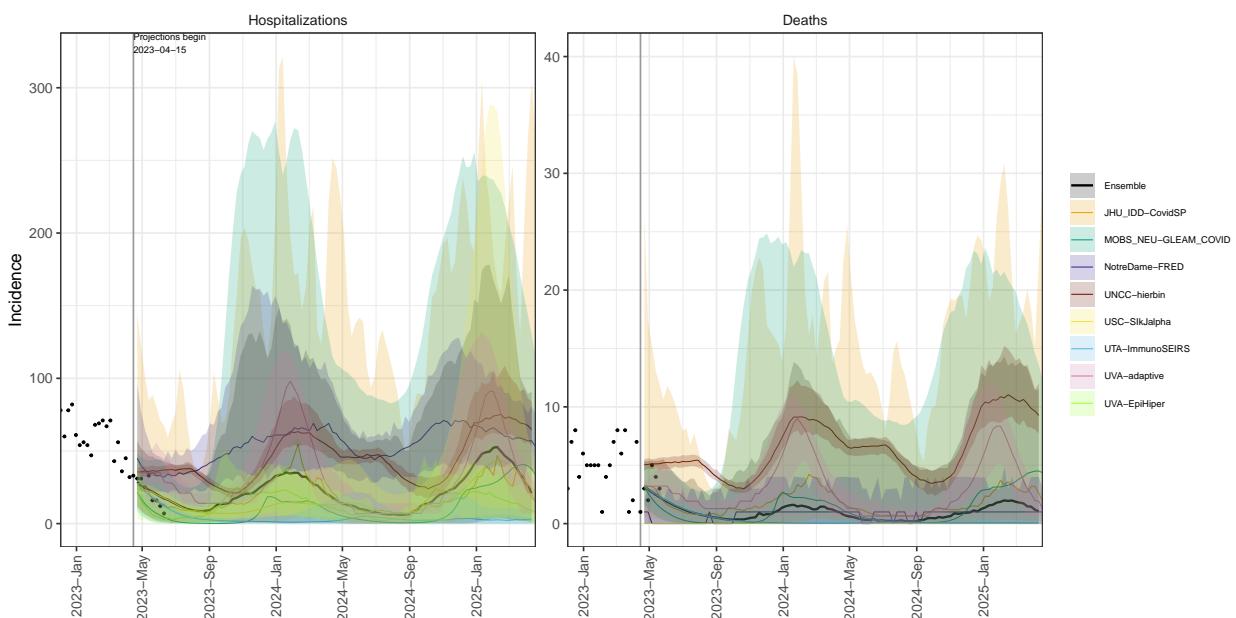
NY model variance & 95% projection intervals – Booster for all, Low immune escape



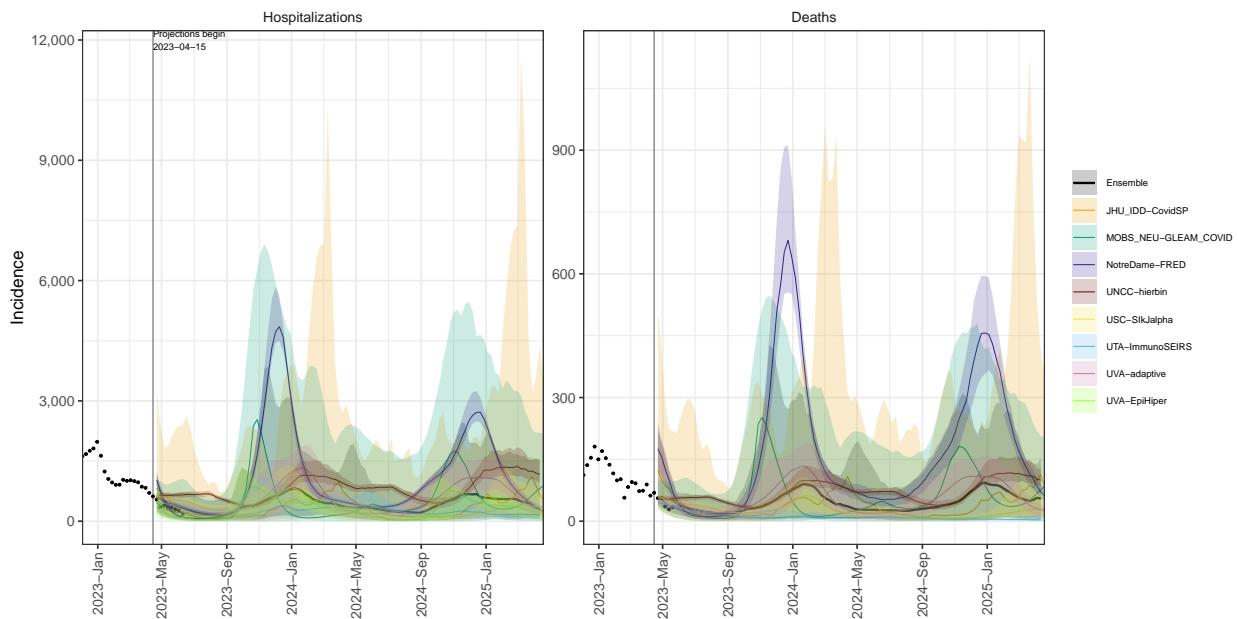
### NC model variance & 95% projection intervals – Booster for all, Low immune escape



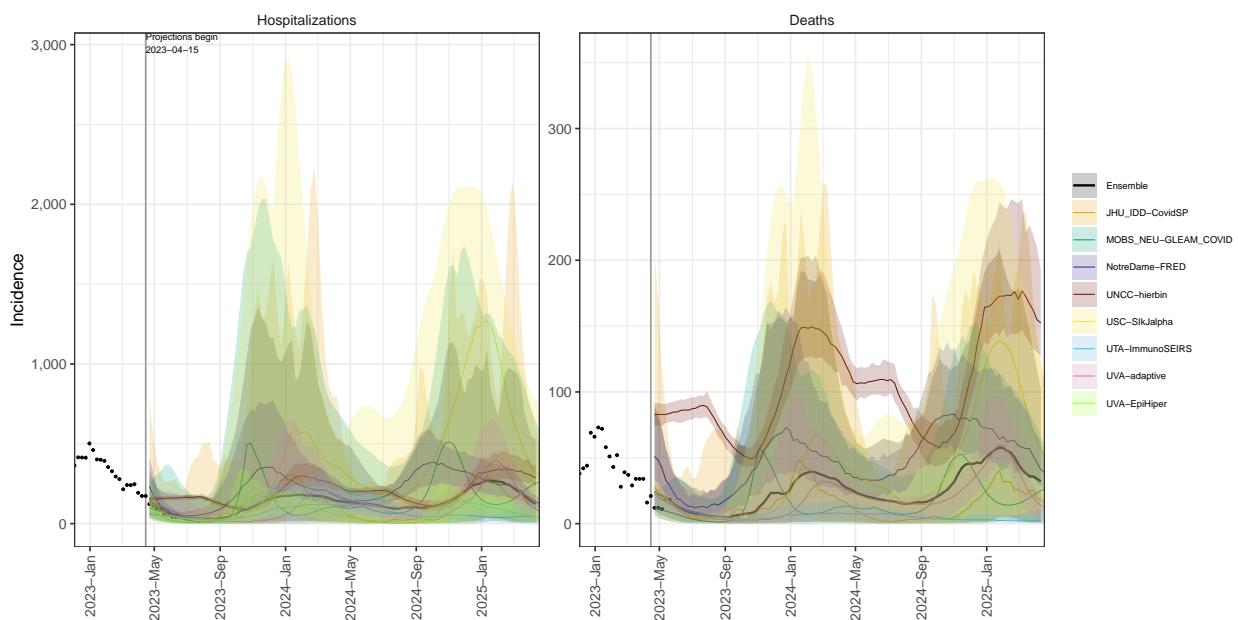
### ND model variance & 95% projection intervals – Booster for all, Low immune escape



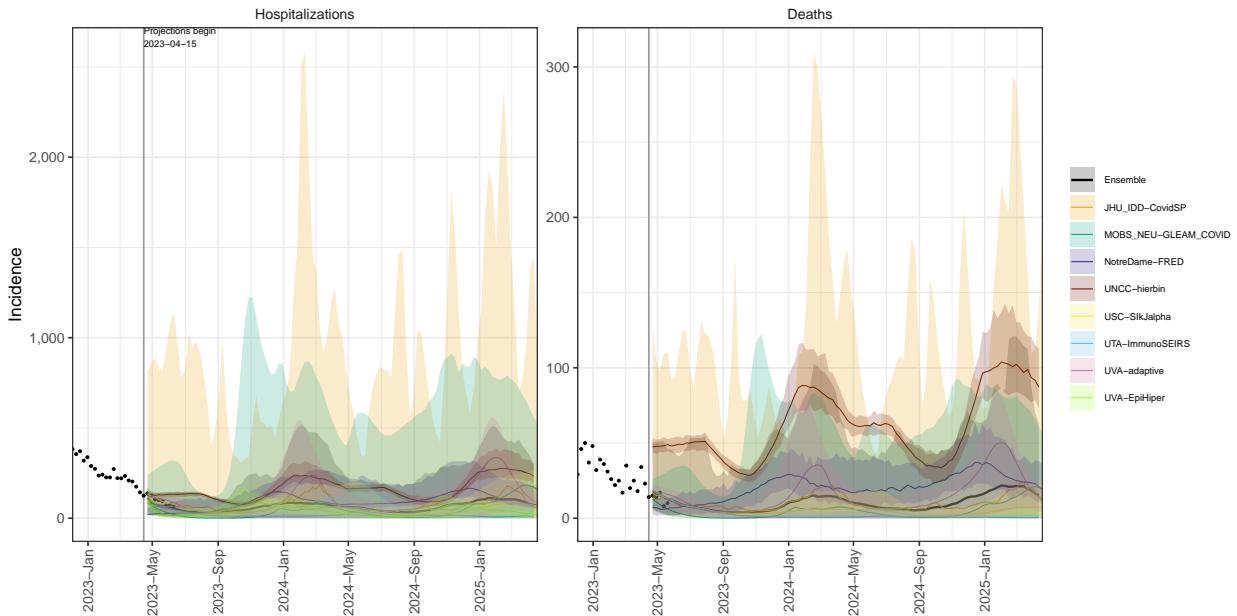
OH model variance & 95% projection intervals – Booster for all, Low immune escape



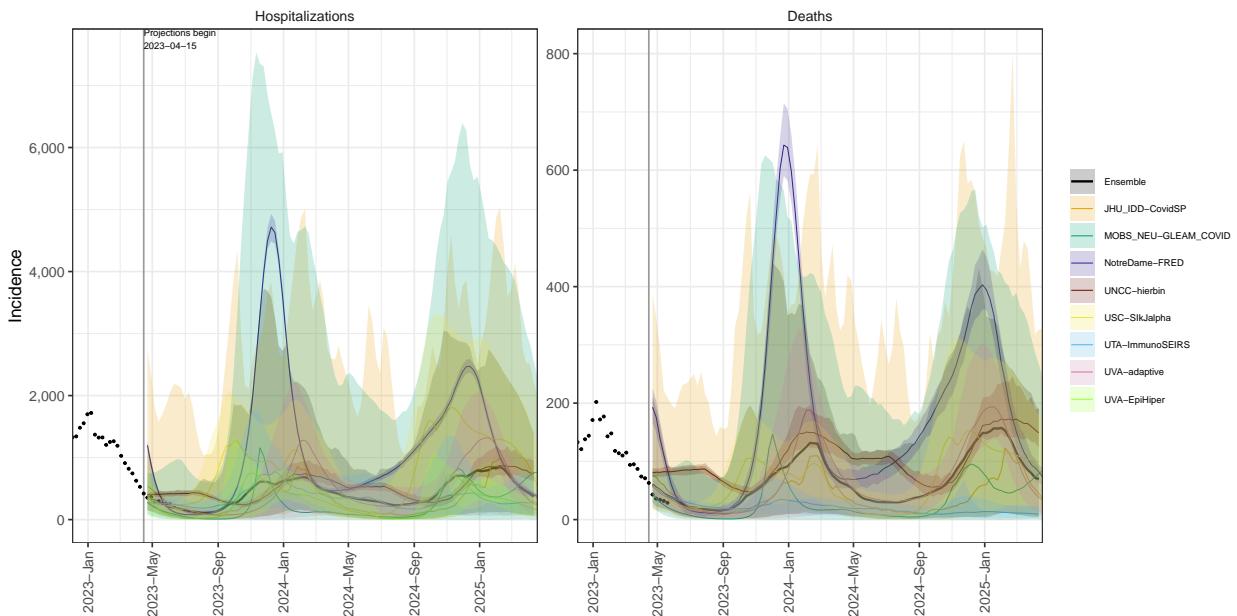
OK model variance & 95% projection intervals – Booster for all, Low immune escape



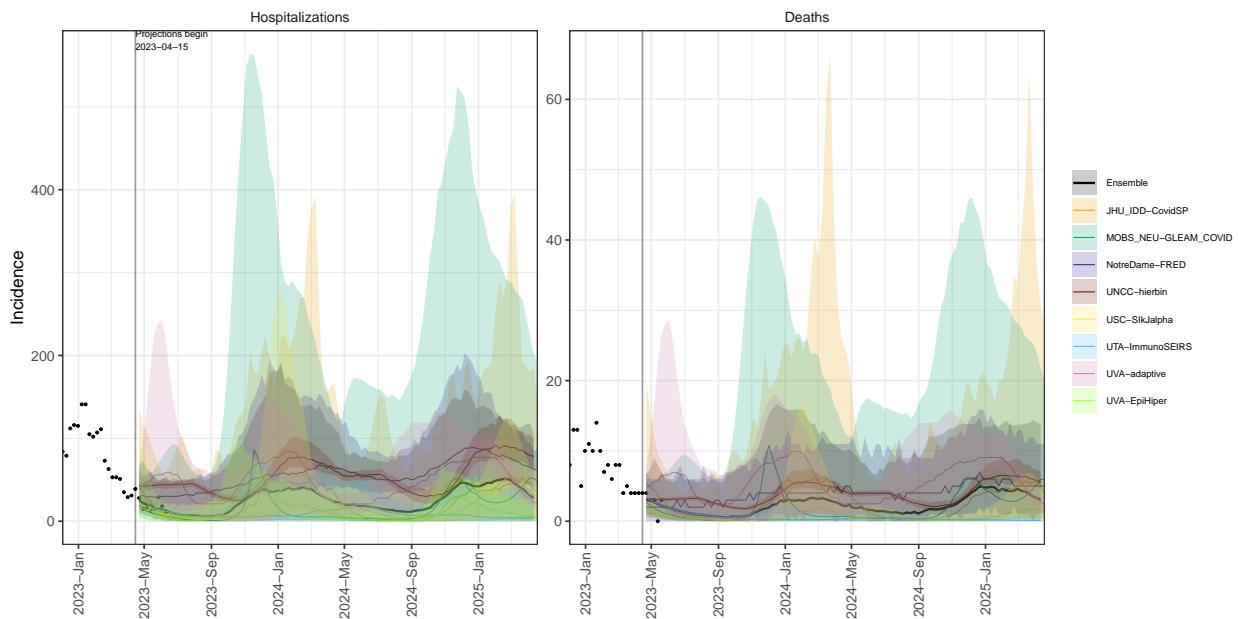
OR model variance & 95% projection intervals – Booster for all, Low immune escape



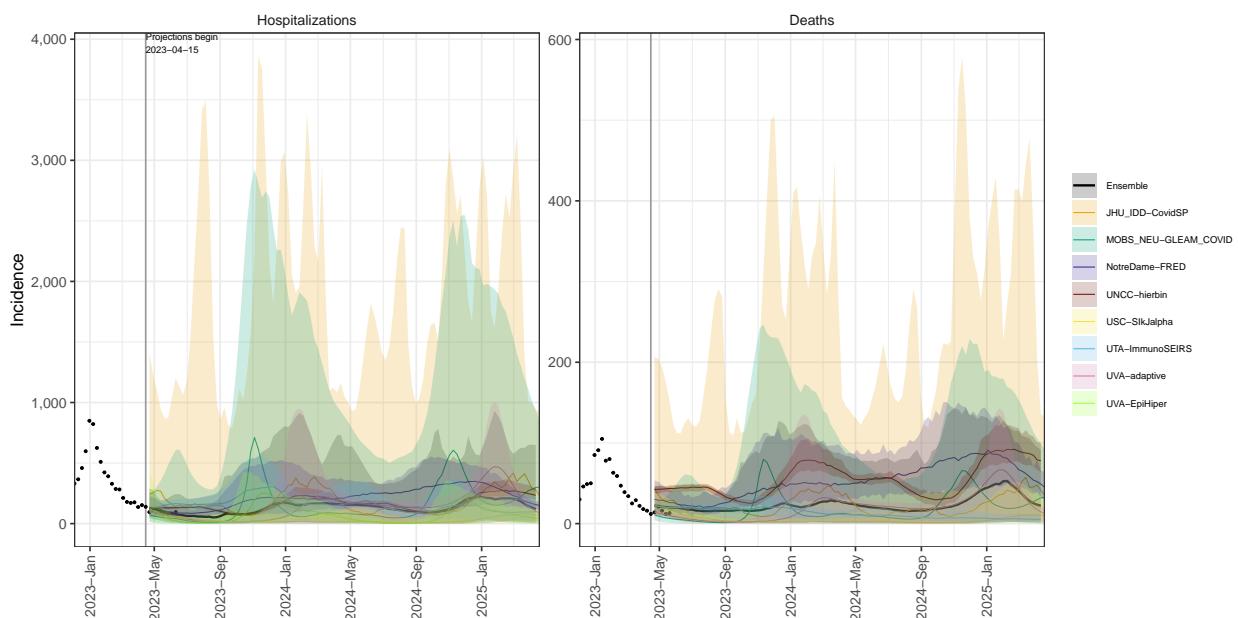
PA model variance & 95% projection intervals – Booster for all, Low immune escape



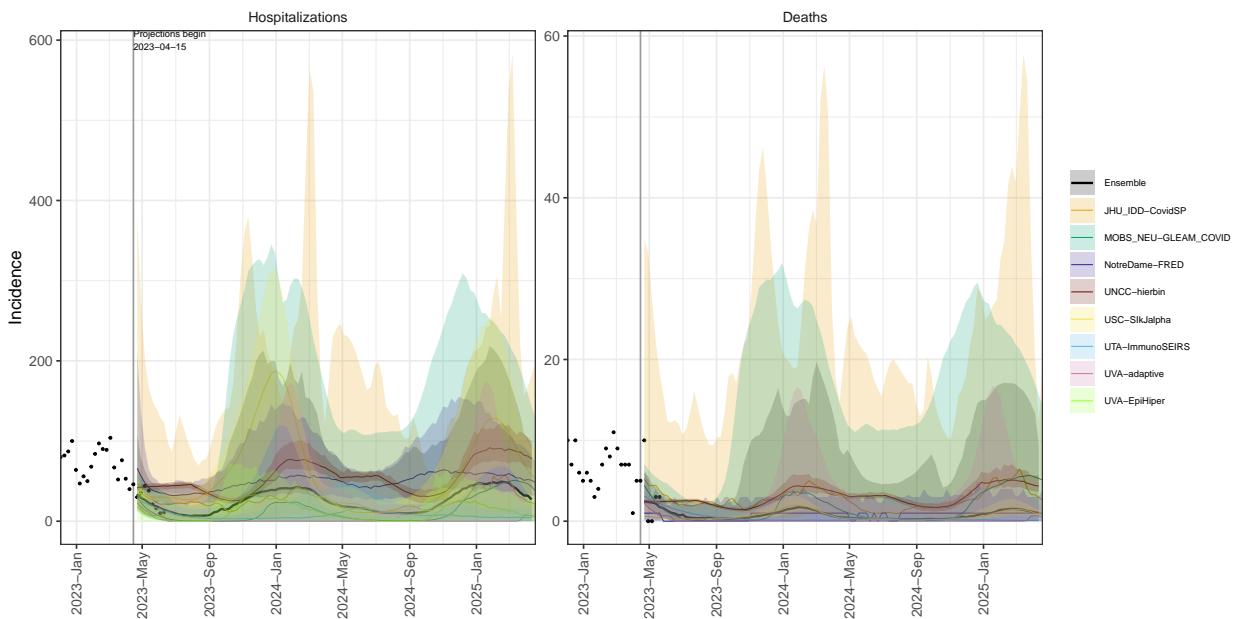
RI model variance & 95% projection intervals – Booster for all, Low immune escape



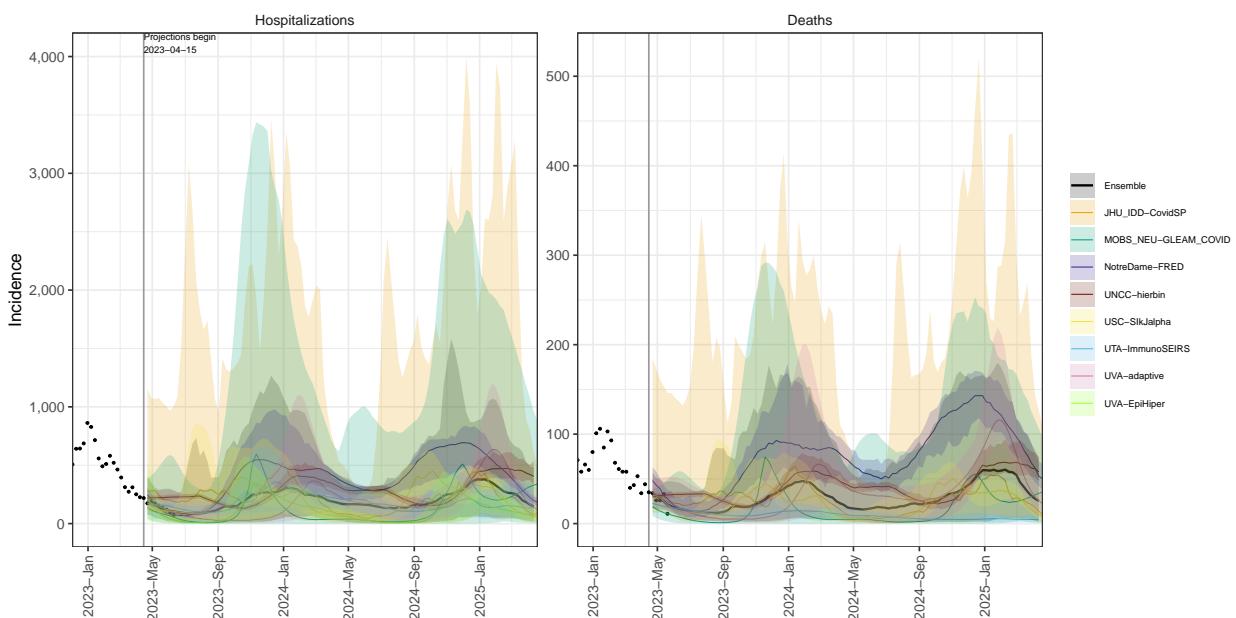
SC model variance & 95% projection intervals – Booster for all, Low immune escape



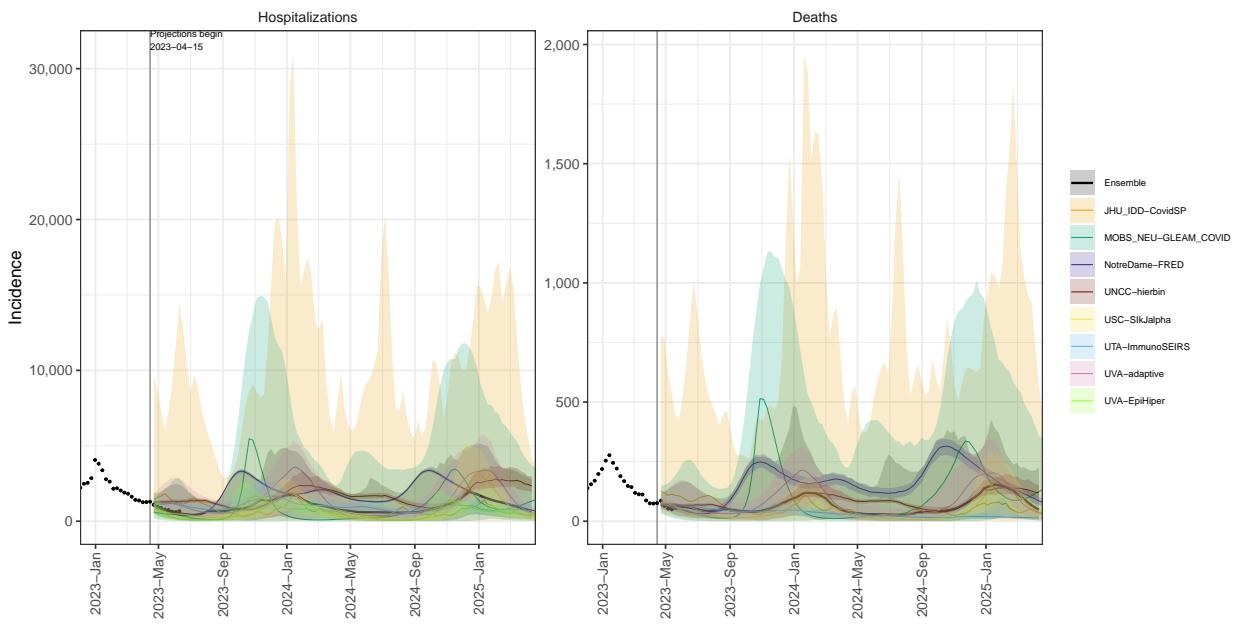
SD model variance & 95% projection intervals – Booster for all, Low immune escape



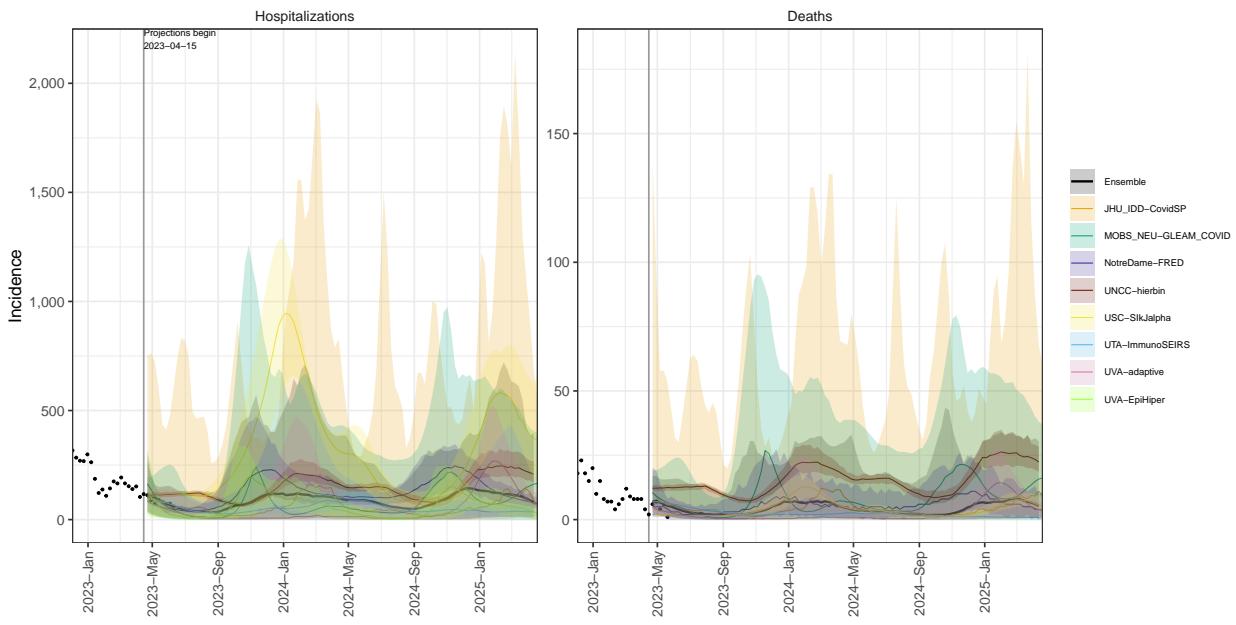
TN model variance & 95% projection intervals – Booster for all, Low immune escape



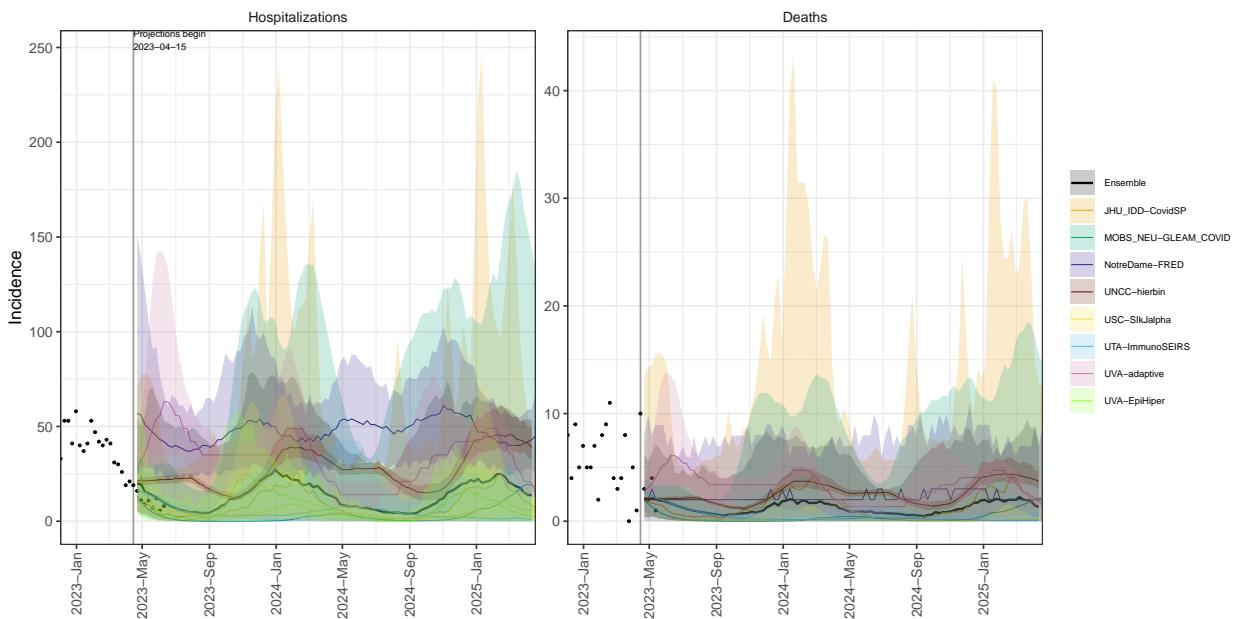
TX model variance & 95% projection intervals – Booster for all, Low immune escape



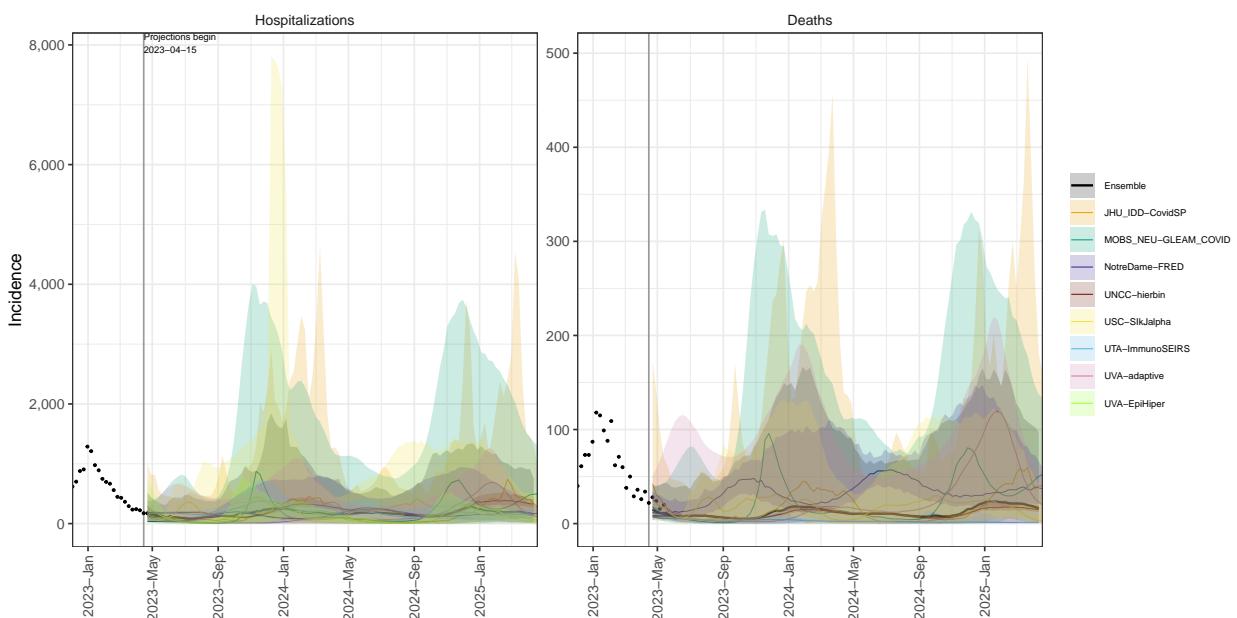
UT model variance & 95% projection intervals – Booster for all, Low immune escape



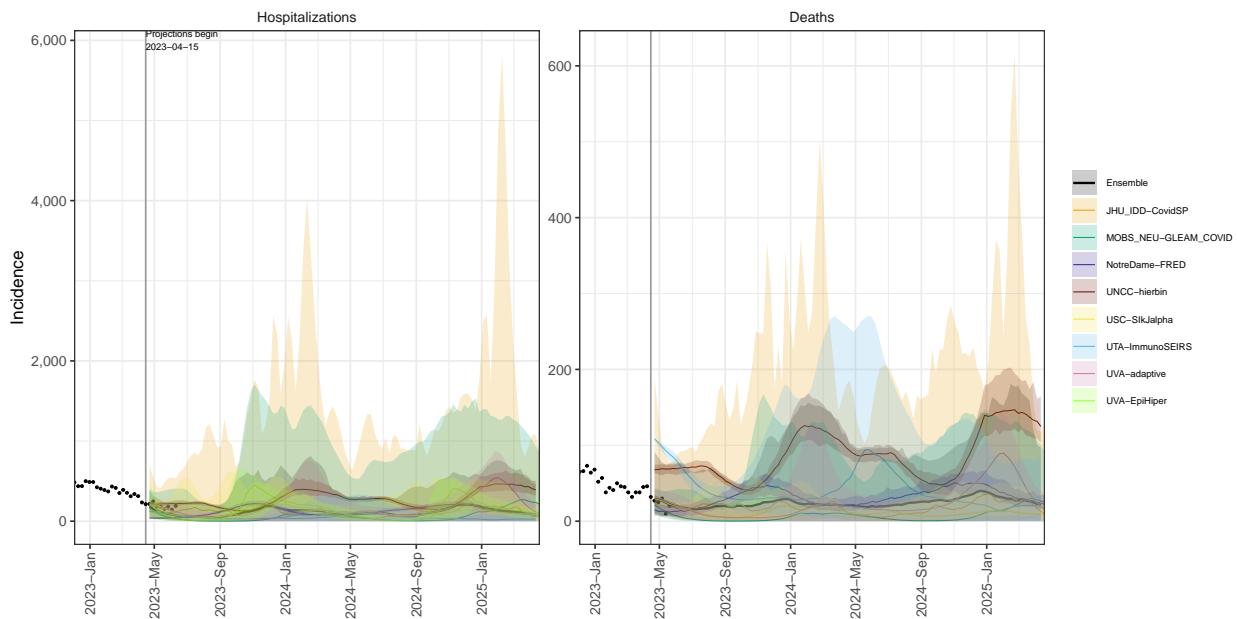
VT model variance & 95% projection intervals – Booster for all, Low immune escape



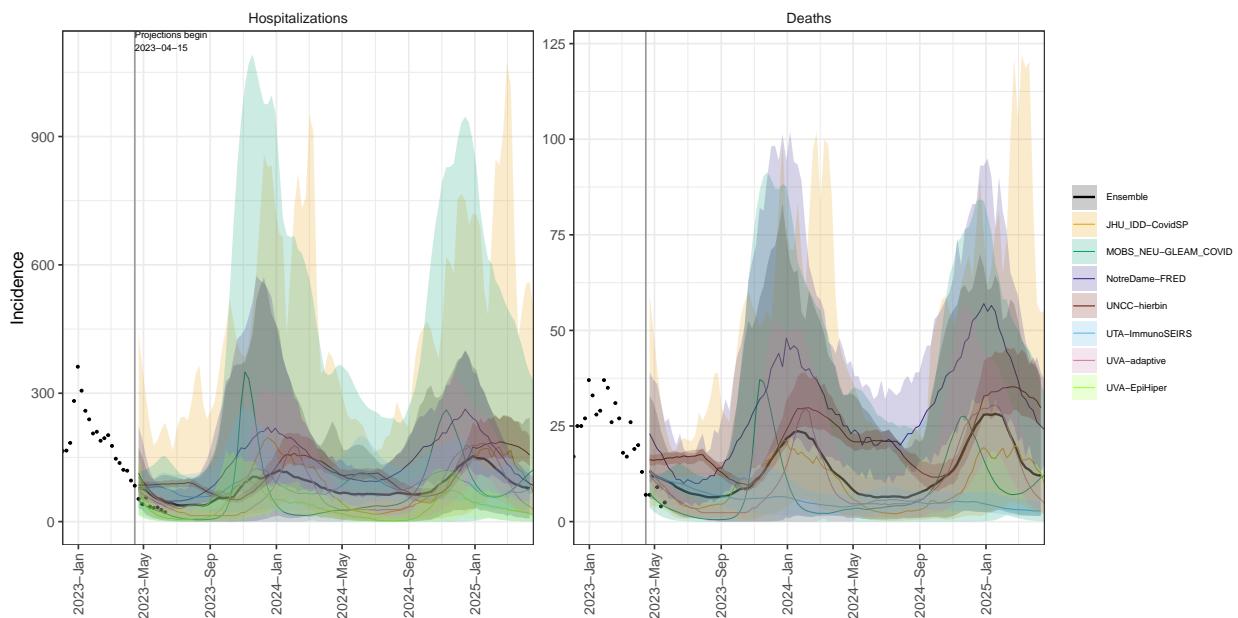
VA model variance & 95% projection intervals – Booster for all, Low immune escape



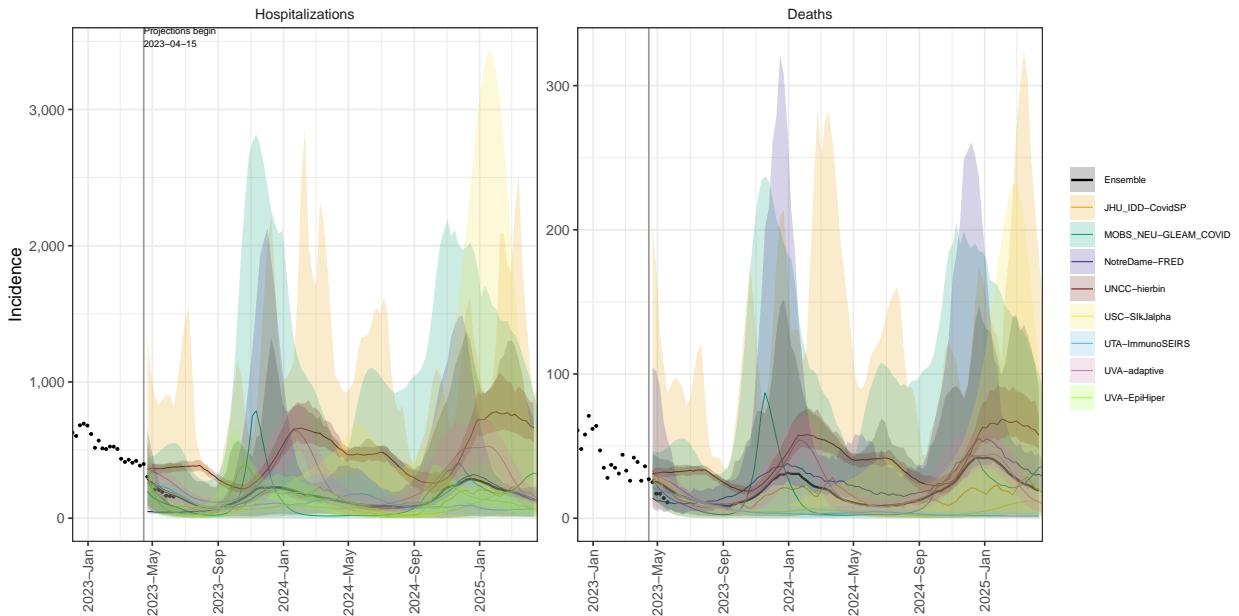
WA model variance & 95% projection intervals – Booster for all, Low immune escape



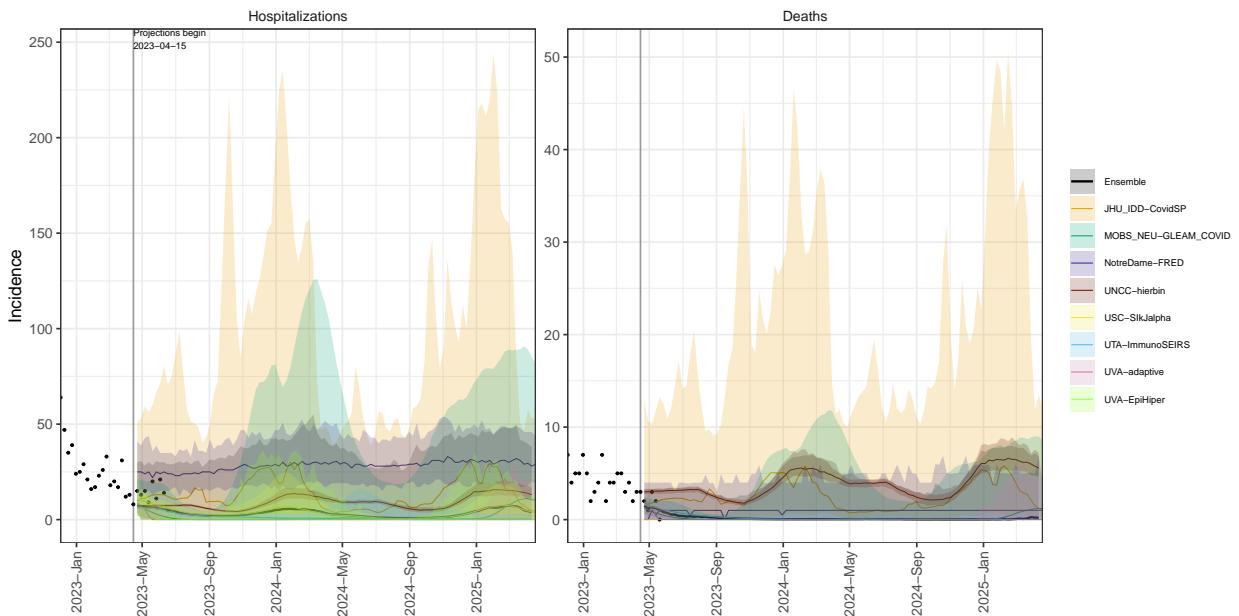
WV model variance & 95% projection intervals – Booster for all, Low immune escape



WI model variance & 95% projection intervals – Booster for all, Low immune escape

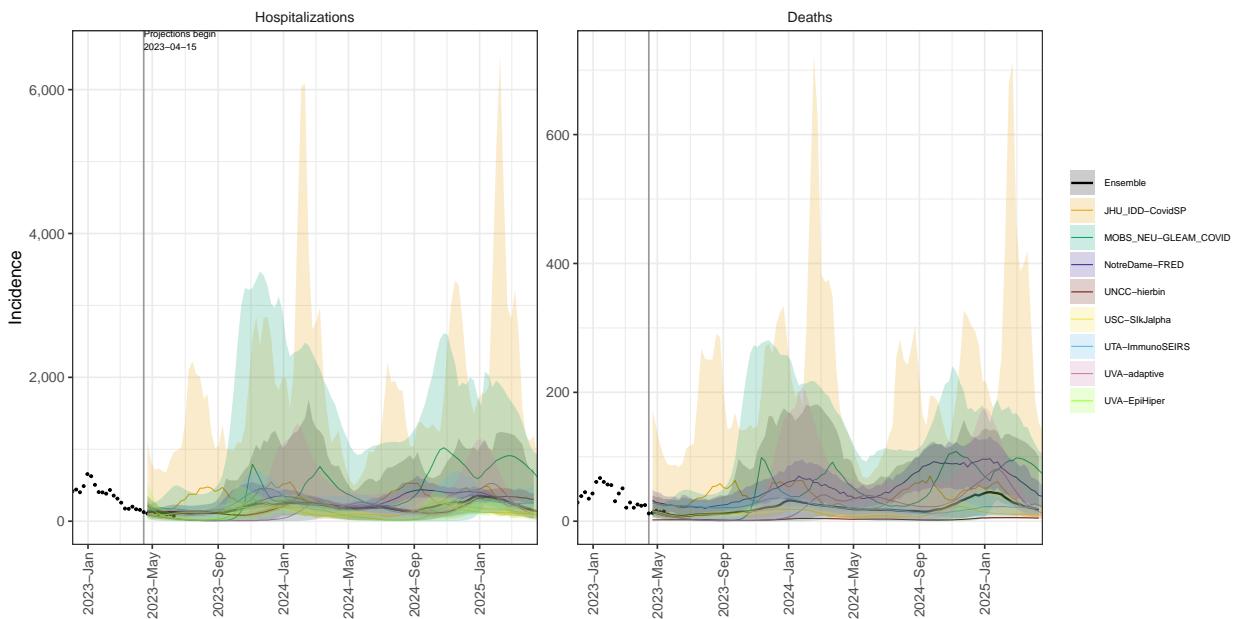


WY model variance & 95% projection intervals – Booster for all, Low immune escape

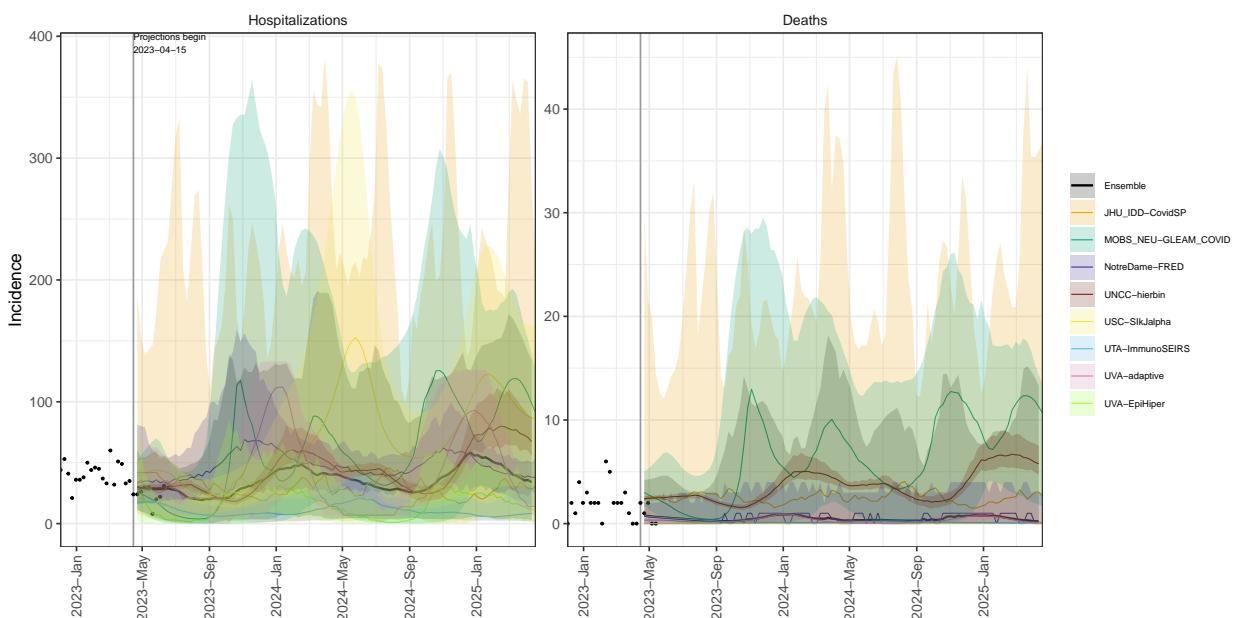


Model variation for Booster for all, High immune escape scenario.

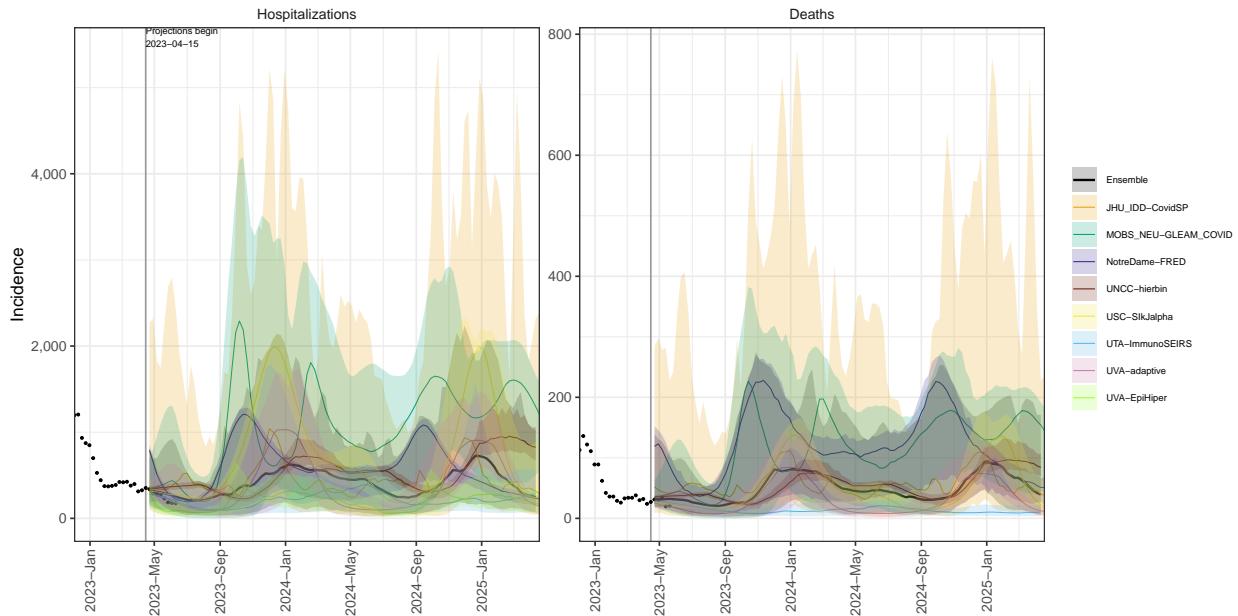
AL model variance & 95% projection intervals – Booster for all, High immune escape



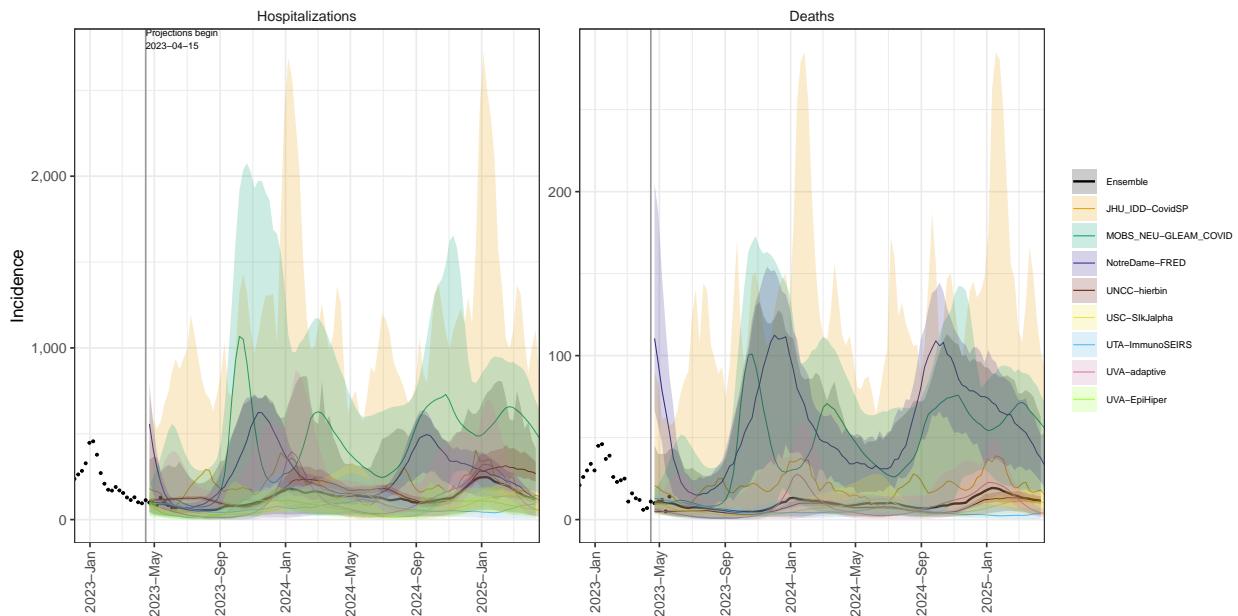
AK model variance & 95% projection intervals – Booster for all, High immune escape



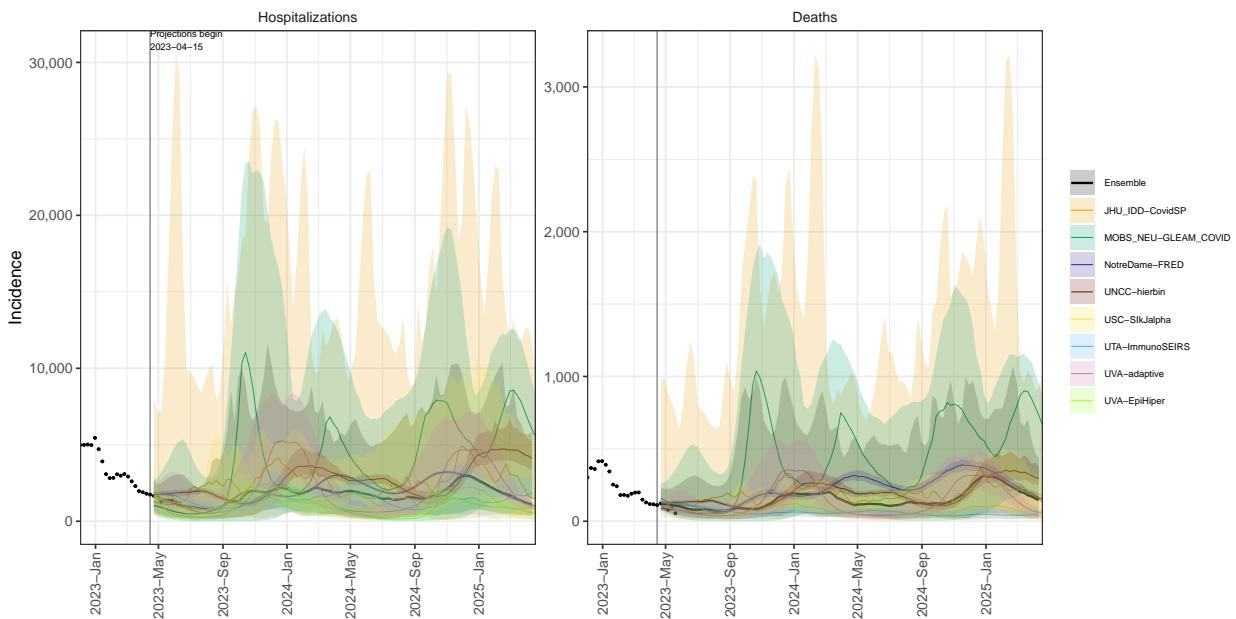
AZ model variance & 95% projection intervals – Booster for all, High immune escape



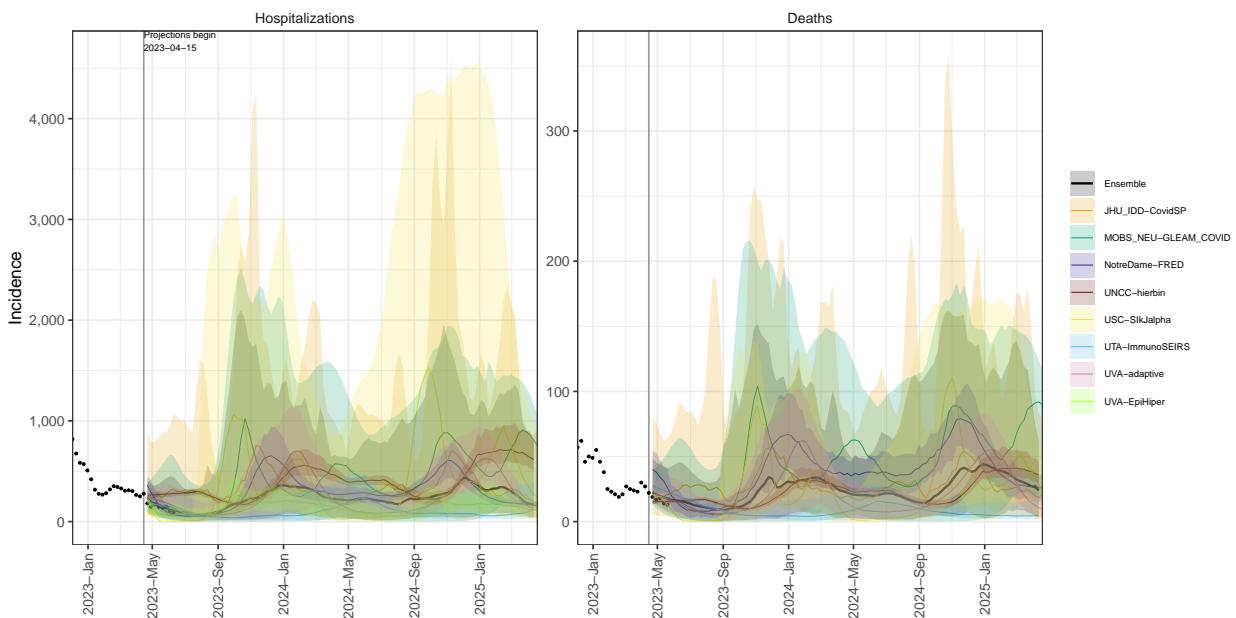
AR model variance & 95% projection intervals – Booster for all, High immune escape



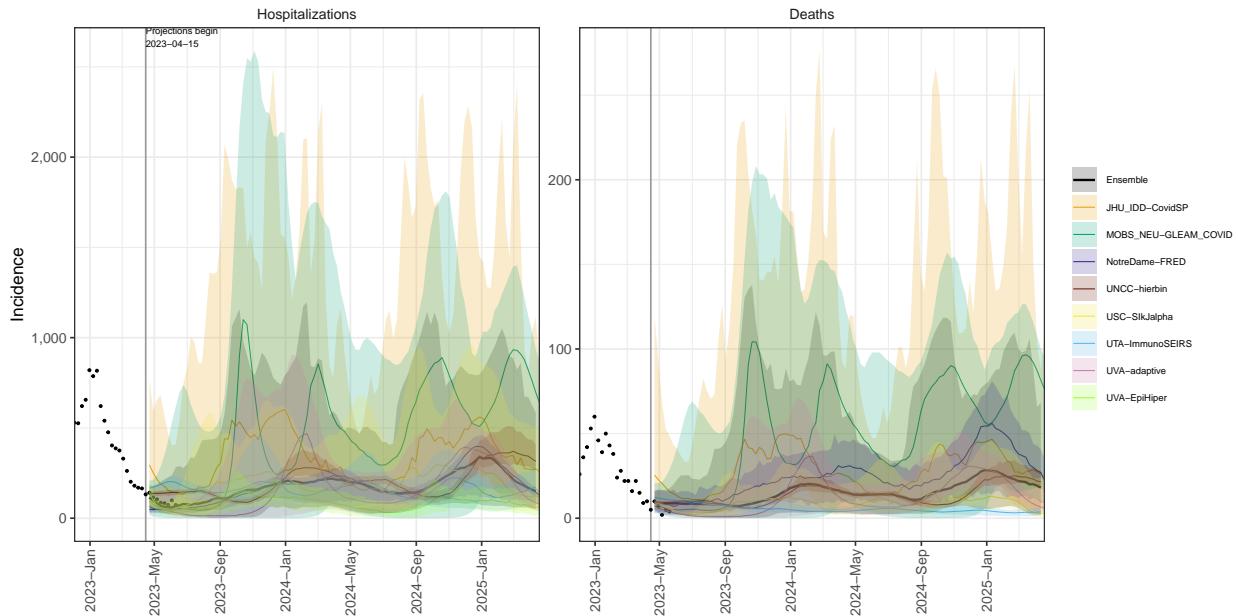
CA model variance & 95% projection intervals – Booster for all, High immune escape



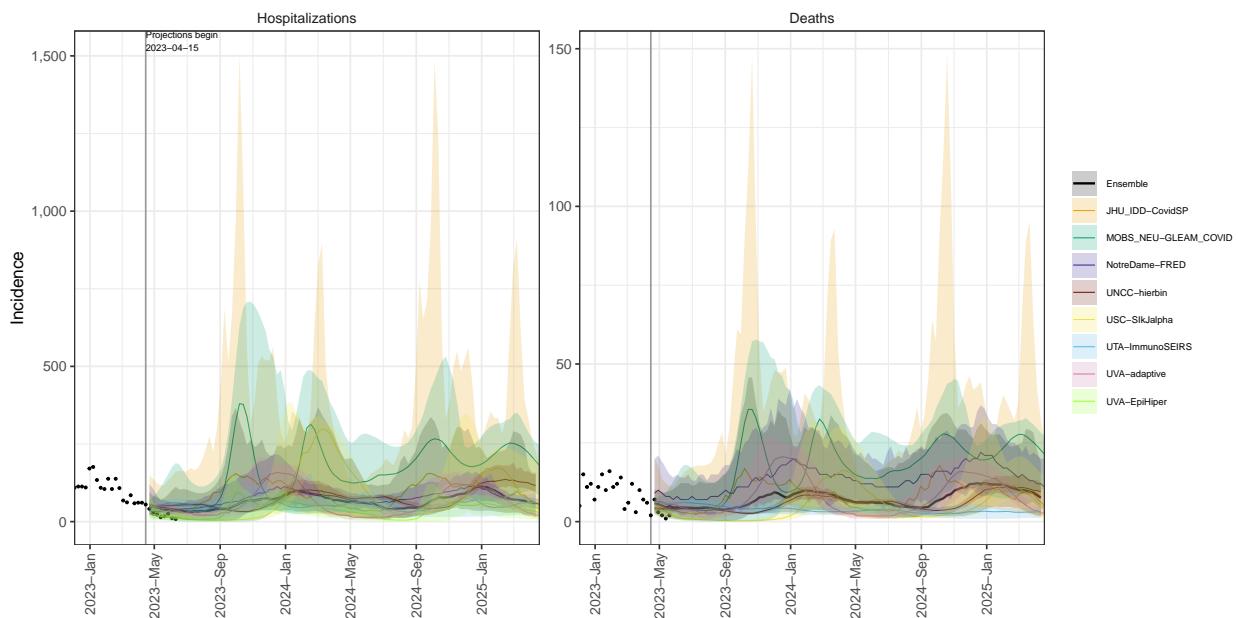
CO model variance & 95% projection intervals – Booster for all, High immune escape



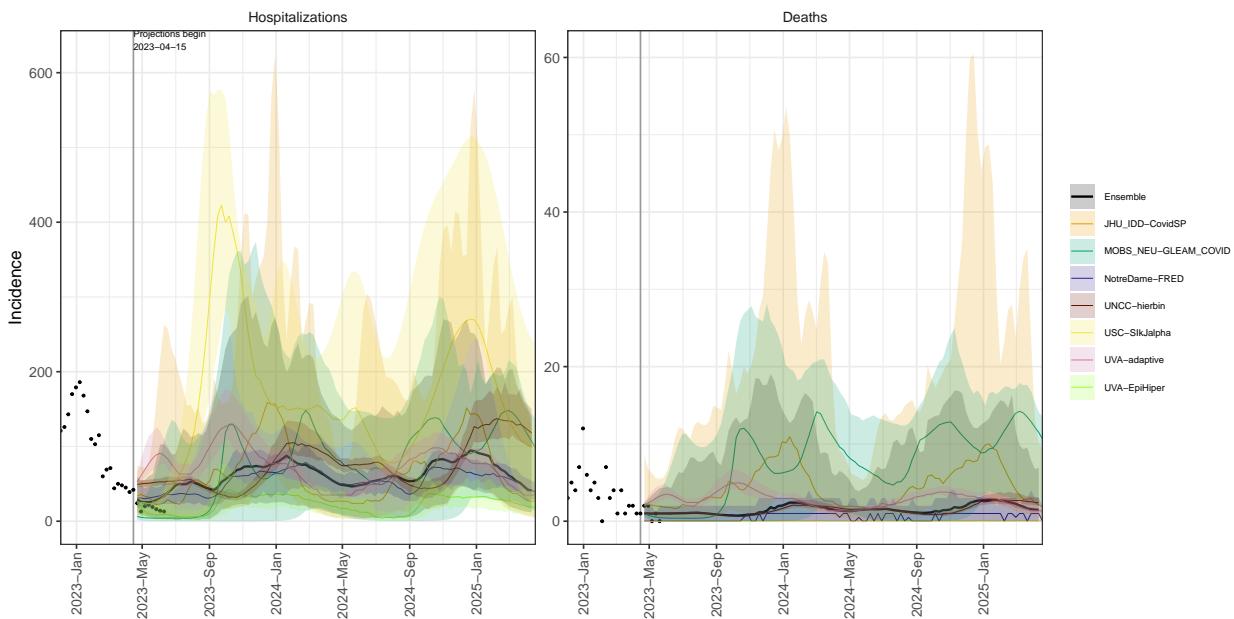
CT model variance & 95% projection intervals – Booster for all, High immune escape



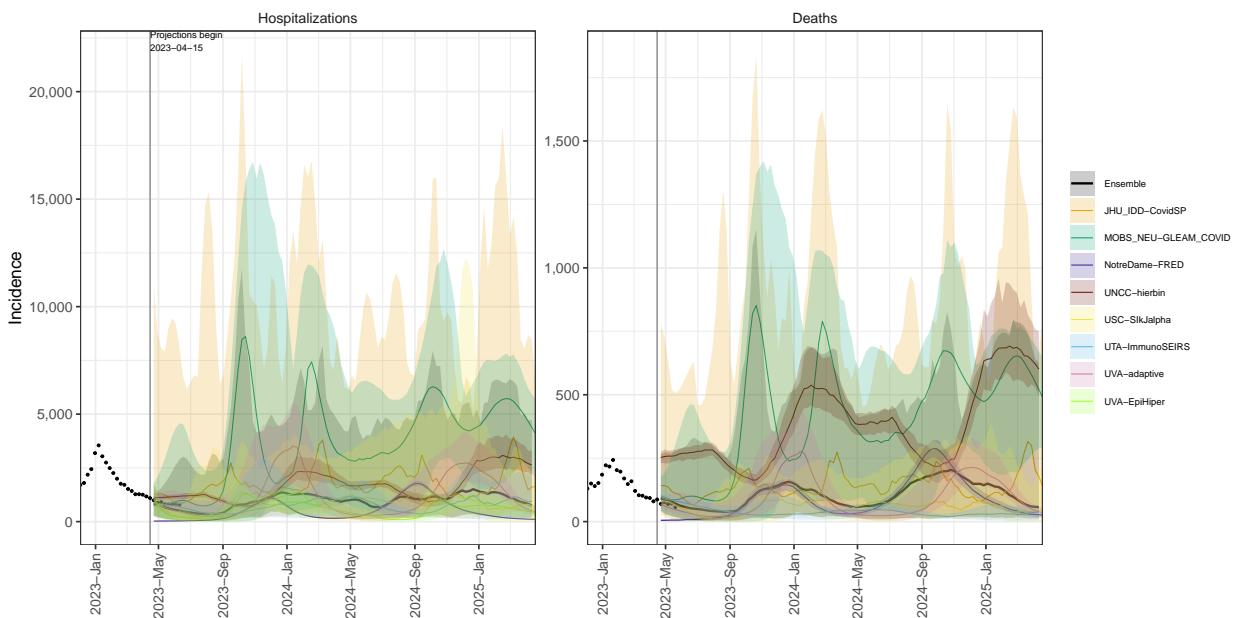
DE model variance & 95% projection intervals – Booster for all, High immune escape



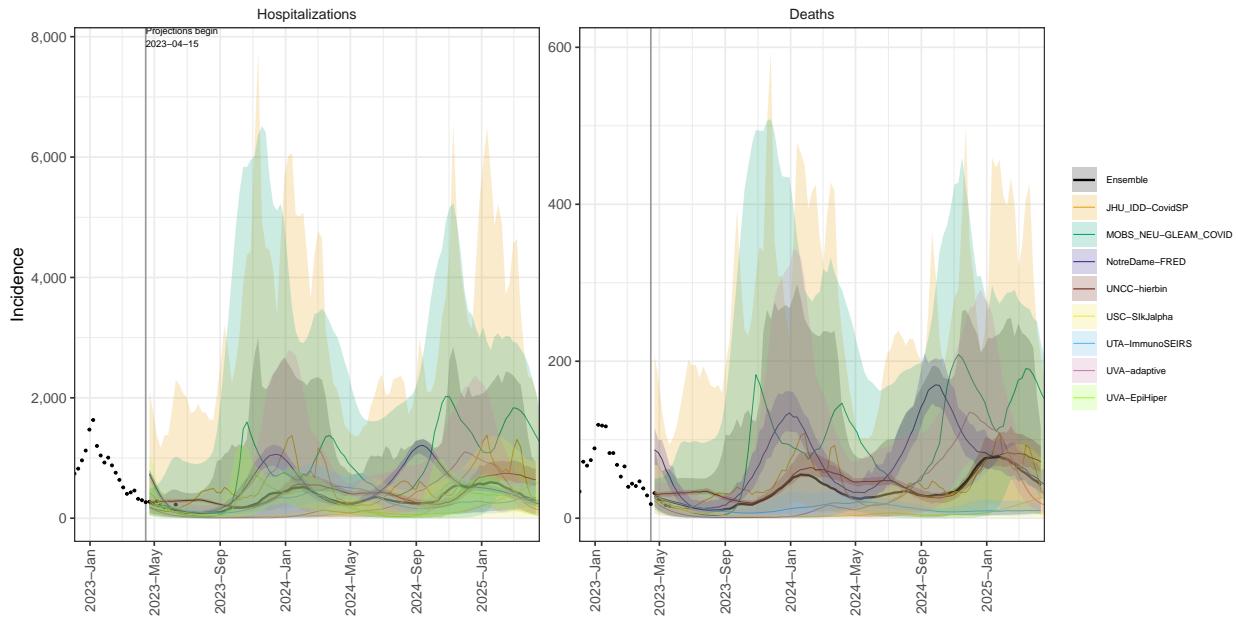
DC model variance & 95% projection intervals – Booster for all, High immune escape



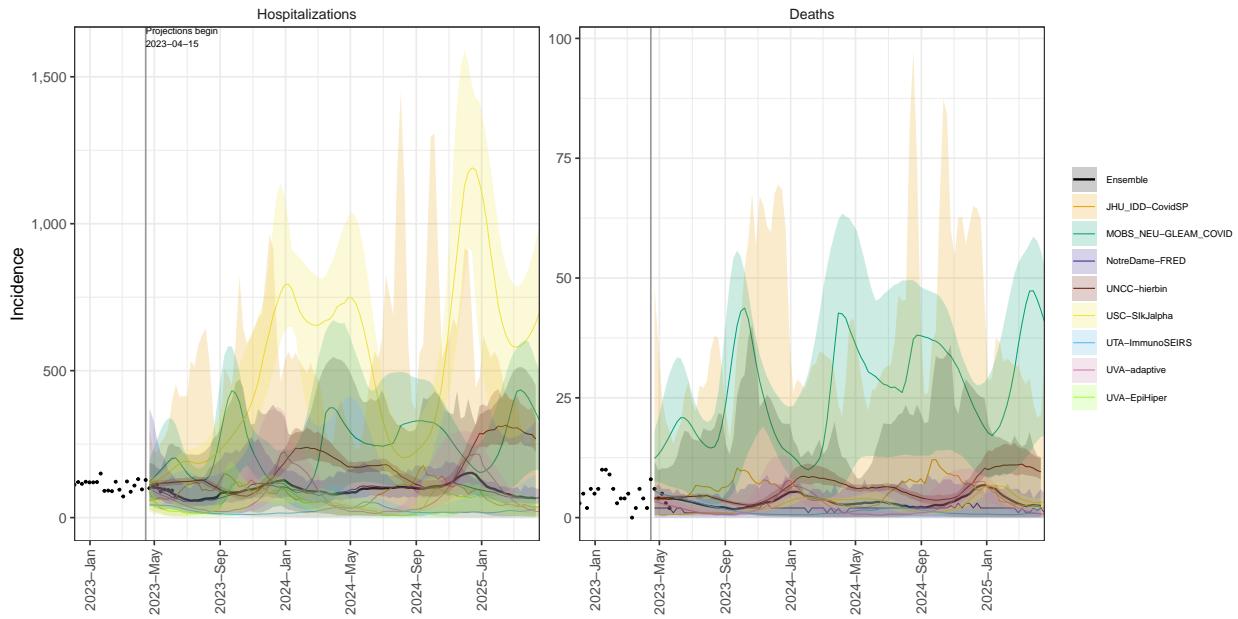
FL model variance & 95% projection intervals – Booster for all, High immune escape



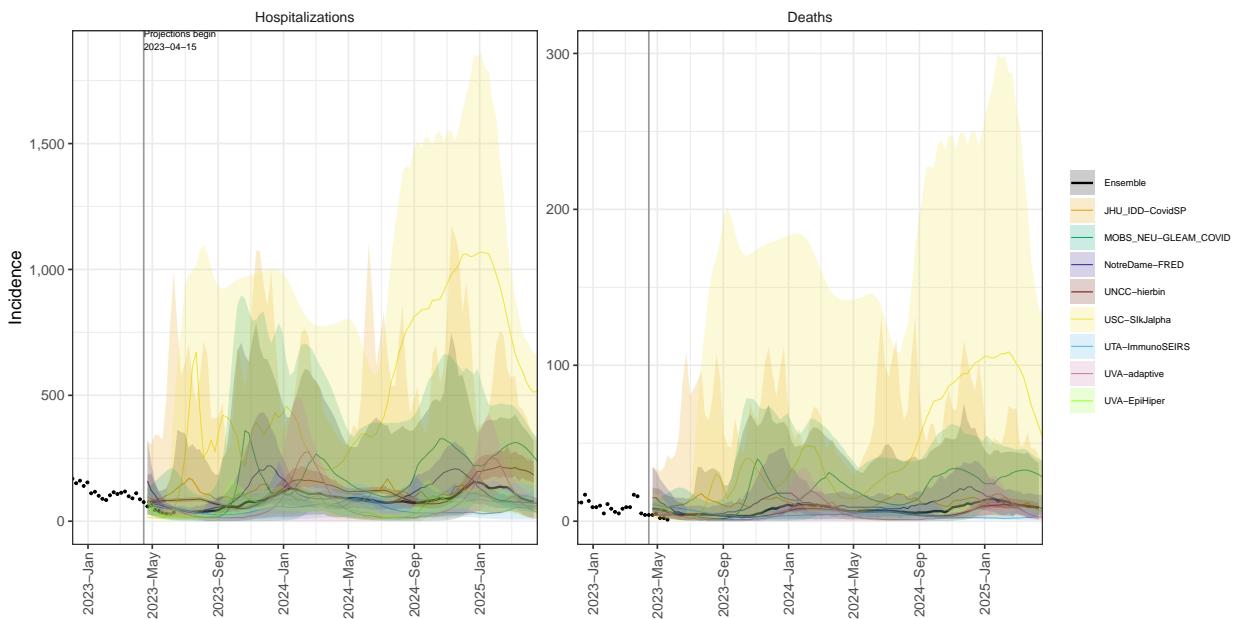
GA model variance & 95% projection intervals – Booster for all, High immune escape



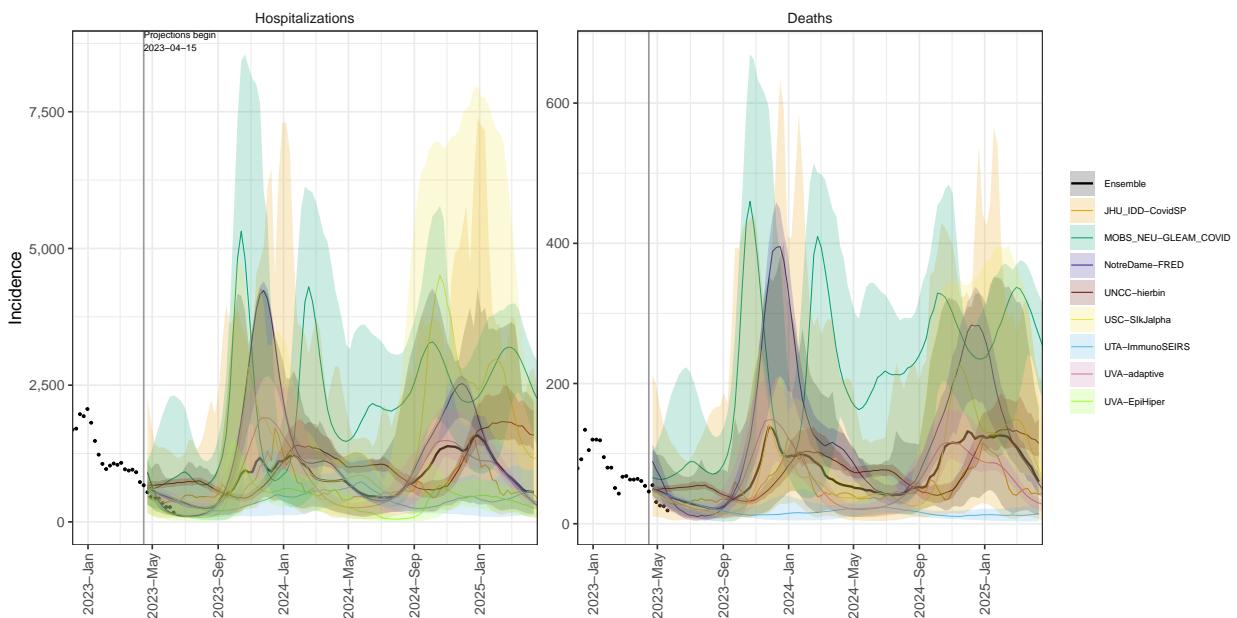
HI model variance & 95% projection intervals – Booster for all, High immune escape



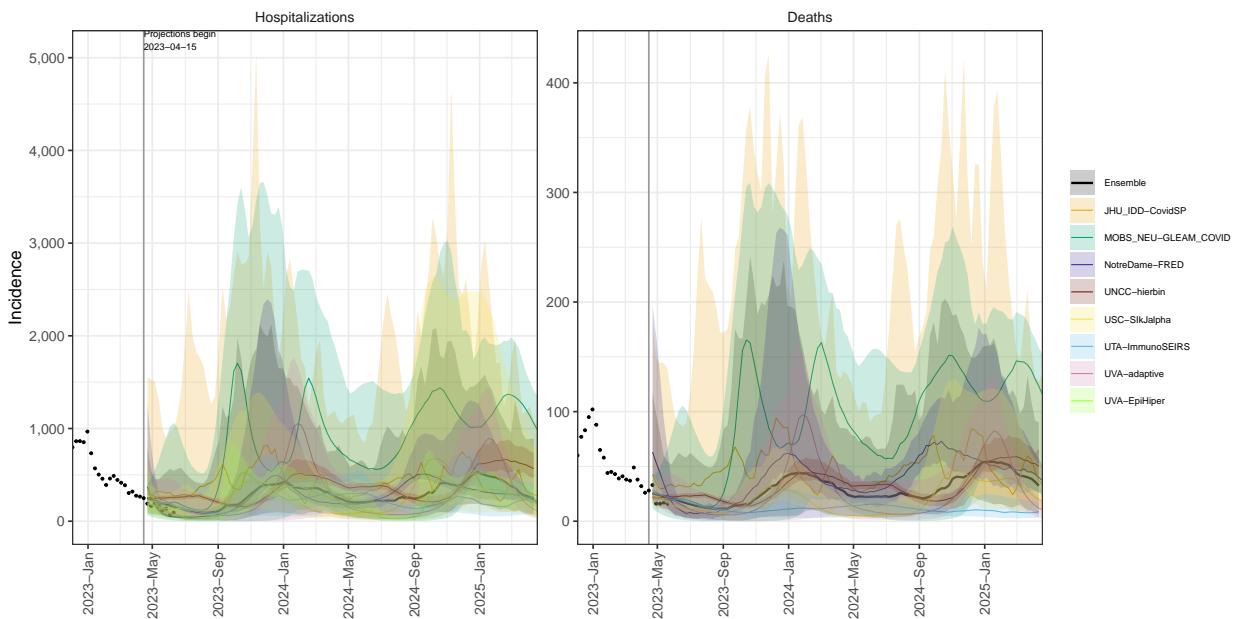
ID model variance & 95% projection intervals – Booster for all, High immune escape



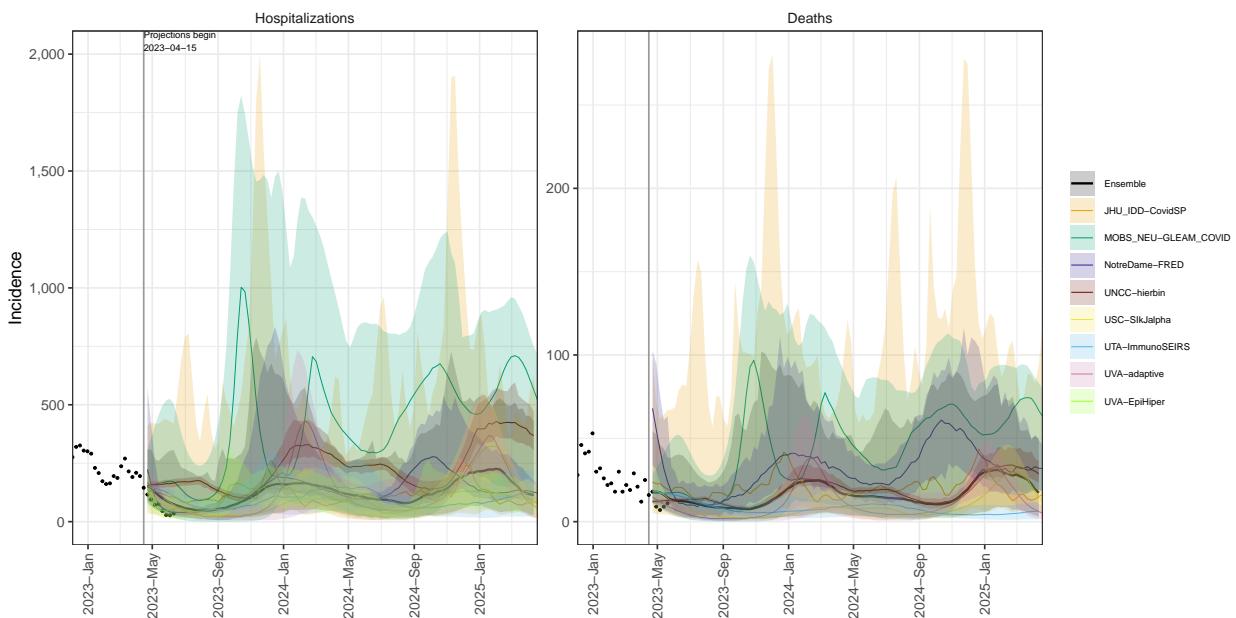
IL model variance & 95% projection intervals – Booster for all, High immune escape



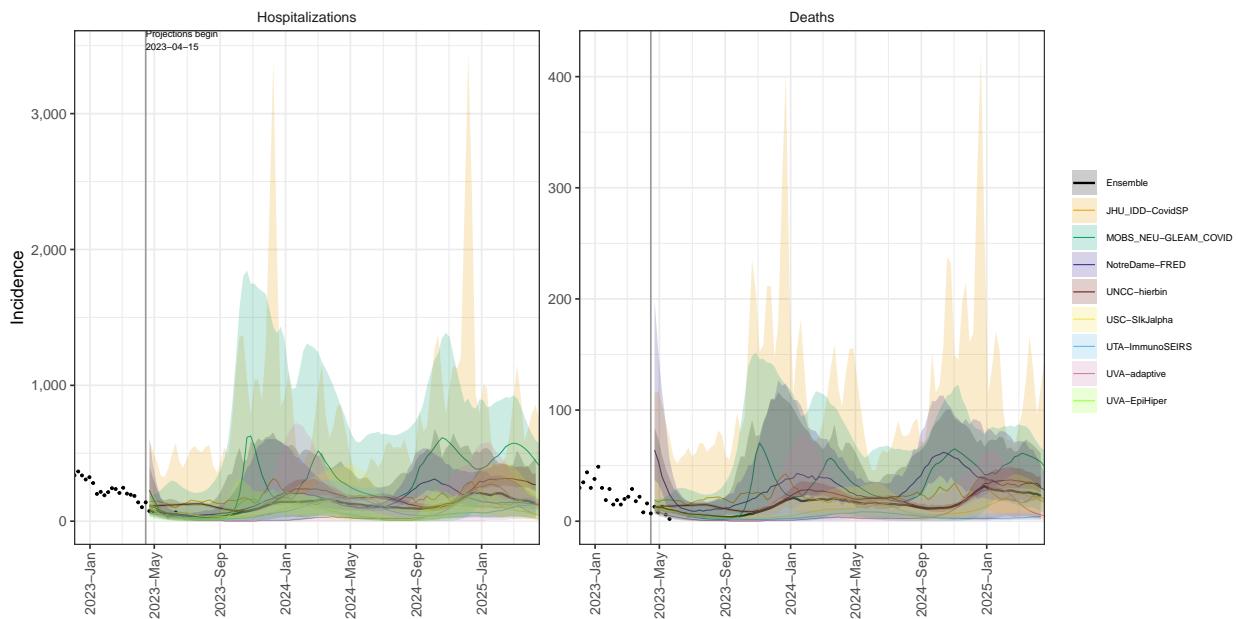
IN model variance & 95% projection intervals – Booster for all, High immune escape



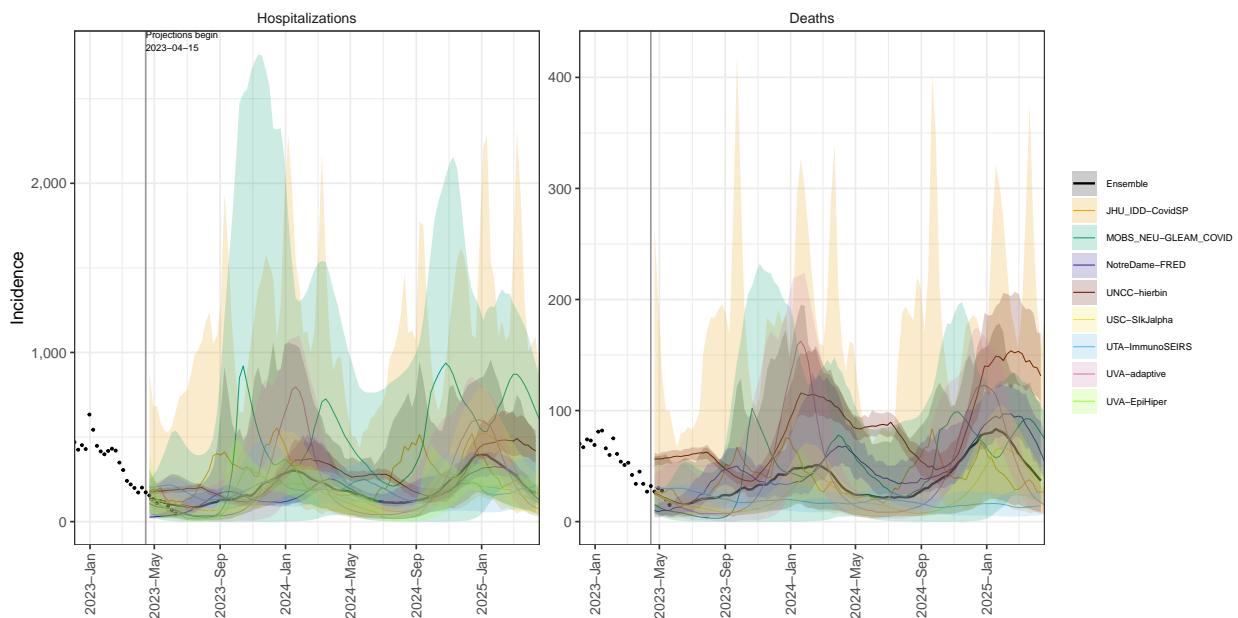
IA model variance & 95% projection intervals – Booster for all, High immune escape



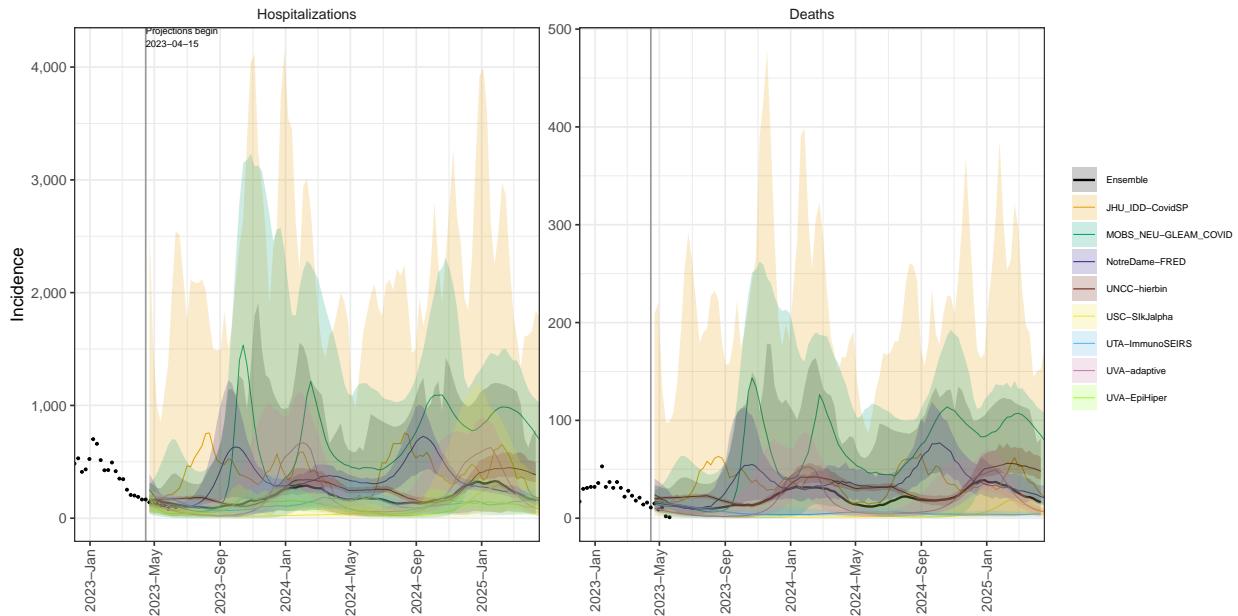
KS model variance & 95% projection intervals – Booster for all, High immune escape



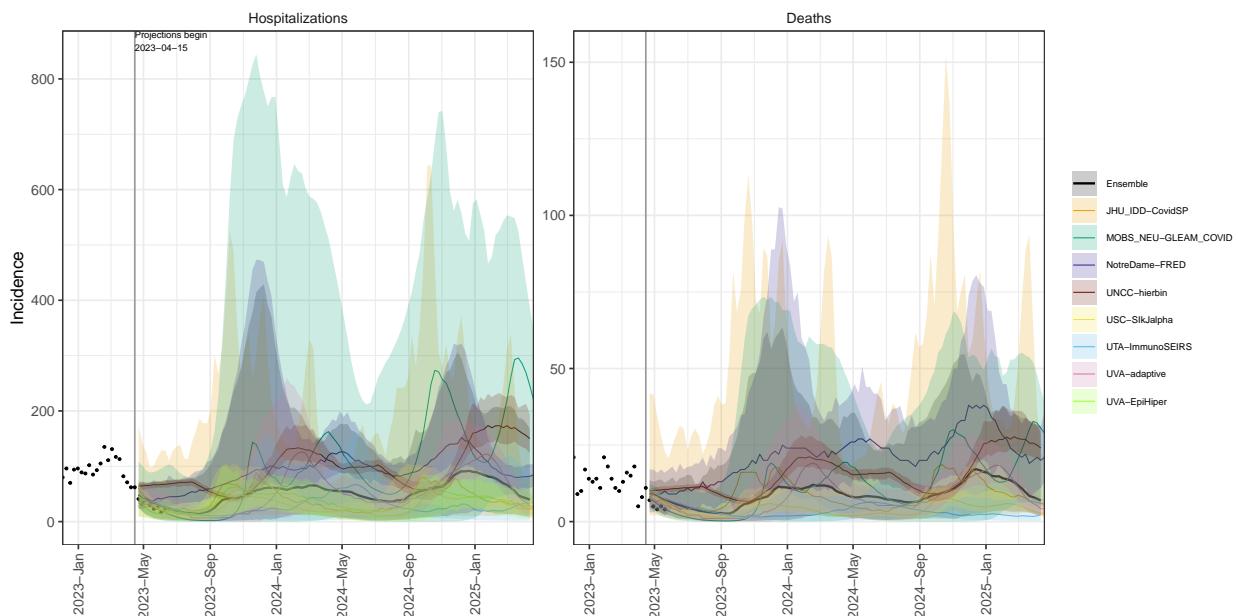
KY model variance & 95% projection intervals – Booster for all, High immune escape



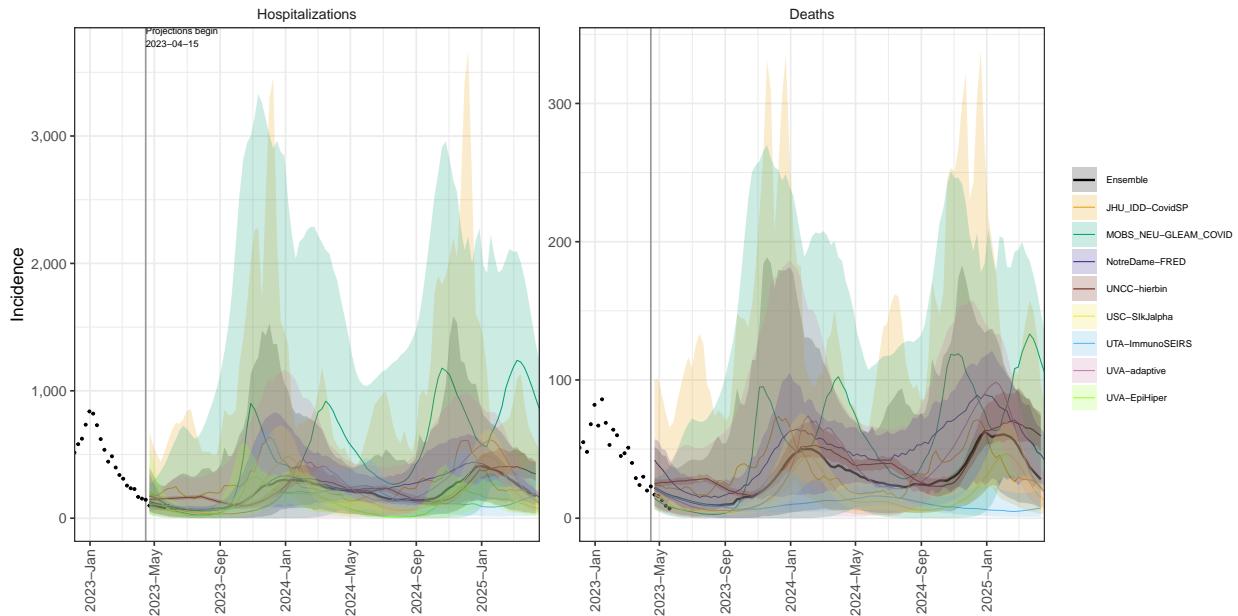
LA model variance & 95% projection intervals – Booster for all, High immune escape



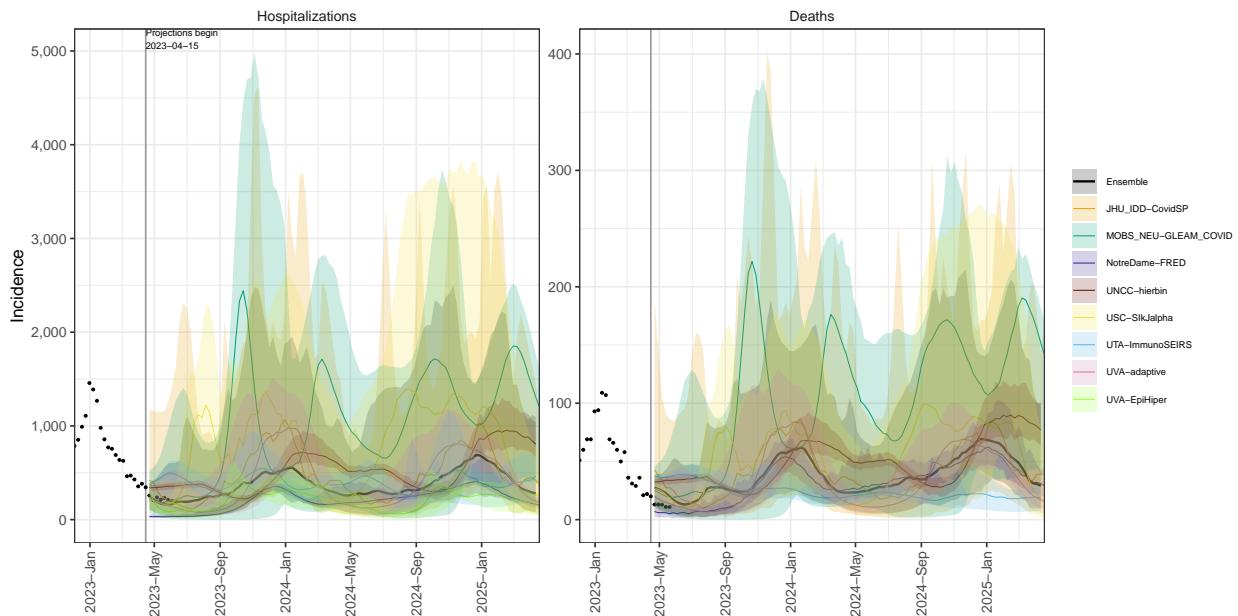
ME model variance & 95% projection intervals – Booster for all, High immune escape



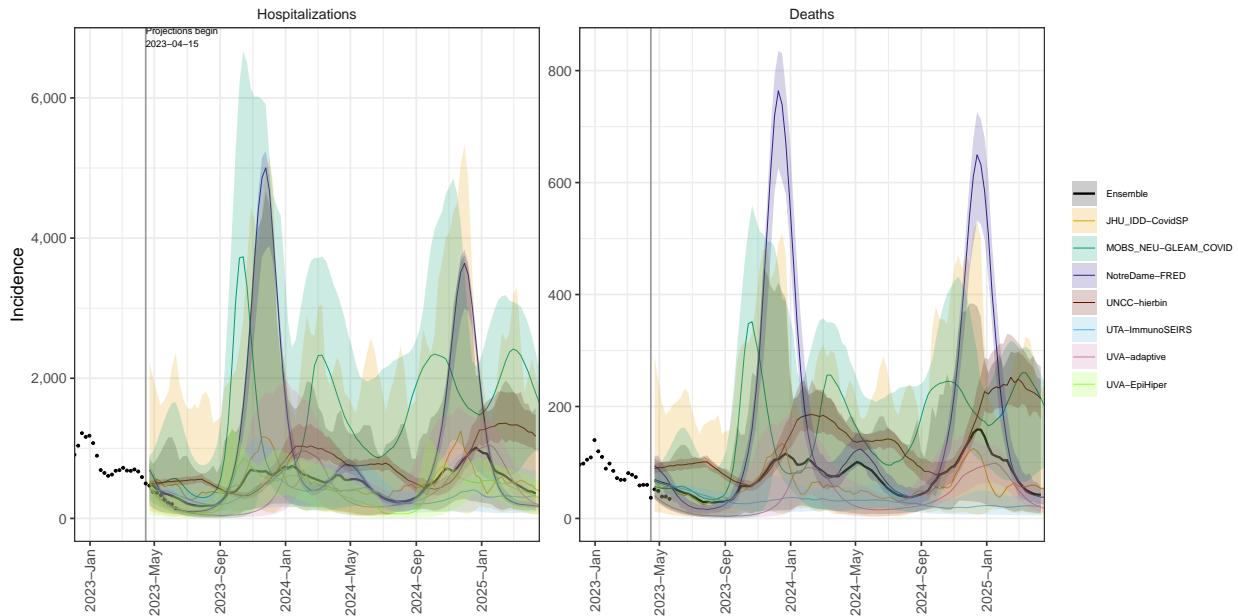
MD model variance & 95% projection intervals – Booster for all, High immune escape



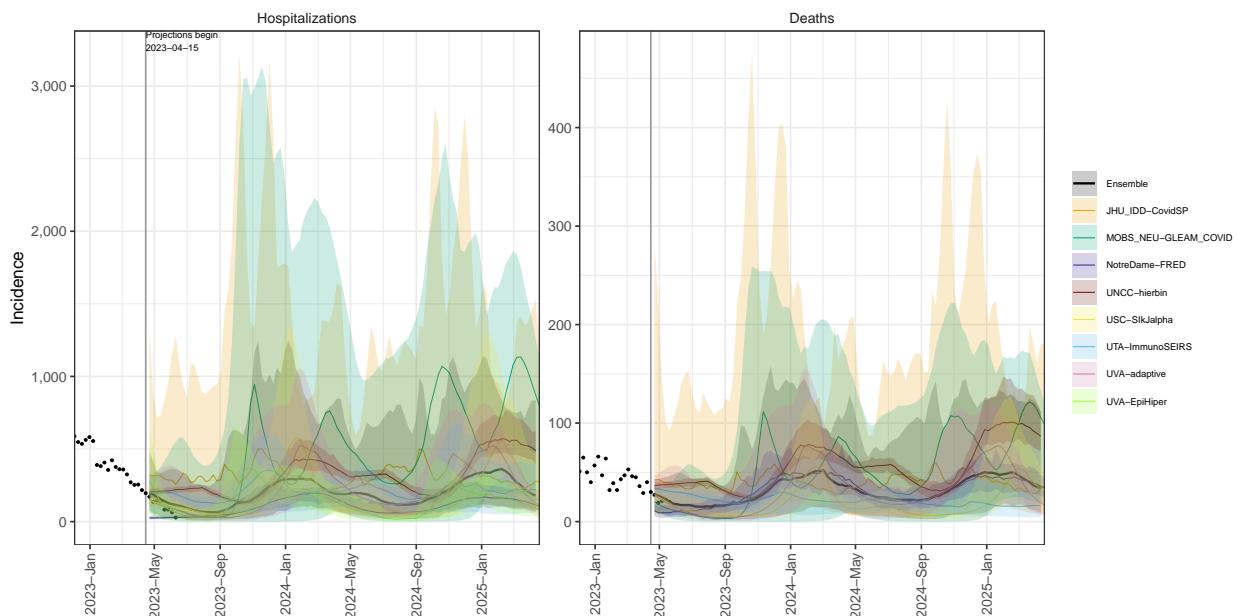
MA model variance & 95% projection intervals – Booster for all, High immune escape



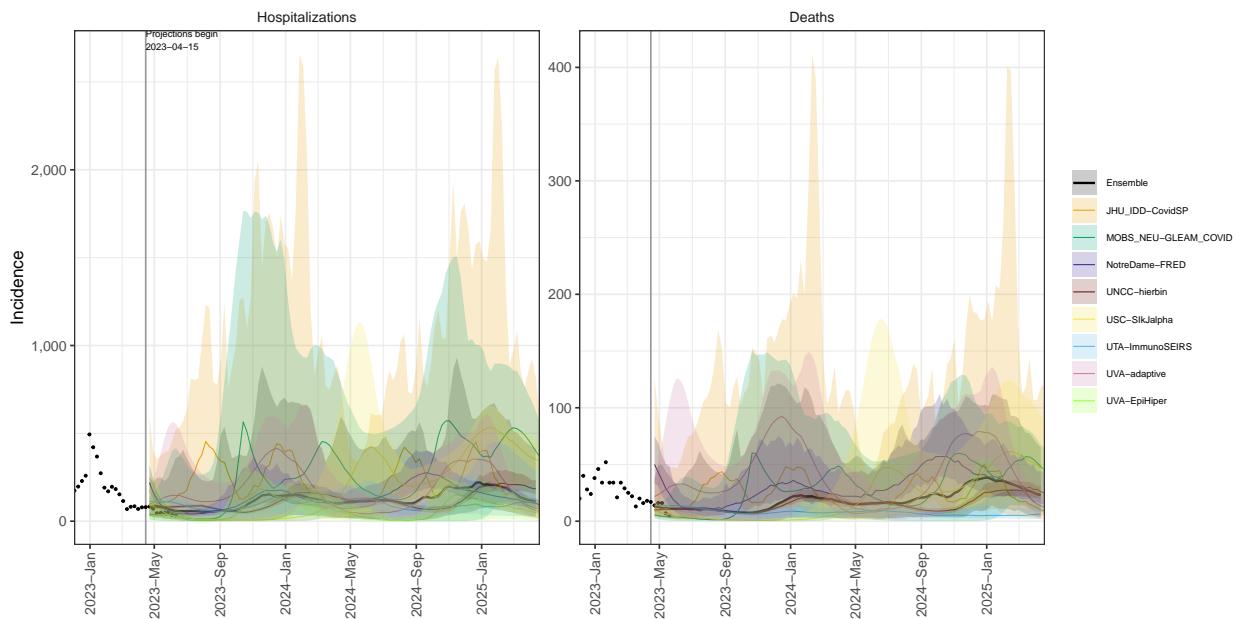
MI model variance & 95% projection intervals – Booster for all, High immune escape



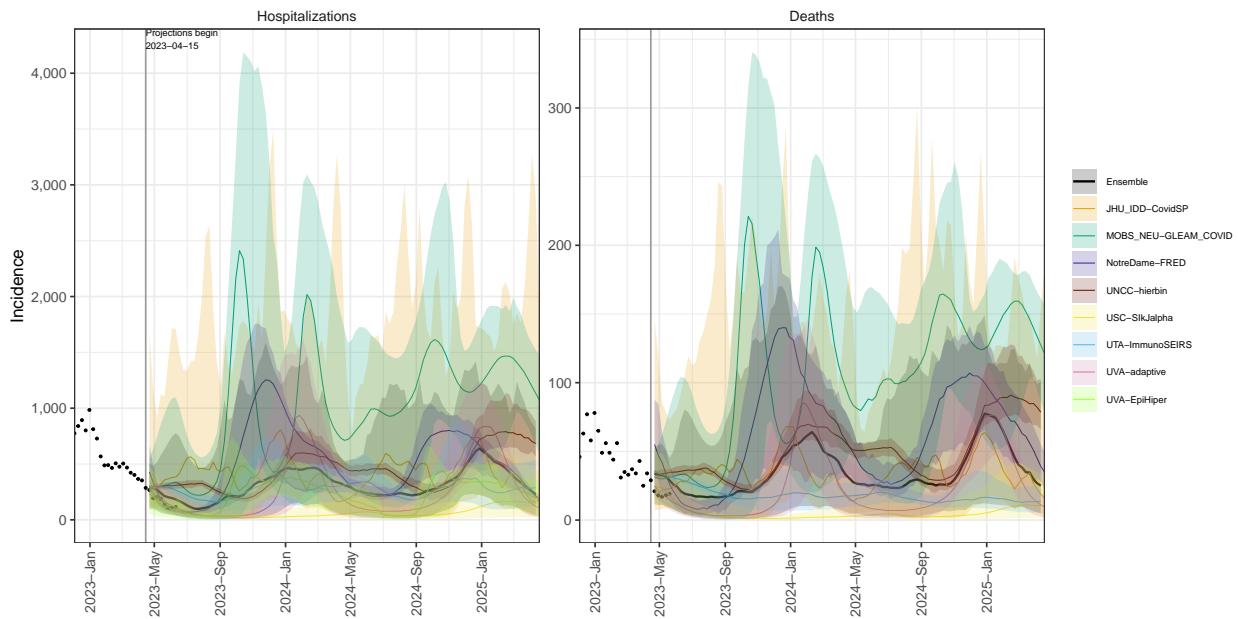
MN model variance & 95% projection intervals – Booster for all, High immune escape



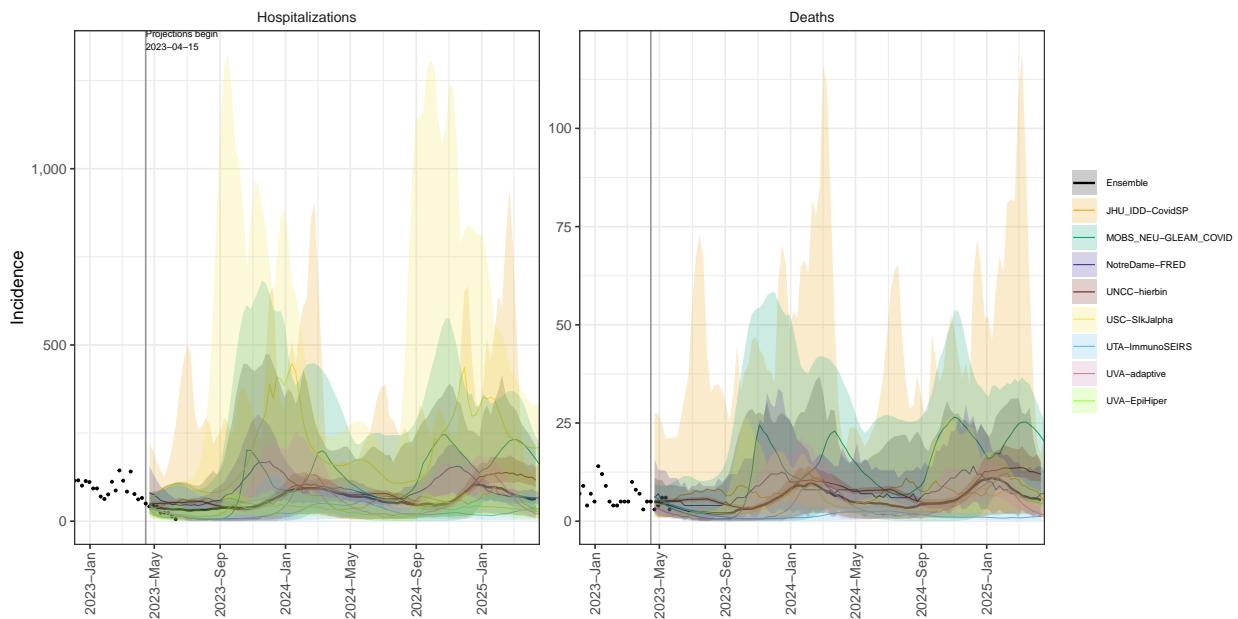
MS model variance & 95% projection intervals – Booster for all, High immune escape



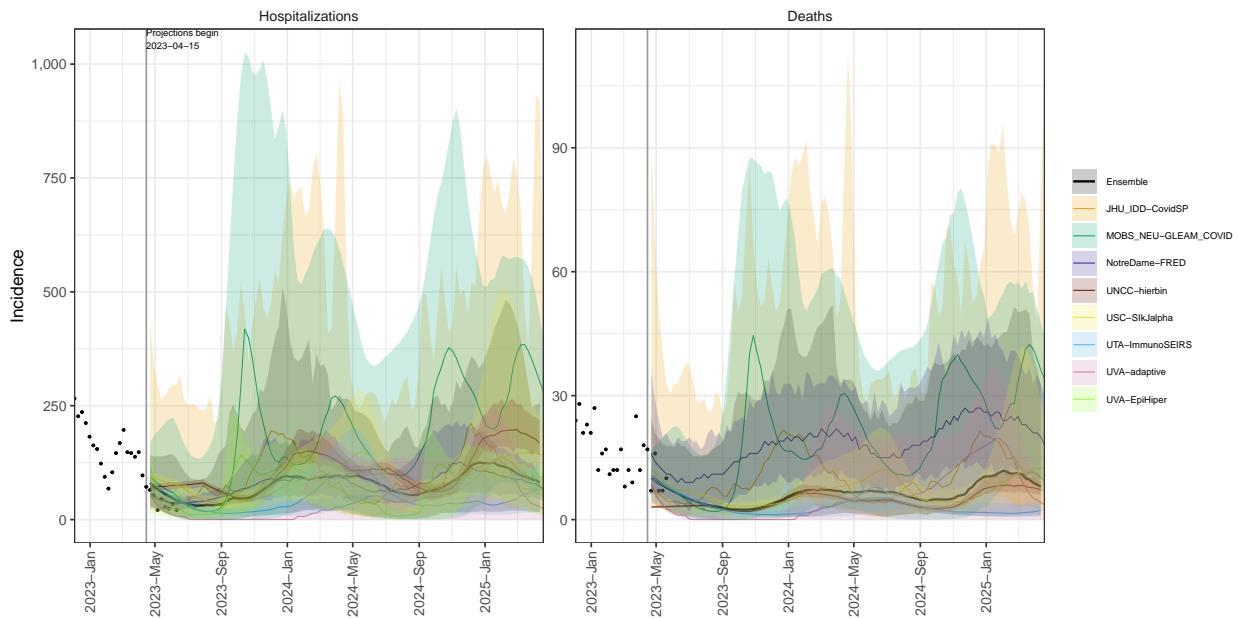
MO model variance & 95% projection intervals – Booster for all, High immune escape



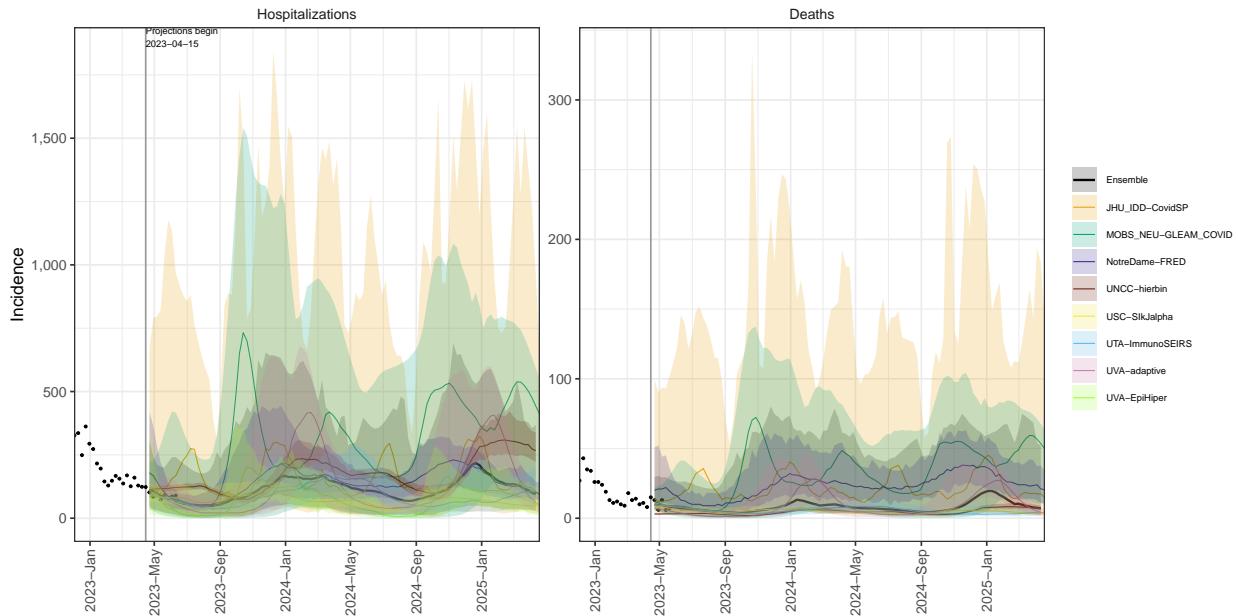
MT model variance & 95% projection intervals – Booster for all, High immune escape



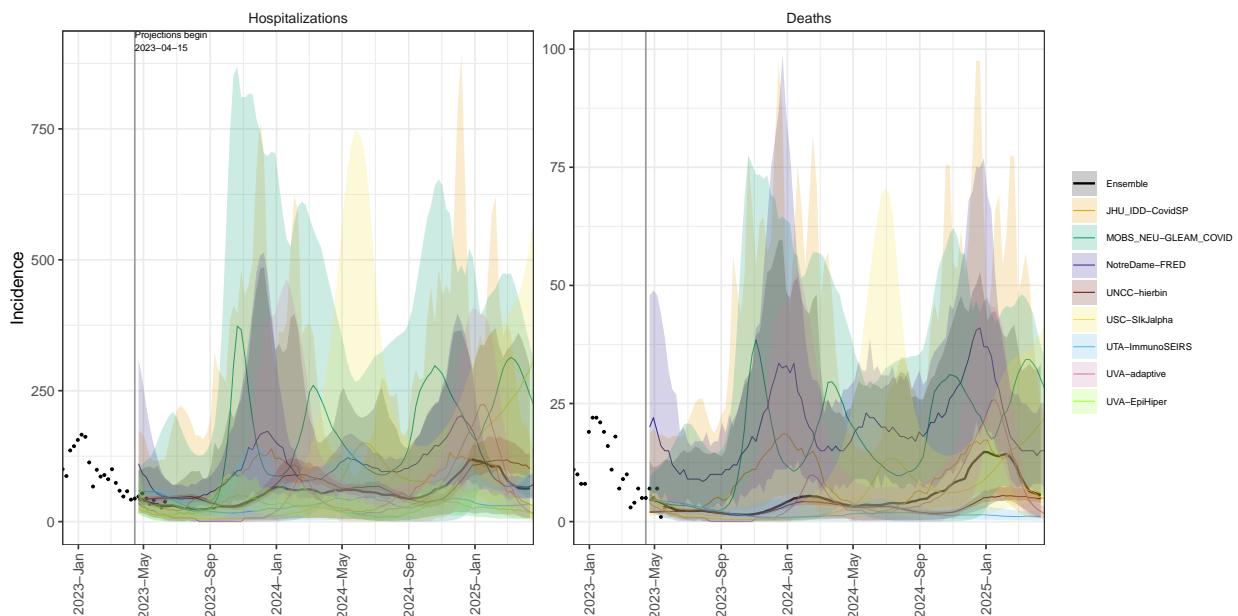
NE model variance & 95% projection intervals – Booster for all, High immune escape



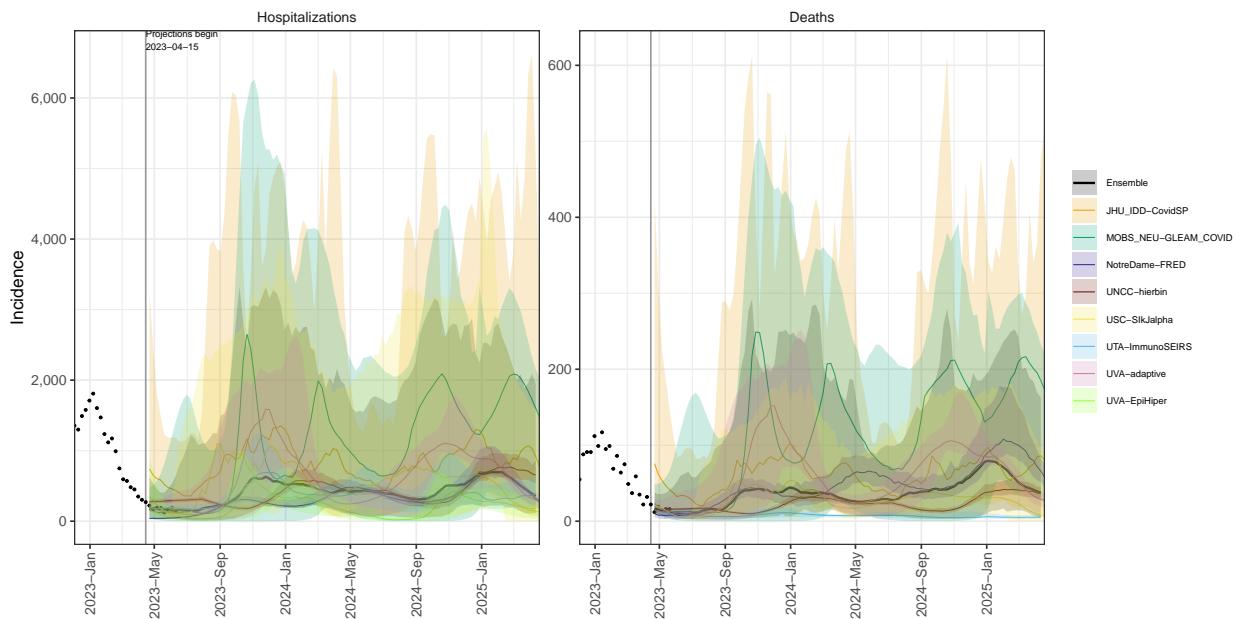
NV model variance & 95% projection intervals – Booster for all, High immune escape



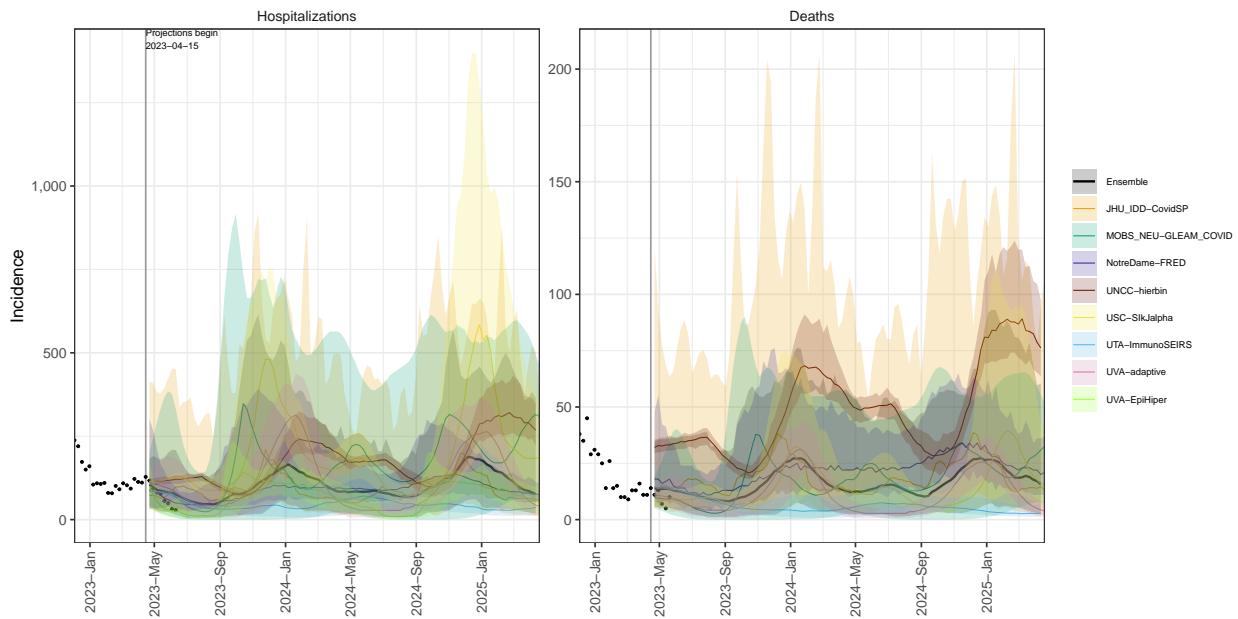
NH model variance & 95% projection intervals – Booster for all, High immune escape



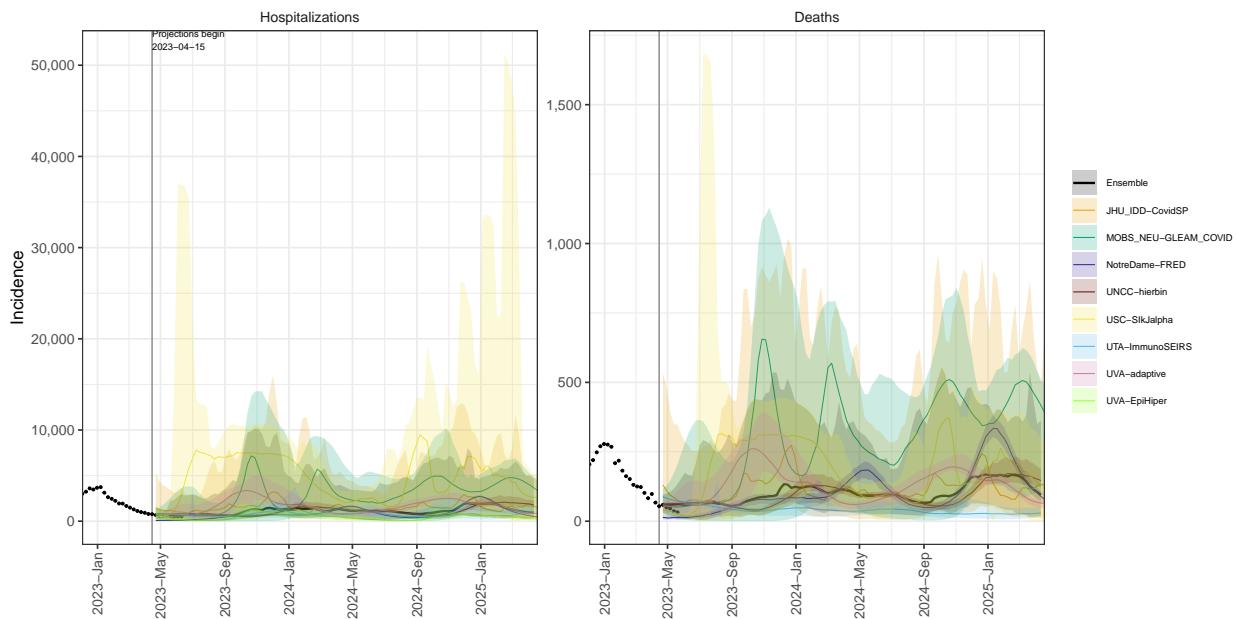
NJ model variance & 95% projection intervals – Booster for all, High immune escape



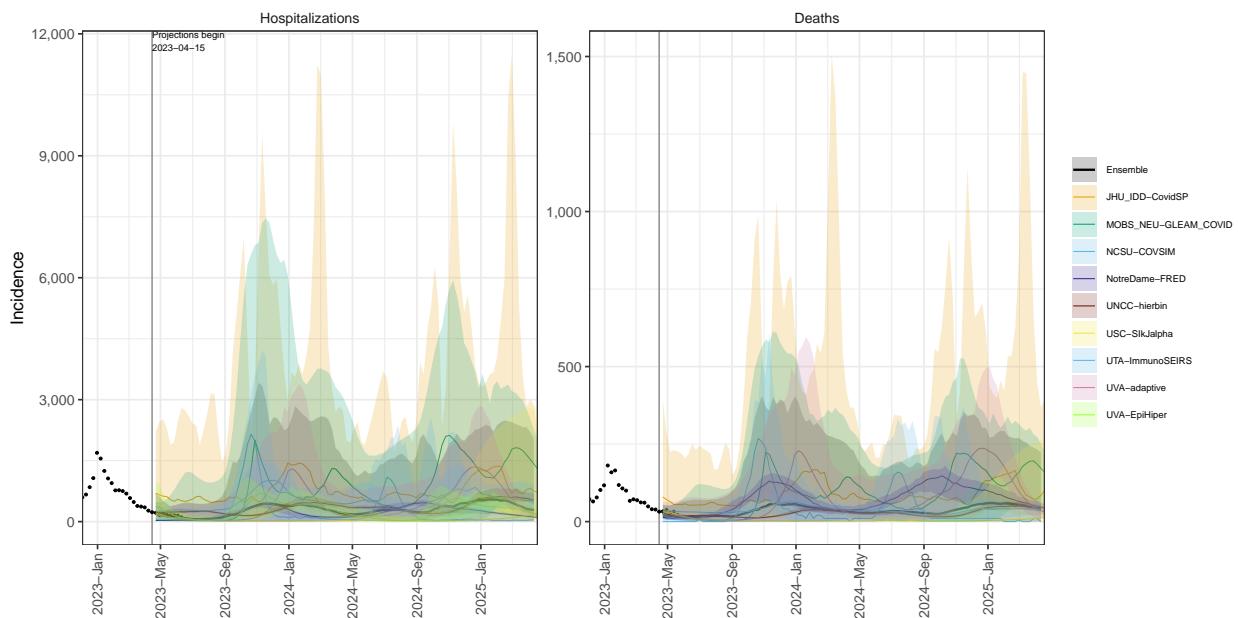
NM model variance & 95% projection intervals – Booster for all, High immune escape



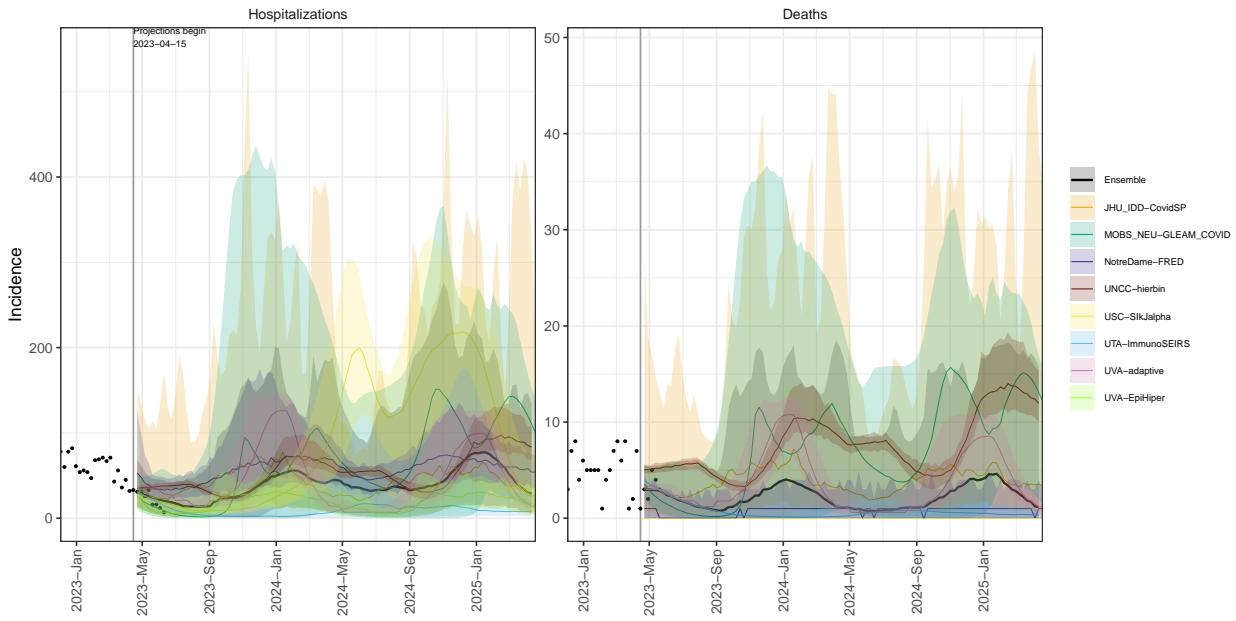
NY model variance & 95% projection intervals – Booster for all, High immune escape



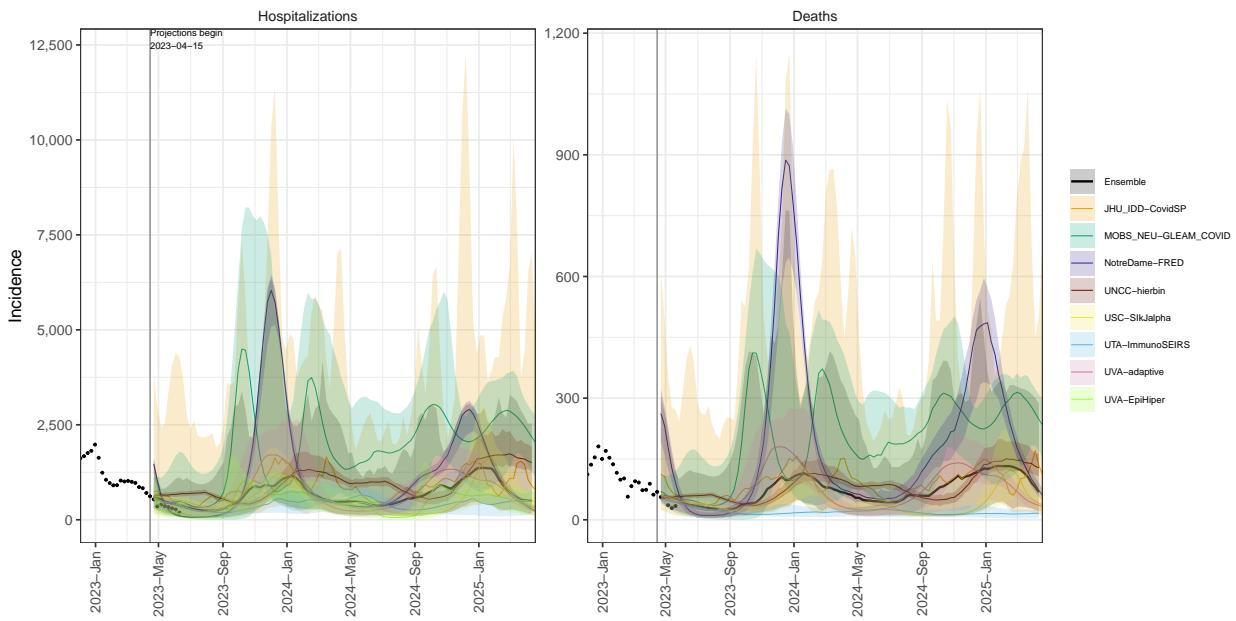
NC model variance & 95% projection intervals – Booster for all, High immune escape



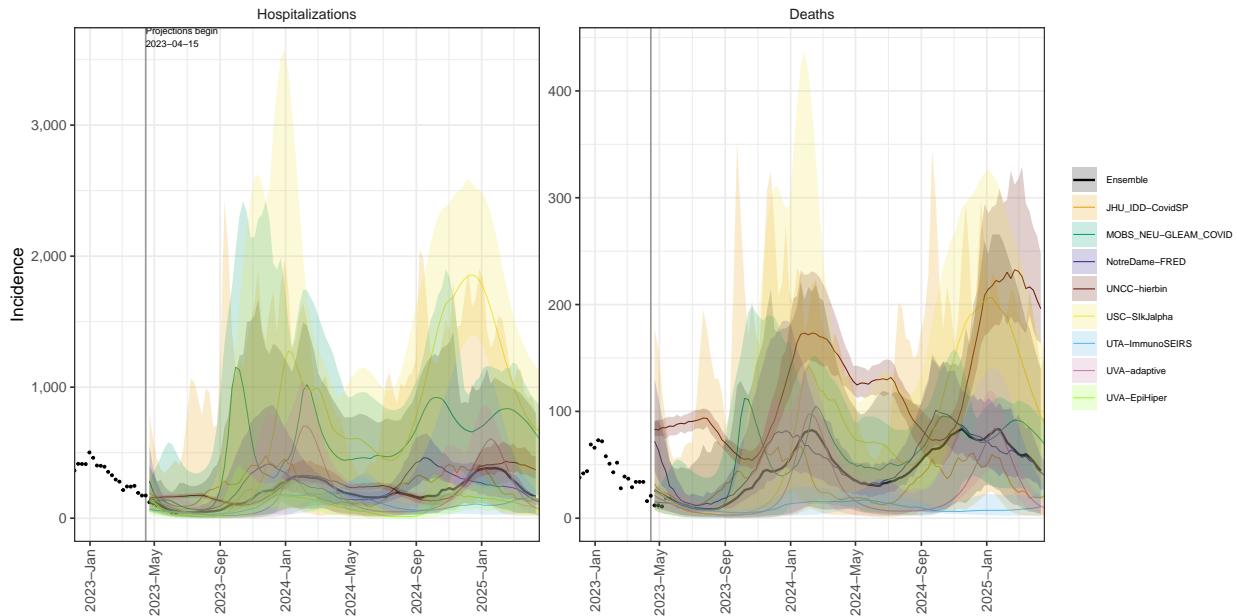
### ND model variance & 95% projection intervals – Booster for all, High immune escape



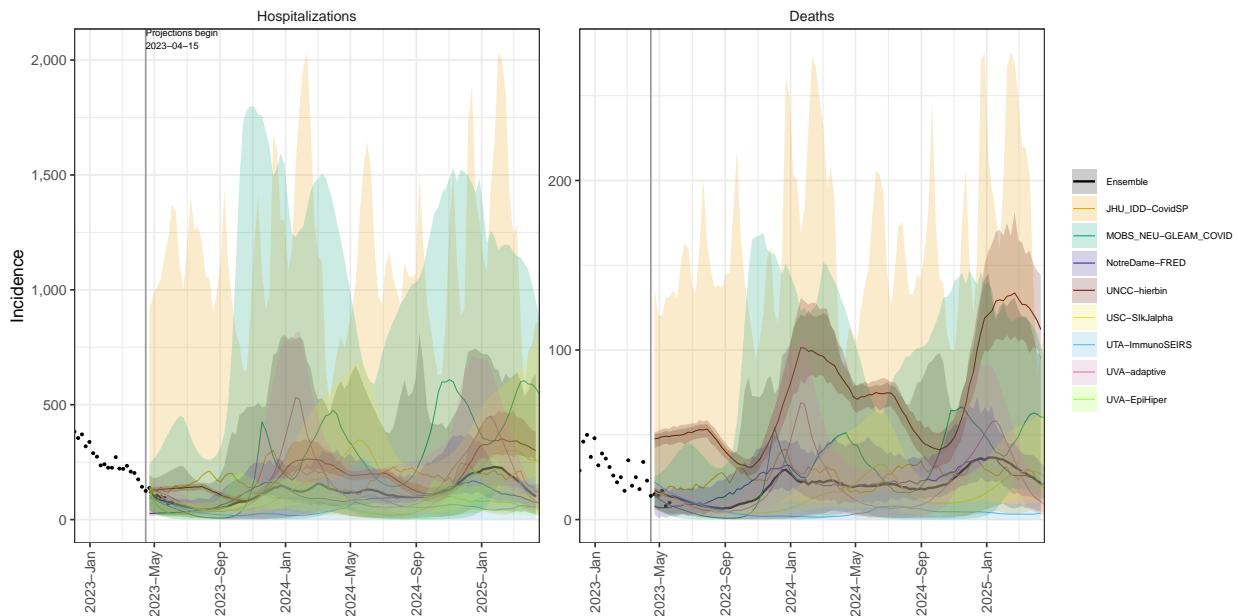
### OH model variance & 95% projection intervals – Booster for all, High immune escape



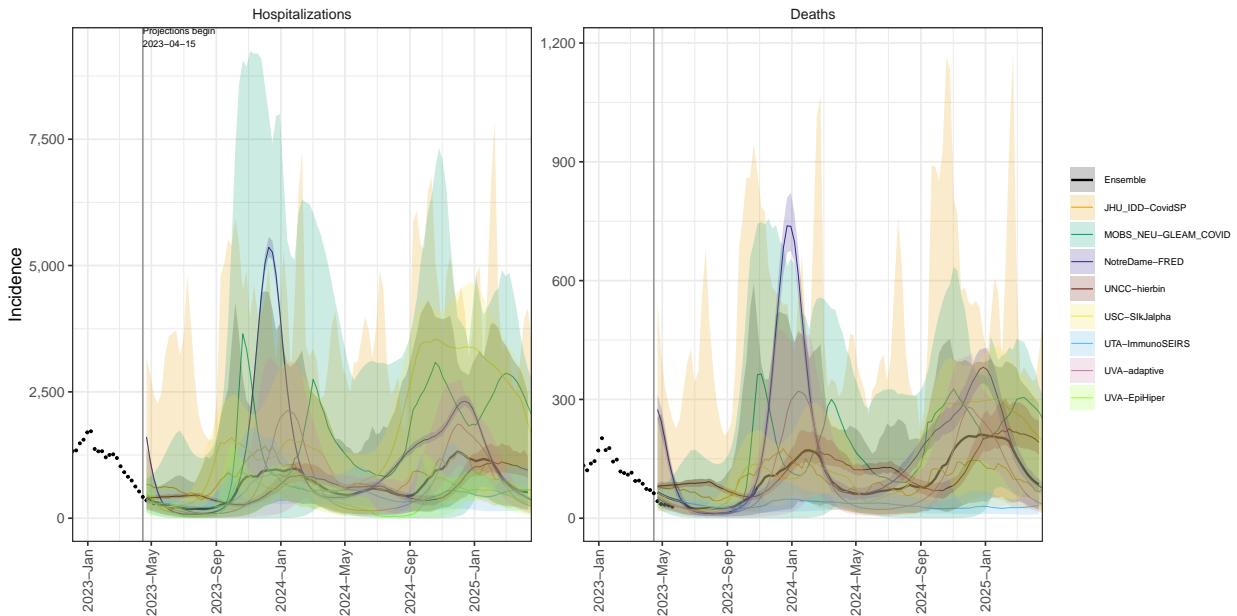
OK model variance & 95% projection intervals – Booster for all, High immune escape



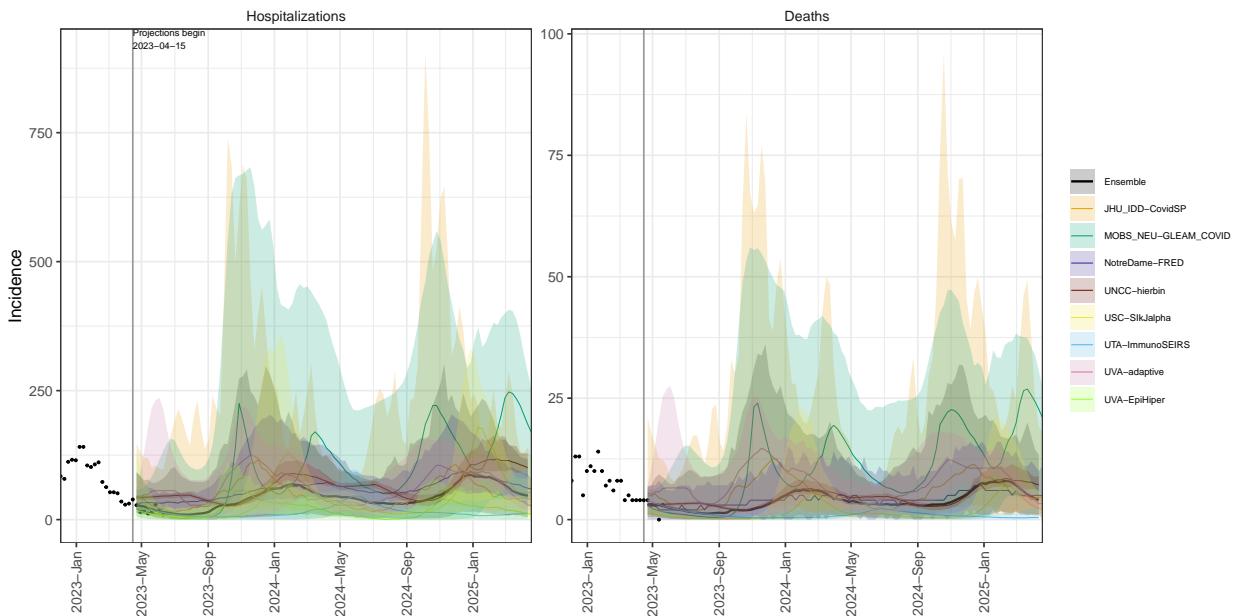
OR model variance & 95% projection intervals – Booster for all, High immune escape



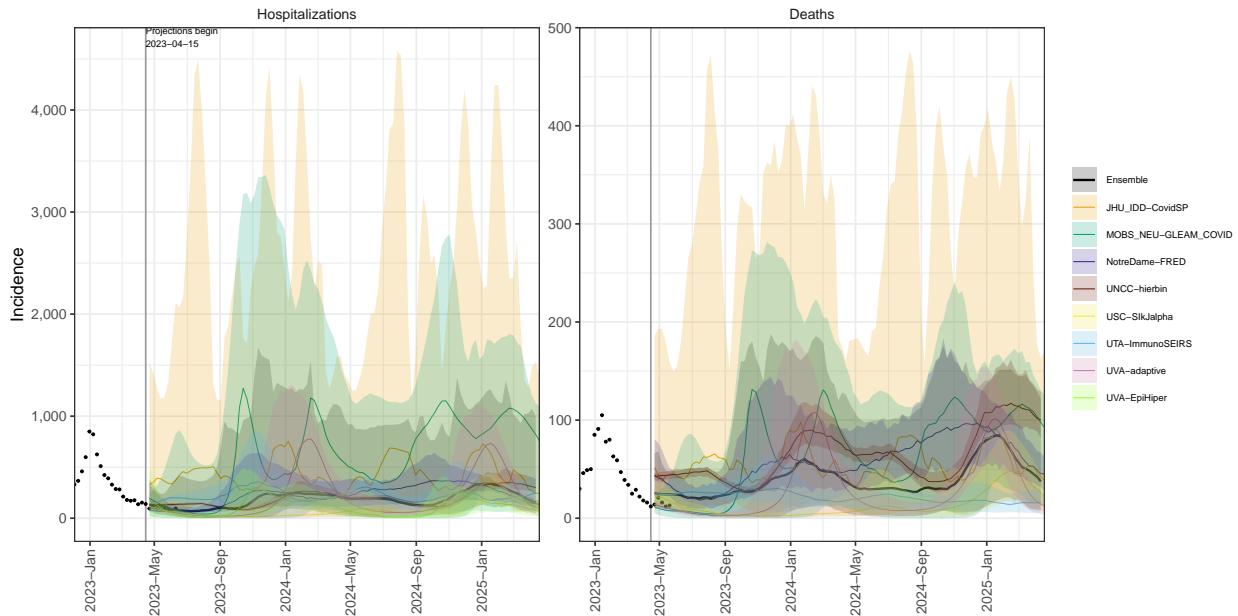
PA model variance & 95% projection intervals – Booster for all, High immune escape



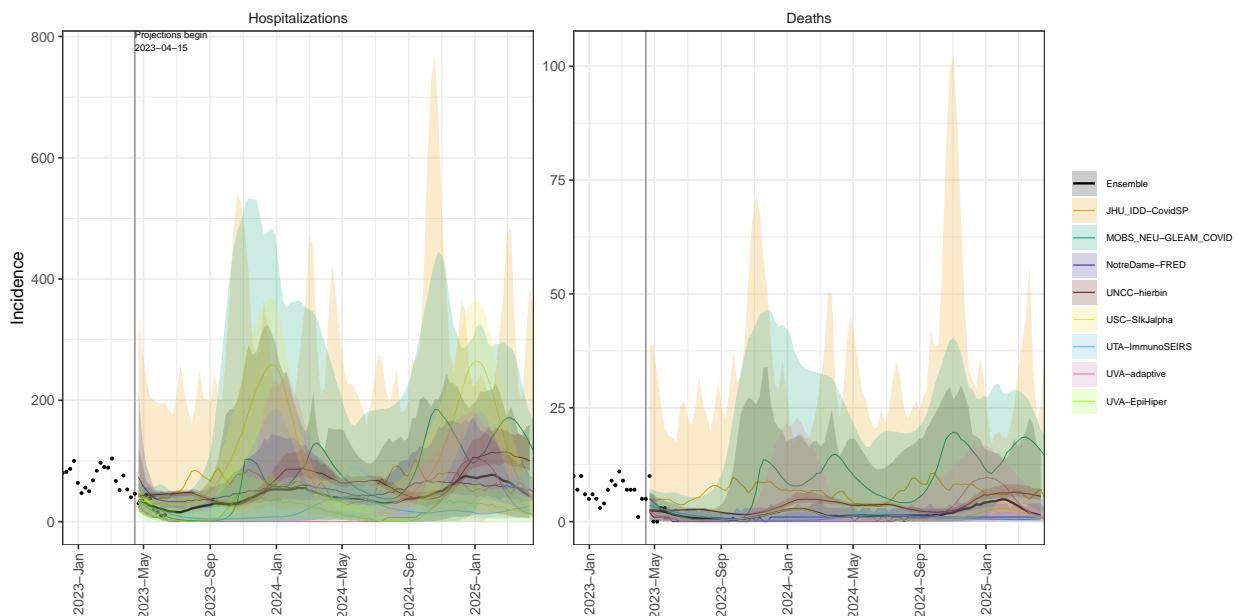
RI model variance & 95% projection intervals – Booster for all, High immune escape



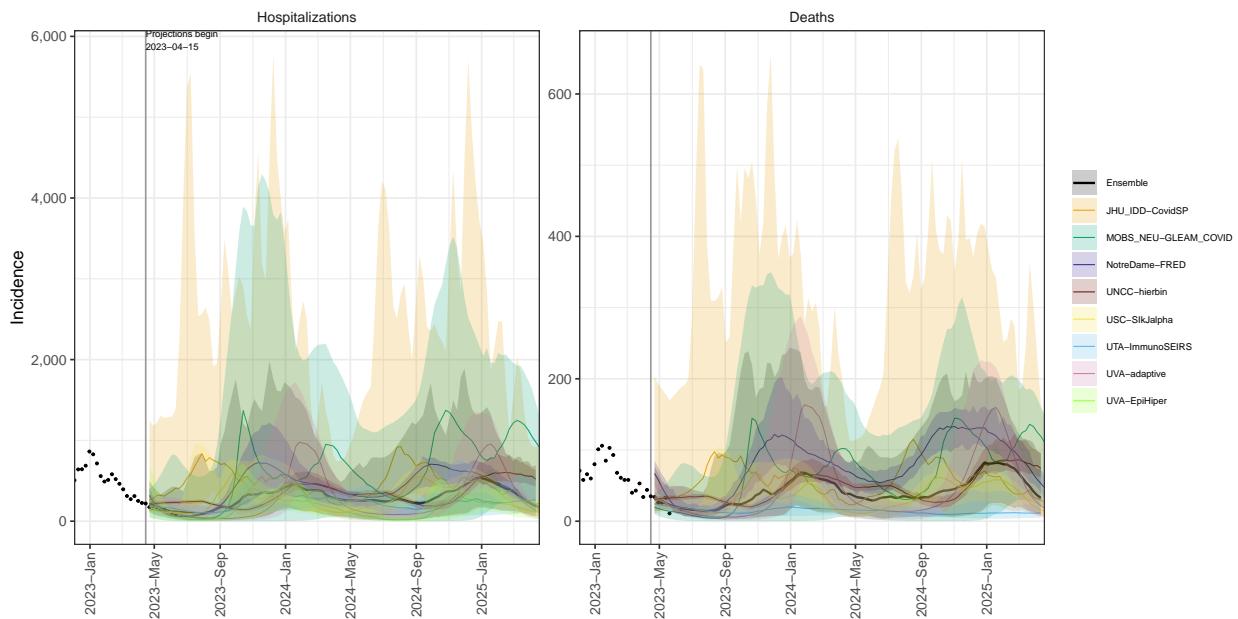
SC model variance & 95% projection intervals – Booster for all, High immune escape



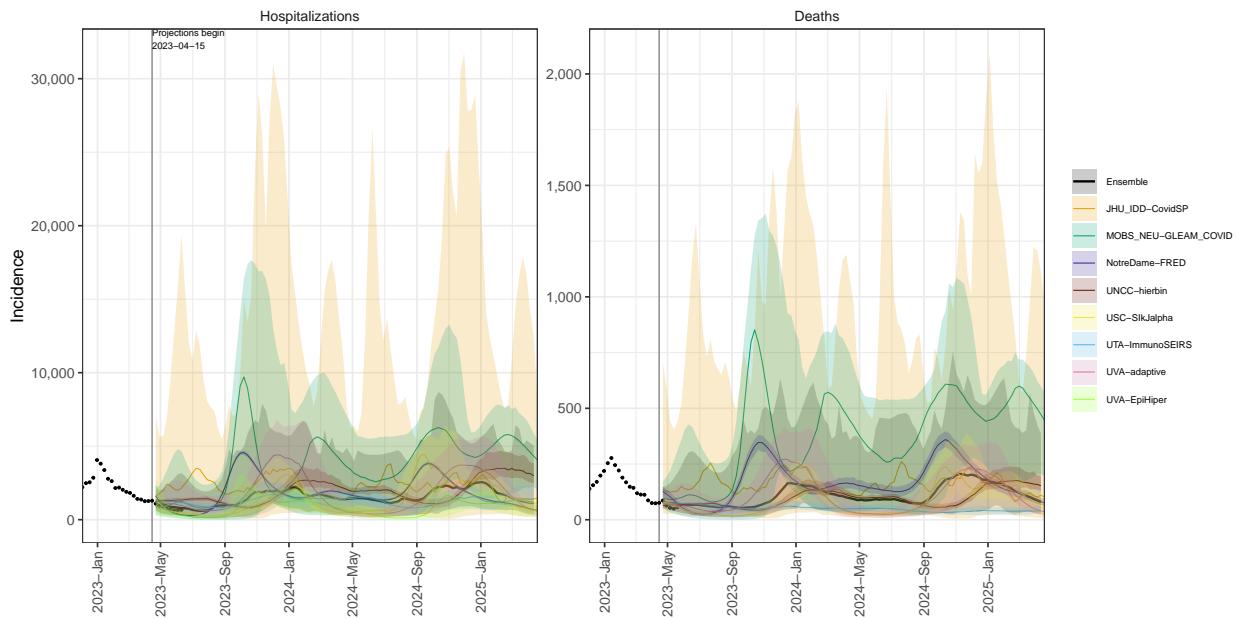
SD model variance & 95% projection intervals – Booster for all, High immune escape



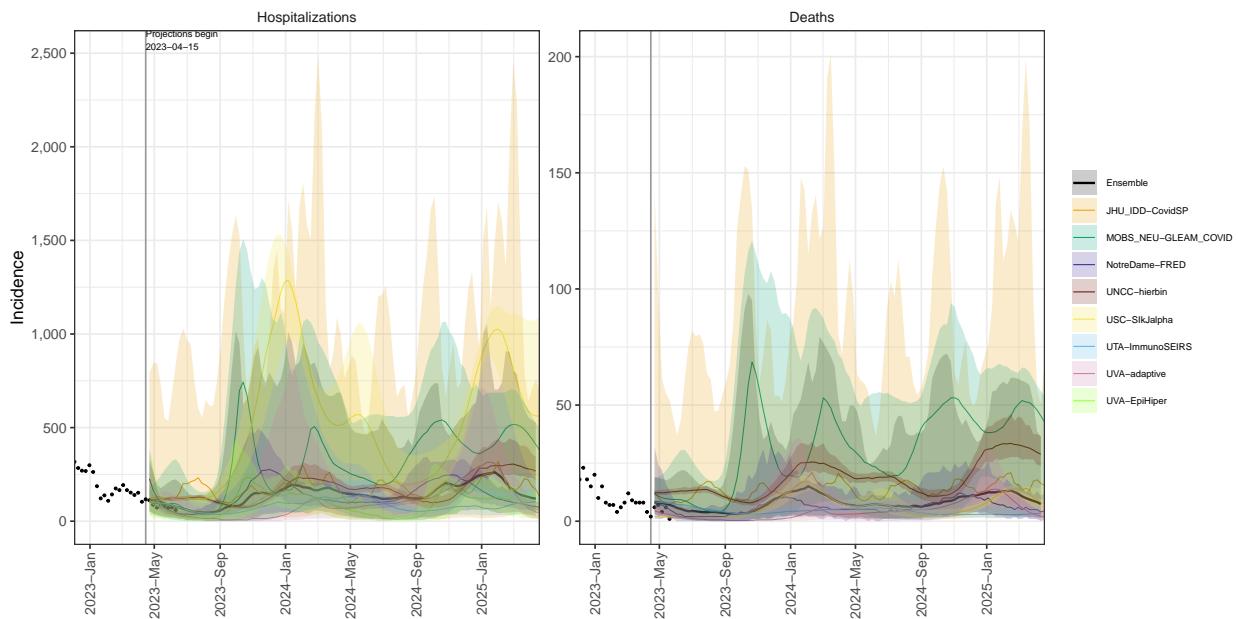
TN model variance & 95% projection intervals – Booster for all, High immune escape



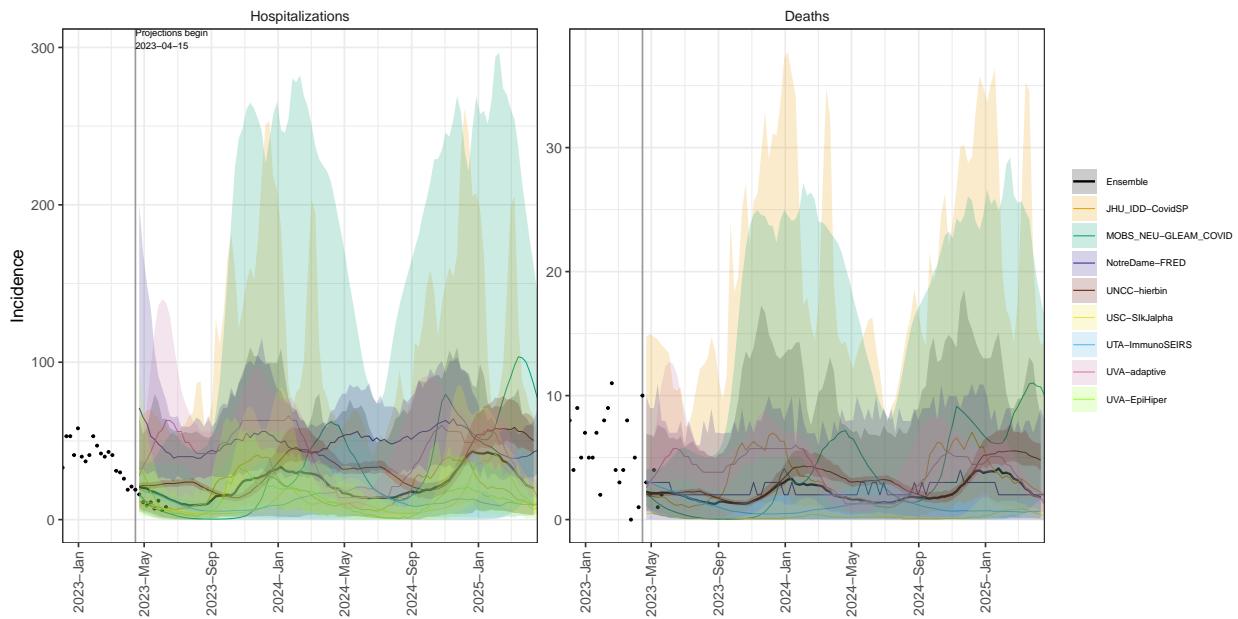
TX model variance & 95% projection intervals – Booster for all, High immune escape



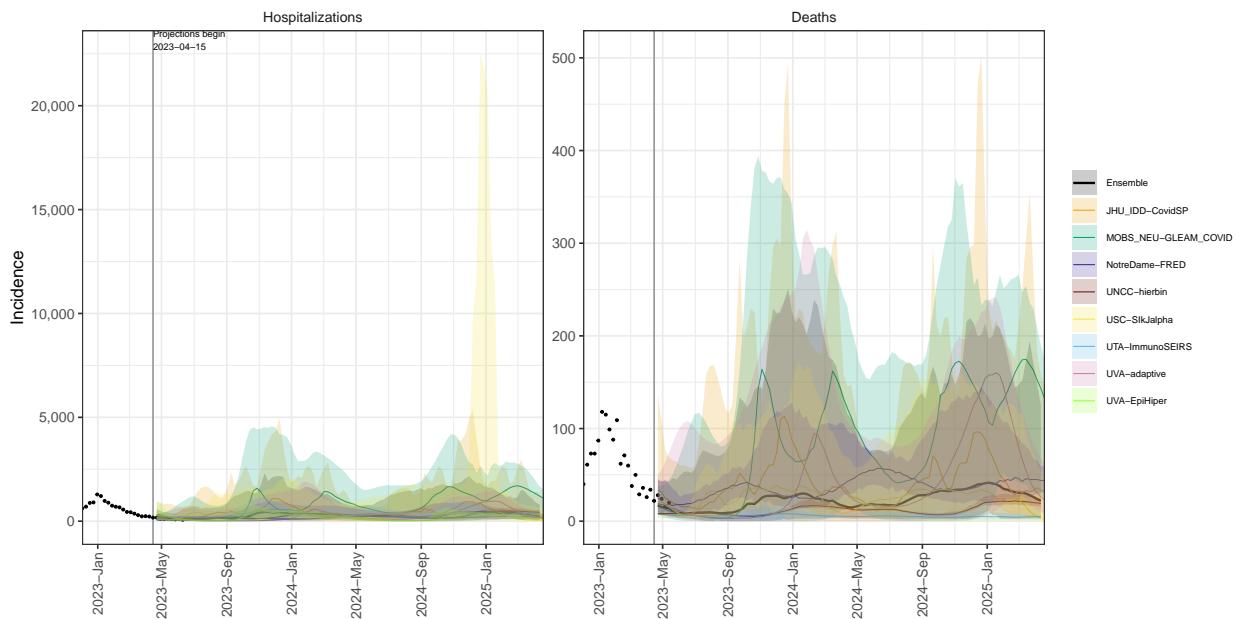
UT model variance & 95% projection intervals – Booster for all, High immune escape



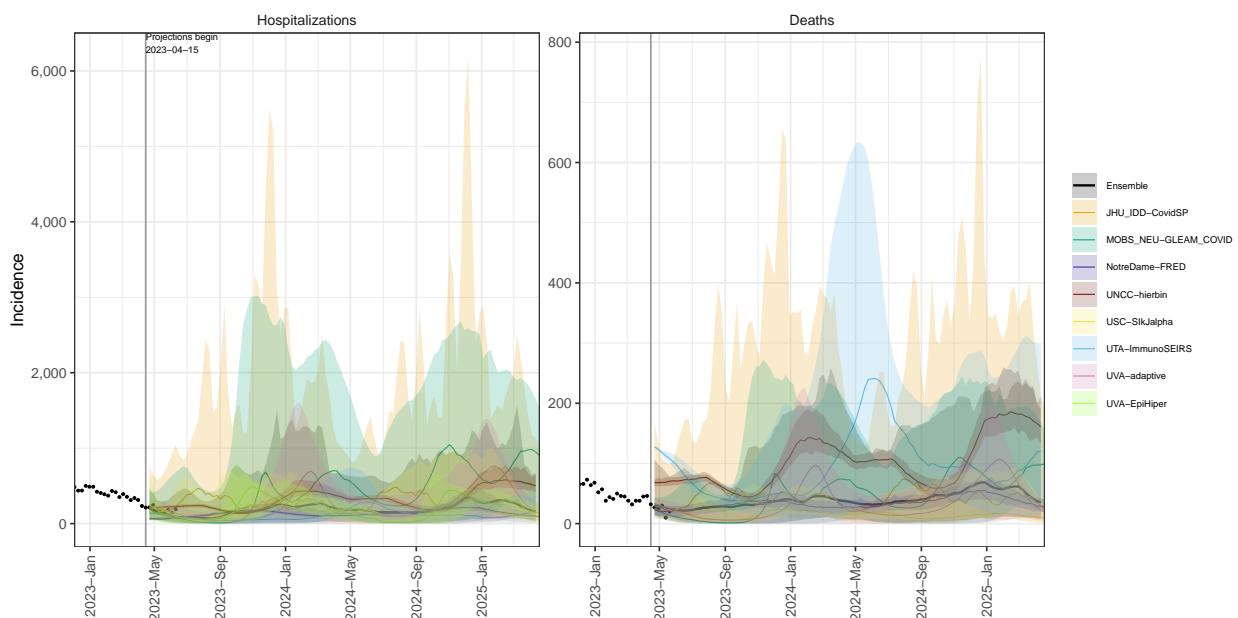
VT model variance & 95% projection intervals – Booster for all, High immune escape



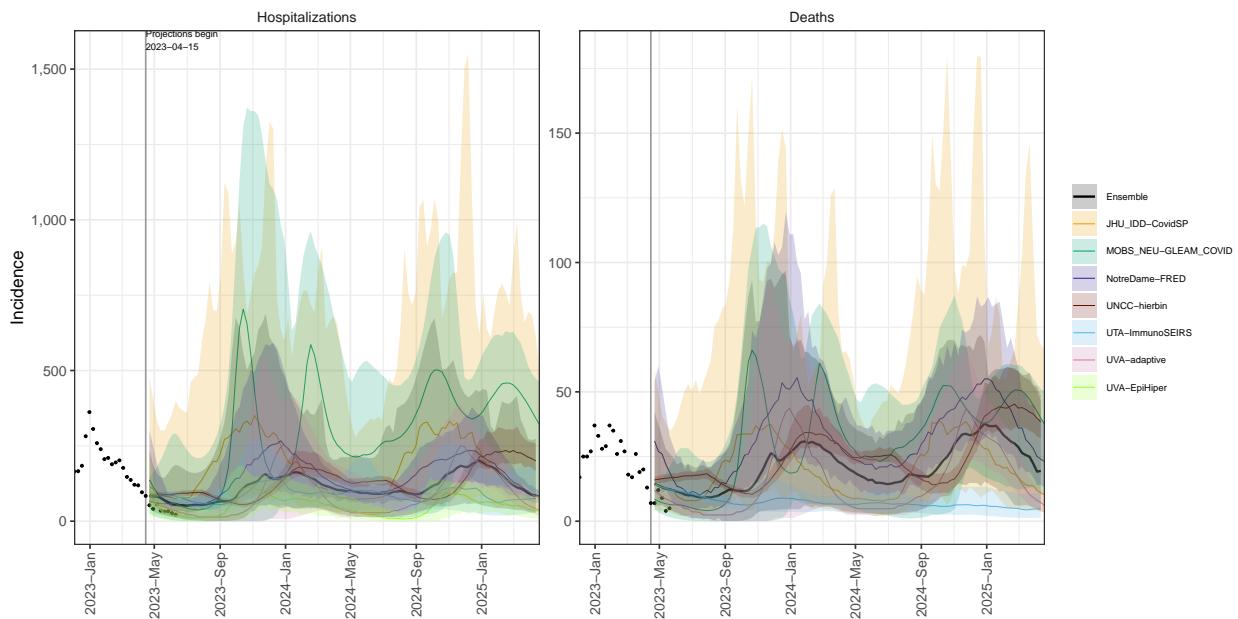
VA model variance & 95% projection intervals – Booster for all, High immune escape



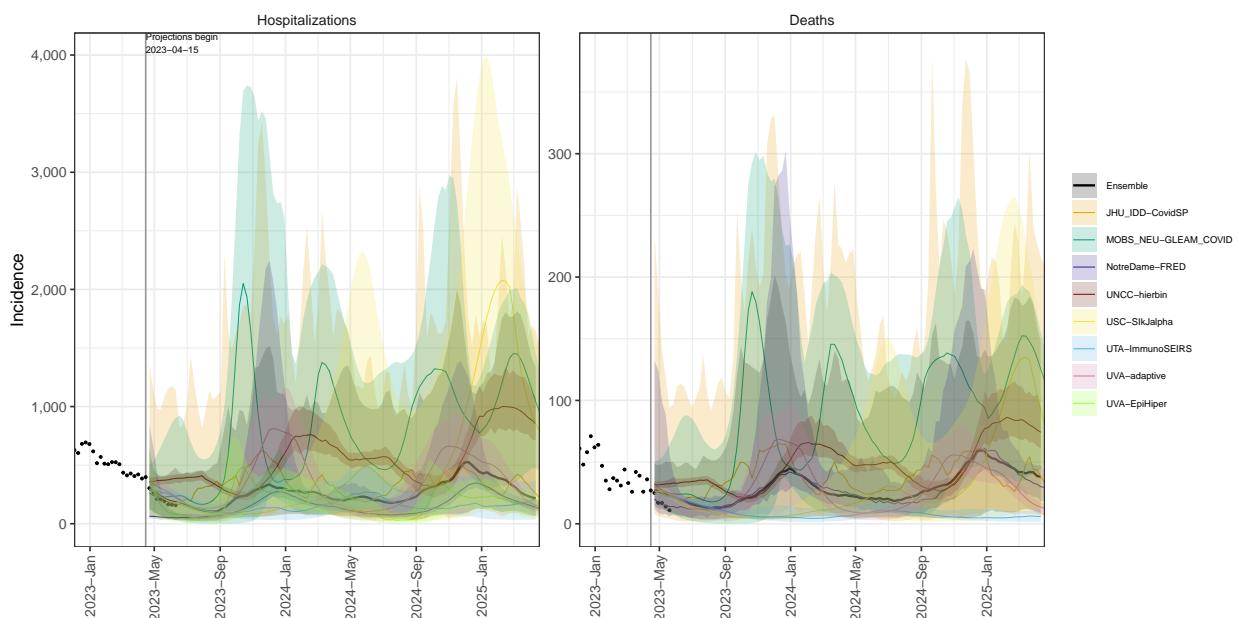
WA model variance & 95% projection intervals – Booster for all, High immune escape



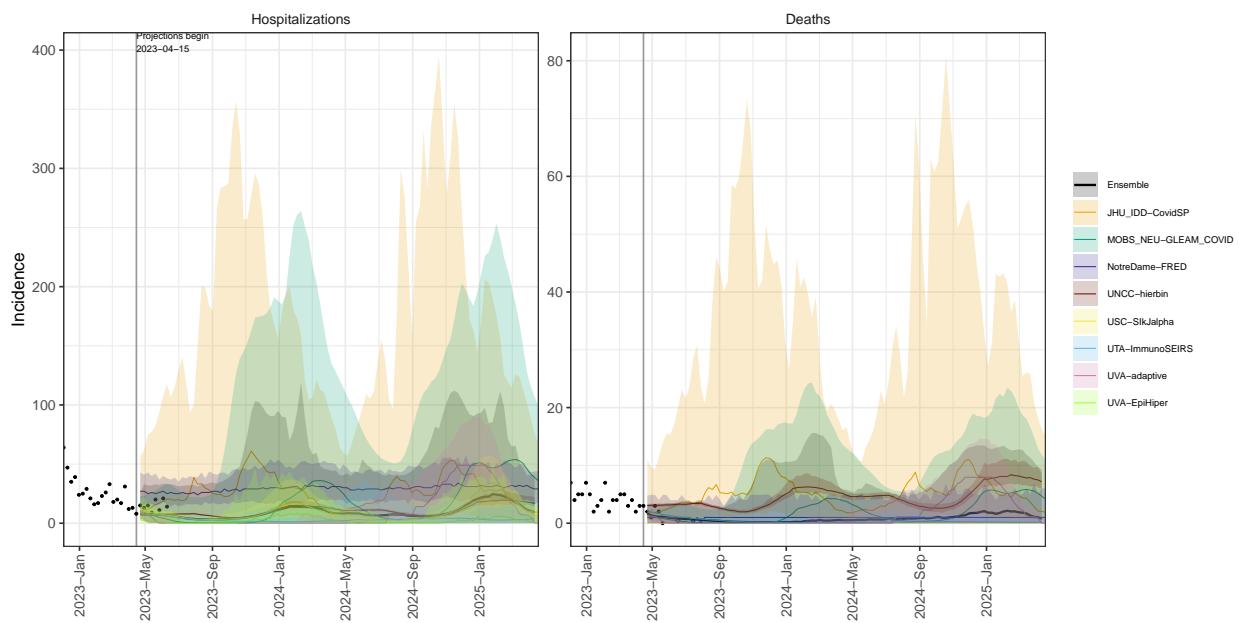
WV model variance & 95% projection intervals – Booster for all, High immune escape



WI model variance & 95% projection intervals – Booster for all, High immune escape



WY model variance & 95% projection intervals – Booster for all, High immune escape



## Total seasonal hospitalizations, by model and scenario

Model	Total hospitalizations - low immune escape			
	Warm season 2023	Cold season 2023-24	Warm season 2024	Cold season 2024-25
<b>Booster for 65+ Low immune escape</b>				
UVA-adaptive	149,098 (126,522- 183,565)	566,668 (497,370- 688,170)	120,496 ( 90,775- 151,923)	683,412 (638,346- 774,729)
UVA-EpiHiper	56,817 ( 20,940- 101,605)	339,255 (179,800- 482,711)	46,814 ( 19,817- 83,711)	316,548 (171,693- 438,127)
UTA-ImmunoSEIRS	164,778 (134,448- 207,951)	643,770 (405,886- 875,939)	197,620 (107,987- 345,350)	581,257 (332,544- 904,775)
USC-SikJalpha	227,340 (102,465- 340,837)	588,274 (266,240- 862,745)	259,526 (109,720- 427,716)	667,972 (426,185- 1,048,518)
UNCC-hierbin	251,774 (246,313- 256,673)	403,249 (373,922- 479,702)	158,319 (154,173- 163,549)	325,148 (292,722- 387,482)
NotreDame-FRED	104,840 ( 99,664- 111,383)	678,898 (637,212- 718,711)	255,752 (248,292- 265,754)	758,460 (734,479- 794,722)
MOBS_NEU-GLEAM_COVID	113,804 ( 74,203- 163,782)	838,363 (711,615- 936,327)	176,931 (102,698- 245,363)	830,016 (687,444- 937,765)
JHU_IDD-CovidSP	267,443 (147,334- 388,131)	875,672 (551,887-1,122,396)	215,937 (114,065- 583,610)	844,686 (533,214-1,123,446)
Ensemble	155,770 ( 36,627- 337,064)	633,550 (259,720- 998,710)	165,248 ( 33,675- 404,807)	689,004 (247,767-1,029,311)
<b>Booster for all Low immune escape</b>				
UVA-adaptive	149,098 (126,522- 183,565)	449,418 (374,235- 557,070)	127,734 ( 98,513- 153,912)	582,062 (531,191- 664,158)
UVA-EpiHiper	56,458 ( 22,151- 103,371)	304,528 (167,599- 442,741)	32,682 ( 15,211- 60,037)	237,090 (136,559- 333,788)
UTA-ImmunoSEIRS	164,844 (134,351- 204,785)	386,506 (177,595- 623,810)	255,420 (135,052- 401,098)	376,341 (174,761- 617,898)
USC-SikJalpha	227,339 (193,823- 374,080)	566,311 (252,162- 834,717)	155,102 ( 68,347- 262,632)	559,095 (328,794- 953,099)
UNCC-hierbin	249,297 (243,406- 256,220)	371,899 (349,896- 453,433)	154,627 (147,936- 161,470)	311,392 (282,491- 385,564)
NotreDame-FRED	104,978 ( 98,526- 112,088)	651,831 (608,085- 701,424)	266,151 (255,408- 274,782)	702,215 (670,951- 740,875)
MOBS_NEU-GLEAM_COVID	107,529 ( 67,501- 160,243)	693,216 (540,243- 799,298)	185,272 (113,745- 269,727)	719,254 (604,526- 812,300)
JHU_IDD-CovidSP	265,714 (155,087- 391,803)	721,317 (454,114- 929,577)	197,901 (105,139- 417,252)	703,391 (497,117- 934,138)
Ensemble	155,995 ( 37,022- 347,750)	484,136 (221,362- 835,510)	160,537 ( 24,070- 342,372)	578,652 (182,653- 874,792)
<b>No booster Low immune escape</b>				
UVA-adaptive	149,098 (126,522- 183,565)	635,284 (565,160- 758,290)	111,188 ( 83,329- 144,708)	739,926 (703,802- 840,921)
UVA-EpiHiper	56,267 ( 21,873- 102,294)	368,888 (195,663- 538,390)	51,210 ( 22,244- 96,523)	358,444 (191,575- 522,550)
UTA-ImmunoSEIRS	166,392 (132,318- 203,400)	731,942 (385,195-1,080,775)	209,356 (118,303- 385,948)	736,095 (378,823-1,133,260)
USC-SikJalpha	225,112 (177,420- 367,809)	705,843 (327,182-1,024,995)	418,672 (224,692- 681,101)	779,799 (519,164-1,208,591)
UNCC-hierbin	257,801 (252,608- 264,915)	478,293 (448,992- 558,131)	169,894 (164,759- 175,440)	383,386 (360,613- 445,031)
NotreDame-FRED	104,521 ( 99,780- 111,597)	689,454 (647,378- 738,635)	251,447 (241,276- 259,396)	793,954 (770,213- 831,388)
MOBS_NEU-GLEAM_COVID	107,305 ( 72,623- 156,526)	980,230 (803,402-1,093,399)	184,080 (118,323- 244,352)	976,710 (797,167-1,081,275)
JHU_IDD-CovidSP	266,518 (149,723- 386,375)	1,028,989 (691,978-1,317,838)	257,531 (118,480- 629,585)	1,015,008 (668,891-1,322,834)
Ensemble	155,995 ( 39,568- 340,004)	683,583 (294,505-1,175,269)	181,944 ( 38,067- 541,457)	767,669 (289,985-1,189,896)

Each value represents the median with the 95% projection interval

Total hospitalizations - high immune escape				
Model	Warm season 2023	Cold season 2023-24	Warm season 2024	Cold season 2024-25
<b>Booster for 65+ High immune escape</b>				
UVA-adaptive	150,842 ( 128,376- 187,777)	829,154 ( 772,195- 967,592)	149,399 ( 114,893- 177,700)	866,628 ( 847,294-1,041,702)
UVA-EpiHiper	86,280 ( 31,470- 148,919)	469,917 ( 234,779- 673,918)	84,304 ( 35,231- 148,861)	446,994 ( 226,564- 641,880)
UTA-ImmunoSEIRS	186,312 ( 149,992- 227,918)	685,913 ( 427,608- 931,723)	211,368 ( 109,024- 356,655)	650,342 ( 311,675- 956,930)
USC-SikJalpa	247,915 ( 167,294- 312,618)	834,426 ( 556,548-1,130,571)	463,119 ( 376,773- 624,391)	1,159,026 ( 925,136-1,401,798)
UNCC-hierbin	261,054 ( 253,950- 266,428)	453,726 ( 417,995- 531,702)	188,826 ( 182,452- 205,745)	409,403 ( 368,035- 495,093)
NotreDame-FRED	117,329 ( 110,951- 123,346)	745,220 ( 704,689- 793,087)	280,196 ( 270,411- 289,565)	768,246 ( 743,700- 802,739)
MOBS_NEU-GLEAM_COVID	222,607 ( 159,513- 299,082)	1,764,885 ( 1,557,202-1,931,401)	636,231 ( 511,327- 759,183)	1,992,563 ( 1,783,728-2,154,307)
JHU_IDD-CovidSP	437,870 ( 319,052- 619,453)	1,347,950 ( 1,100,723-1,610,485)	510,412 ( 366,540- 714,972)	1,371,039 ( 1,100,498-1,614,894)
Ensemble	193,737 ( 54,279- 528,133)	776,014 ( 351,161-1,828,664)	275,614 ( 57,303- 713,014)	851,544 ( 331,625-2,061,422)
<b>Booster for all High immune escape</b>				
UVA-adaptive	150,842 ( 128,376- 187,777)	695,914 ( 633,464- 814,180)	151,002 ( 119,717- 175,832)	760,421 ( 727,014- 916,717)
UVA-EpiHiper	84,985 ( 31,931- 152,486)	423,440 ( 223,164- 622,205)	64,406 ( 27,077- 118,260)	352,508 ( 191,471- 520,579)
UTA-ImmunoSEIRS	181,590 ( 155,252- 228,198)	465,660 ( 252,064- 697,992)	297,740 ( 139,176- 435,272)	445,397 ( 190,288- 668,749)
USC-SikJalpa	247,960 ( 186,395- 318,812)	806,746 ( 522,930-1,100,686)	334,312 ( 252,566- 463,346)	1,112,226 ( 905,316-1,409,015)
UNCC-hierbin	258,665 ( 253,649- 263,343)	426,613 ( 395,119- 518,536)	185,105 ( 178,132- 194,265)	397,104 ( 356,125- 492,981)
NotreDame-FRED	117,358 ( 111,834- 123,409)	715,230 ( 667,674- 758,906)	285,246 ( 273,049- 293,493)	710,882 ( 684,136- 738,510)
MOBS_NEU-GLEAM_COVID	215,453 ( 147,616- 285,949)	1,659,382 ( 1,431,913-1,812,368)	628,634 ( 510,060- 759,918)	1,900,545 ( 1,681,892-2,065,435)
JHU_IDD-CovidSP	451,227 ( 316,650- 641,384)	1,208,903 ( 927,085-1,482,569)	480,824 ( 307,708- 667,129)	1,222,061 ( 914,886-1,495,996)
Ensemble	191,151 ( 58,919- 542,153)	701,224 ( 306,308-1,746,389)	284,110 ( 48,674- 686,017)	731,706 ( 247,707-2,004,126)
<b>No booster High immune escape</b>				
UVA-adaptive	150,842 ( 128,376- 187,777)	899,671 ( 840,602-1,045,824)	145,470 ( 112,141- 179,100)	921,032 ( 903,637-1,106,992)
UVA-EpiHiper	85,594 ( 31,907- 150,176)	505,832 ( 253,352- 737,378)	92,106 ( 36,141- 167,170)	499,770 ( 247,283- 740,052)
UTA-ImmunoSEIRS	181,444 ( 147,076- 215,157)	751,081 ( 463,815-1,038,495)	213,481 ( 112,682- 375,519)	708,361 ( 353,364-1,079,554)
USC-SikJalpa	247,381 ( 175,321- 300,827)	967,505 ( 658,855-1,325,947)	657,132 ( 546,008- 903,230)	1,333,788 ( 1,076,332-1,660,914)
UNCC-hierbin	267,232 ( 261,911- 274,591)	534,899 ( 501,845- 625,396)	202,589 ( 196,415- 209,183)	480,722 ( 451,847- 558,846)
NotreDame-FRED	117,146 ( 111,048- 124,633)	761,380 ( 710,034- 804,629)	276,186 ( 264,469- 285,810)	801,865 ( 774,541- 836,042)
MOBS_NEU-GLEAM_COVID	214,519 ( 165,375- 313,920)	1,919,743 ( 1,642,105-2,123,746)	625,599 ( 520,118- 777,503)	2,127,764 ( 1,864,481-2,352,802)
JHU_IDD-CovidSP	446,305 ( 313,912- 639,995)	1,550,868 ( 1,245,827-1,794,268)	593,622 ( 406,965- 834,802)	1,583,751 ( 1,252,381-1,812,420)
Ensemble	189,405 ( 56,721- 531,383)	838,567 ( 384,435-1,997,508)	271,478 ( 63,590- 804,529)	909,056 ( 374,258-2,215,139)

Each value represents the median with the 95% projection interval

## Total seasonal deaths, by model and scenario

Total deaths - low immune escape				
Model	Warm season 2023	Cold season 2023-24	Warm season 2024	Cold season 2024-25
<b>Booster for 65+ Low immune escape</b>				
UVA-adaptive	14,661 ( 12,441- 18,050)	55,720 ( 48,906- 67,668)	11,848 ( 8,926- 14,939)	67,200 ( 62,769- 76,179)
UTA-ImmunoSEIRS	16,521 ( 14,971- 18,591)	32,279 ( 18,655- 44,216)	12,136 ( 7,253- 19,078)	23,900 ( 13,904- 40,310)
USC-SIkJalpha	13,320 ( 10,078- 16,127)	32,749 ( 16,863- 52,982)	13,512 ( 5,308- 24,596)	41,260 ( 23,655- 73,441)
UNCC-hierbin	24,141 ( 23,728- 24,761)	38,743 ( 35,785- 46,151)	15,240 ( 14,762- 15,696)	31,363 ( 28,238- 37,381)
NotreDame-FRED	16,012 ( 15,159- 16,786)	93,784 ( 87,808-100,421)	37,908 ( 36,326- 39,582)	127,310 ( 121,712-133,229)
MOBS_NEU-GLEAM_COVID	13,236 ( 9,273- 18,029)	83,294 ( 71,119- 92,638)	19,463 ( 11,502- 27,079)	83,625 ( 68,765- 93,833)
JHU_IDD-CovidSP	26,937 ( 16,069- 38,302)	76,887 ( 45,488-102,403)	20,221 ( 11,714- 50,989)	76,567 ( 46,542-101,684)
Ensemble	16,120 ( 10,690- 34,451)	55,640 ( 21,199- 98,602)	15,340 ( 7,667- 39,203)	66,603 ( 17,273-130,380)
<b>Booster for all Low immune escape</b>				
UVA-adaptive	14,661 ( 12,441- 18,050)	44,191 ( 36,799- 54,777)	12,560 ( 9,687- 15,134)	57,234 ( 52,232- 65,307)
UTA-ImmunoSEIRS	16,490 ( 14,906- 18,262)	18,684 ( 9,199- 30,776)	9,606 ( 5,007- 14,511)	13,107 ( 6,762- 21,906)
USC-SIkJalpha	13,564 ( 11,184- 16,127)	32,381 ( 17,306- 52,094)	9,153 ( 3,409- 17,213)	34,403 ( 18,373- 65,512)
UNCC-hierbin	23,924 ( 23,421- 24,352)	36,364 ( 33,578- 42,777)	14,839 ( 14,403- 15,493)	30,150 ( 27,284- 37,378)
NotreDame-FRED	16,038 ( 15,002- 17,070)	88,828 ( 82,402- 96,661)	38,387 ( 36,085- 39,787)	113,299 ( 106,498-119,384)
MOBS_NEU-GLEAM_COVID	12,541 ( 8,460- 17,780)	70,041 ( 55,137- 80,632)	19,808 ( 12,067- 27,950)	73,023 ( 61,052- 83,568)
JHU_IDD-CovidSP	27,053 ( 15,972- 38,083)	68,780 ( 44,757- 91,718)	20,183 ( 10,975- 41,173)	69,450 ( 50,160- 92,737)
Ensemble	16,068 ( 10,495- 31,696)	45,406 ( 12,792- 92,095)	14,800 ( 5,233- 39,060)	57,275 ( 9,392-115,921)
<b>No booster Low immune escape</b>				
UVA-adaptive	14,661 ( 12,441- 18,050)	62,467 ( 55,572- 74,563)	10,933 ( 8,194- 14,229)	72,757 ( 69,205- 82,688)
UTA-ImmunoSEIRS	16,511 ( 14,579- 18,109)	46,202 ( 23,900- 67,035)	17,660 ( 10,653- 26,606)	38,562 ( 20,853- 63,112)
USC-SIkJalpha	13,336 ( 10,893- 16,127)	37,181 ( 21,383- 59,730)	27,025 ( 13,800- 50,162)	46,015 ( 27,847- 80,801)
UNCC-hierbin	24,794 ( 24,192- 25,300)	46,100 ( 42,912- 53,821)	16,337 ( 15,856- 16,721)	37,056 ( 34,327- 43,103)
NotreDame-FRED	16,044 ( 15,125- 17,107)	95,598 ( 90,641-104,090)	37,302 ( 35,439- 38,945)	135,420 ( 130,694-142,793)
MOBS_NEU-GLEAM_COVID	12,453 ( 9,069- 17,018)	100,661 ( 82,985-110,326)	20,394 ( 13,618- 27,060)	100,353 ( 83,011-110,137)
JHU_IDD-CovidSP	27,460 ( 16,436- 37,451)	107,614 ( 65,754-139,113)	28,303 ( 14,371- 65,982)	109,506 ( 65,612-139,381)
Ensemble	16,122 ( 10,435- 32,590)	64,014 ( 25,210-121,425)	19,519 ( 9,590- 46,185)	72,996 ( 27,276-140,375)

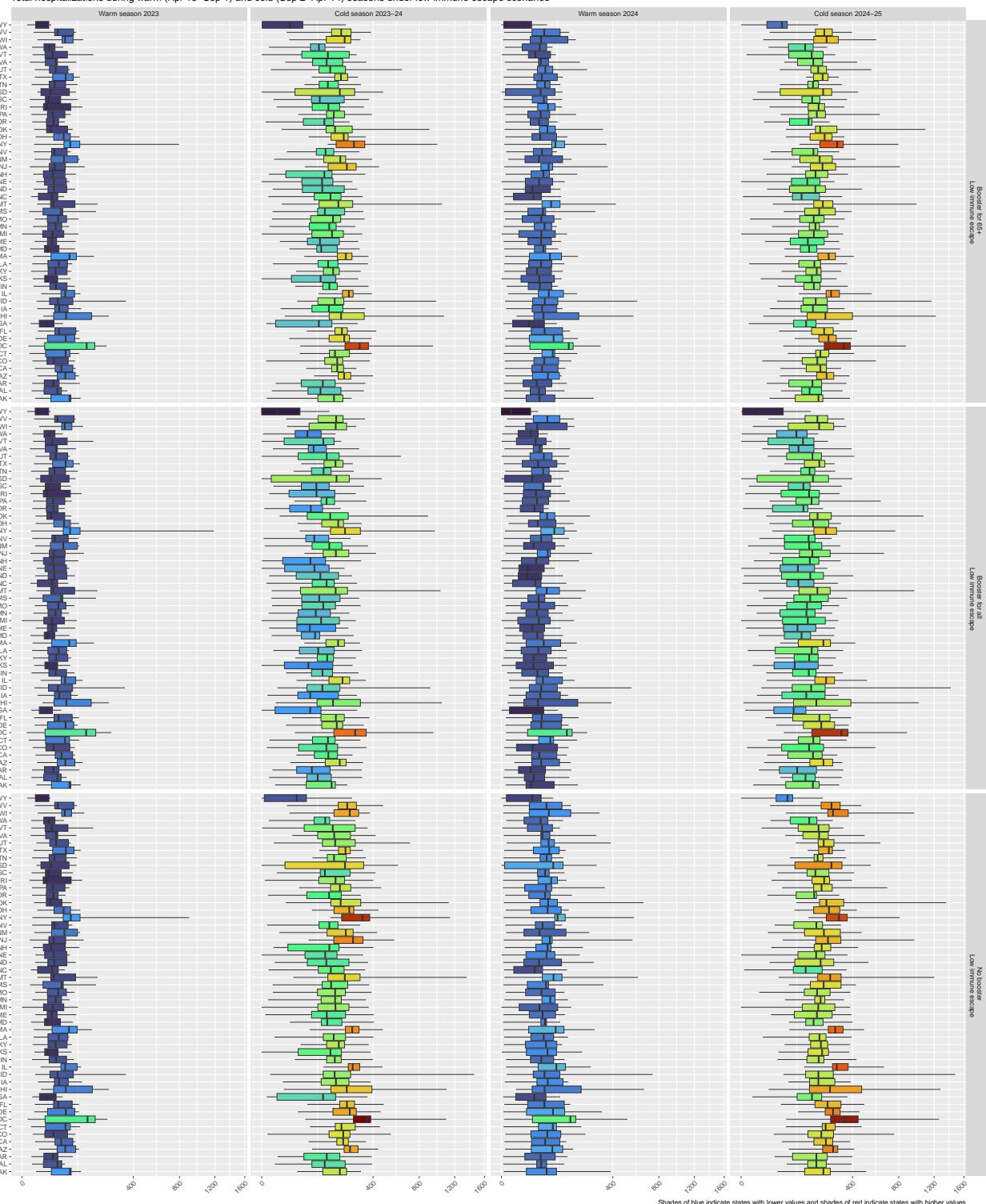
Each value represents the median with the 95% projection interval

Total deaths - high immune escape				
Model	Warm season 2023	Cold season 2023-24	Warm season 2024	Cold season 2024-25
<b>Booster for 65+ High immune escape</b>				
UVA-adaptive	14,512 ( 12,351- 18,065)	79,770 ( 74,290- 93,088)	14,373 ( 11,053- 17,096)	83,375 ( 81,515-100,218)
UTA-ImmunoSEIRS	20,190 ( 18,135- 22,613)	39,372 ( 23,092- 55,511)	15,753 ( 9,376- 24,384)	32,067 ( 14,125- 49,900)
USC-SIkJalpha	14,294 ( 11,140- 18,950)	47,320 ( 29,548- 68,999)	24,248 ( 17,421- 37,066)	69,946 ( 53,562- 93,352)
UNCC-hierbin	25,038 ( 24,523- 25,559)	44,034 ( 40,370- 51,606)	18,145 ( 17,530- 18,687)	39,943 ( 35,720- 47,237)
NotreDame-FRED	19,228 ( 17,842- 20,409)	103,660 ( 96,305-111,237)	41,571 ( 39,152- 43,187)	130,923 (124,690-136,788)
MOBS_NEU-GLEAM_COVID	23,485 ( 17,092- 31,073)	175,797 (154,365-192,115)	67,228 ( 55,040- 80,110)	203,659 (181,404-220,598)
JHU_IDD-CovidSP	41,680 ( 30,246- 56,022)	124,299 (101,146-153,629)	44,420 ( 30,017- 60,695)	128,298 (102,027-154,842)
Ensemble	20,061 ( 12,560- 48,769)	80,400 ( 30,932-184,039)	24,845 ( 11,391- 74,055)	83,852 ( 22,547-211,593)
<b>Booster for all High immune escape</b>				
UVA-adaptive	14,512 ( 12,351- 18,065)	66,951 ( 60,943- 78,329)	14,527 ( 11,517- 16,916)	73,157 ( 69,943- 88,194)
UTA-ImmunoSEIRS	20,019 ( 18,463- 22,451)	25,387 ( 14,372- 39,174)	15,717 ( 8,595- 23,563)	21,499 ( 9,892- 31,667)
USC-SIkJalpha	14,371 ( 11,543- 19,275)	46,769 ( 28,720- 68,293)	18,465 ( 12,304- 29,223)	67,663 ( 51,967- 92,435)
UNCC-hierbin	24,790 ( 24,378- 25,293)	40,531 ( 37,667- 48,802)	17,683 ( 17,065- 18,425)	37,806 ( 34,010- 47,409)
NotreDame-FRED	19,195 ( 17,861- 20,578)	98,350 ( 89,877-104,253)	41,022 ( 38,806- 42,711)	116,481 (109,043-121,130)
MOBS_NEU-GLEAM_COVID	22,784 ( 16,015- 29,635)	166,106 (142,461-183,092)	68,027 ( 55,116- 79,095)	195,041 (172,102-212,275)
JHU_IDD-CovidSP	43,992 ( 28,441- 57,209)	120,080 ( 90,538-148,688)	47,074 ( 28,712- 64,109)	120,450 ( 89,987-151,516)
Ensemble	19,886 ( 12,713- 50,900)	67,864 ( 20,488-175,327)	20,164 ( 11,417- 73,524)	74,988 ( 14,406-204,766)
<b>No booster High immune escape</b>				
UVA-adaptive	14,512 ( 12,351- 18,065)	86,554 ( 80,871-100,615)	13,995 ( 10,789- 17,230)	88,609 ( 86,935-106,499)
UTA-ImmunoSEIRS	19,761 ( 18,206- 21,615)	56,174 ( 35,259- 76,615)	21,244 ( 12,813- 32,582)	40,799 ( 19,086- 69,008)
USC-SIkJalpha	14,283 ( 11,285- 16,920)	52,380 ( 33,490- 76,576)	42,551 ( 32,726- 62,807)	78,082 ( 60,228- 97,926)
UNCC-hierbin	25,710 ( 25,074- 26,232)	51,565 ( 47,963- 60,290)	19,483 ( 18,909- 19,941)	46,473 ( 43,013- 54,121)
NotreDame-FRED	19,242 ( 17,786- 20,521)	107,247 ( 98,370-113,113)	41,184 ( 38,401- 42,864)	139,899 (131,689-145,747)
MOBS_NEU-GLEAM_COVID	22,534 ( 18,001- 32,280)	194,282 (167,247-216,308)	66,462 ( 56,495- 80,435)	219,571 (192,060-243,204)
JHU_IDD-CovidSP	41,660 ( 29,534- 57,806)	163,443 (131,884-203,217)	61,056 ( 41,860- 87,204)	168,737 (137,759-211,402)
Ensemble	19,903 ( 12,666- 50,793)	87,200 ( 38,470-207,426)	39,700 ( 12,594- 77,026)	89,717 ( 29,133-231,815)

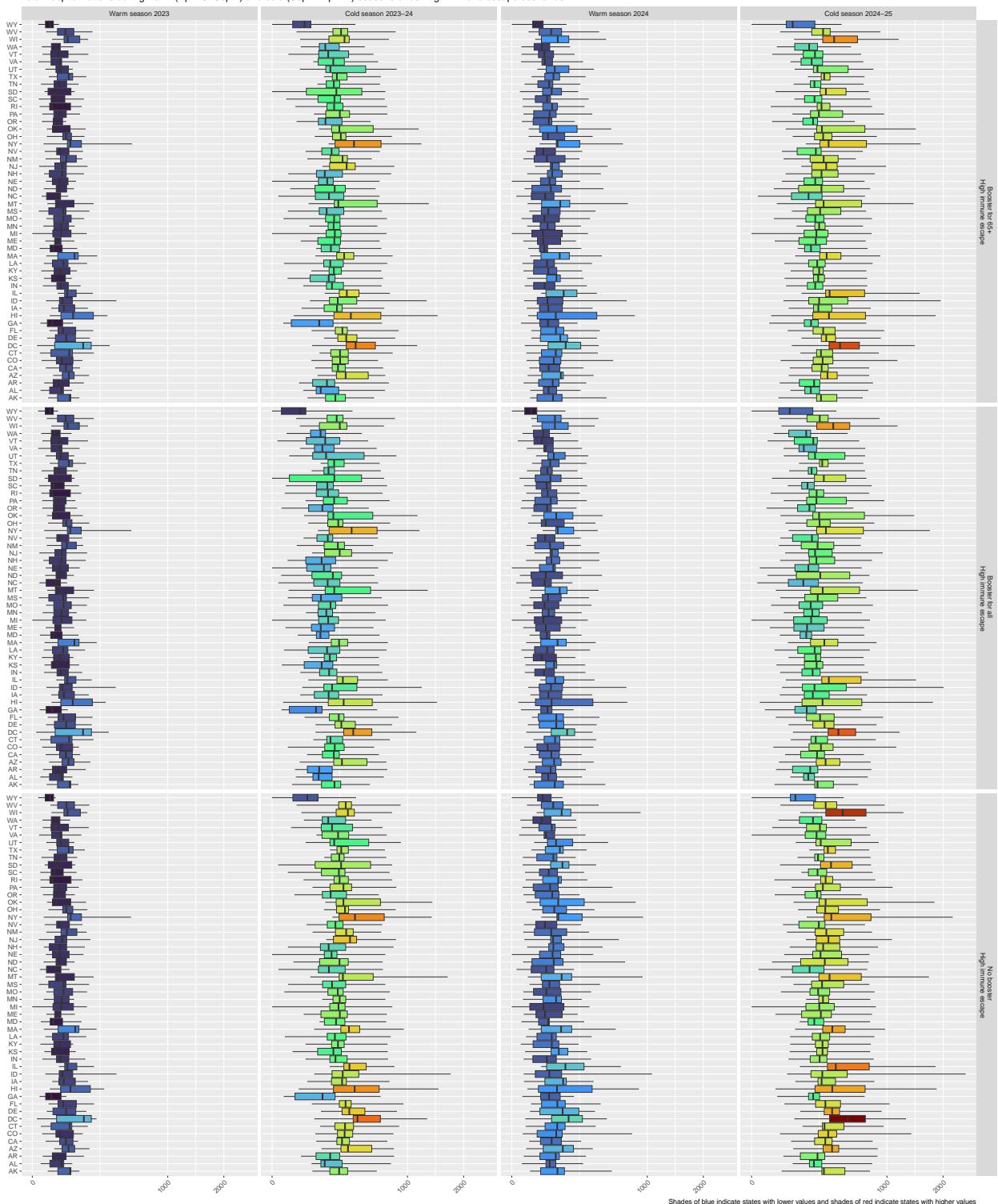
Each value represents the median with the 95% projection interval

## Additional state-level seasonal plots

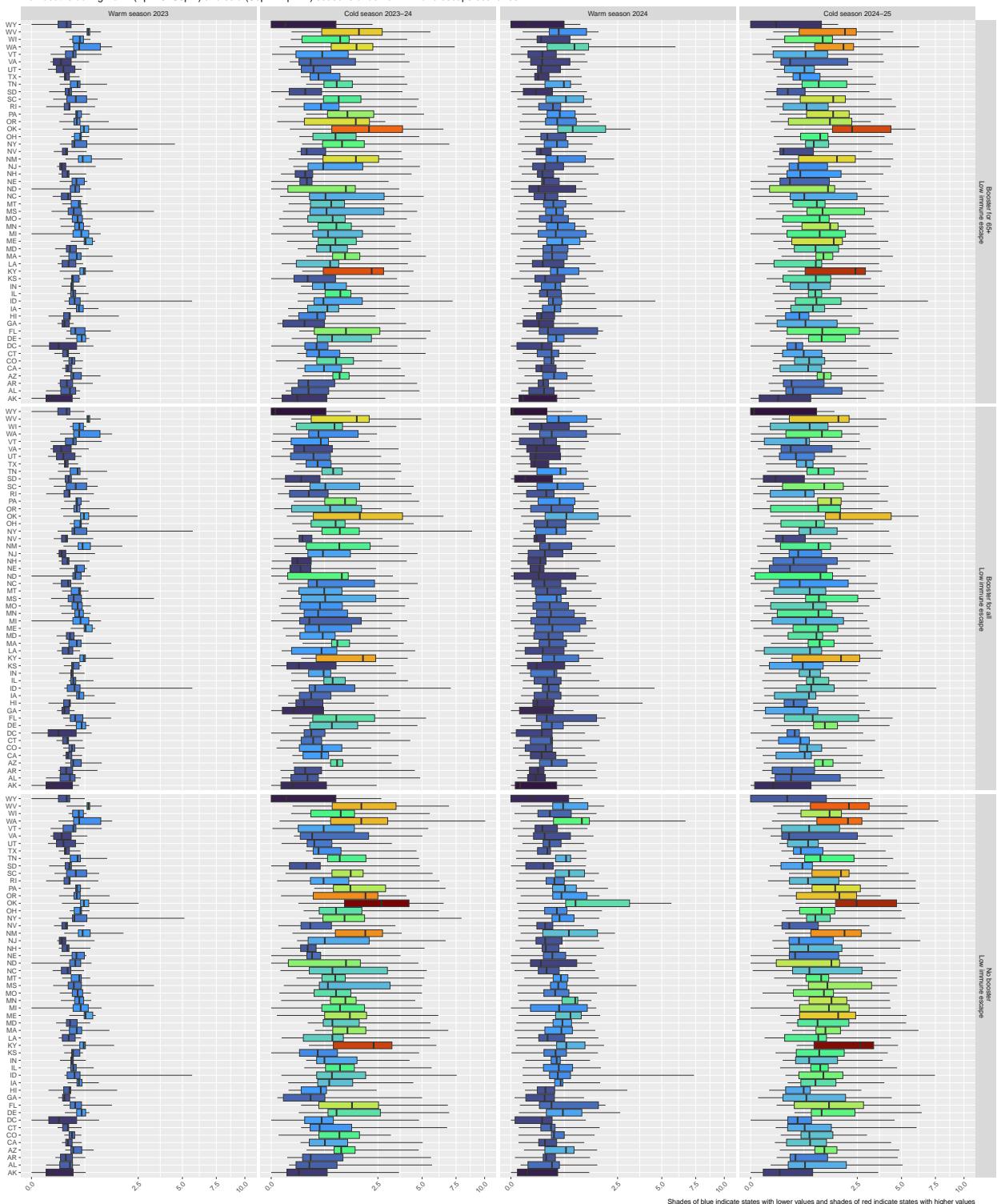
Total hospitalizations during warm (Apr 15–Sep 1) and cold (Sep 2–Apr 14) seasons under low immune escape scenarios



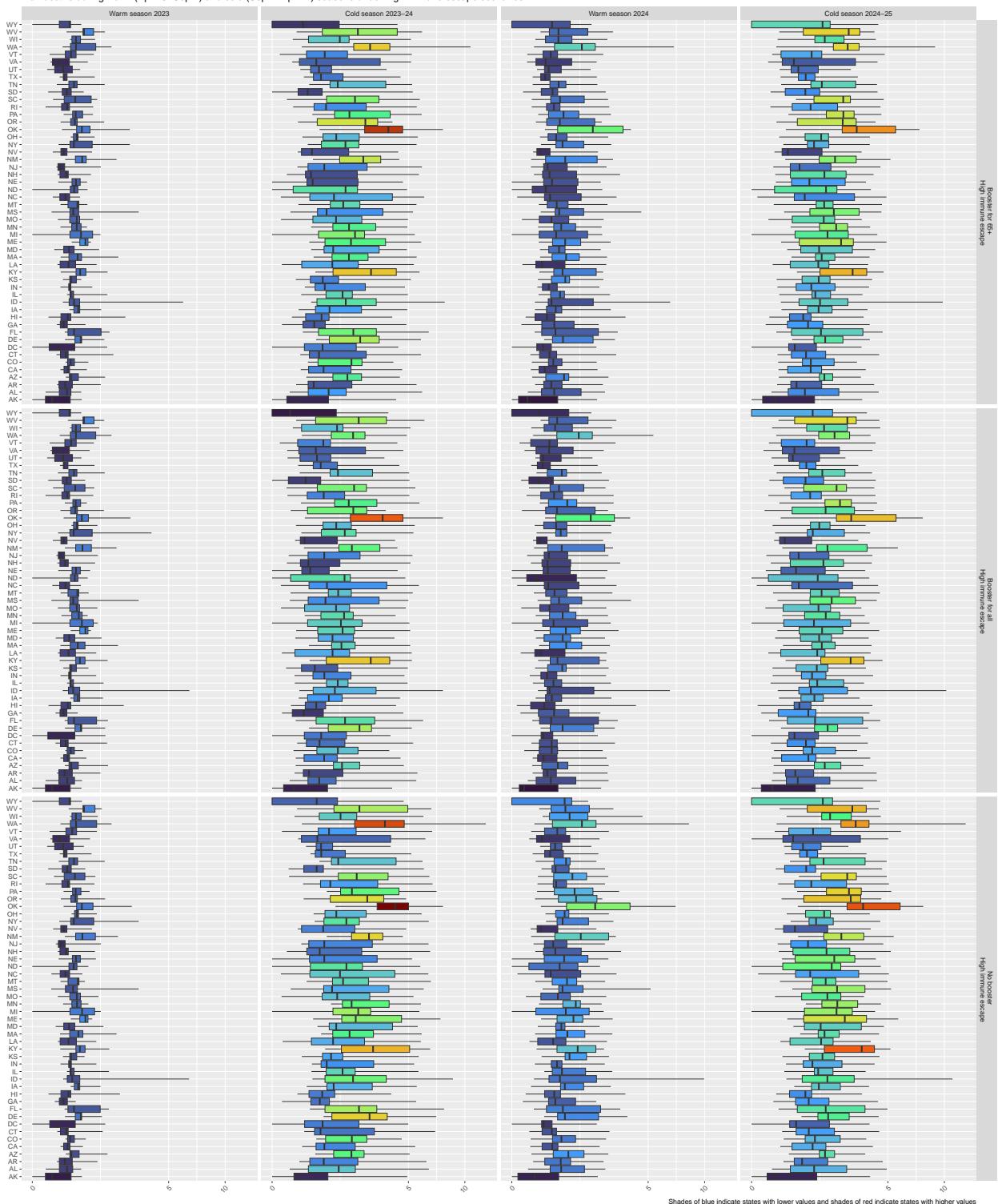
Total hospitalizations during warm (Apr 15–Sep 1) and cold (Sep 2–Apr 14) seasons under high immune escape scenarios



Max deaths during warm (Apr 15–Sep 1) and cold (Sep 2–Apr 14) seasons under low immune escape scenarios



Max deaths during warm (Apr 15–Sep 1) and cold (Sep 2–Apr 14) seasons under high immune escape scenarios



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