RSV Scenario Modeling Hub Report

26 February, 2024
Scenario Modeling Hub Team[1]

Key Takeaways

Full scenario specifications can be found here.

In our first round of RSV projections, we generated mid-season hospitalization estimates for the 29-week period Nov 12, 2023 to June 1, 2024. We considered 4 intervention scenarios representing the impact of new interventions to mitigate the burden of RSV, along with a counterfactual "status quo" scenario where RSV control is the same as in past years. Intervention scenarios assumed optimistic and pessimistic levels of coverage and effectiveness of long-acting monoclonal antibodies (nirsevimab) in infants under 7 mo, combined with optimistic and pessimistic levels of coverage and effectiveness of vaccination in seniors 60+ yrs. Scenario assumptions were indexed on past coverage of influenza vaccines by state and age group and efficacy estimates from randomized control trials for RSV interventions. Here we present ensemble projections based on contributions from 10 teams, using the trimmed linear opinion pool aggregation approach. All-age and age-specific estimates of RSV hospitalizations are provided nationally and for 12 states contributing to RSV-NET surveillance.

Our main findings include:

- RSV interventions, compared to a no-intervention scenario, would avert on average 11% (95% CI 6-16%) of RSV hospitalizations during the projection period based on our most optimistic assumptions (scenario A, optimistic intervention coverage and high effectiveness in both infants and seniors). This amounts to 15,500 average seasonal hospitalizations averted nationally (95%CI 9,300-21,600). These reductions would be 4% (95% CI 2-6%), or 6,200 (95% CI 3,600-8,900) average hospitalizations averted, with the most pessimistic assumptions (scenario D, pessimistic intervention coverage and moderate effectiveness in both infants and seniors).
- Intervention benefits are projected to be higher in the targeted age groups than overall. In the most optimistic scenario, an average of 21% (95% CI 16-24%) of RSV hospitalizations would be averted among seniors over 65 yrs and 15% (95% CI 4-24%) among infants under 1 yr. In this optimistic scenario, about 56% of total hospitalizations averted are projected to be in infants. These results correspond to 1.24 (95% CI 0.45-2.03) infant hospitalization averted per 100 doses of monoclonals delivered in 2023-24) and 0.04 (0.03-0.05) senior hospitalization averted per 100 vaccine doses.
- The peak and cumulative hospitalization burden of the 2023-24 RSV season is likely to remain lower than that of the last season which had seen a large and unusual post-COVID-19 rebound of RSV, especially in children. The projected peak in 2023-24 is somewhat higher than that of the last pre-pandemic season (2019-20). This is based on the 75% projection interval of all-age estimates.

- In our most optimistic scenario (scenario A, high intervention coverage and effectiveness in both infants and seniors), median weekly hospitalizations would peak at 11,200 (95% PI 4,400-25,900). In our most pessimistic scenario (scenario E, non-intervention counterfactual), weekly hospitalizations would peak at 12,100 (95% PI 5,900-28,700). Cumulative RSV hospitalizations for the period July 1, 2023-June 1, 2024 are projected to reach 168,000 (95,500-303,000) for the most optimistic scenario, and 183,000 (95%PI 106,000-315,000) for the counterfactual scenario.
- In all scenarios, ensemble projections suggest a prolonged period of RSV activity between November and March, with a peak most likely to occur in mid-December 2023. Based on the median of all contributing models and the ensemble, the national peak of RSV is projected to have passed at the time of writing of this report. There is heterogeneity in projected RSV timing between the 12 states considered in this analysis, with most likely peak dates ranging between Nov 15, 2023 (Georgia, Tennessee) and Jan 15, 2024 (Utah).
- The combined impact of RSV, influenza, and COVID-19 on hospitalizations is likely to remain below that of last season (2022-23). This result is based on the 75% projection interval combining prior projections generated by the scenario Modeling Hub for these 3 pathogens. We assume high immune escape for COVID-19 with moderate booster uptake in all age groups (https://covid19scenariomodelinghub.org/), dominance of the A/H1N1 influenza subtype with typical influenza vaccine coverage (https://fluscenariomodelinghub.org/), optimistic RSV interventions for seniors and infants

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(scenario A), and no interaction between respiratory viruses. COVID-19 is projected to remain the dominant pathogen contributing to respiratory hospitalizations throughout the season. Of note in 2022-23, there was concurrent activity of influenza, COVID-19, and RSV early in the season, resulting in a particularly high total hospitalization burden. Activity of these pathogens is projected to be more asynchronous this year.
- There is variability between states in the projected timing and intensity of RSV activity this season. This variability is due in part to geographic differences in the seasonality of RSV, the impact of COVID-19 NPIs since 2020, and potential differences in testing and transmission intensities.

A few caveats are worth noting:

- There are differences in the post-pandemic rebound of RSV across age groups, which are not fully understood nor accounted for by all models. In particular, projections tend to underestimate disease burden in seniors. These differences could be in part due to different strengths of NPIs between young children and adults during the COVID19 period (including masking propensities), along with age-specific changes in RSV reporting.
- Based on recent data on RSV intervention uptake in the US, our optimistic scenario A seems most closely aligned with reality, though data on infant monoclonal uptake are incomplete at this time.
- This is the first round of RSV projections, and there is limited availability of calibration data or past RSV modeling experience. This is the first time that the RSV-NET hospitalization dataset has been used for long-term projections. RSV-NET covers a fraction of 12 states (9% of the US population overall) and the amount of retrospective data is limited. Further, few auxiliary datasets are available for RSV calibration, particularly regarding infections.
- Most models assume that RSV interventions will not reduce infection or transmission, so that indirect benefits are close to zero in ensemble estimates. Further, based on our optimistic scenario assumptions, the maximum reductions that would be expected from RSV interventions this season would be 21% for infants and 25% for seniors, in the hypothetical situation where intervention coverage had reached saturation before the start of the RSV season. Our ensemble projections based on the dynamics of RSV epidemics and a realistic roll-out of interventions suggest somewhat lower benefits (15 and 21% in infants and seniors, respectively), likely due to a small amount of interventions delivered too late with respect to the timing of the RSV season.
- Testing practices continue to evolve in the wake of the COVID19 pandemic, including increased use of multi-pathogen testing in clinical settings, which may affect reported hospitalizations in the RSV-NET system. This in turn will affect comparison with our projections and with prior year hospitalization data.
- We have presented the trimmed LOP as our default for ensembling, but results for the untrimmed LOP are shown on the website.

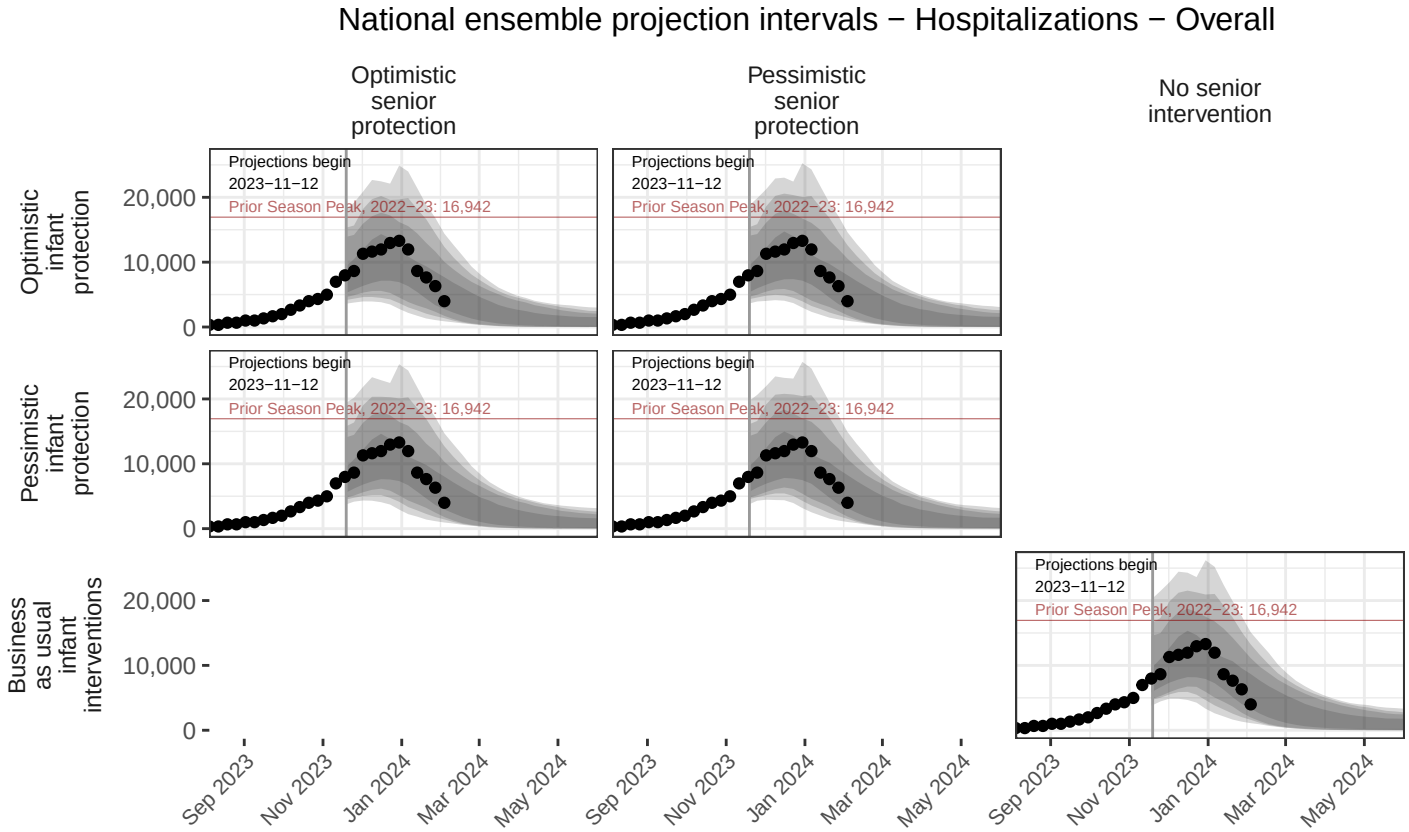
Round 1 - 2023-2024 Scenario Specifications

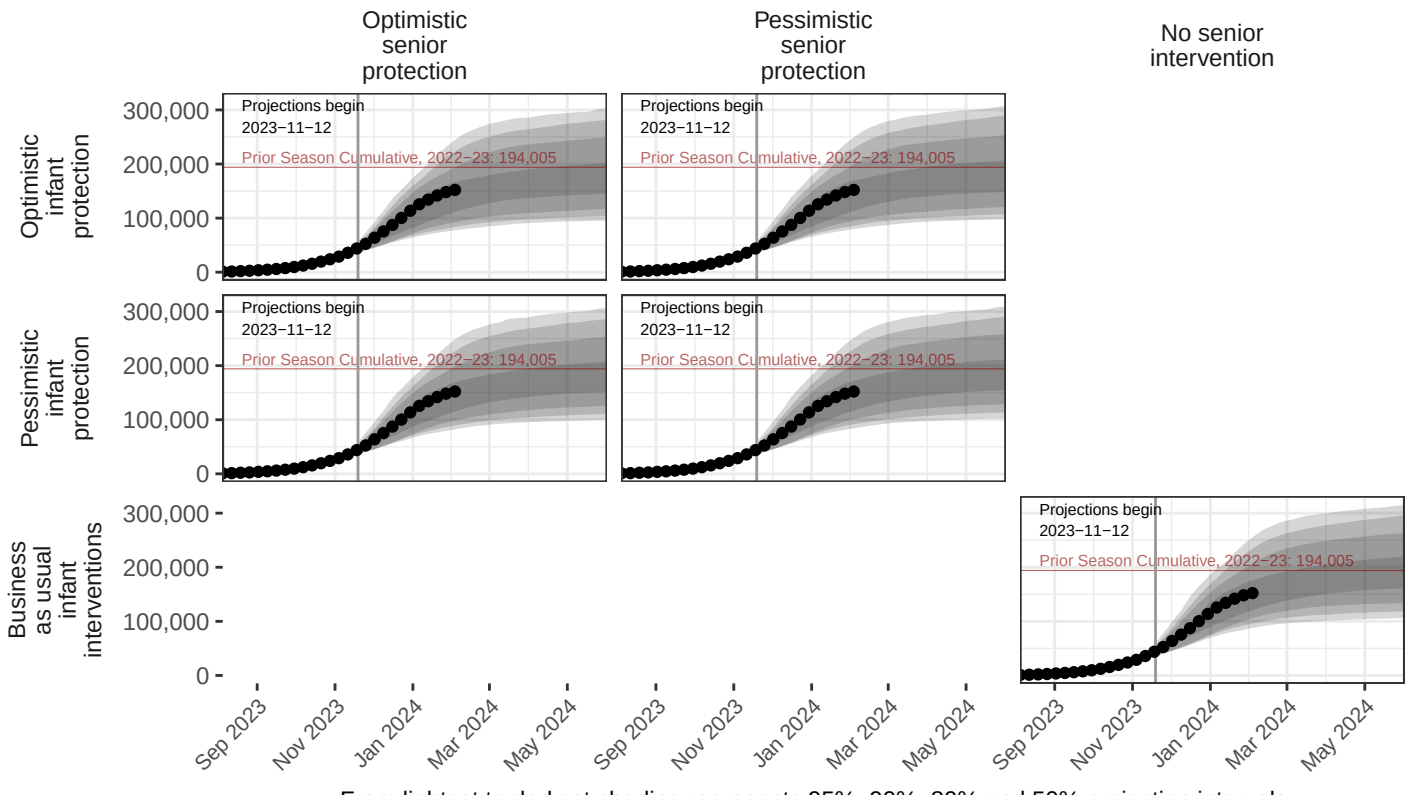
RSV Round 1 considered 4 intervention scenarios representing the impact of new interventions to mitigate the burden of RSV, plus 1 counterfactual "status quo" scenario with RSV control the same as in past years (assuming new vaccines and monoclonal antibodies were not available in 2023-24). Intervention scenarios assumed (1) optimistic and pessimistic coverage and effectiveness of long-acting monoclonal antibodies (nirsevimab) in infants under 7 months, and (2) optimistic and pessimistic coverage and effectiveness of vaccination in seniors 60+ years. Scenario assumptions are indexed on past coverage of influenza vaccines by state and age group and efficacy estimates from randomized control trials for RSV interventions.

	Optimistic senior protection Vaccine is administered from Sep-June to seniors **60+ yrs** - coverage saturates at **40%** of the 2021-22 state- and age-specific flu vaccine coverage - VE against hospitalization is **90%**	**Pessimistic senior protection** Vaccine is administered from Sep-June to seniors **60+ yrs** - coverage saturates at **20%** of the 2021-22 state-and age-specific flu vaccine coverage - VE against hospitalization is **70%**	**No senior intervention**
Optimistic infant protection Long-acting monoclonals target infants **< 6 months** during RSV season (Oct-Mar) - coverage saturates at **60%** of the 2021-22 state- and age-specific flu vaccine coverage - VE against hospitalization is **80%**	**Scenario A**	**Scenario** B	
Pessimistic infant protection Long-acting monoclonals target infants **< 6 months** during RSV season (Oct-Mar) -coverage saturates at **20%** of the 2021-22 state- and age-specific flu vaccine coverage - VE against hospitalization is **60%**	**Scenario C**	**Scenario D**	
No infant intervention beyond what was used in prior years (limited supply of palivizumab, targeting ~2% of birth cohort at high risk)			**Scenario E (counterfactual)**

Full scenario specifications can be found here.

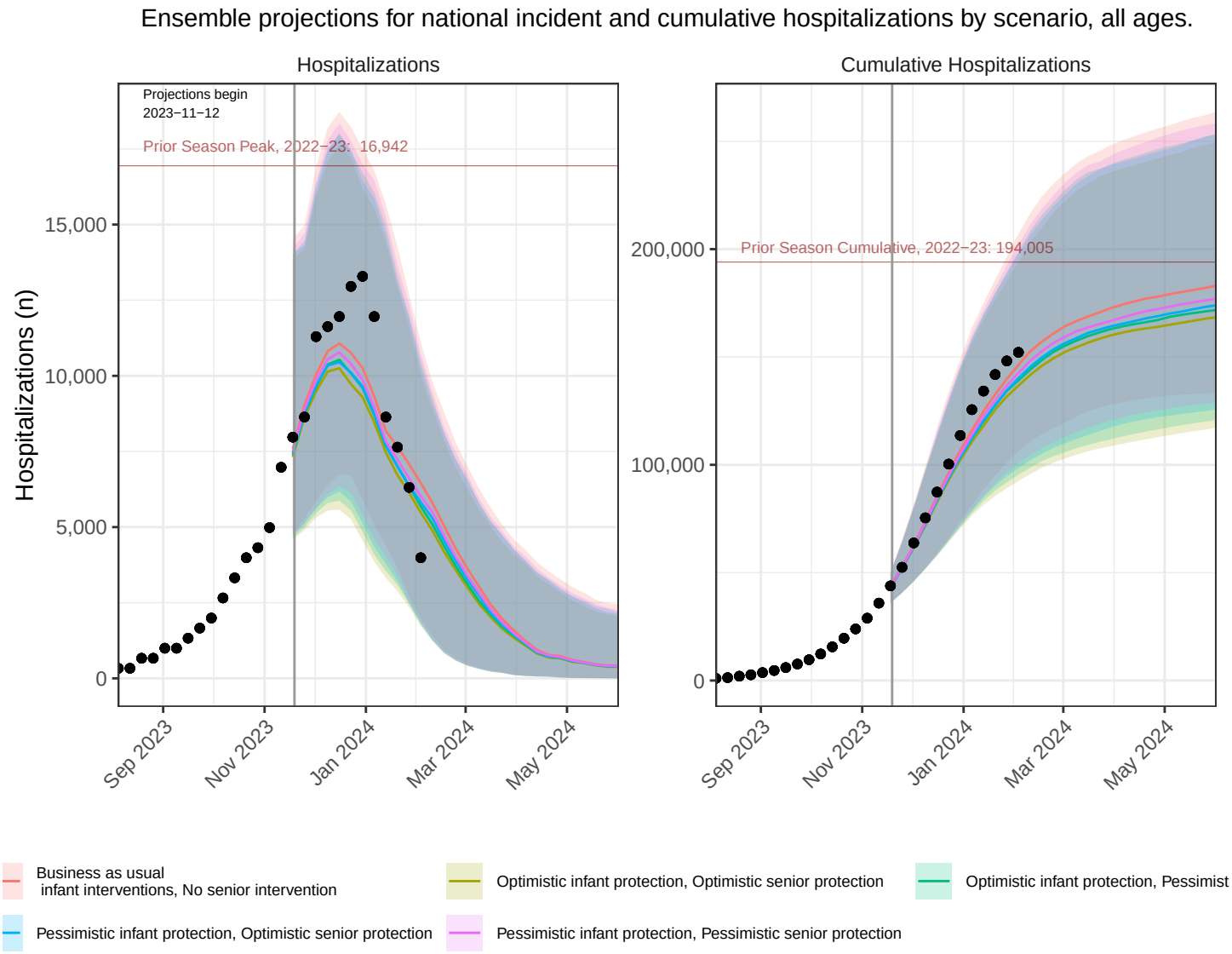
National ensemble projections





Scenario Comparison

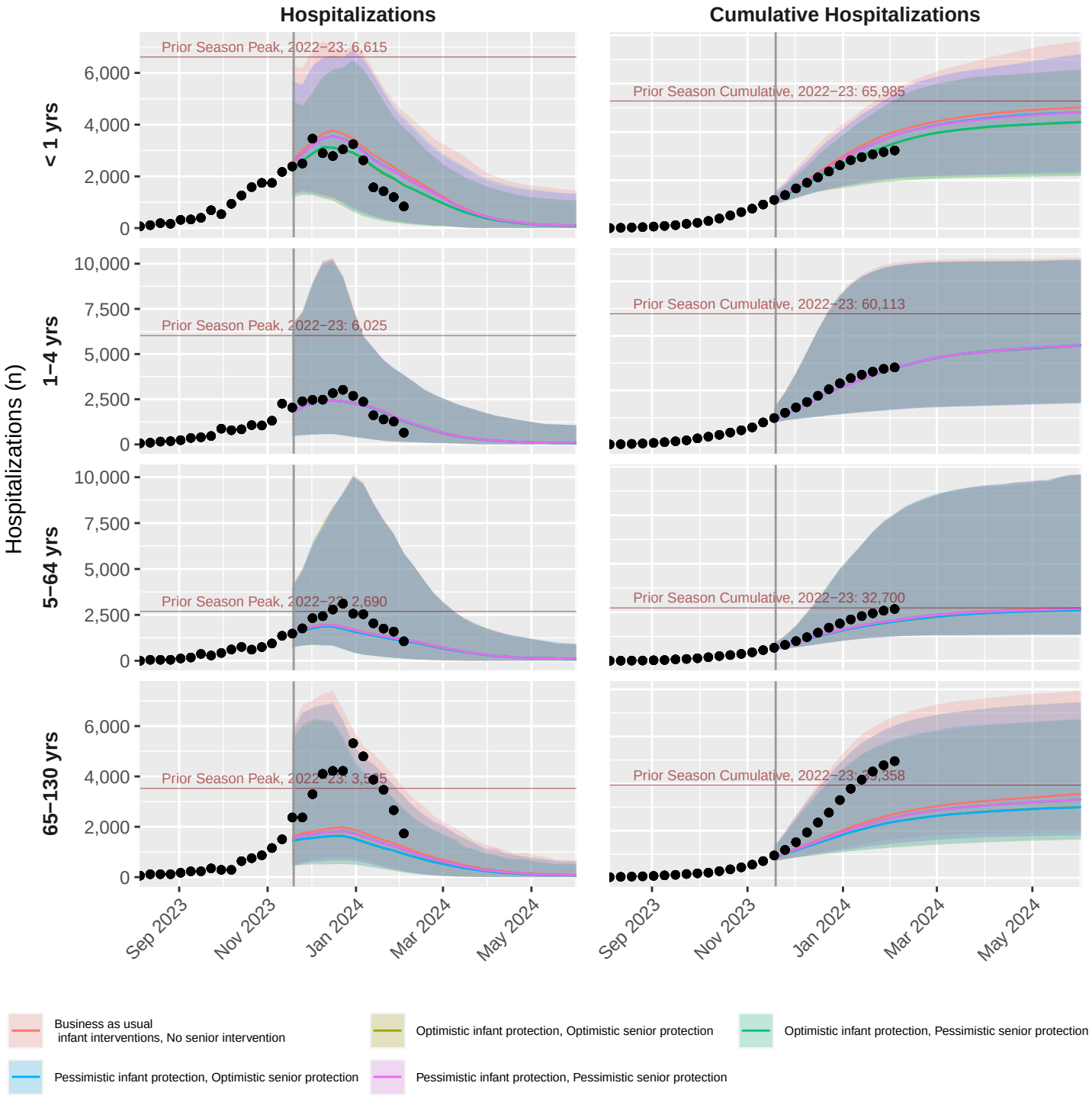
The scenario projections were overall very similar between scenarios, with increased peak and cumulative size as scenarios became more pessimistic. The national projections also follow the empirical hospitalizations well for both incident and cumulative projections, demonstrating robustness and good calibration of the overall ensemble. Horizontal lines are given for prior peak incident and cumulative hospitalizations from the 2022-23 season, taken from RSV-NET (which is used as a proxy for hospitalizations).



Comparisons by Age

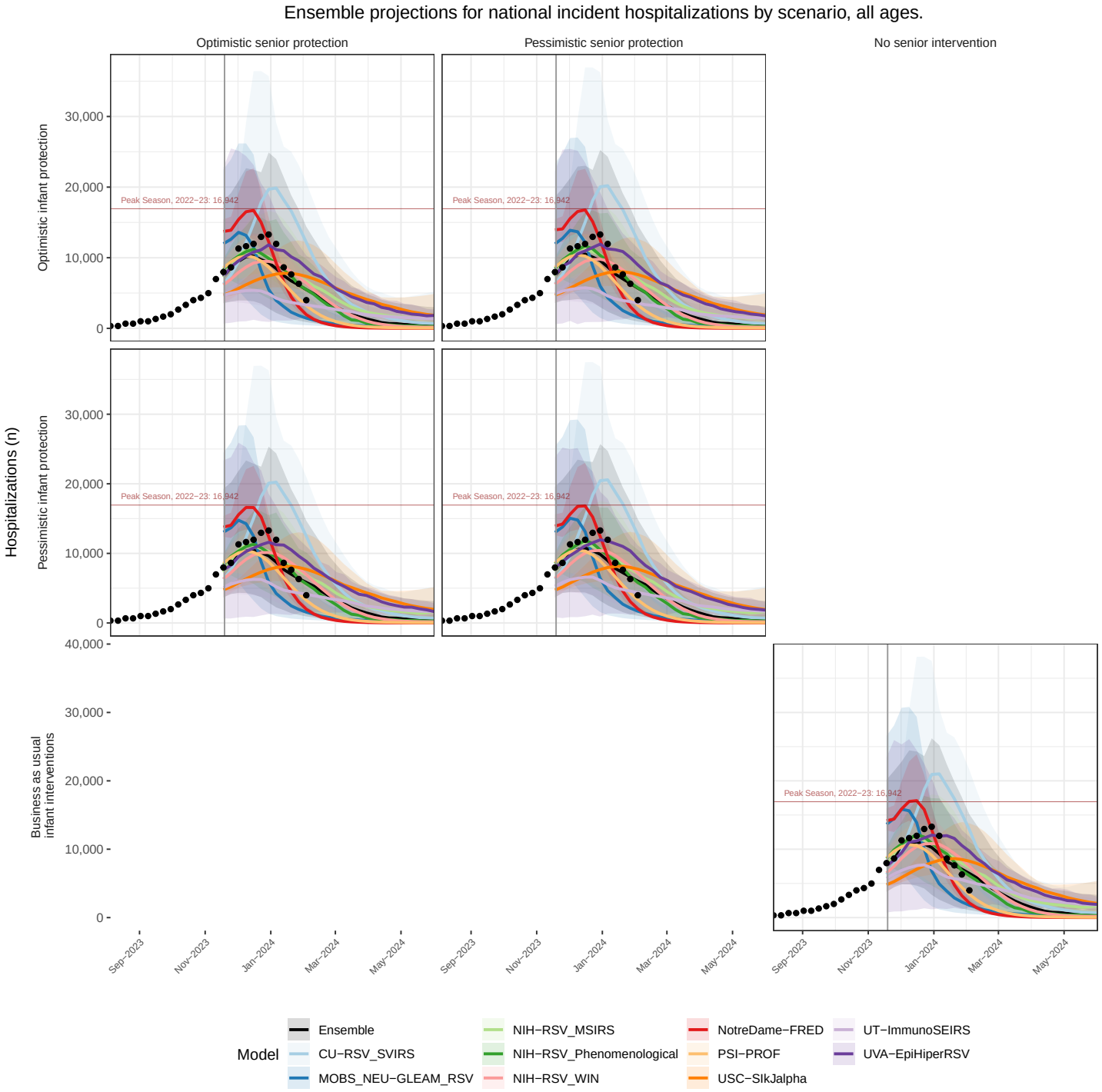
The scenario projections by age group were also very similar between scenarios nationally, with increased peak and cumulative size as scenarios became more pessimistic. The national projections also follow the empirical age-specific hospitalizations well for the younger age groups, however, there is significant under-projection of hospitalizations in the 65-130 year age group, though the 95% projection intervals of the cumulative do contain the empirical data. This age group also substantially exceeded both peak and cumulative hospitalizations from the 2022-23 season, which was considered substantially larger; this may indicate a change in testing or reporting among this age group, and not a difference in infection or disease. Horizontal lines are given for prior peak incident and cumulative hospitalizations from the 2022-23 season, taken from RSV-NET (which is used as a proxy for hospitalizations). Lines represent the median ensemble projections, and shaded regions represent the 95% prediction intervals.

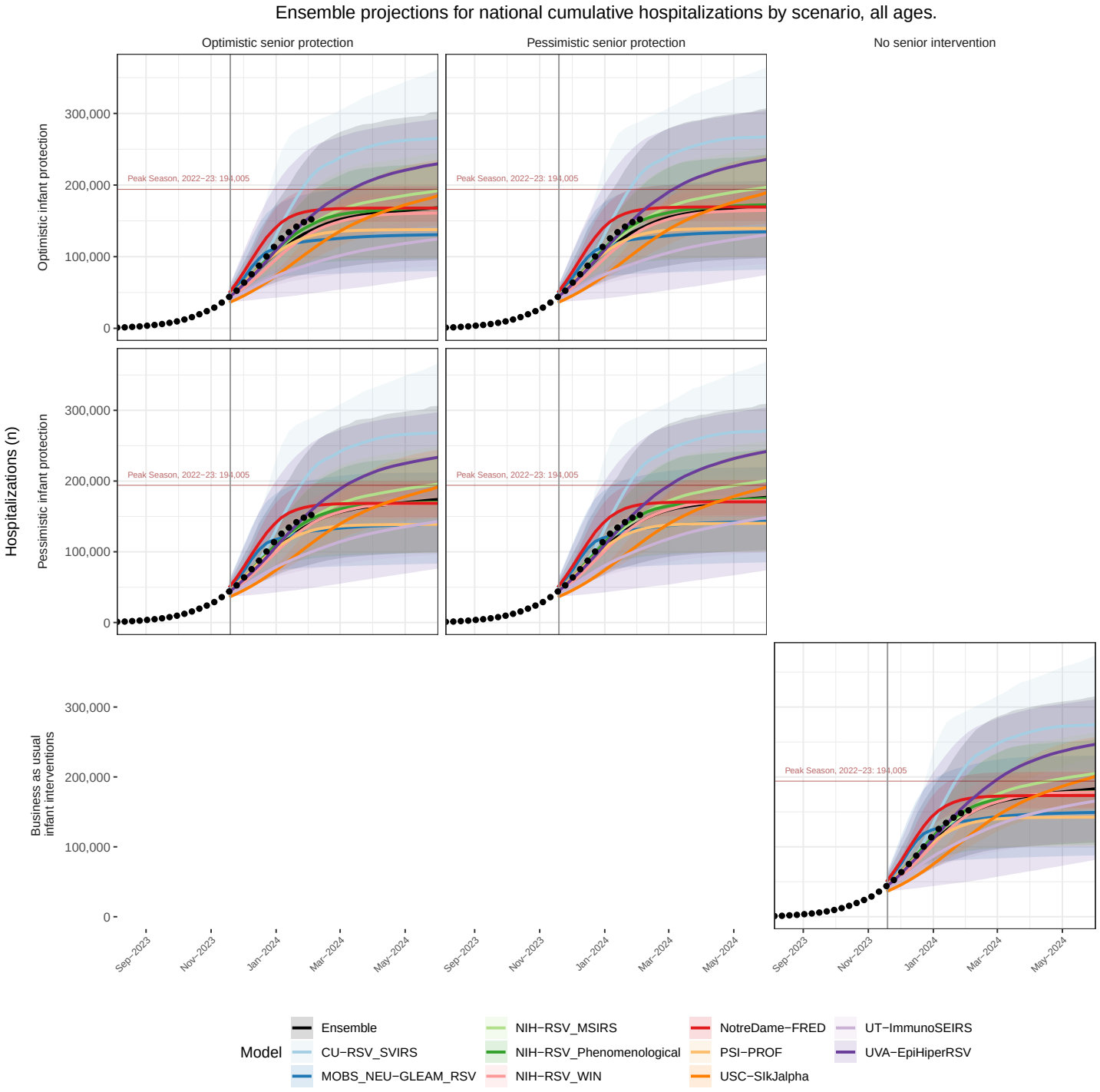
National ensemble projections of incident and cumulative RSV hospitalizations, by Age



National individual model projections

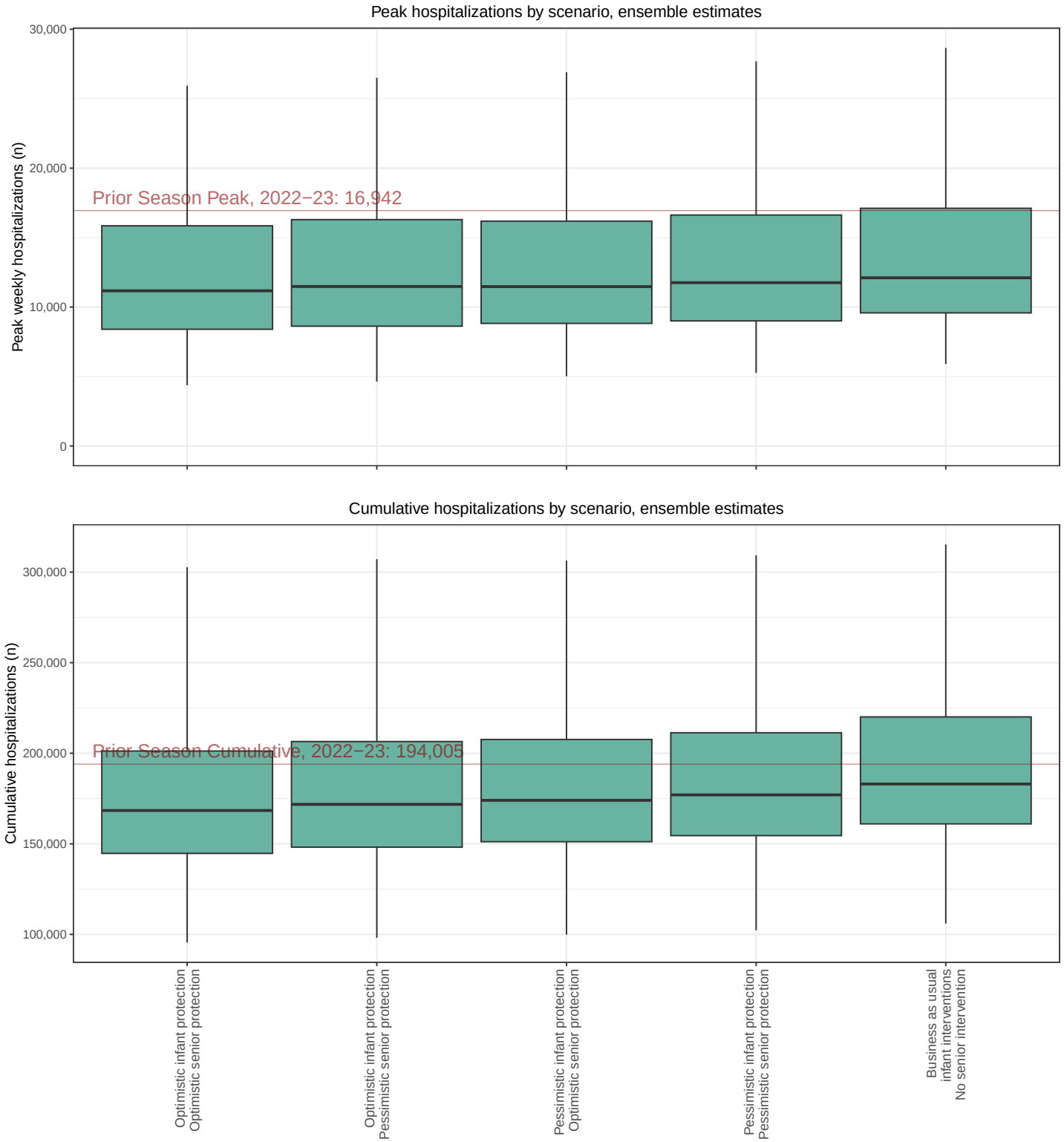
Individual model projections and ensemble by scenario for national hospitalizations, deaths and cumulative hospitalizations.




Ensemble projections for national cumulative hospitalizations by scenario, all ages.
Optimistic senior protection
Pessimistic senior protection
No senior intervention
Optimistic infant protection
Pessimistic infant protection
Business as usual infant interventions
Hospitalizations (n)
300,000
200,000
100,000
0
Peak Season, 2022–23: 194,005
Sep–2023
Nov–2023
Jan–2024
Mar–2024
May–2024
Model
Ensemble
CU–RSV_SVIRS
MOBS_NEU–GLEAM_RSV
NIH–RSV_MSIRS
NIH–RSV_Phenomenological
NIH–RSV_WIN
NotreDame–FRED
PSI–PROF
USC–SIkJalpha
UT–ImmunoSEIRS
UVA–EpiHiperRSV

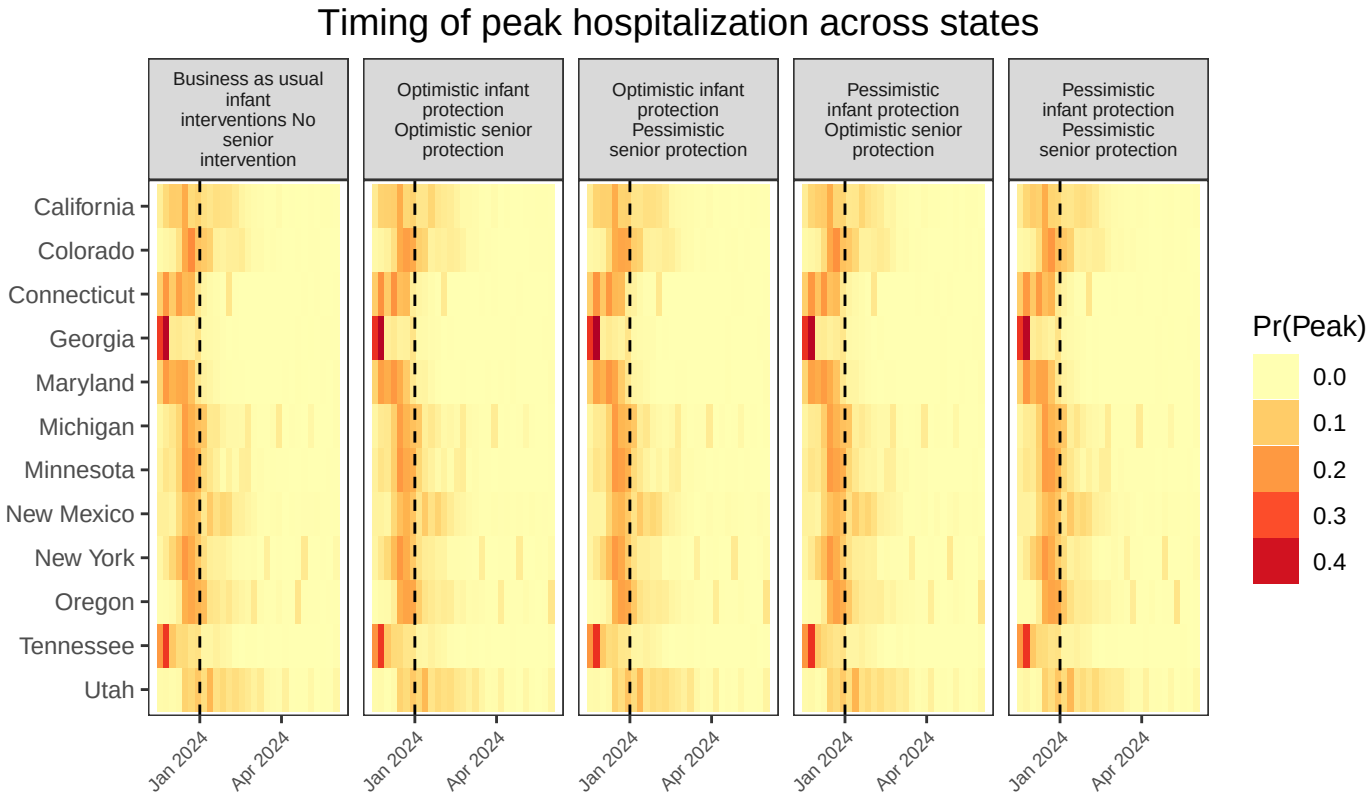
Peak and Cumulative Hospitalizations

Scenario variation in national peak size and cumulative hospitalization burden

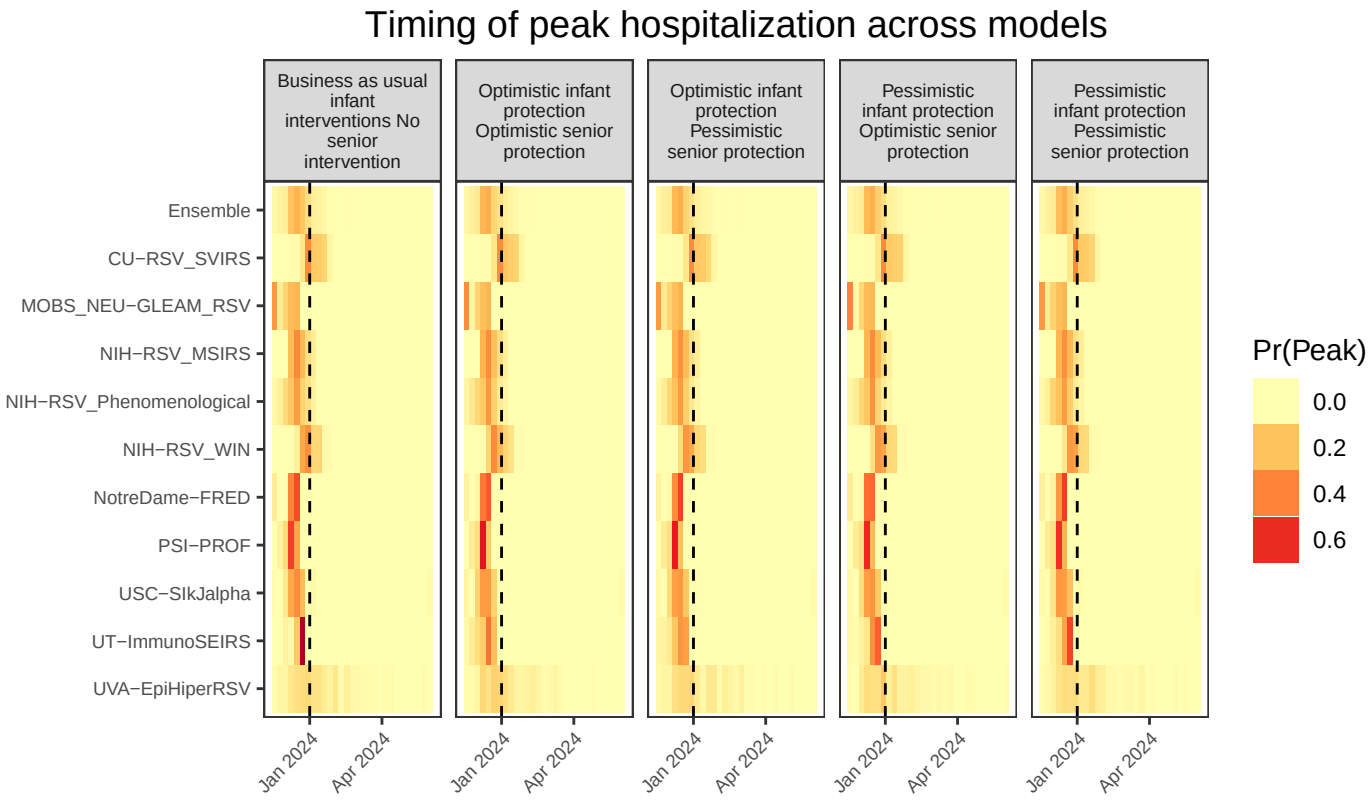


Peak hospitalization timing

State variability in peak hospitalization timing. Ensemble projections of state-level timing of peak hospitalization incidence.



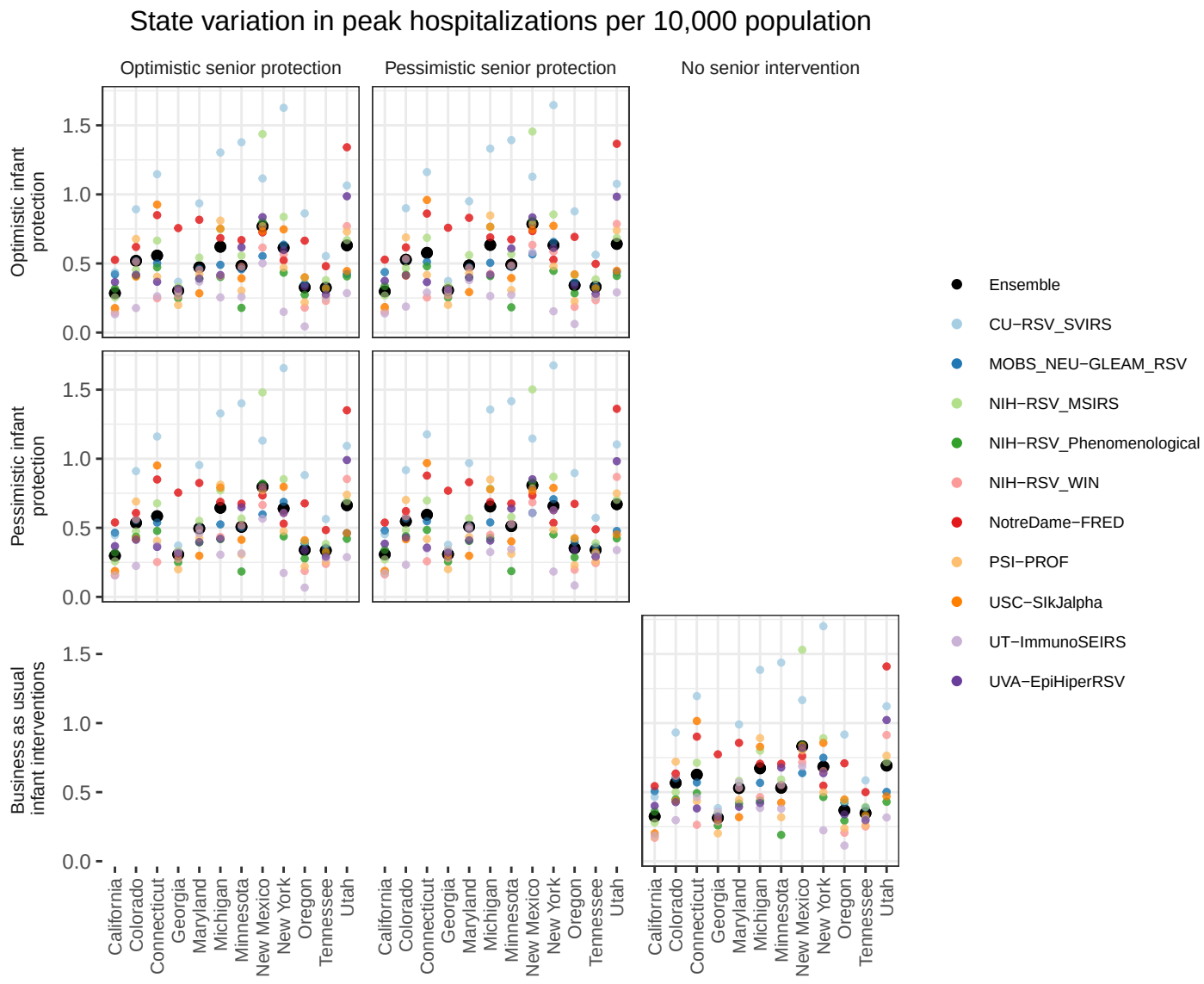
Model variability in national peak hospitalization timing. Individual model probabilities for national timing of peak hospitalizations.



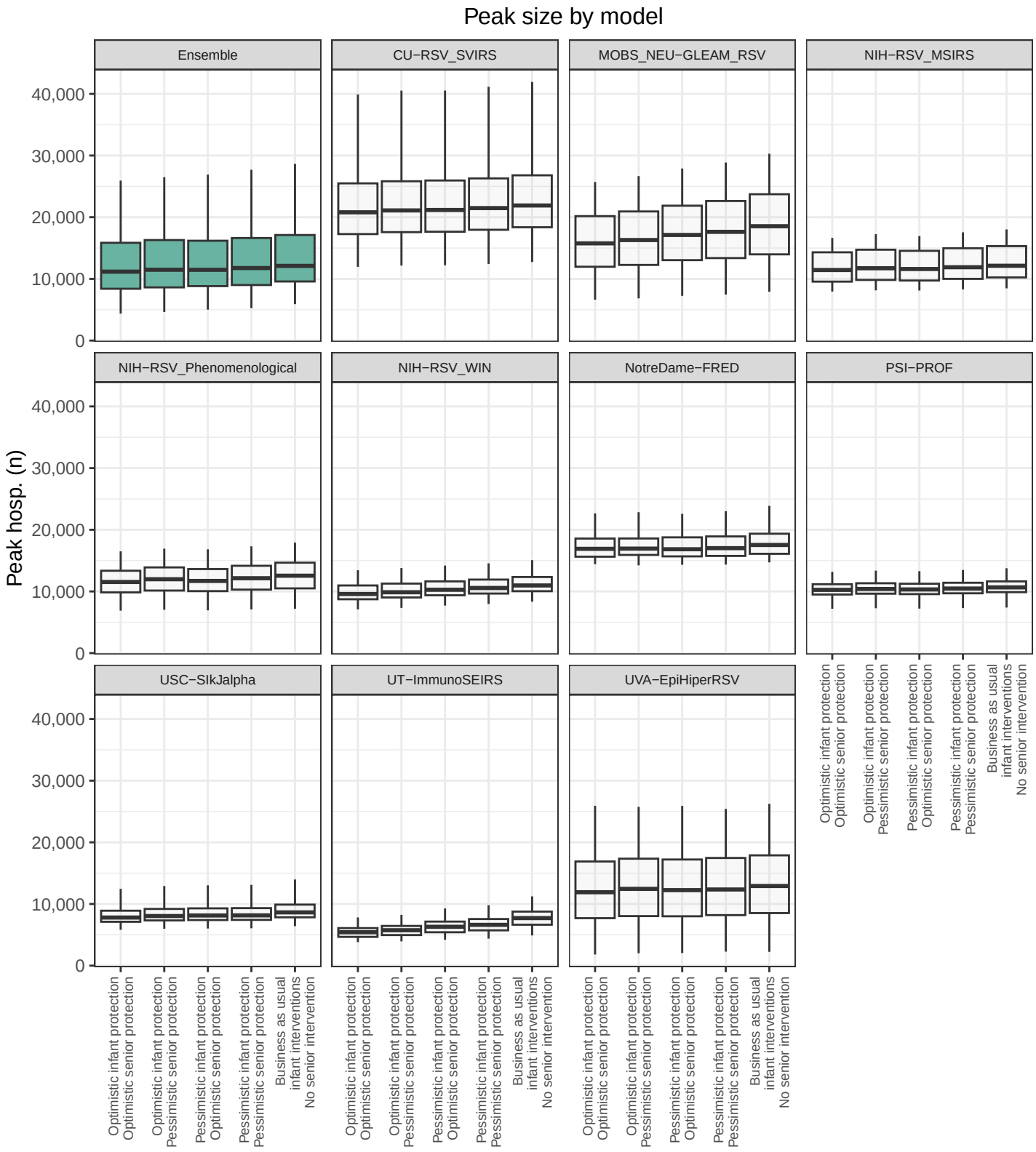
Peak hospitalization size

Variability in peak hospitalization incidence, by state and model.

Individual model and ensemble projections for state-level weekly peak hospitalization incidence per 10,000 population.

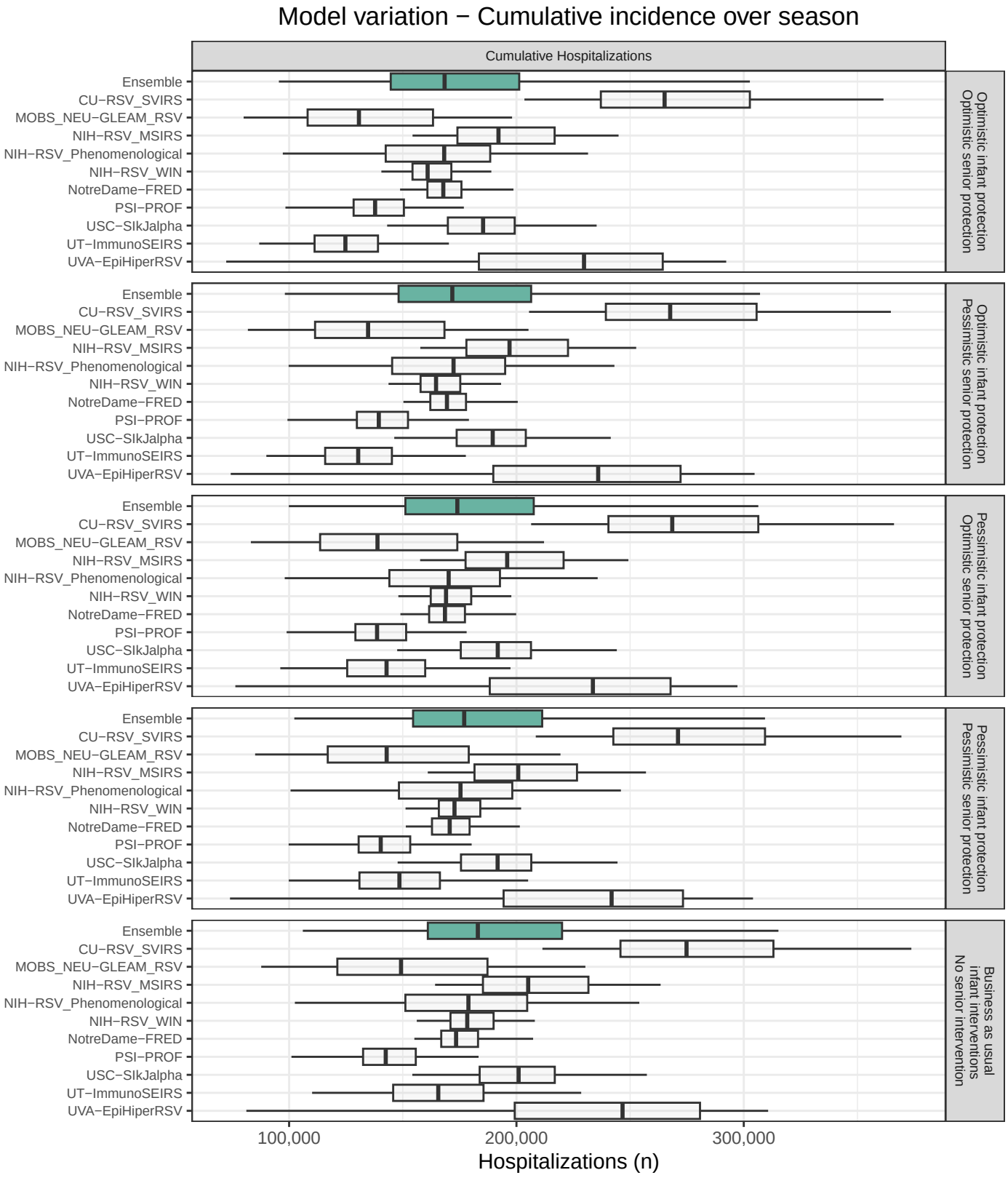


Model variability in national peak size



Cumulative Hospitalizations

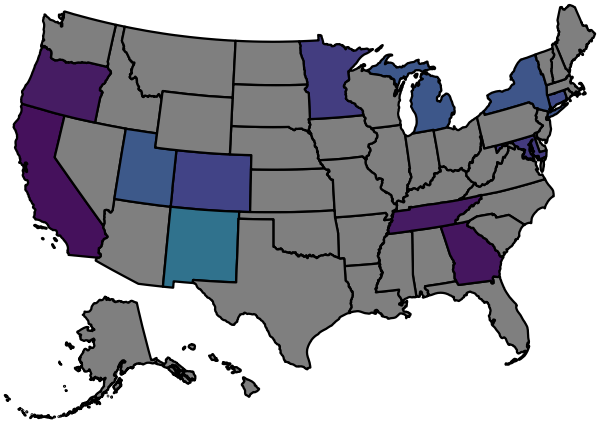
Cumulative incidence over season by model



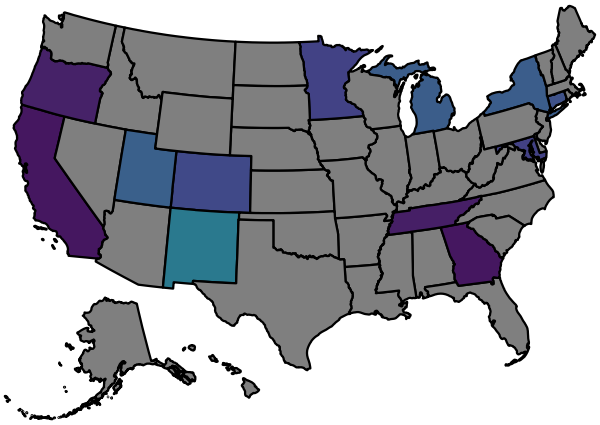
Risk Maps, Peak and Cumulative Hospitalization Rates

Peak Hospitalizations per 10,000 population

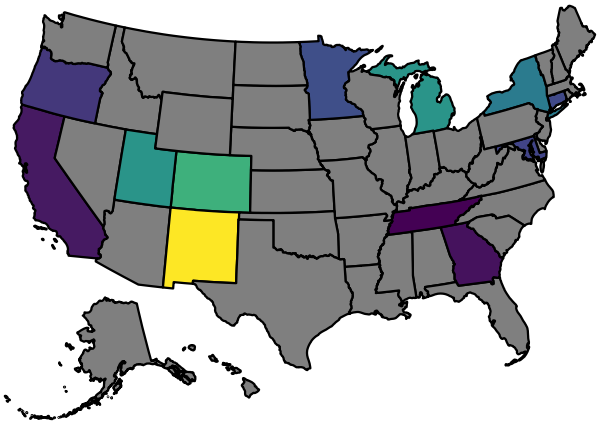
Projected peak size for 2023−2024 season,
Optimistic infant protection, Optimistic senior prot



Projected peak size for 2023−2024 season,
Pessimistic infant protection, Pessimistic senior pr



Reported peak size, 2022−2023 season

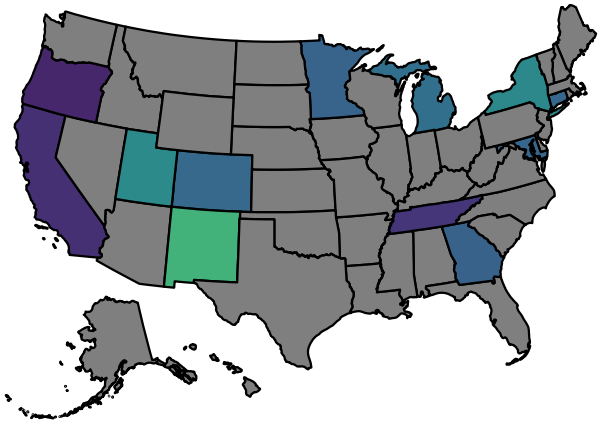


Peak incident hosps
per 10,000 pop

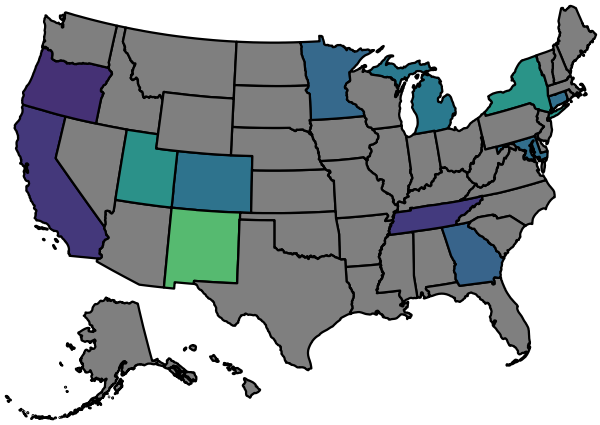
0.4 0.8 1.2 1.6

Cumulative Hospitalizations per 10,000 population

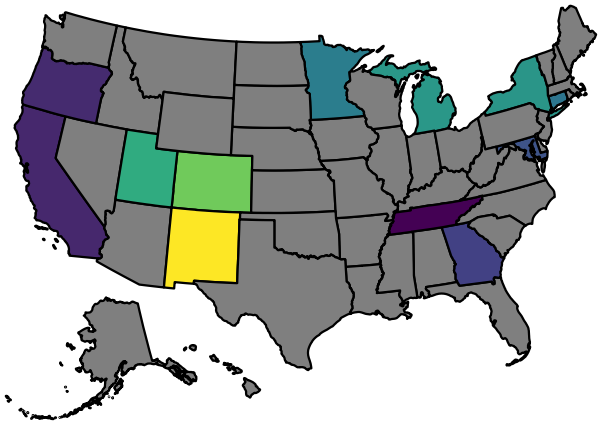
Projected cumulative hosp. rate, 2023−2024 seas
Optimistic infant protection, Optimistic senior prot



Projected cumulative hosp. rate, 2023−2024 seas
Pessimistic infant protection, Pessimistic senior pr



Reported cumulative hosp. rate, 2022−2023 seas



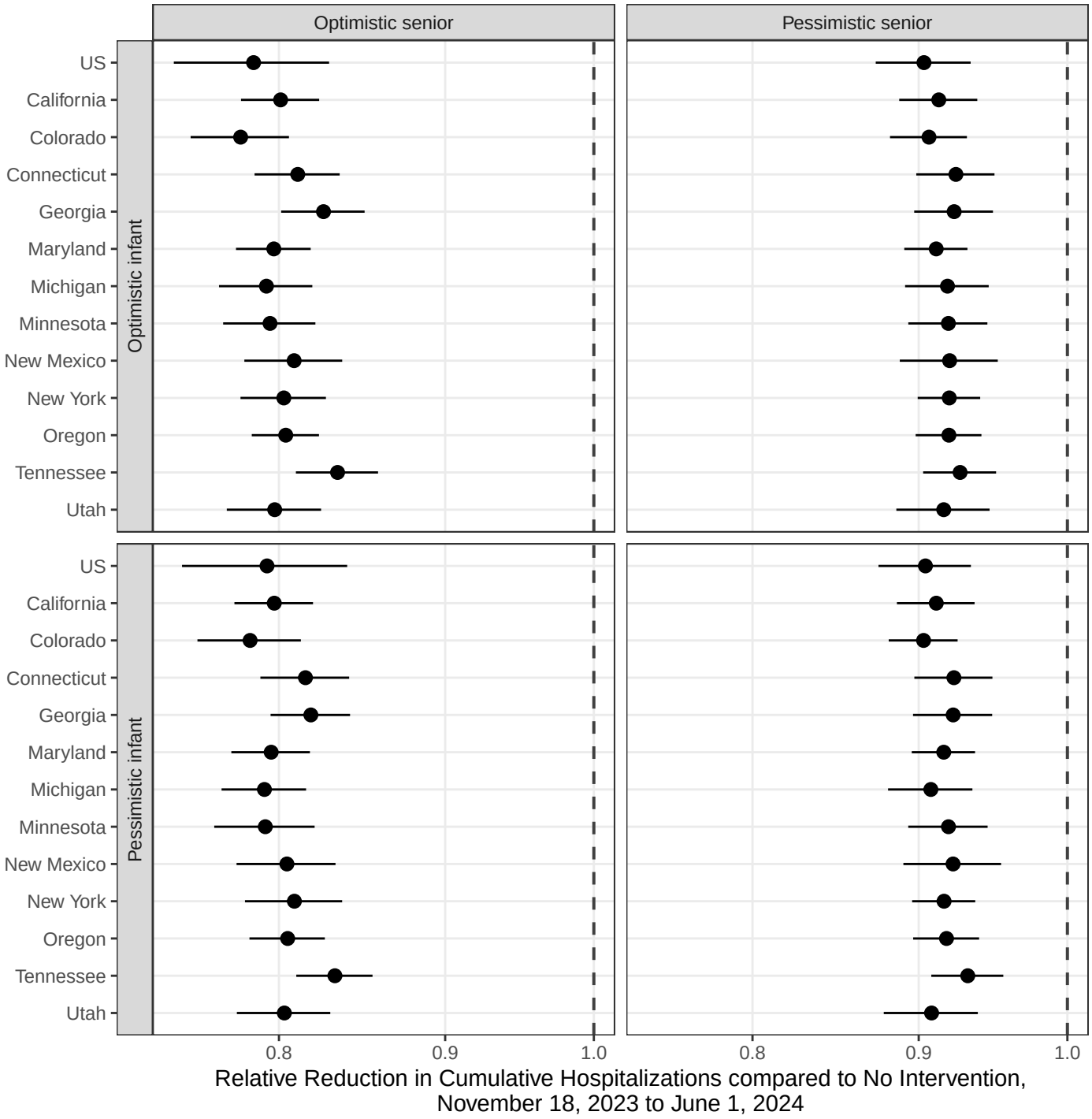
Cumulative hosps
per 10,000 pop

3 5 7 9 11

Meta-Analysis of Scenario Comparative Impacts - National

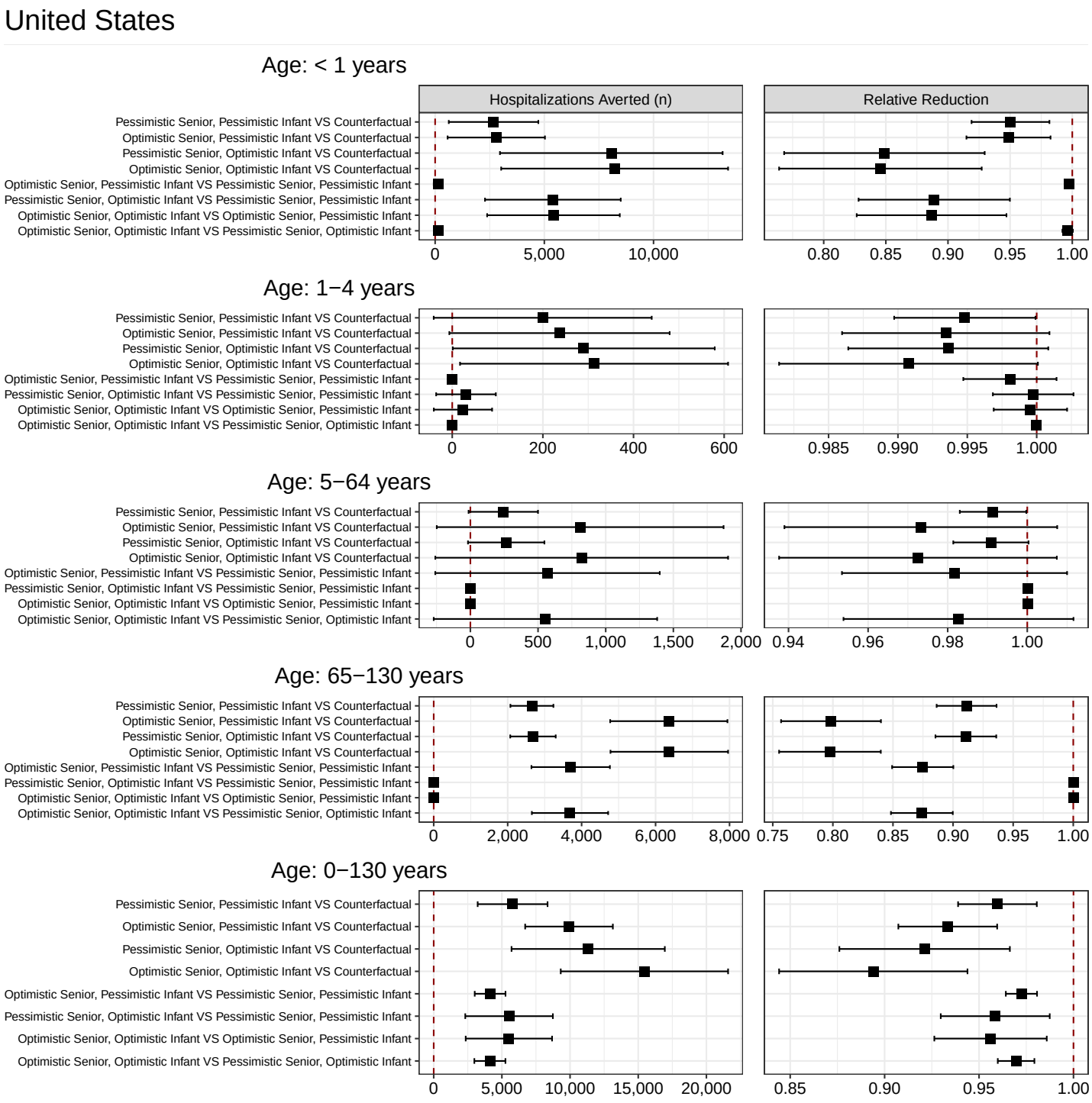
Relative Reduction in Hospitalization compared to No Intervention (the Counterfactual)

Estimates of relative hospitalizations averted contrasting cumulative projections at the end of the season for each vaccine scenario versus the counterfactual scenario, for the US and each state, all age groups.



National Impact of RSV Immunization Scenarios, by Age

Estimates of cumulative hospitalizations averted and relative reduction in hospitalization for November 18, 2023 to June 1, 2024 comparing scenarios, for the US, by age group.

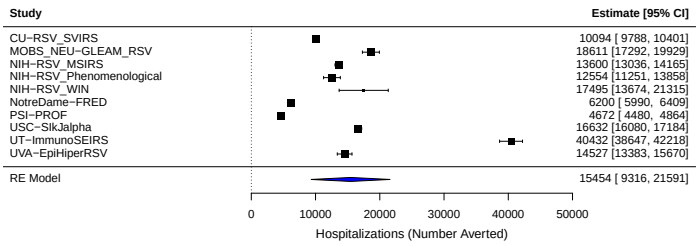


National Estimates of Hospitalizations averted by Infant and Senior Immunization as compared to the Counterfactual

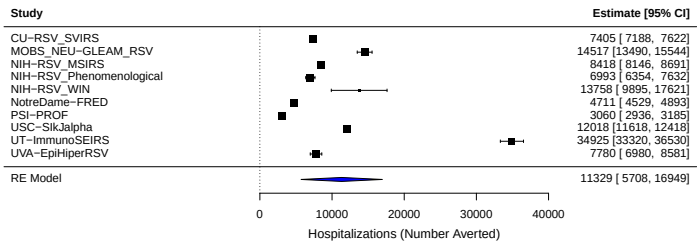
Number of Hospitalizations Averted

Estimates of hospitalizations averted contrasting cumulative projections at the end of the season for each vaccine scenario vs the counterfactual scenario.

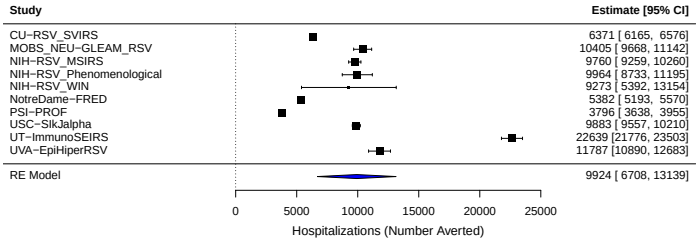
Optimistic Senior, Optimistic Infant VS Counterfactual
US − 0−130 years



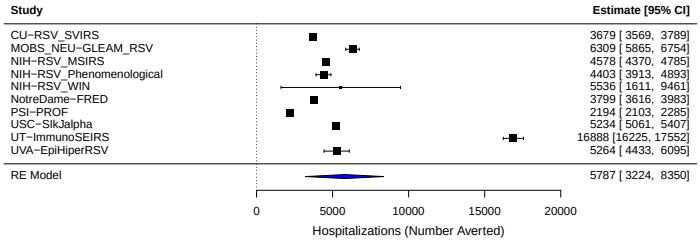
Pessimistic Senior, Optimistic Infant VS Counterfactual
US − 0−130 years



Optimistic Senior, Pessimistic Infant VS Counterfactual
US − 0−130 years



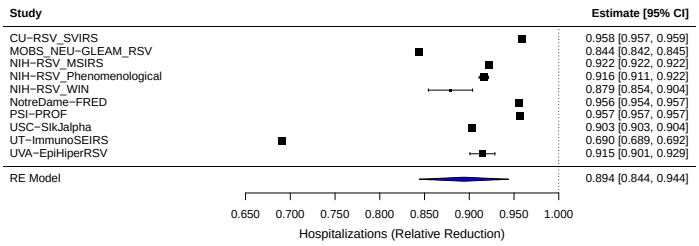
Pessimistic Senior, Pessimistic Infant VS Counterfactual
US − 0−130 years



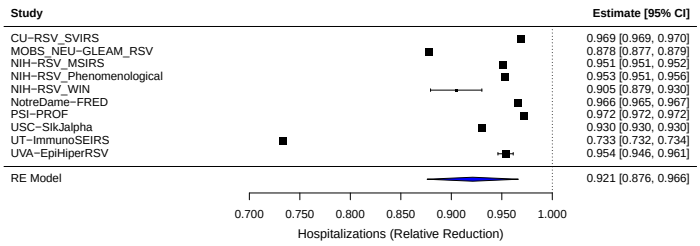
Relative Reduction in Hospitalizations

Estimates of the relative reduction in hospitalization contrasting cumulative projections at the end of the season for each vaccine scenario vs the counterfactual scenario.

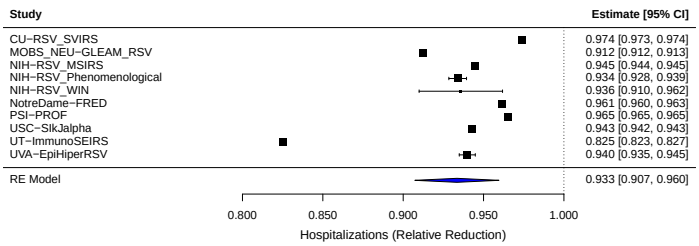
Optimistic Senior, Optimistic Infant VS Counterfactual
US − 0−130 years



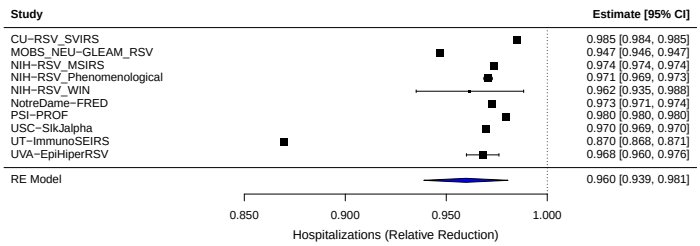
Pessimistic Senior, Optimistic Infant VS Counterfactual
US − 0−130 years



Optimistic Senior, Pessimistic Infant VS Counterfactual
US − 0−130 years



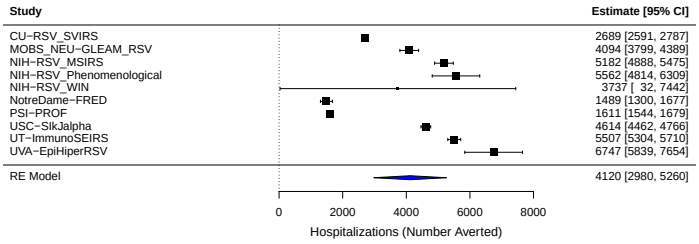
Pessimistic Senior, Pessimistic Infant VS Counterfactual
US − 0−130 years



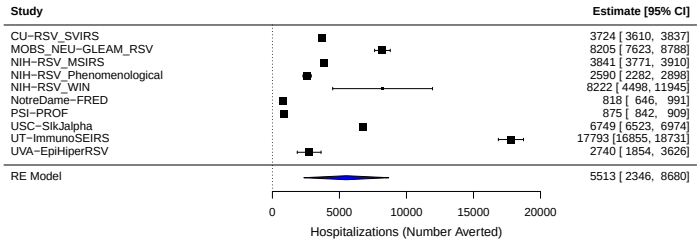
National Estimates of Hospitalizations averted by Optimistic vs Pessimistic Immunization

Number of Hospitalizations Averted

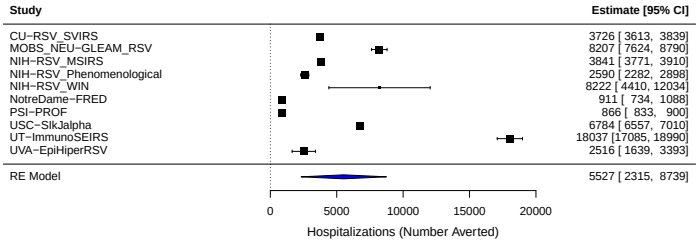
Optimistic Senior, Optimistic Infant VS Pessimistic Senior, Optimistic Infant
US − 0−130 years



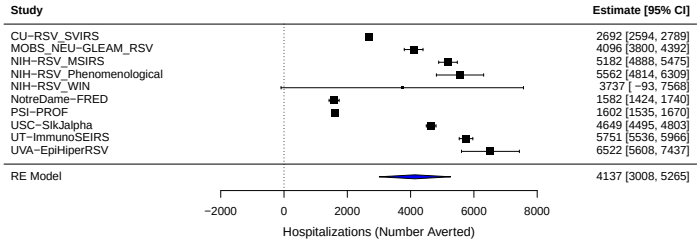
Optimistic Senior, Optimistic Infant VS Optimistic Senior, Pessimistic Infant
US − 0−130 years



Pessimistic Senior, Optimistic Infant VS Pessimistic Senior, Pessimistic Infant
US − 0−130 years

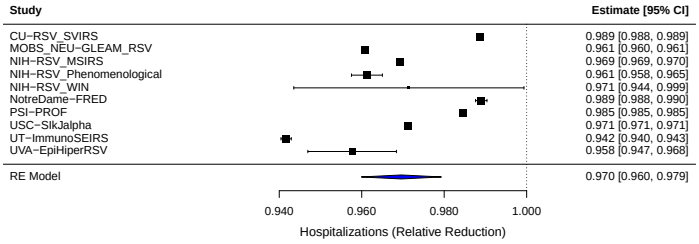


Optimistic Senior, Pessimistic Infant VS Pessimistic Senior, Pessimistic Infant
US − 0−130 years

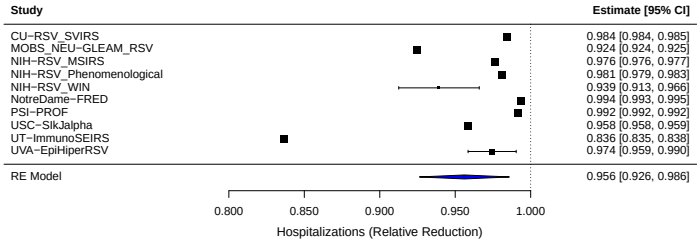


Relative Reduction in Hospitalizations

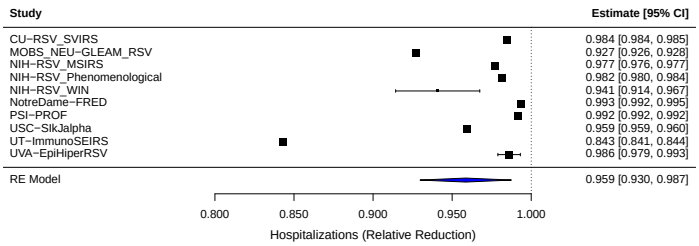
Optimistic Senior, Optimistic Infant VS Pessimistic Senior, Optimistic Infant
US − 0−130 years



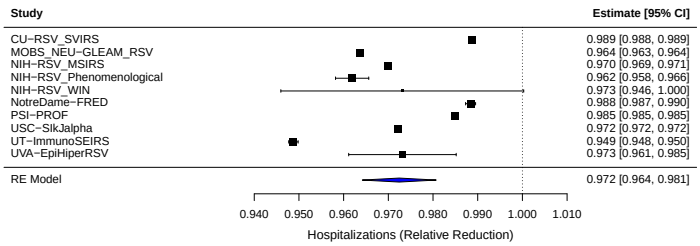
Optimistic Senior, Optimistic Infant VS Optimistic Senior, Pessimistic Infant
US − 0−130 years



Pessimistic Senior, Optimistic Infant VS Pessimistic Senior, Pessimistic Infant
US − 0−130 years



Optimistic Senior, Pessimistic Infant VS Pessimistic Senior, Pessimistic Infant
US − 0−130 years

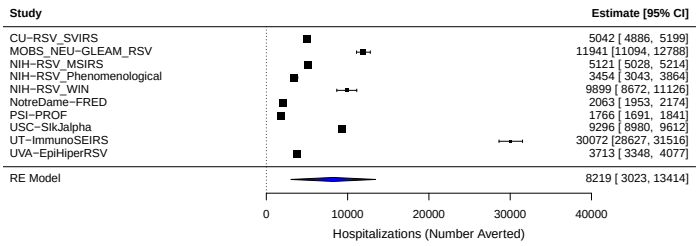


Infants: National Estimates of Hospitalizations averted by Infant and Senior Immunization as compared to the Counterfactual

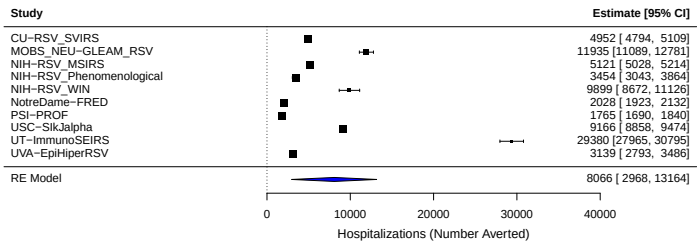
Number of Hospitalizations Averted Among Infants (0 - 0.99 yrs)

Estimates of hospitalizations averted contrasting cumulative projections at the end of the season for each vaccine scenario vs the counterfactual scenario.

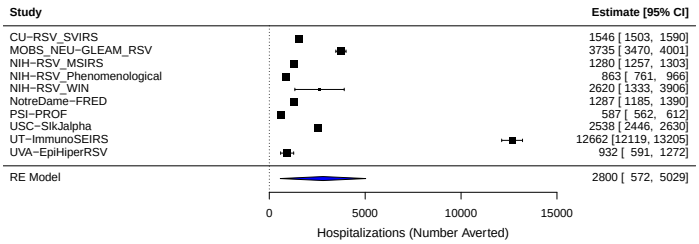
Optimistic Senior, Optimistic Infant VS Counterfactual
US − < 1 years



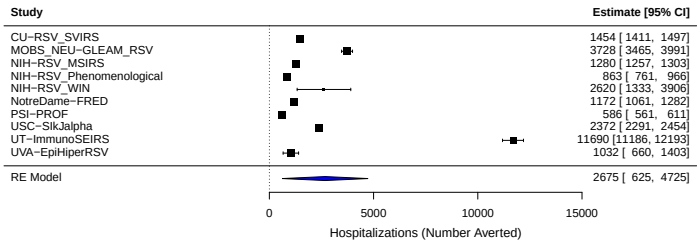
Pessimistic Senior, Optimistic Infant VS Counterfactual
US − < 1 years



Optimistic Senior, Pessimistic Infant VS Counterfactual
US − < 1 years



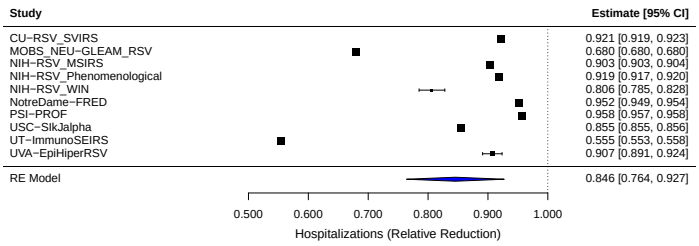
Pessimistic Senior, Pessimistic Infant VS Counterfactual
US − < 1 years



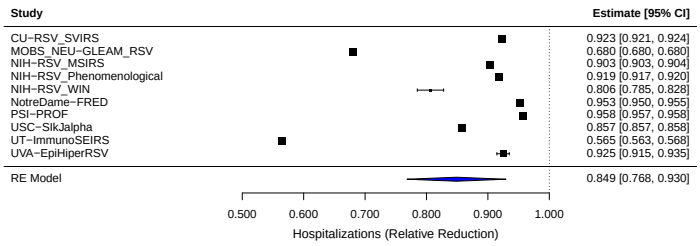
Relative Reduction in Hospitalizations Among Infants (0 - 0.99 yrs)

Estimates of the relative reduction in hospitalization contrasting cumulative projections at the end of the season for each vaccine scenario vs the counterfactual scenario.

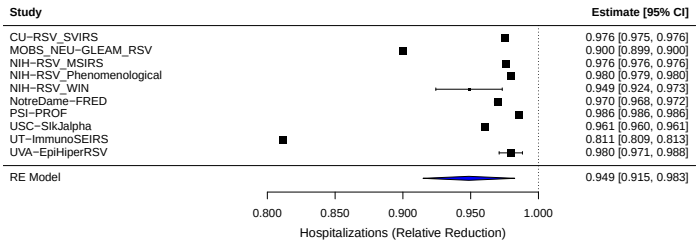
Optimistic Senior, Optimistic Infant VS Counterfactual
US − < 1 years



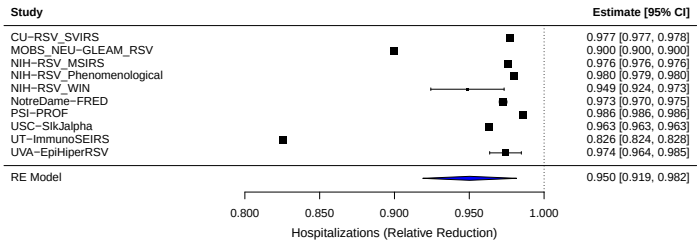
Pessimistic Senior, Optimistic Infant VS Counterfactual
US − < 1 years



Optimistic Senior, Pessimistic Infant VS Counterfactual
US − < 1 years



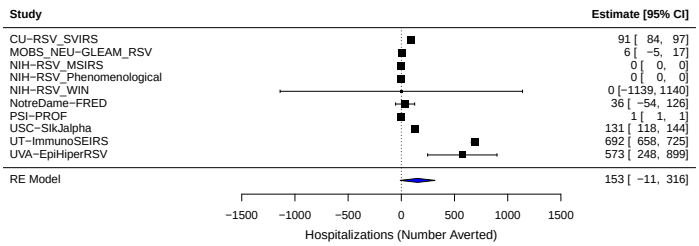
Pessimistic Senior, Pessimistic Infant VS Counterfactual
US − < 1 years



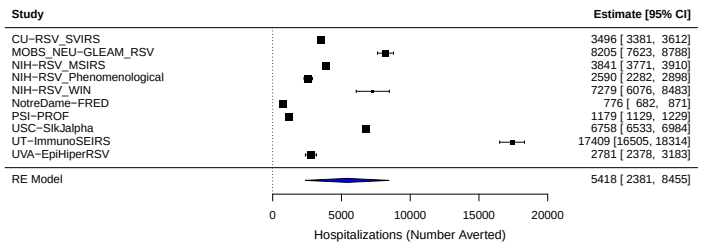
Infants: National Estimates of Hospitalizations averted by Optimistic vs Pessimistic Immunization

Number of Hospitalizations Averted Among Infants (0 - 0.99 yrs)

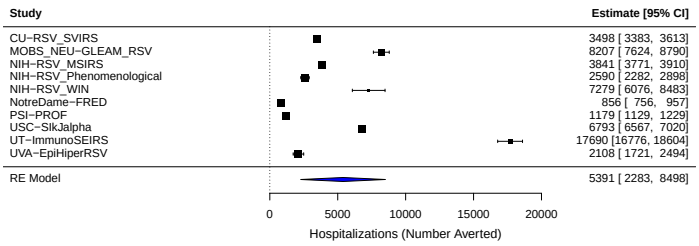
Optimistic Senior, Optimistic Infant VS Pessimistic Senior, Optimistic Infant
US − < 1 years



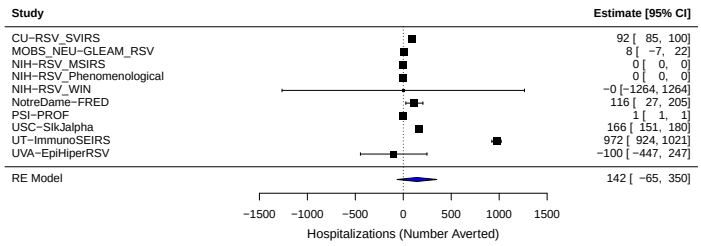
Optimistic Senior, Optimistic Infant VS Optimistic Senior, Pessimistic Infant
US − < 1 years



Pessimistic Senior, Optimistic Infant VS Pessimistic Senior, Pessimistic Infant
US − < 1 years

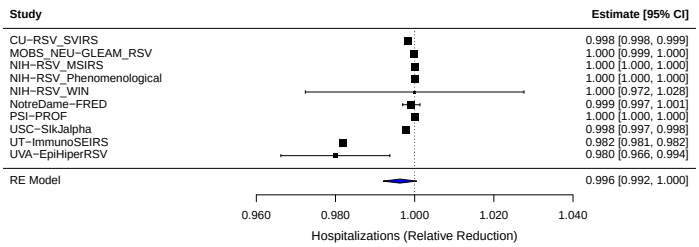


Optimistic Senior, Pessimistic Infant VS Pessimistic Senior, Pessimistic Infant
US − < 1 years

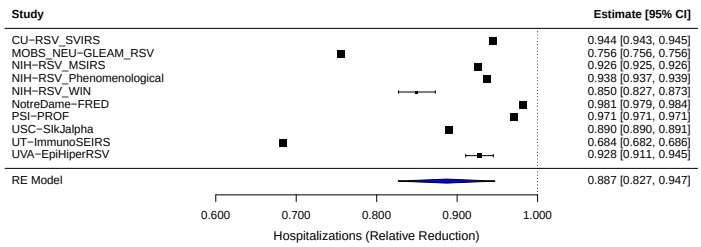


Relative Reduction in Hospitalizations Among Infants (0 - 0.99 yrs)

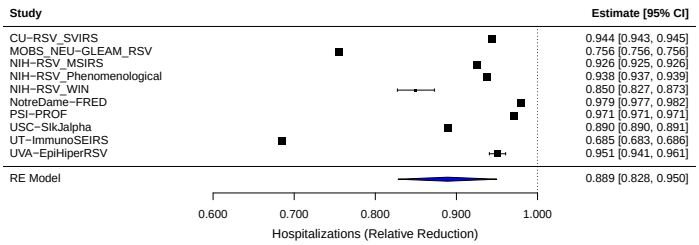
Optimistic Senior, Optimistic Infant VS Pessimistic Senior, Optimistic Infant
US − < 1 years



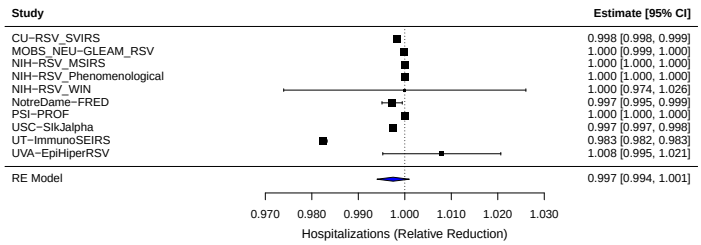
Optimistic Senior, Optimistic Infant VS Optimistic Senior, Pessimistic Infant
US − < 1 years



Pessimistic Senior, Optimistic Infant VS Pessimistic Senior, Pessimistic Infant
US − < 1 years



Optimistic Senior, Pessimistic Infant VS Pessimistic Senior, Pessimistic Infant
US − < 1 years

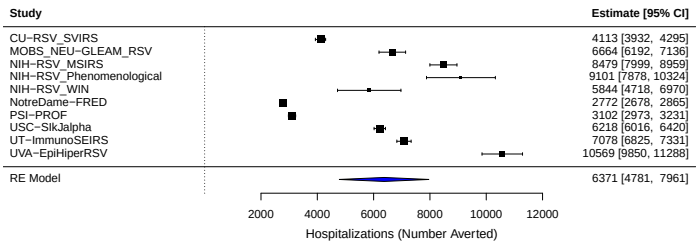


Seniors: National Estimates of Hospitalizations averted by Infant and Senior Immunization as compared to the Counterfactual

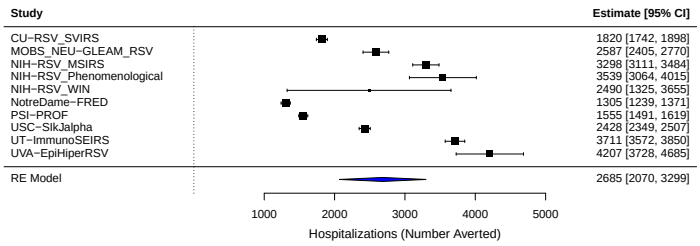
Number of Hospitalizations Averted Among Seniors (65 - 130 yrs)

Estimates of hospitalizations averted contrasting cumulative projections at the end of the season for each vaccine scenario vs the counterfactual scenario.

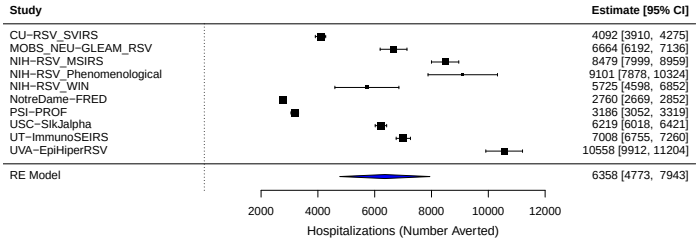
Optimistic Senior, Optimistic Infant VS Counterfactual
US − 65−130 years



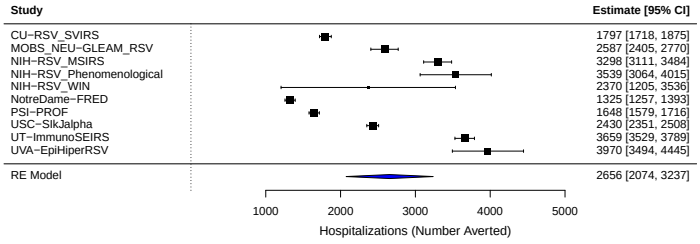
Pessimistic Senior, Optimistic Infant VS Counterfactual
US − 65−130 years



Optimistic Senior, Pessimistic Infant VS Counterfactual
US − 65−130 years



Pessimistic Senior, Pessimistic Infant VS Counterfactual
US − 65−130 years



Relative Reduction in Hospitalizations Among Seniors (65 - 130 yrs)

Estimates of the relative reduction in hospitalization contrasting cumulative projections at the end of the season for each vaccine scenario vs the counterfactual scenario.

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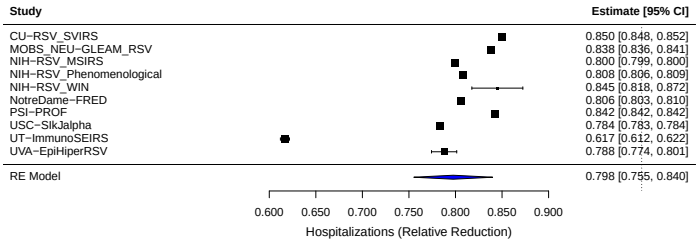
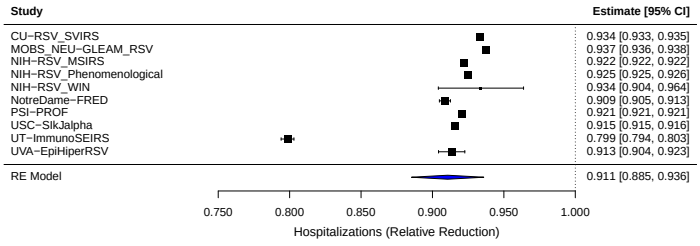
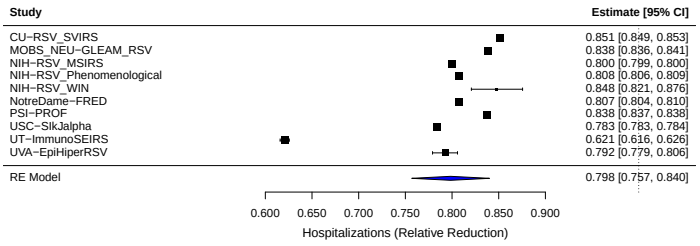
US − 65−130 years



Pessimistic Senior, Optimistic Infant VS Counterfactual
US − 65−130 years



Optimistic Senior, Pessimistic Infant VS Counterfactual
US − 65−130 years



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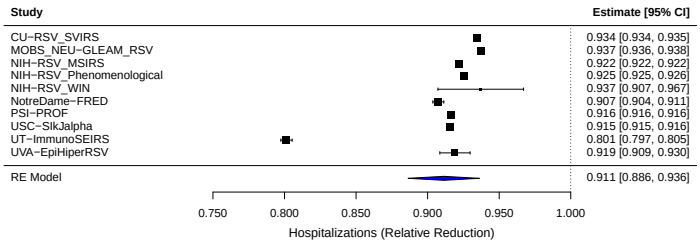
US − 65−130 years



Seniors: National Estimates of Hospitalizations averted by Optimistic vs Pessimistic Immunization

Number of Hospitalizations Averted Among Seniors (65 - 130 yrs)

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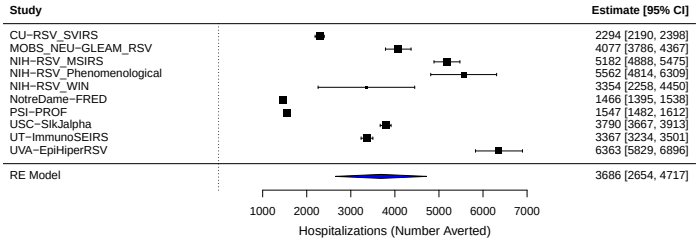
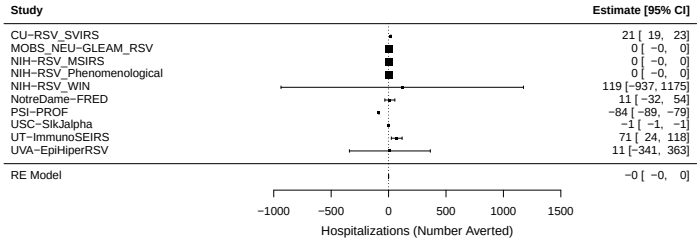
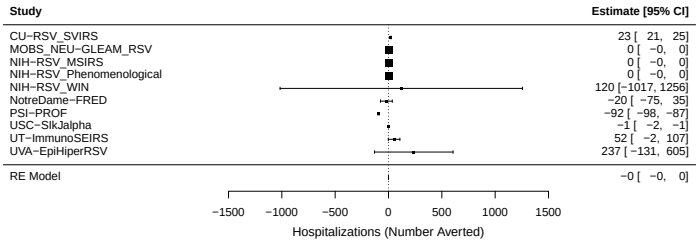
US − 65−130 years



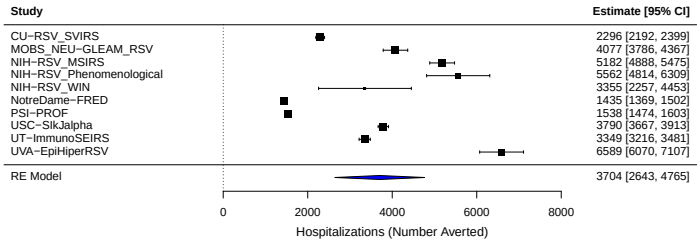
Optimistic Senior, Optimistic Infant VS Optimistic Senior, Pessimistic Infant
US − 65−130 years



Pessimistic Senior, Optimistic Infant VS Pessimistic Senior, Pessimistic Infant
US − 65−130 years

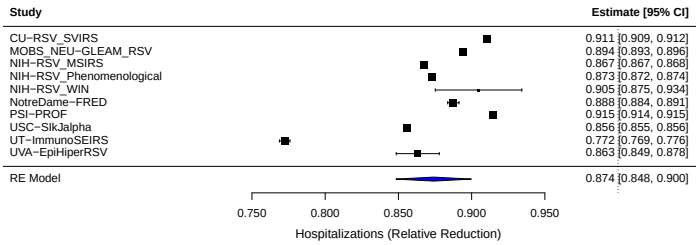


Optimistic Senior, Pessimistic Infant VS Pessimistic Senior, Pessimistic Infant
US − 65−130 years

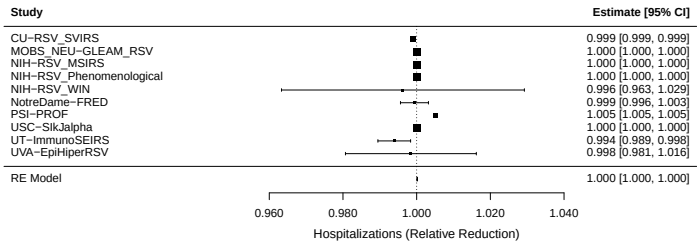


Relative Reduction in Hospitalizations Among Seniors (65 - 130 yrs)

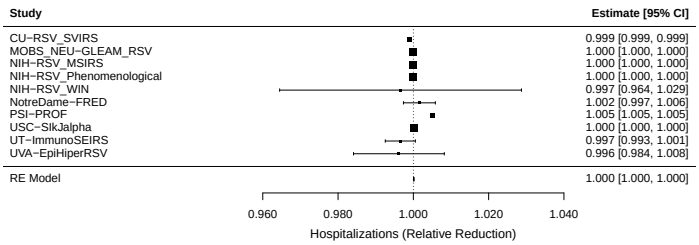
Optimistic Senior, Optimistic Infant VS Pessimistic Senior, Optimistic Infant
US − 65−130 years



Optimistic Senior, Optimistic Infant VS Optimistic Senior, Pessimistic Infant
US − 65−130 years



Pessimistic Senior, Optimistic Infant VS Pessimistic Senior, Pessimistic Infant
US − 65−130 years



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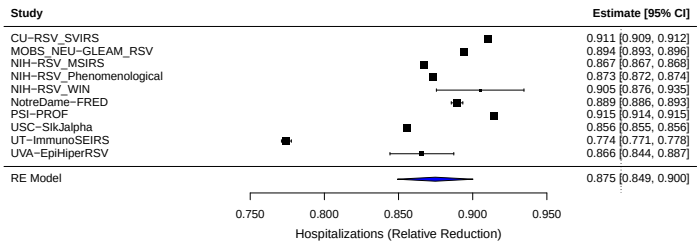
US − 65−130 years

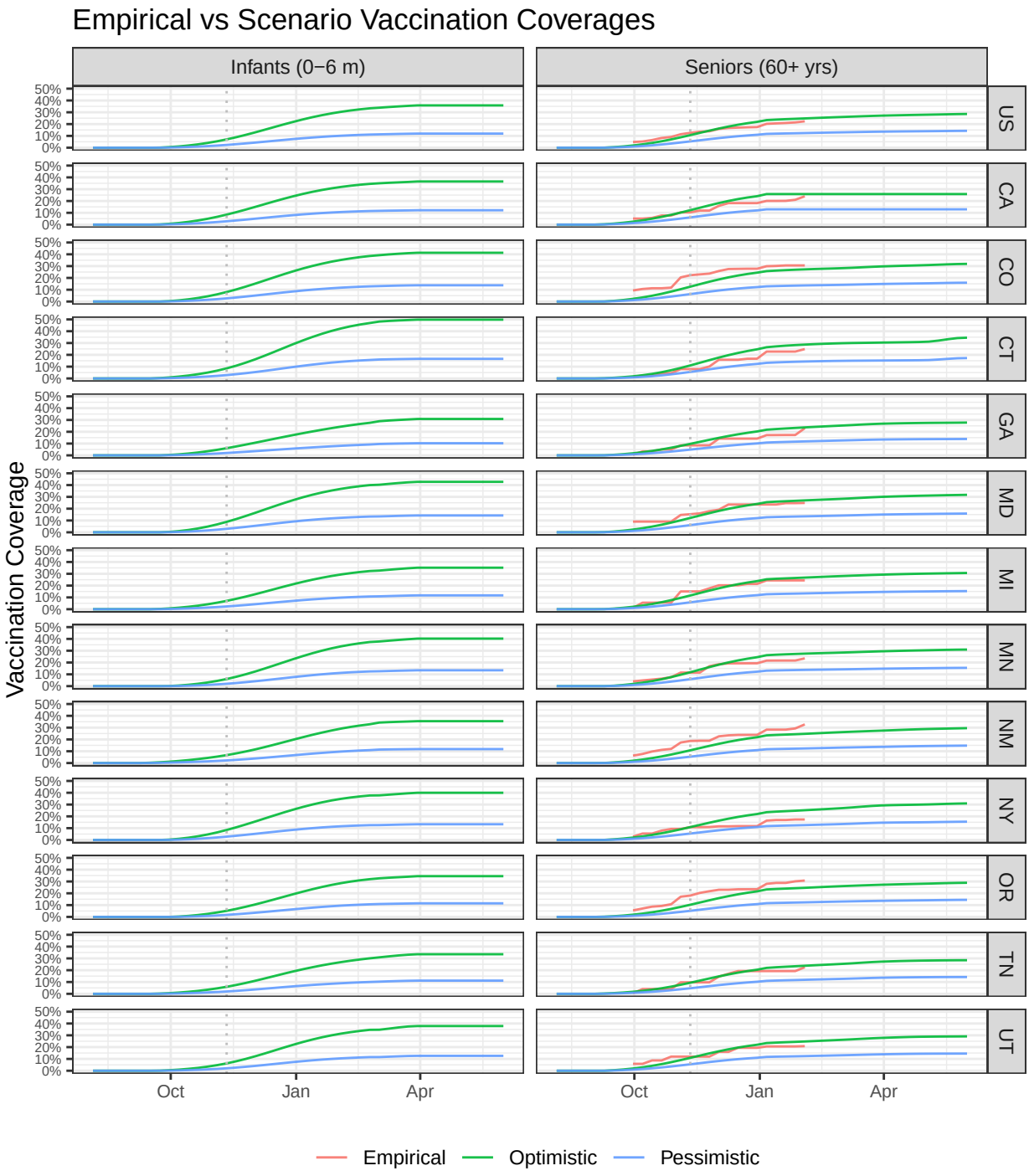


Scenarios VS Reality

How well do our scenarios match up with reality?

Answer: It Depends on the state and age group, but generally reality appears to match with Scenario A overall.

Senior vaccination coverage appears to be similar to the "optimistic" scenario, and always higher than pessimistic. However, data on the empirical infant vaccination coverage currently remain uncertain, and thus we have excluded them from the figure below. The CDC provides two sources of data for infant Nirsevimab coverage which contradict each other sharply. Current estimates from the National Immunization Survey (NIS) put national coverage at around 40% among infants <8 months (Jan 2024). However, these survey estimates have notable caveats and potential biases. In contrast, estimates from the Immunization Immunization System (ISS) are much more pessimistic, falling in line with or below the "pessimistic" scenario (~10% coverage). These data also have substantial problematic caveats, specifically that they do not include infants born on or after October 1, 2023. See data and details on CDC's RSV Vax View. Based on these caveats, we believe the NIS coverage at ~40% in January 2024 may be more accurate, which puts reality close to the "optimistic" infant scenario.



Teams and models

- Columbia University - RSV_SVIRS
- Teresa Yamana, Sen Pei
- Fogarty International Center, National Institutes of Health (NIH) — RSV_MSIRS
- Kaiyuan Sun, Cécile Viboud
- Fogarty International Center, National Institutes of Health (NIH) — RSV_Phenomenological
- Kaiyuan Sun, Cécile Viboud
- Fogarty International Center, National Institutes of Health (NIH) — RSV_WIN
- Samantha Bents, Chelsea Hansen, Cécile Viboud
- Northeastern University MOBS Lab — GLEAM RSV
- Alessandro Vespignani, Matteo Chinazzi, Jessica T. Davis, Clara Bay, Guillaume St-Onge
- Predictive Science — M2
- James Turtle, Michal Ben-Nun, Pete Riley
- University of Notre Dame — FRED
- Sean Moore, Alex Perkins, Guido Espana
- University of Southern California — SIkJalpha
- Ajitesh Srivastava, Majd Al Aawar
- University of Texas at Austin — UT-ImmunoSEIRS
- Kaiming Bi (UT-Austin), Spencer J. Fox (University of Georgia), Shraddha R Bandekar (UT-Austin), Anass Bouchnita (UT-El Paso), Lauren Ancel Meyers (UT-Austin)
- University of Virginia Biocomplexity Institute — FluXSim
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- Michael Runge, USGS
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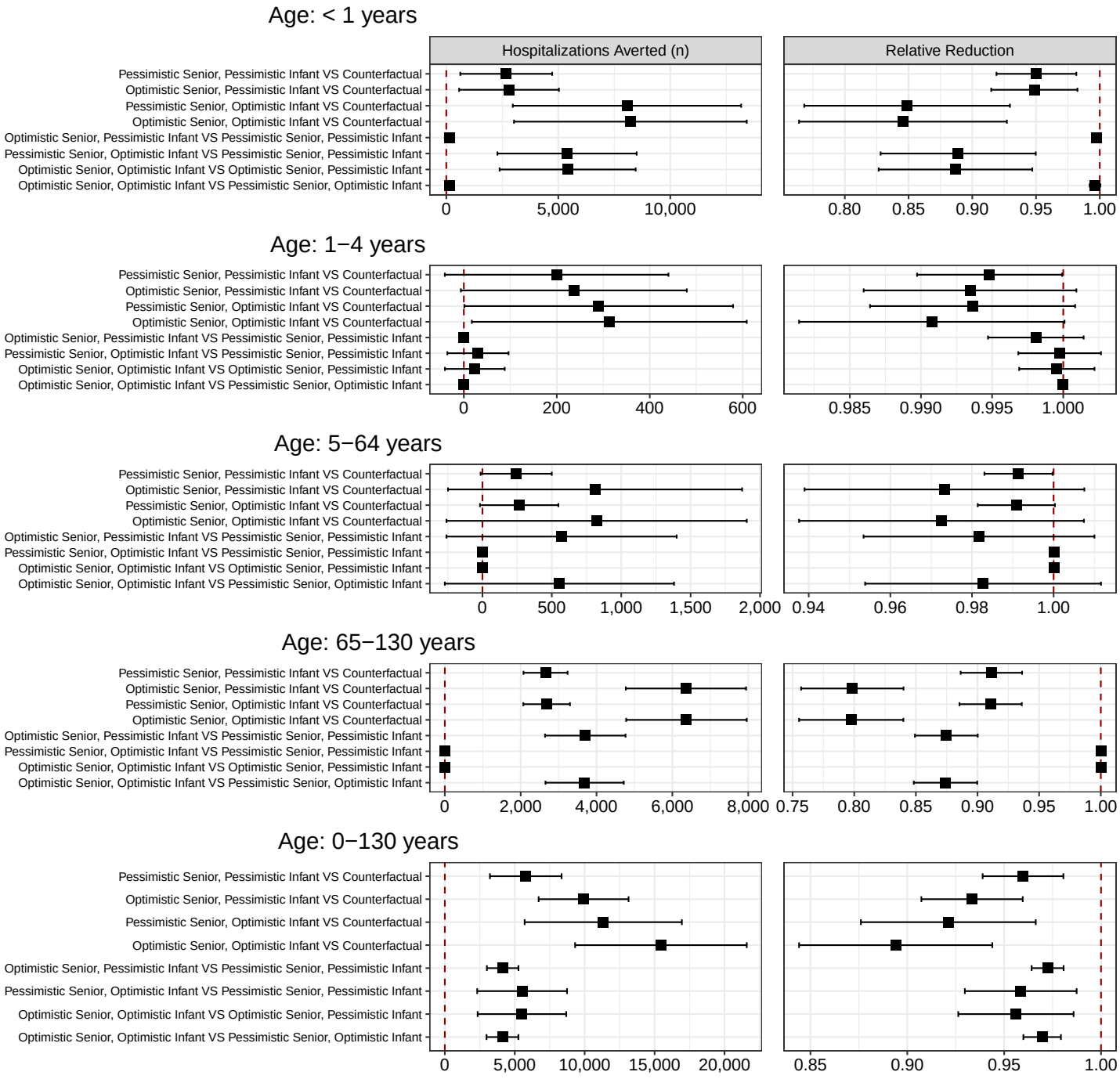
- Sung-mok Jung, University of North Carolina
- J Espino, University of Pittsburgh
- John Levander, University of Pittsburgh

Supplementary Information

State Impact of RSV Immunization Scenarios, by Age

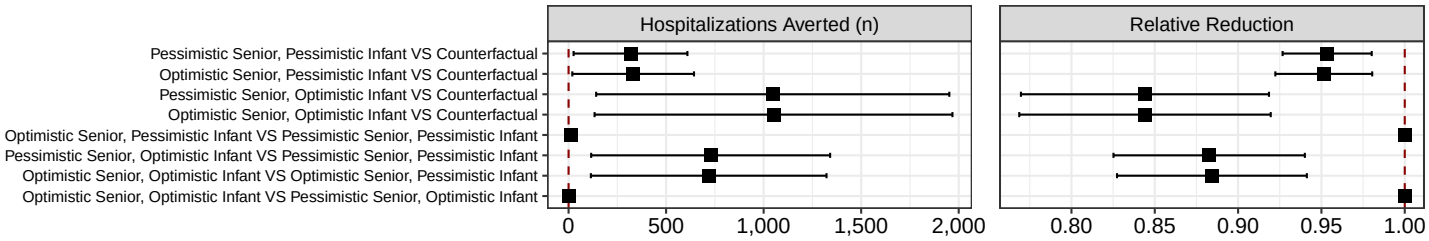
Estimates of cumulative hospitalizations averted and relative reduction in hospitalization for November 18, 2023 to June 1, 2024 comparing scenarios, for the each state, by age group.

United States

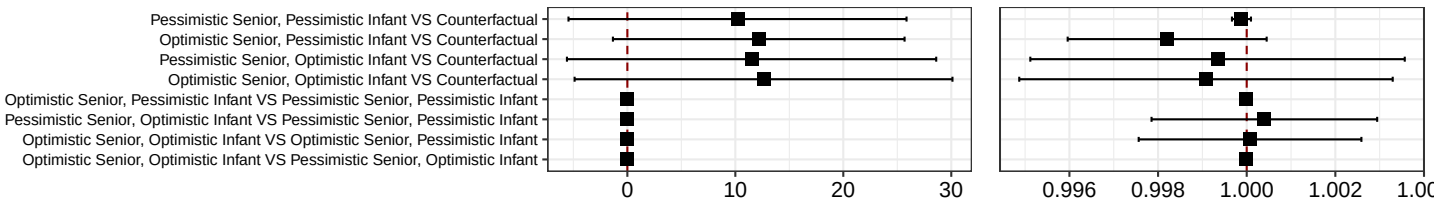


California

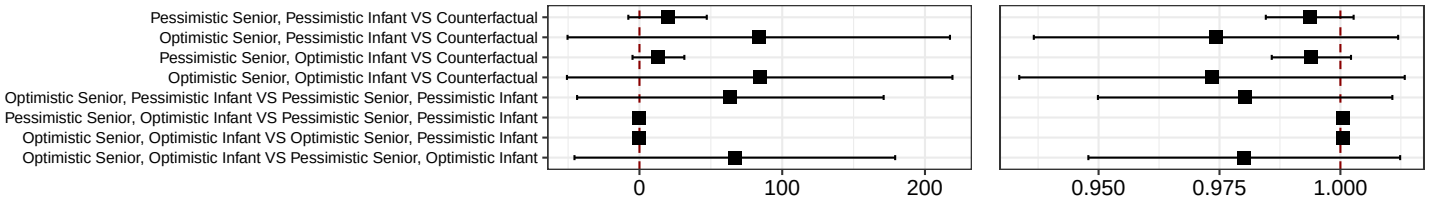
Age: < 1 years



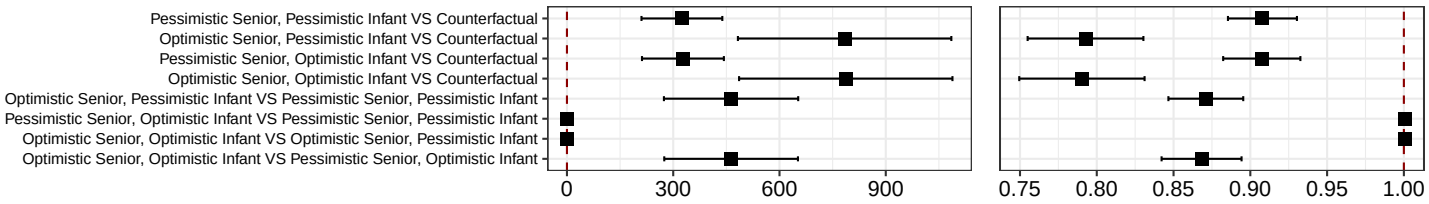
Age: 1−4 years



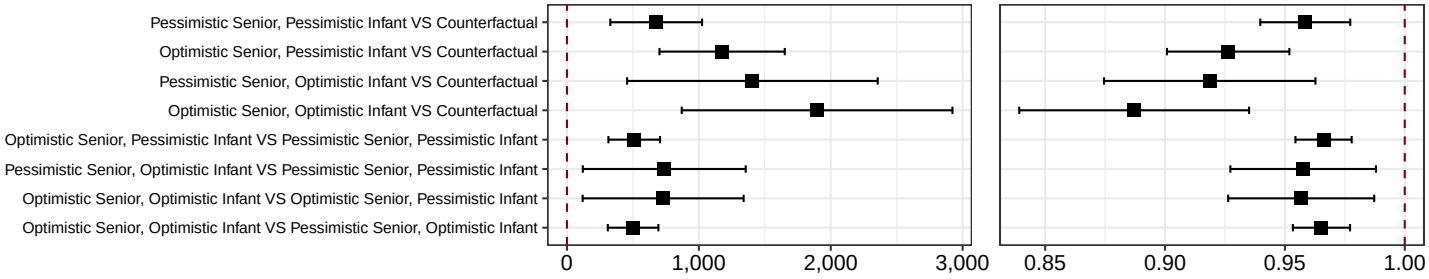
Age: 5−64 years



Age: 65−130 years

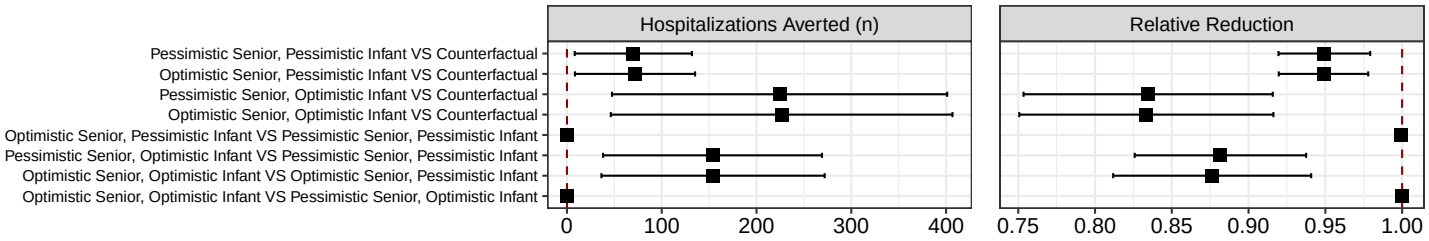


Age: 0−130 years

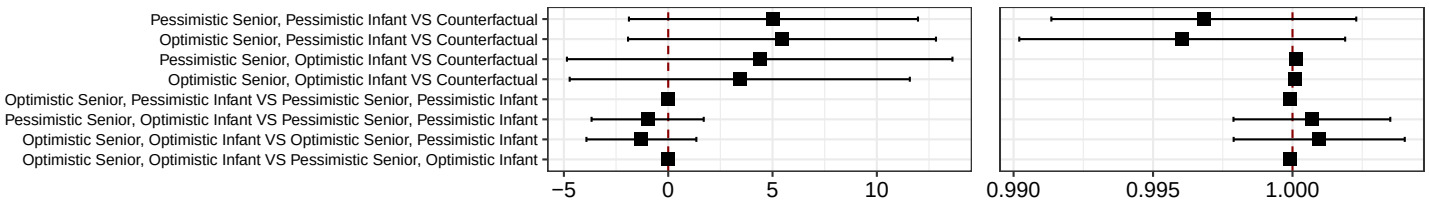


Colorado

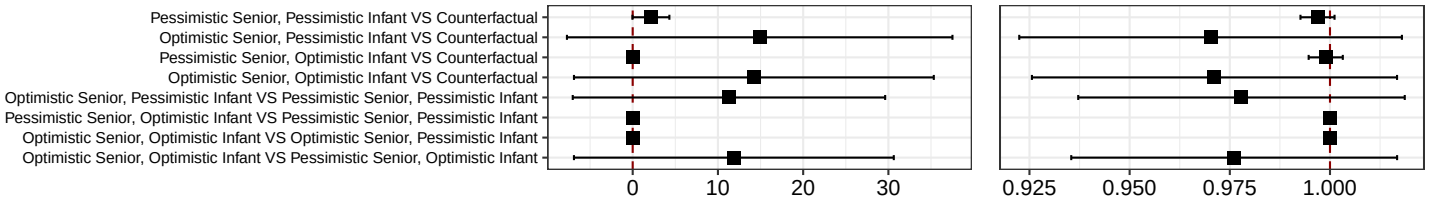
Age: < 1 years



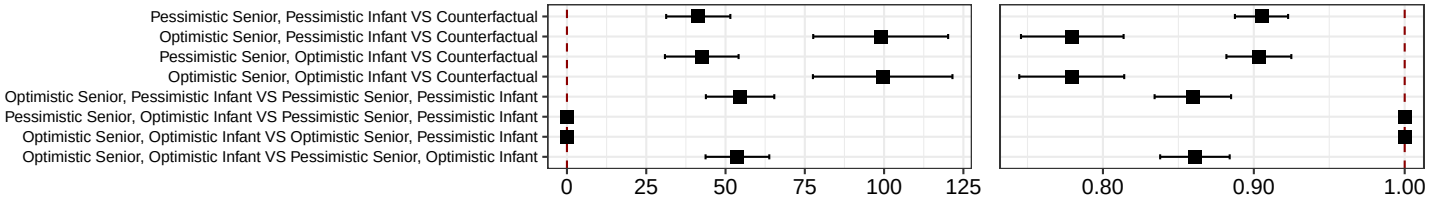
Age: 1−4 years



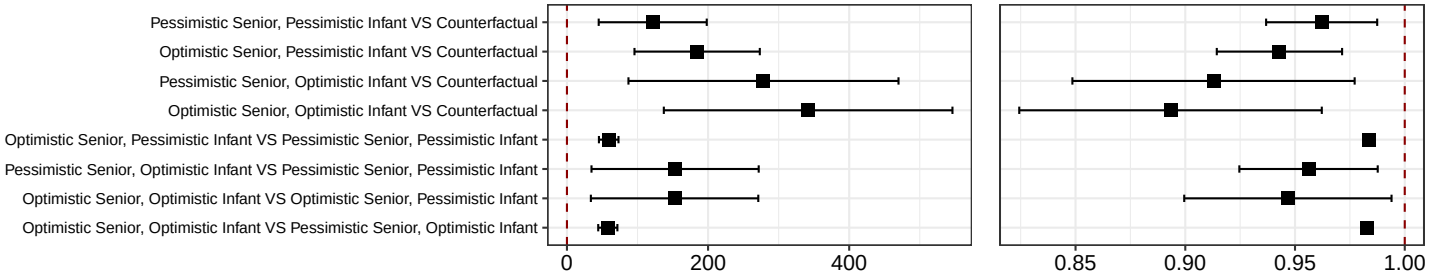
Age: 5−64 years



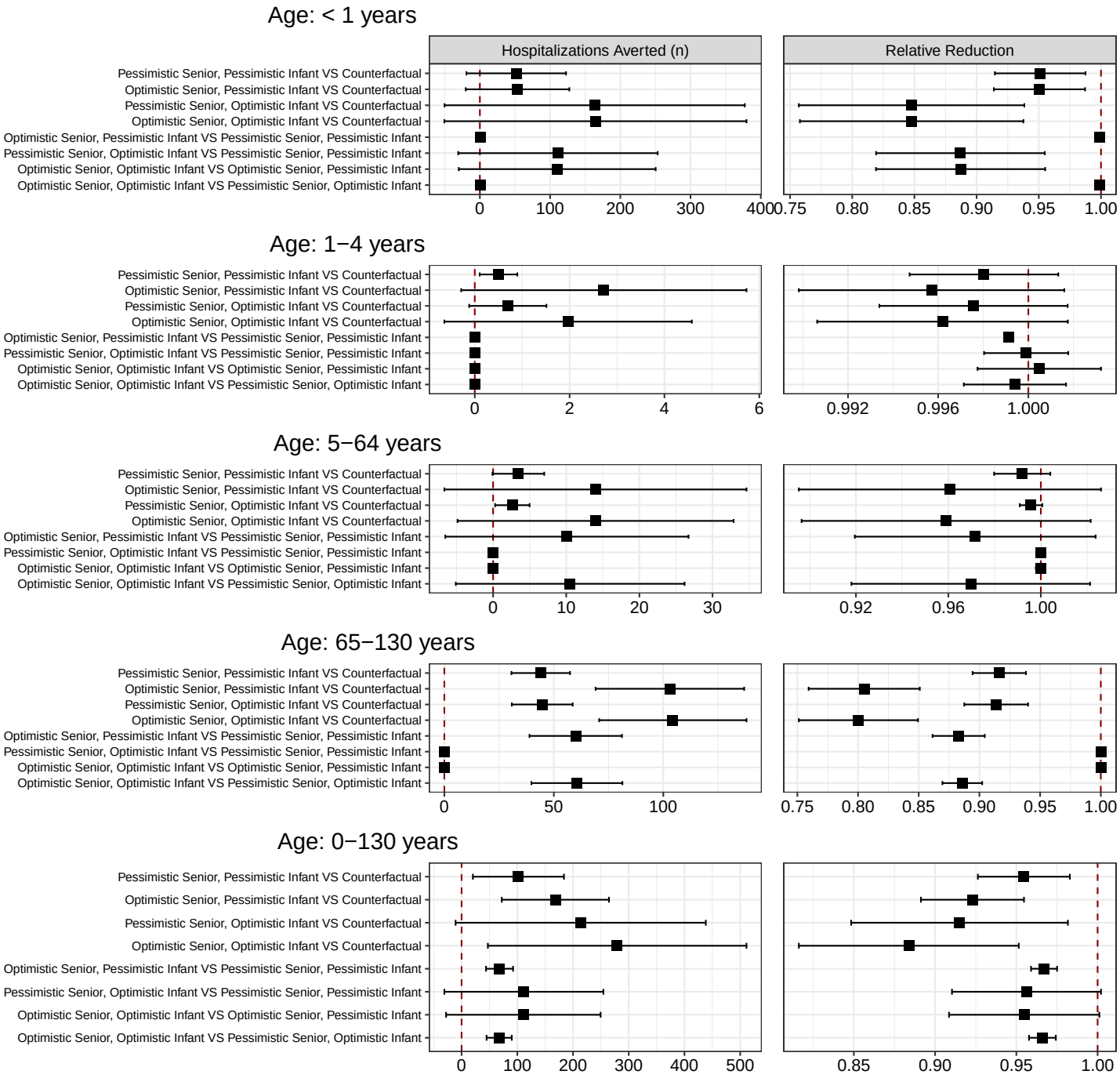
Age: 65−130 years



Age: 0−130 years

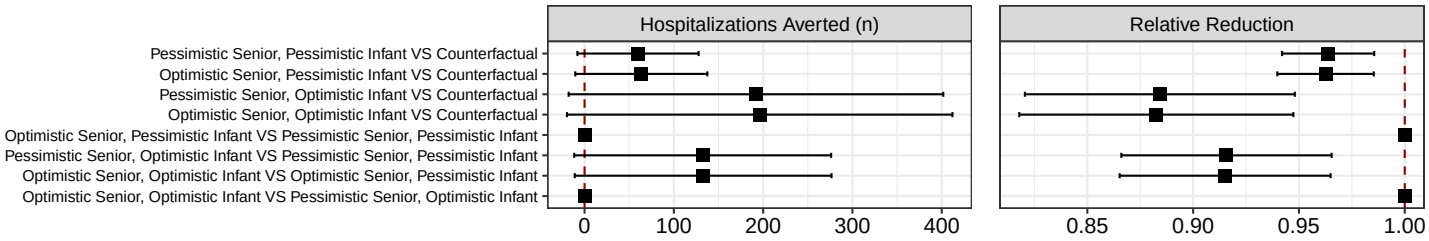


Connecticut

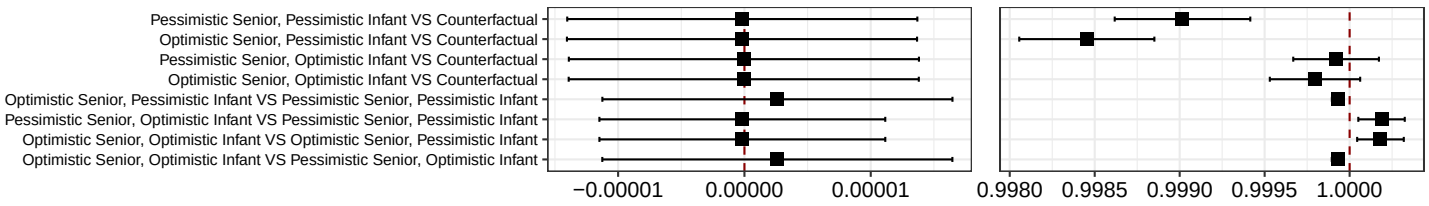


Georgia

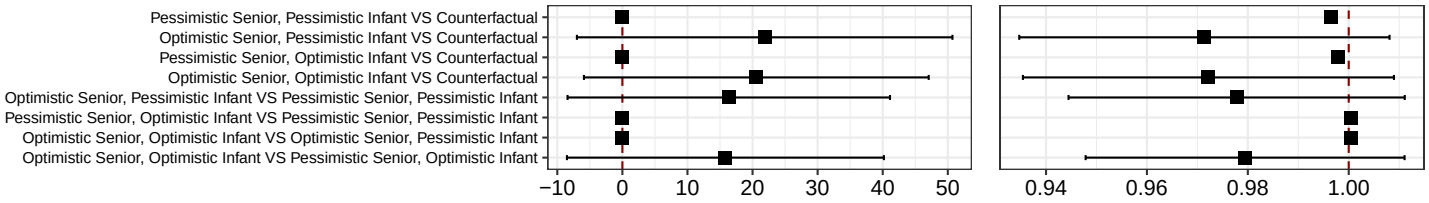
Age: < 1 years



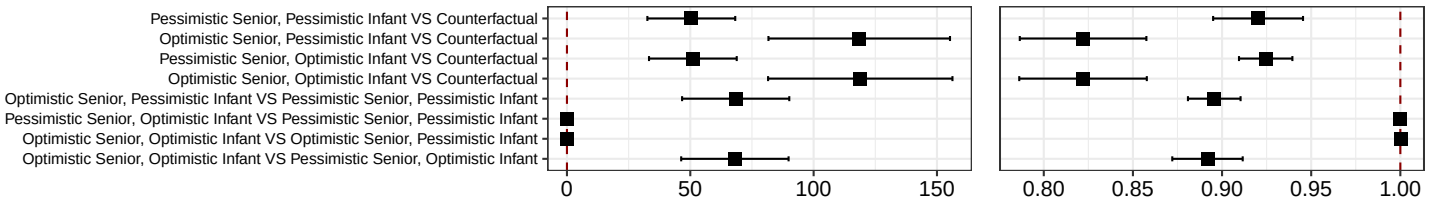
Age: 1−4 years



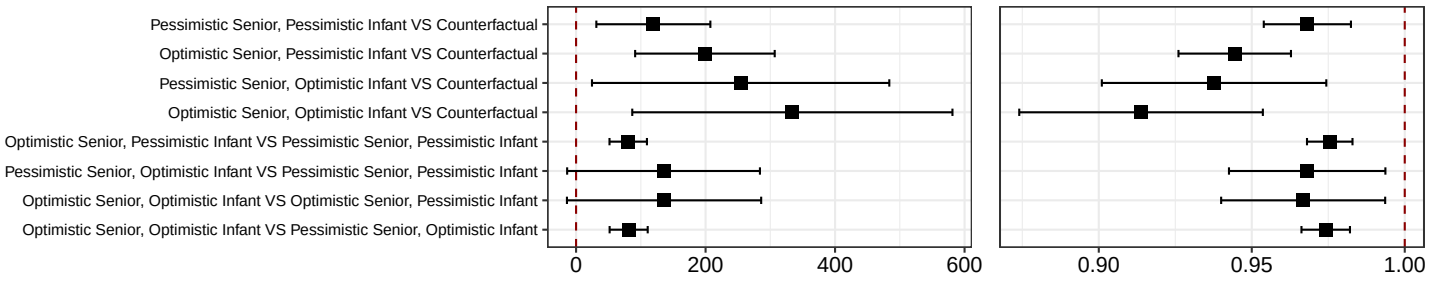
Age: 5−64 years



Age: 65−130 years

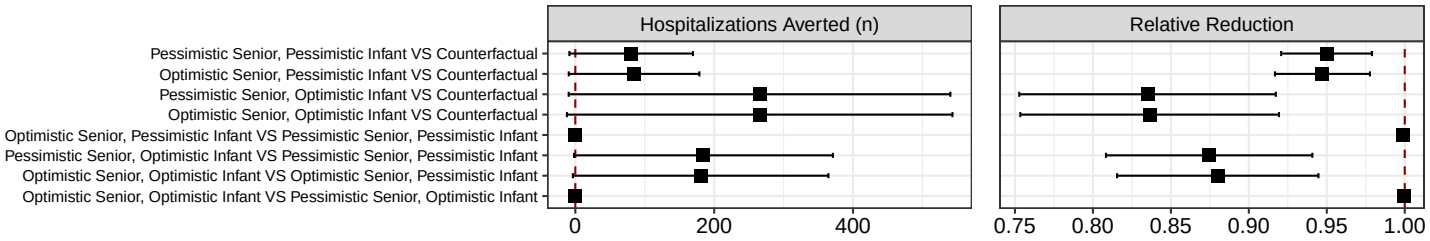


Age: 0−130 years

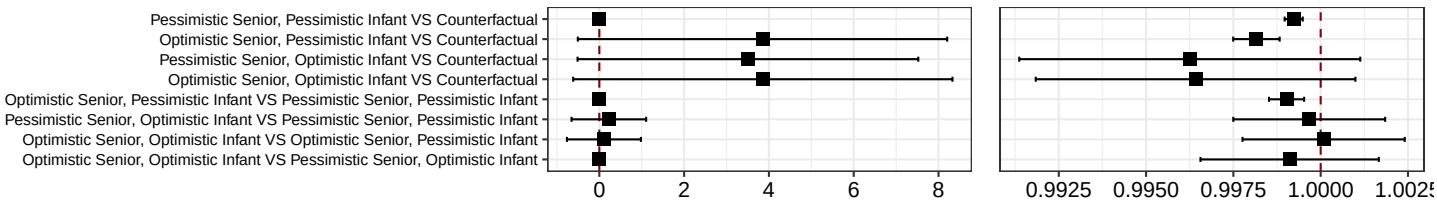


Maryland

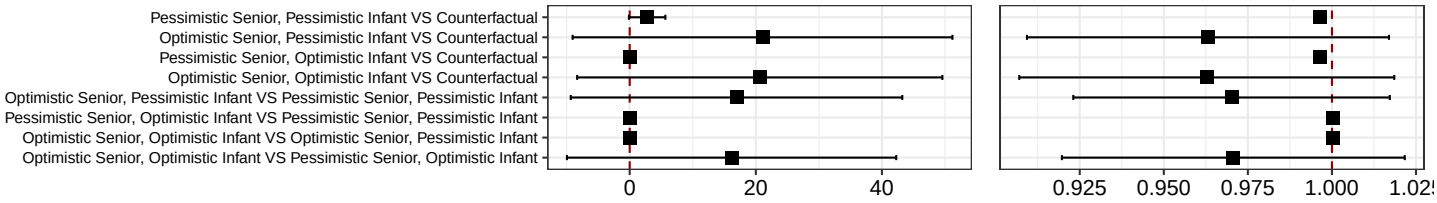
Age: < 1 years



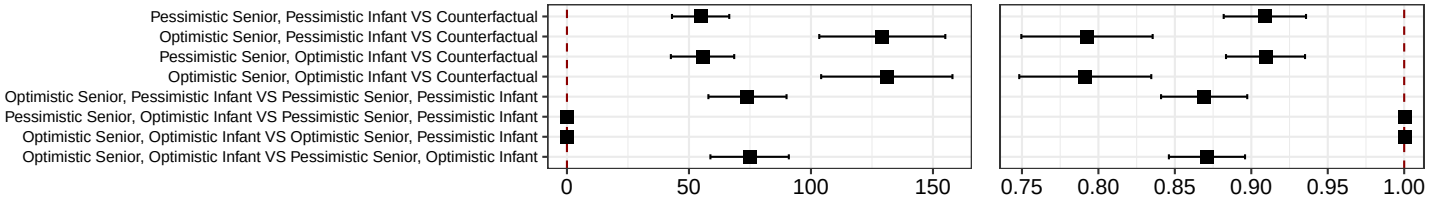
Age: 1−4 years



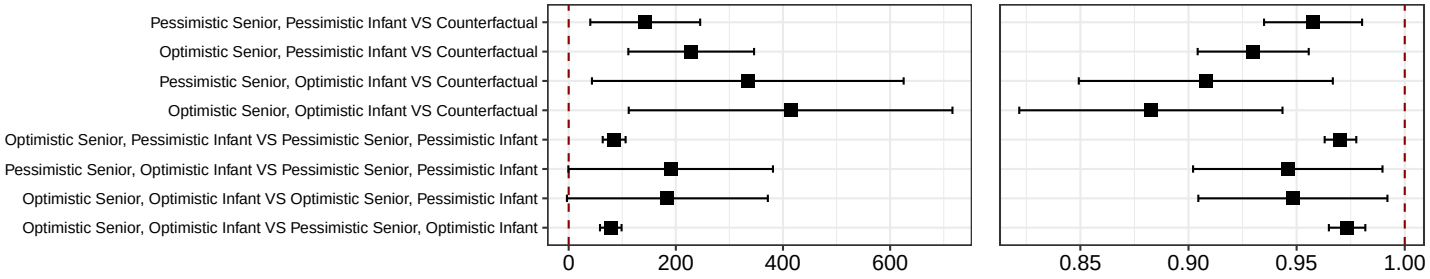
Age: 5−64 years



Age: 65−130 years

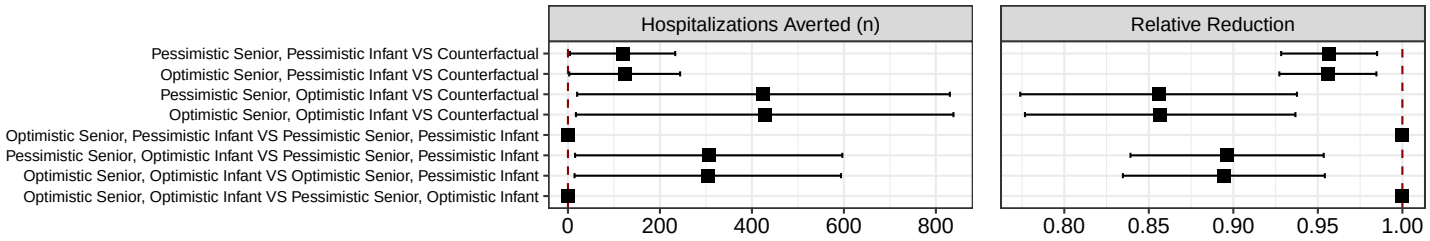


Age: 0−130 years

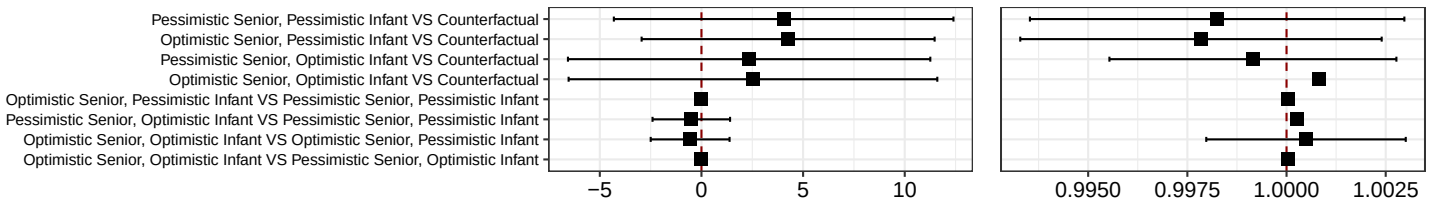


Michigan

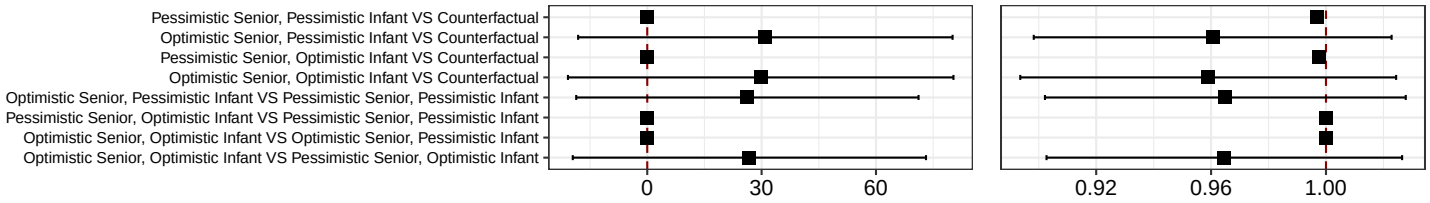
Age: < 1 years



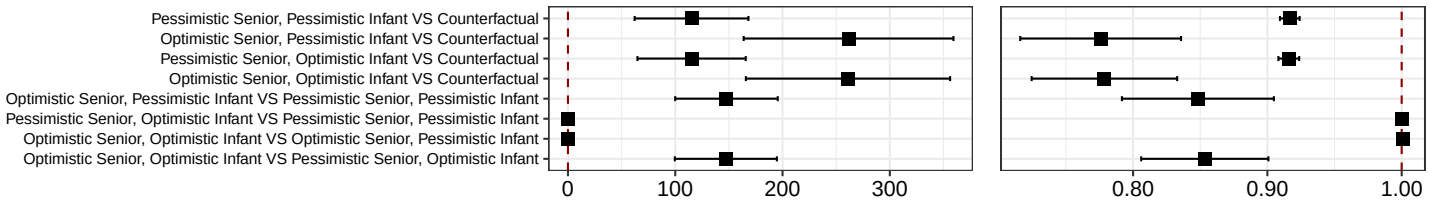
Age: 1−4 years



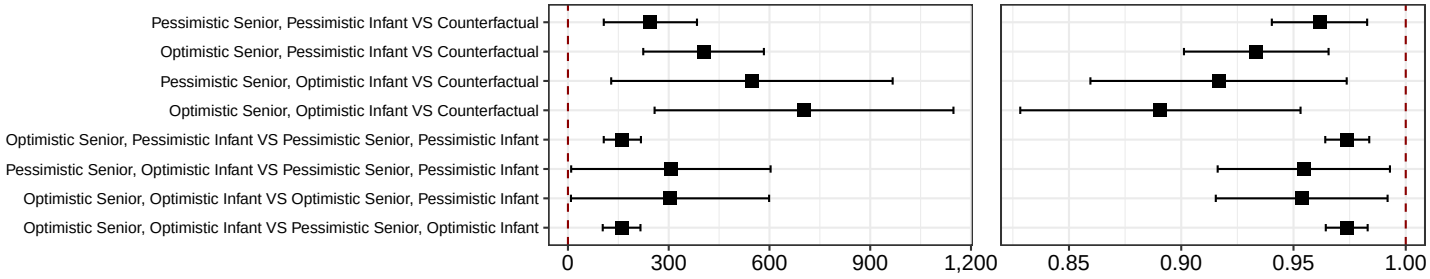
Age: 5−64 years



Age: 65−130 years

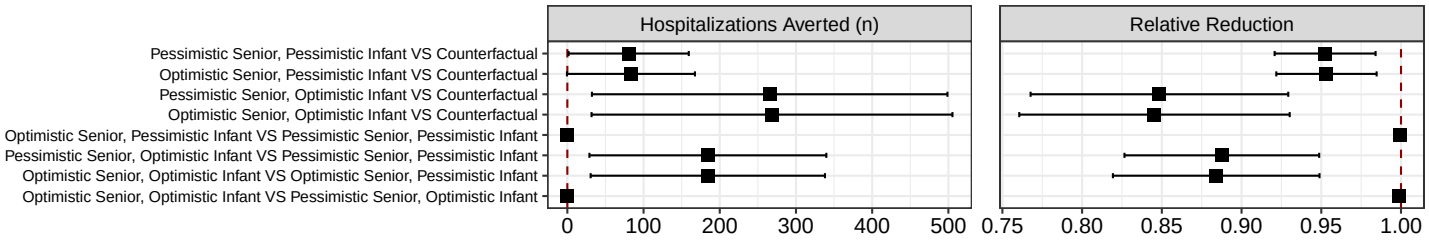


Age: 0−130 years

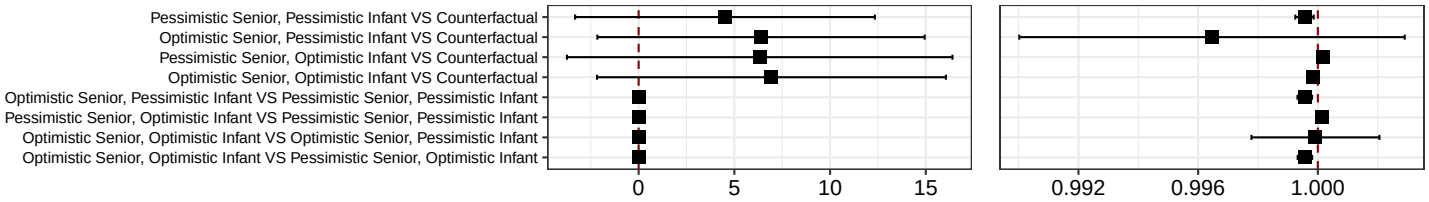


Minnesota

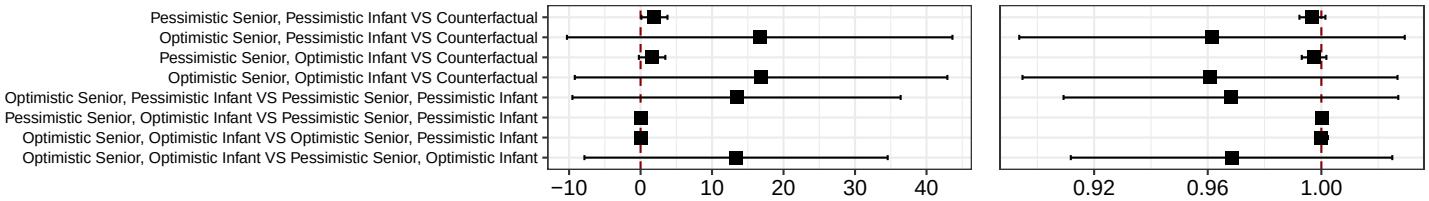
Age: < 1 years



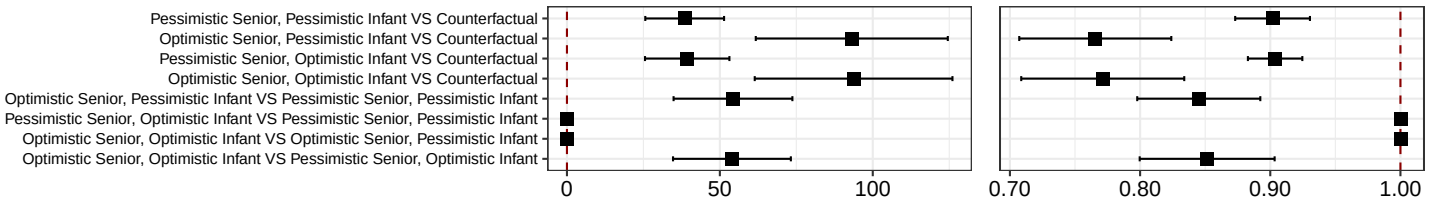
Age: 1−4 years



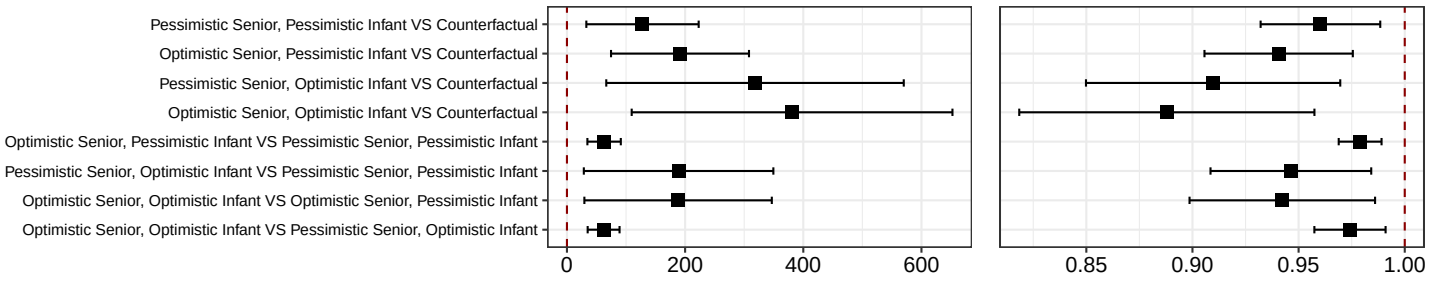
Age: 5−64 years



Age: 65−130 years

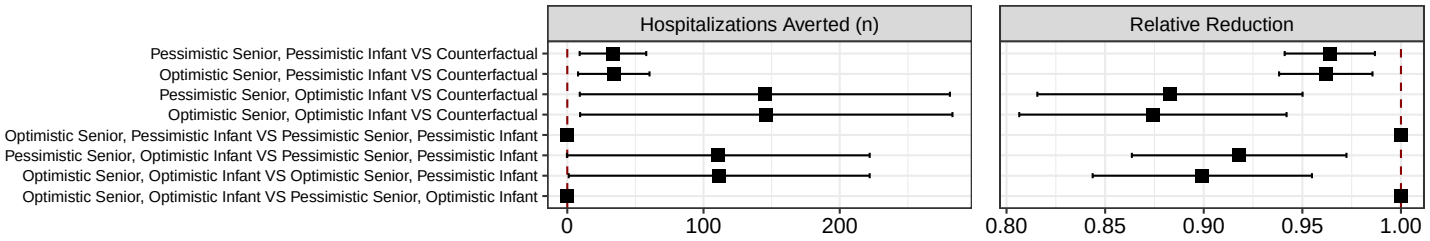


Age: 0−130 years

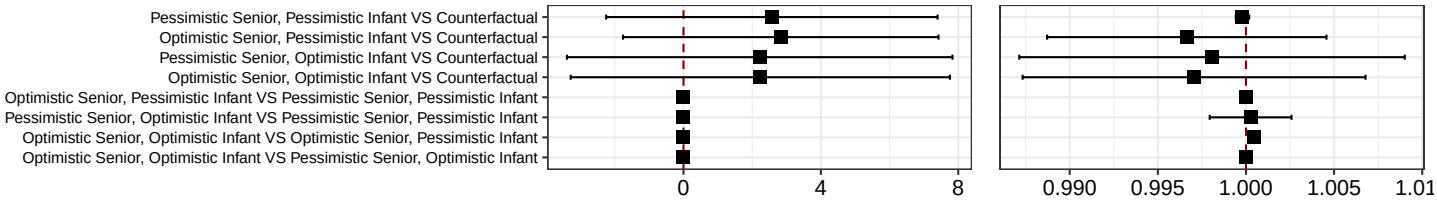


New Mexico

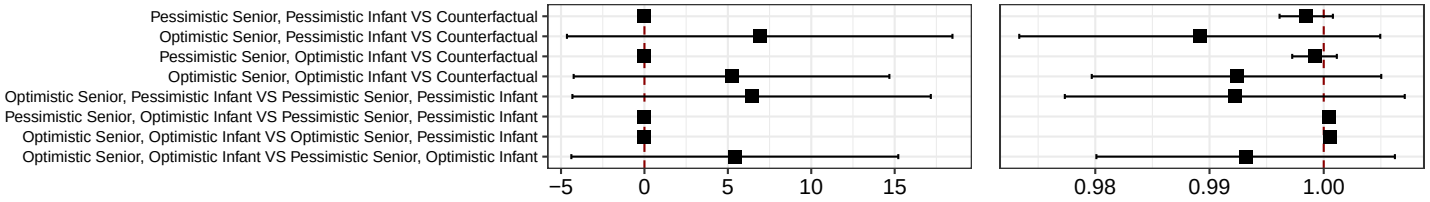
Age: < 1 years



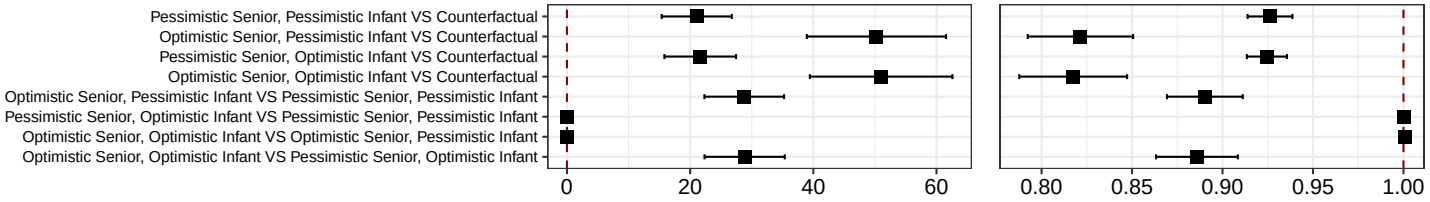
Age: 1−4 years



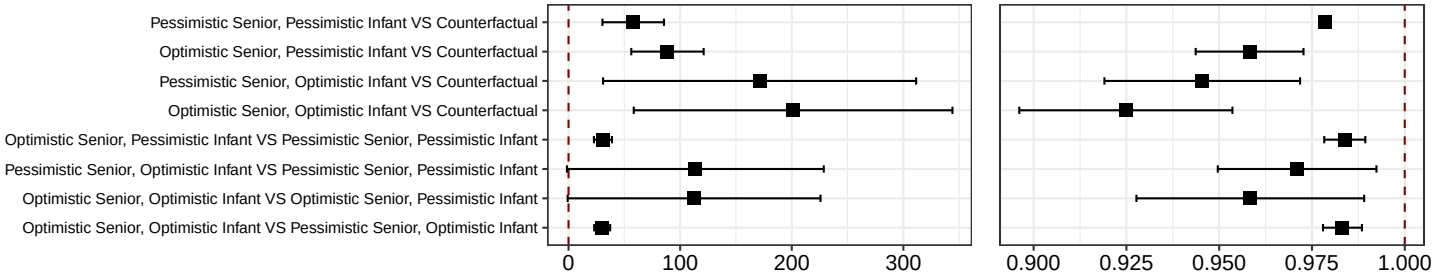
Age: 5−64 years



Age: 65−130 years

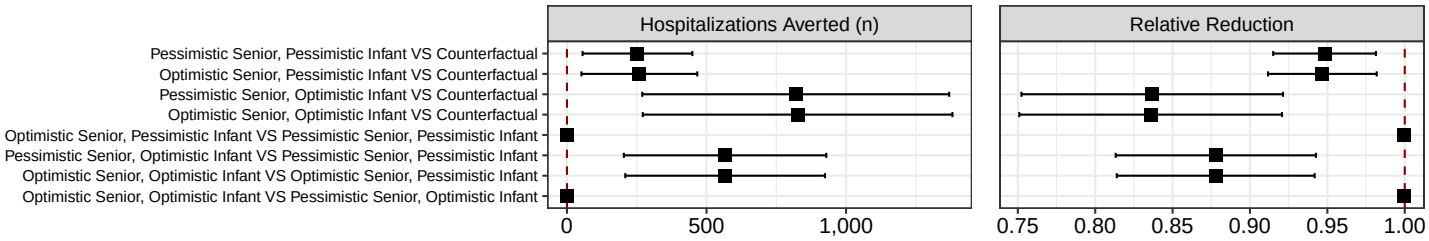


Age: 0−130 years

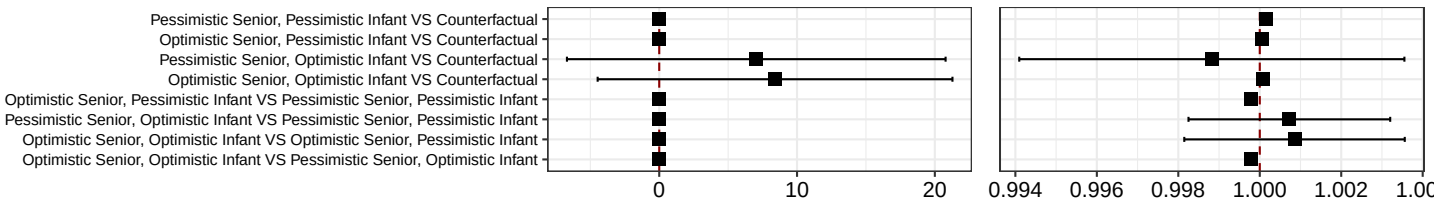


New York

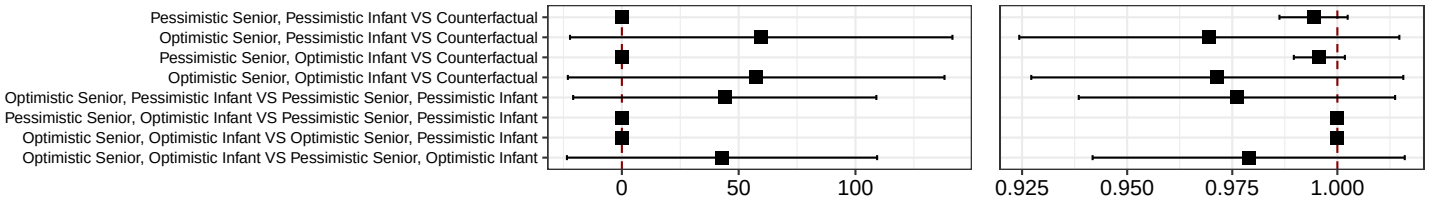
Age: < 1 years



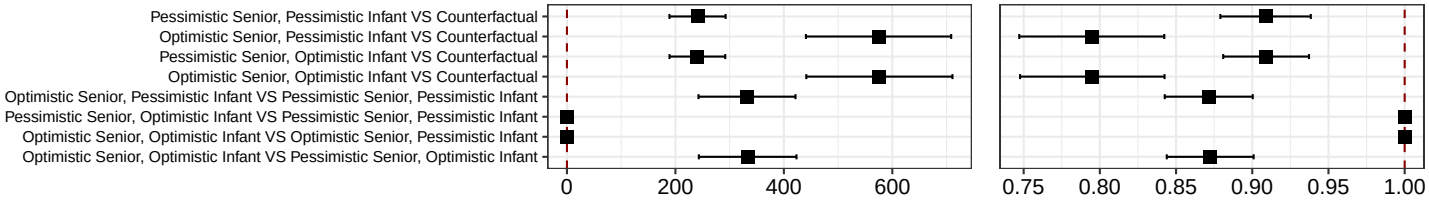
Age: 1−4 years



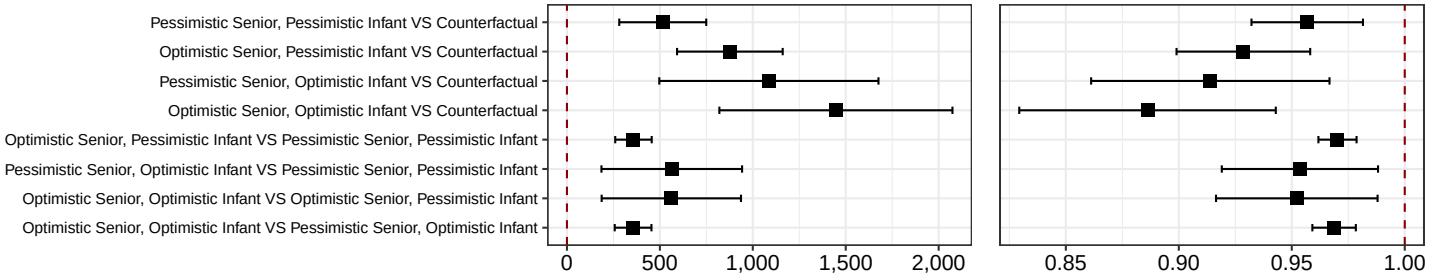
Age: 5−64 years



Age: 65−130 years

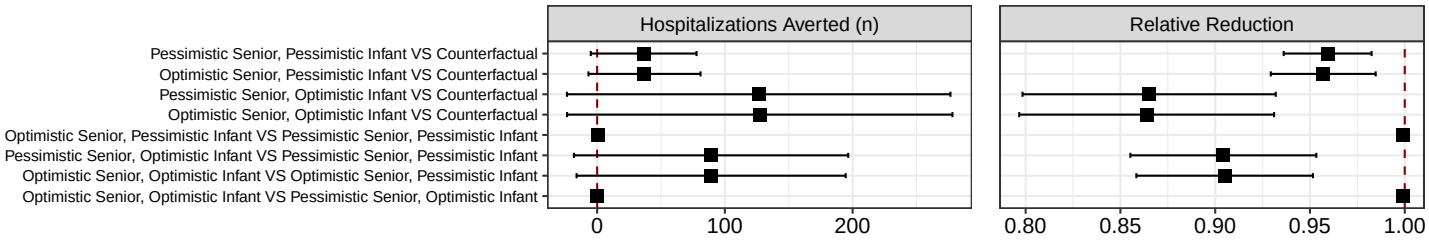


Age: 0−130 years

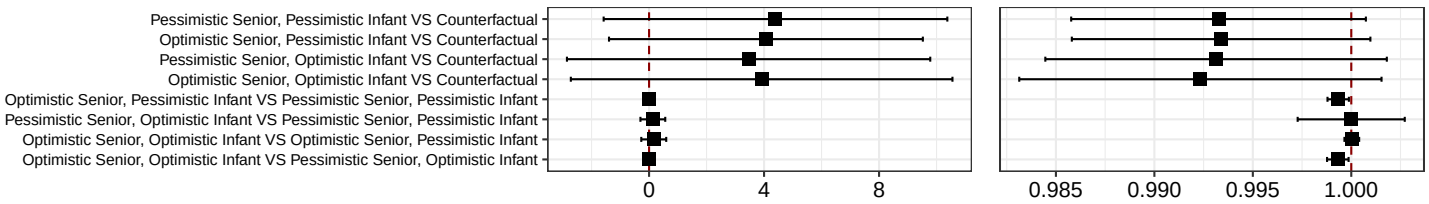


Oregon

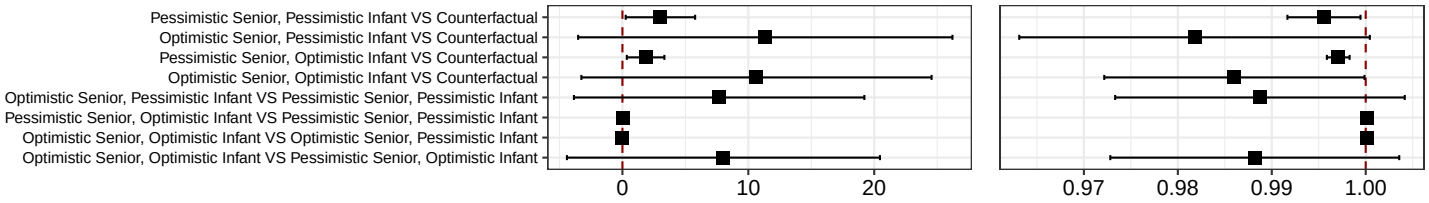
Age: < 1 years



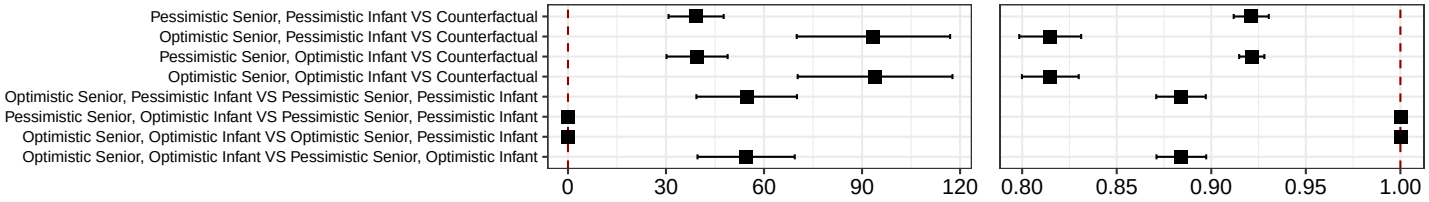
Age: 1−4 years



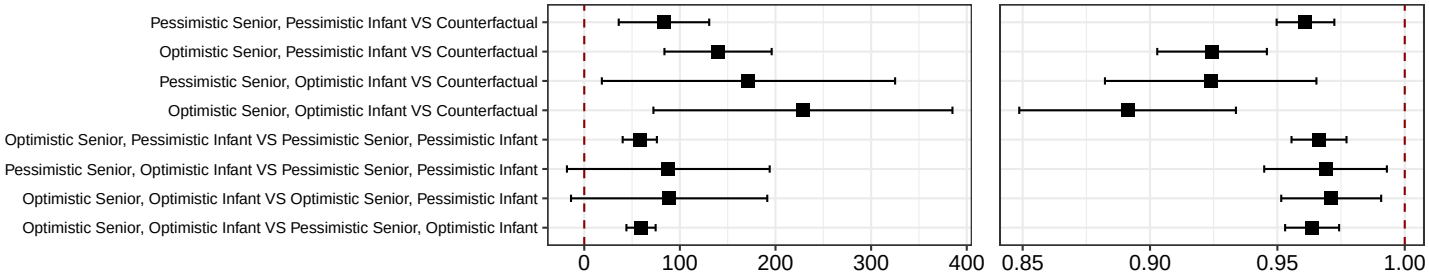
Age: 5−64 years



Age: 65−130 years

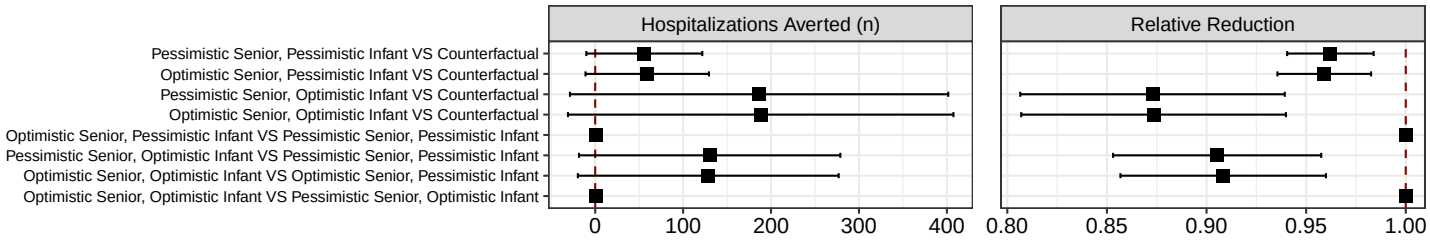


Age: 0−130 years

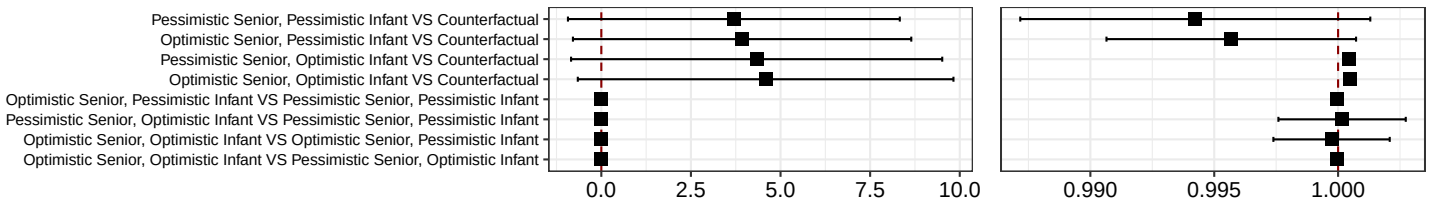


Tennessee

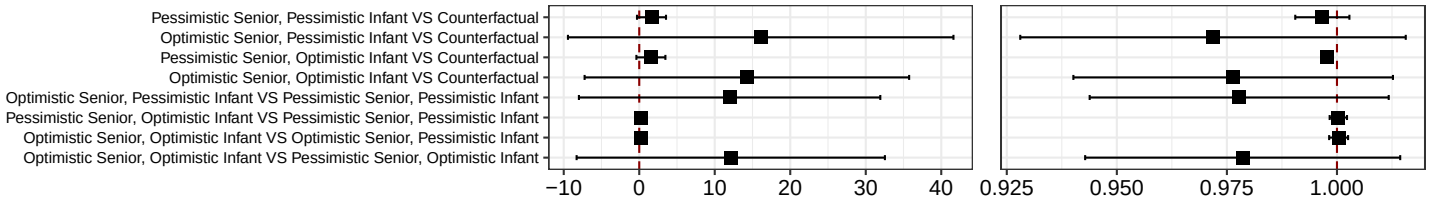
Age: < 1 years



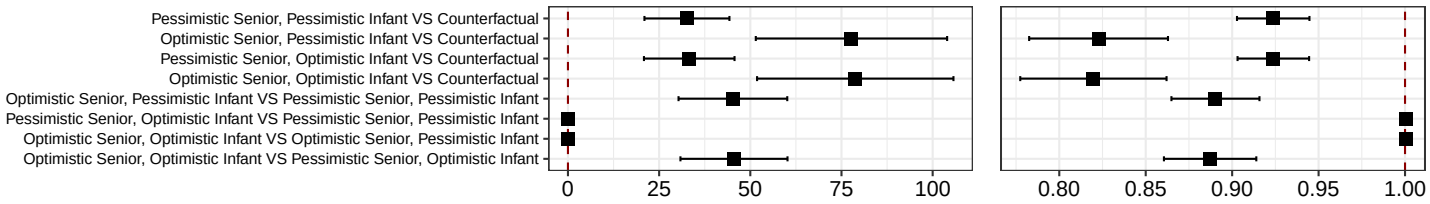
Age: 1−4 years



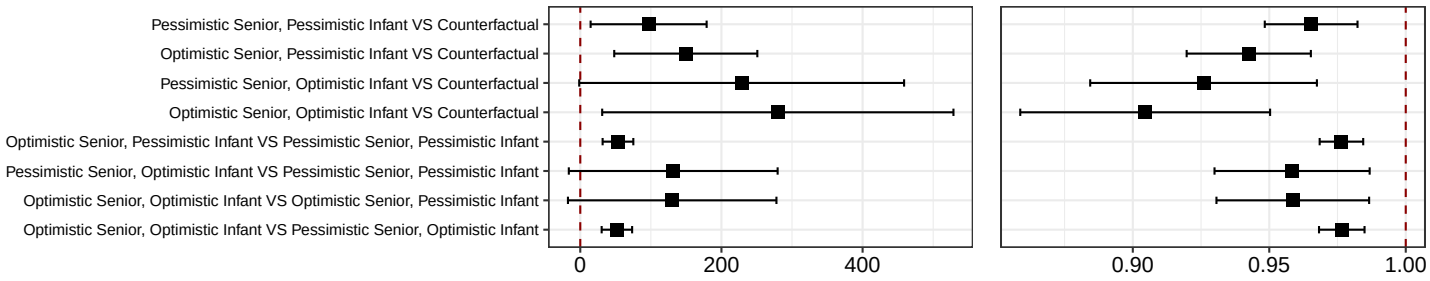
Age: 5−64 years



Age: 65−130 years

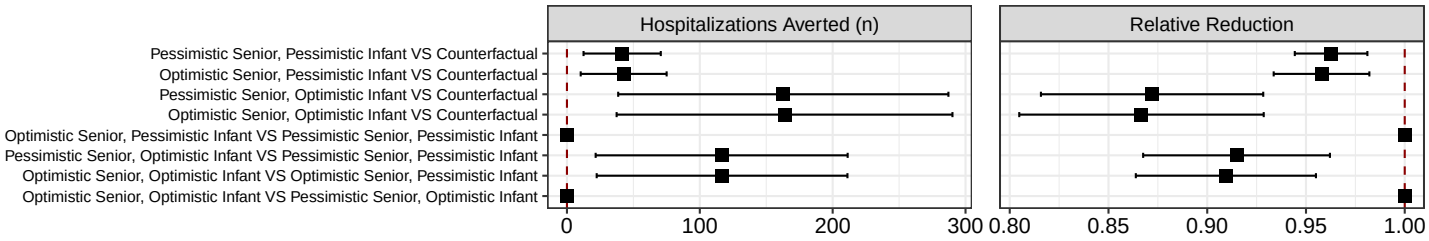


Age: 0−130 years

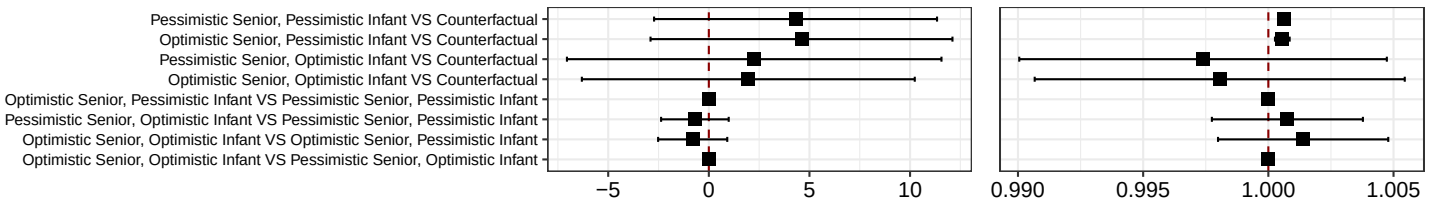


Utah

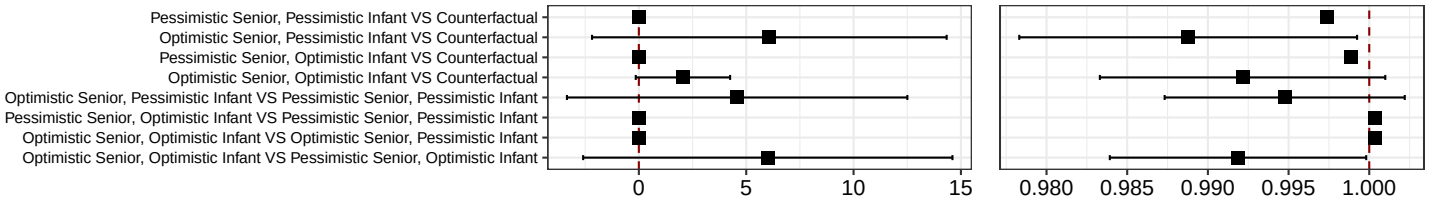
Age: < 1 years



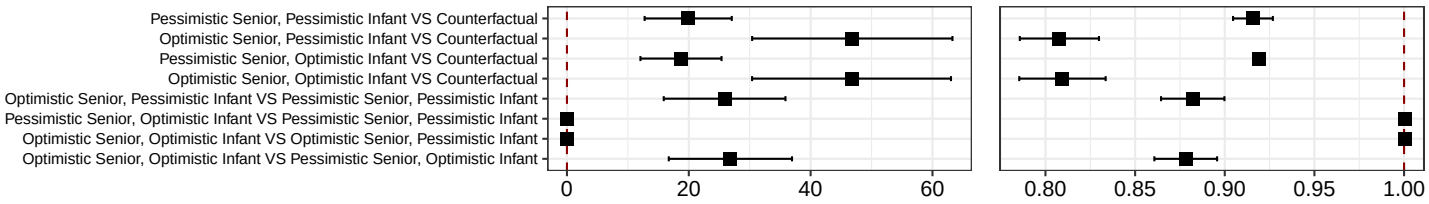
Age: 1−4 years



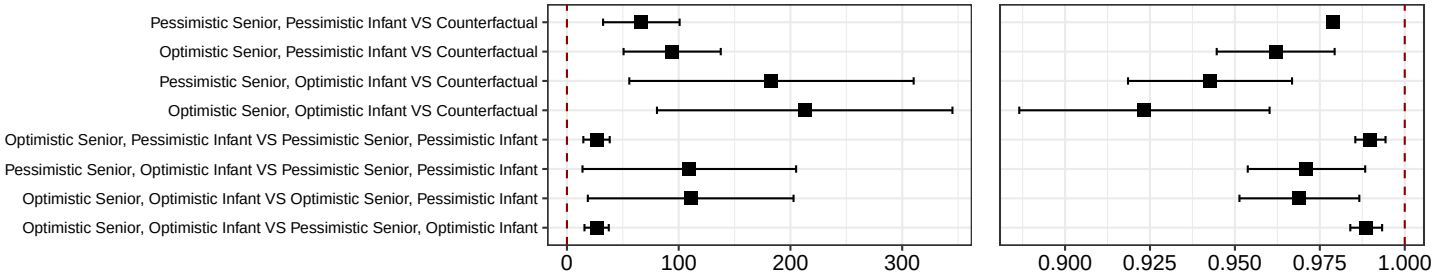
Age: 5−64 years



Age: 65−130 years

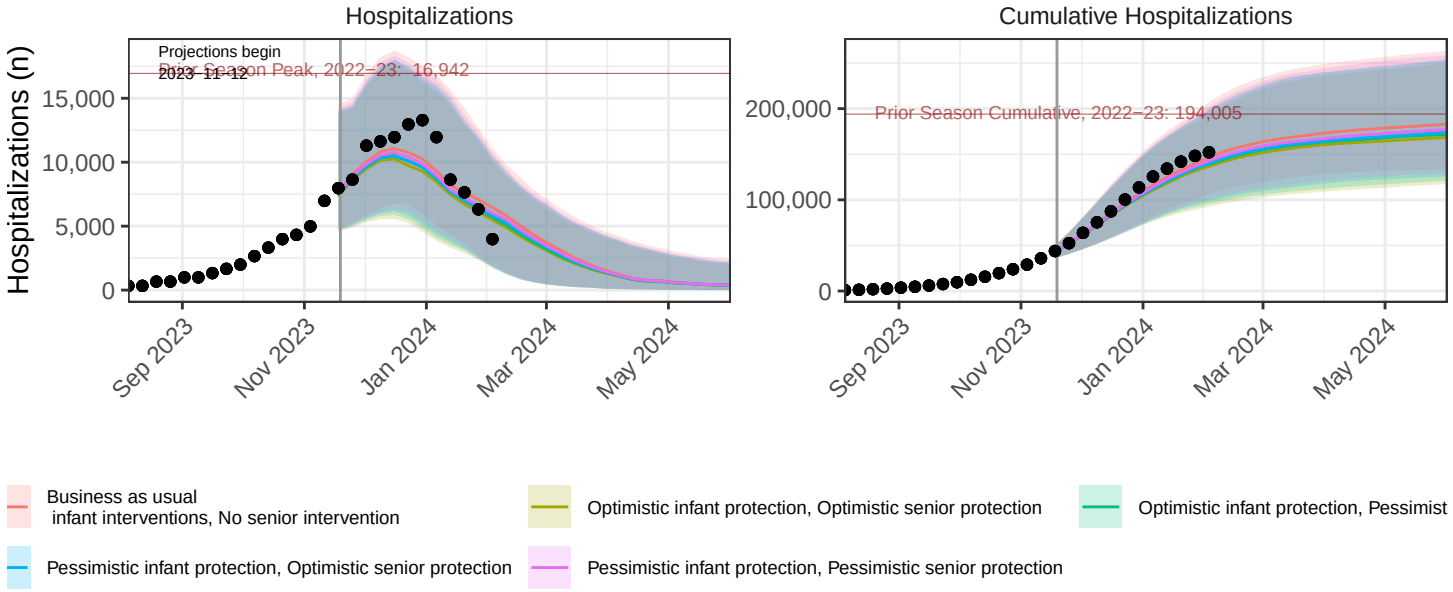


Age: 0−130 years

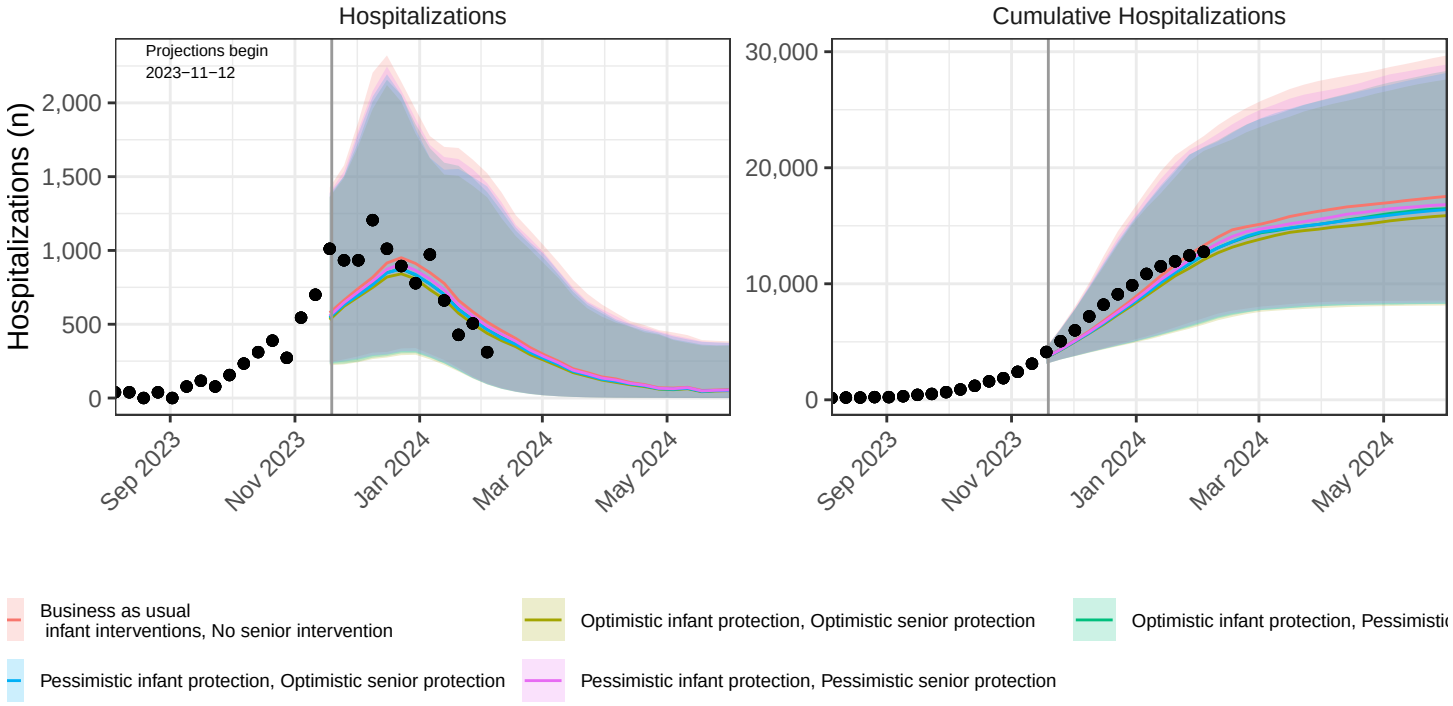


State Scenario Comparison

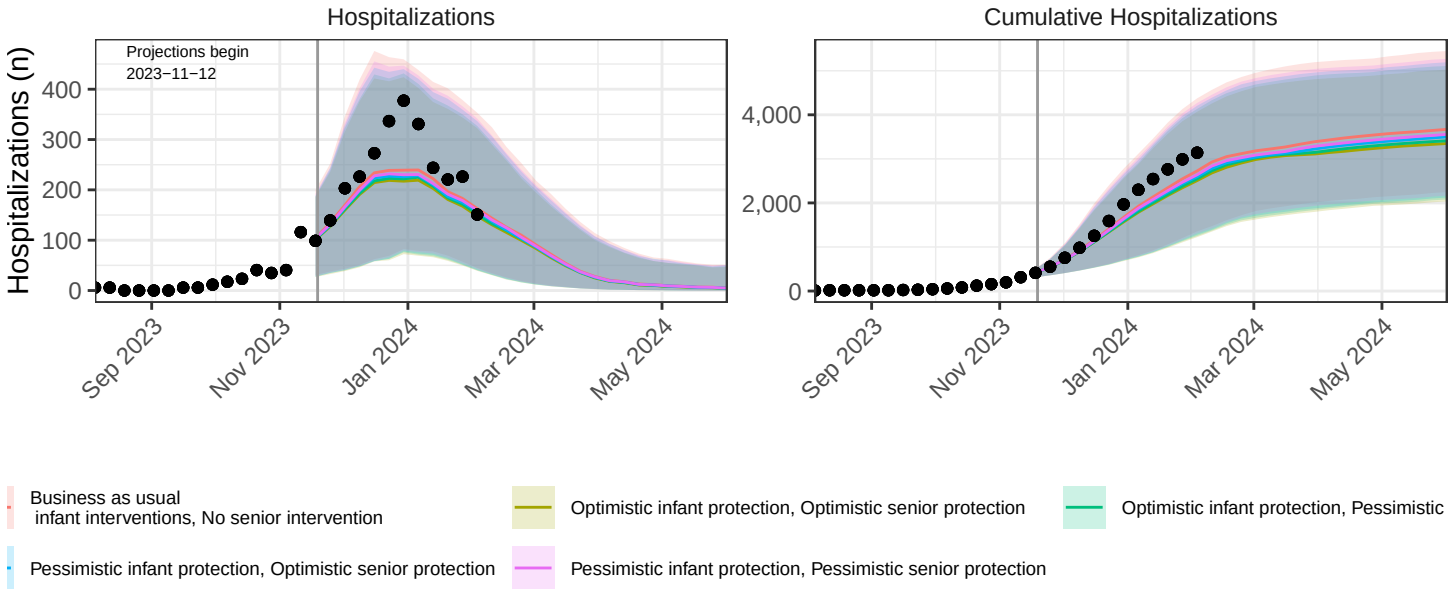
United States, Ensemble projections for incident and cumulative hospitalizations by scenario, all ages.



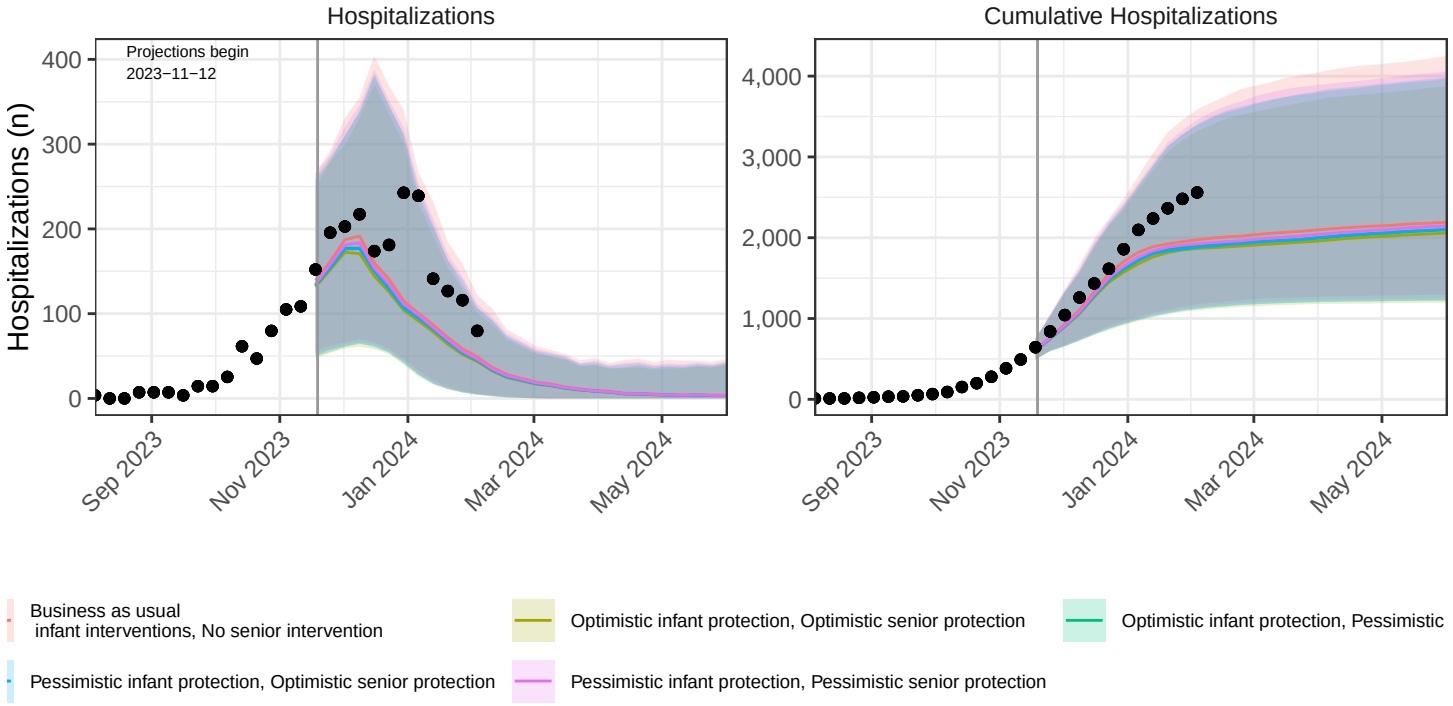
California, Ensemble projections for incident and cumulative hospitalizations by scenario, all ages.



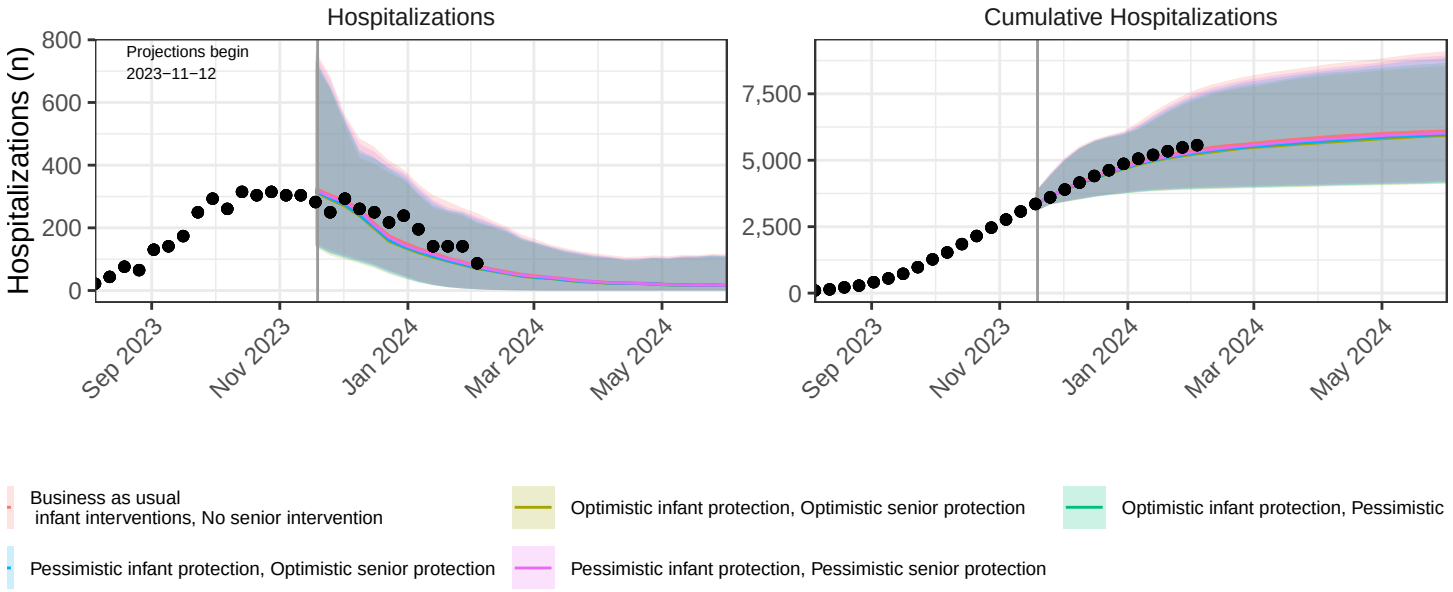
Colorado, Ensemble projections for incident and cumulative hospitalizations by scenario, all ages.



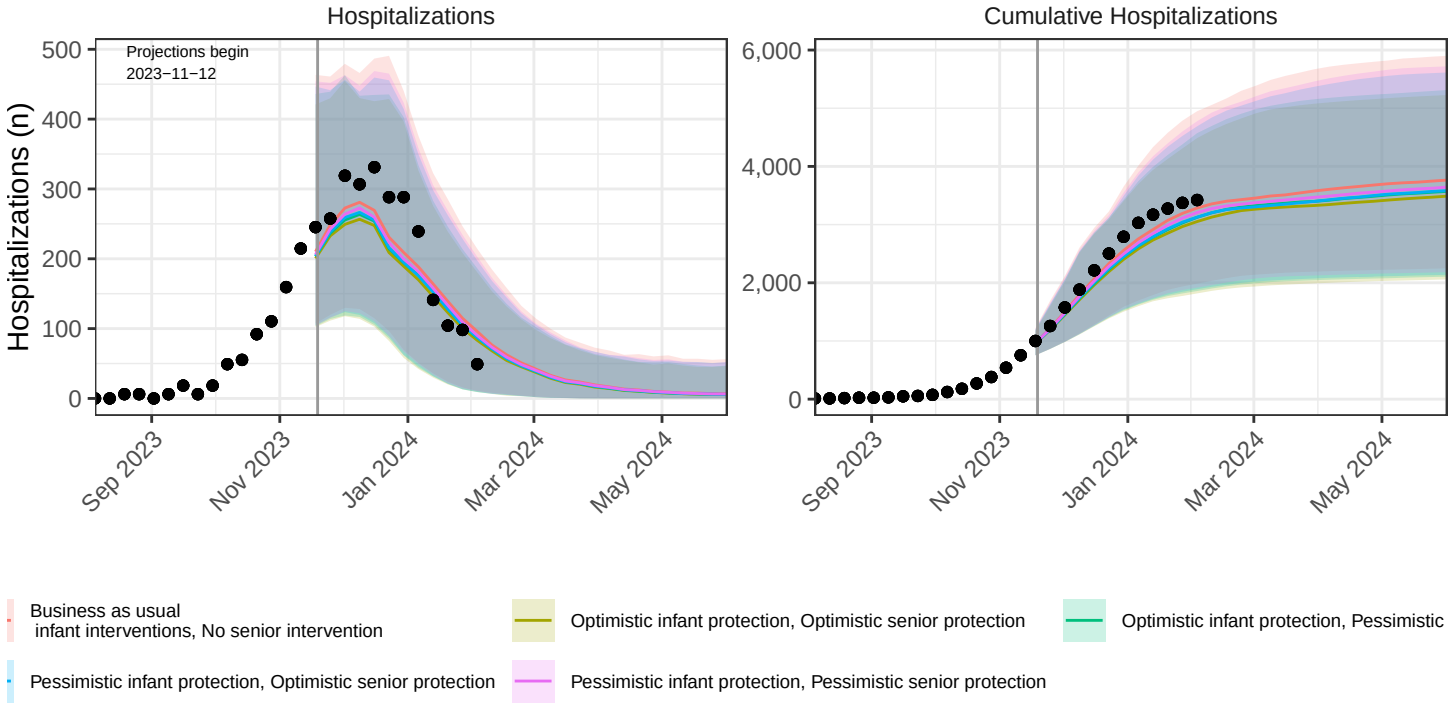
Connecticut, Ensemble projections for incident and cumulative hospitalizations by scenario, all ages.



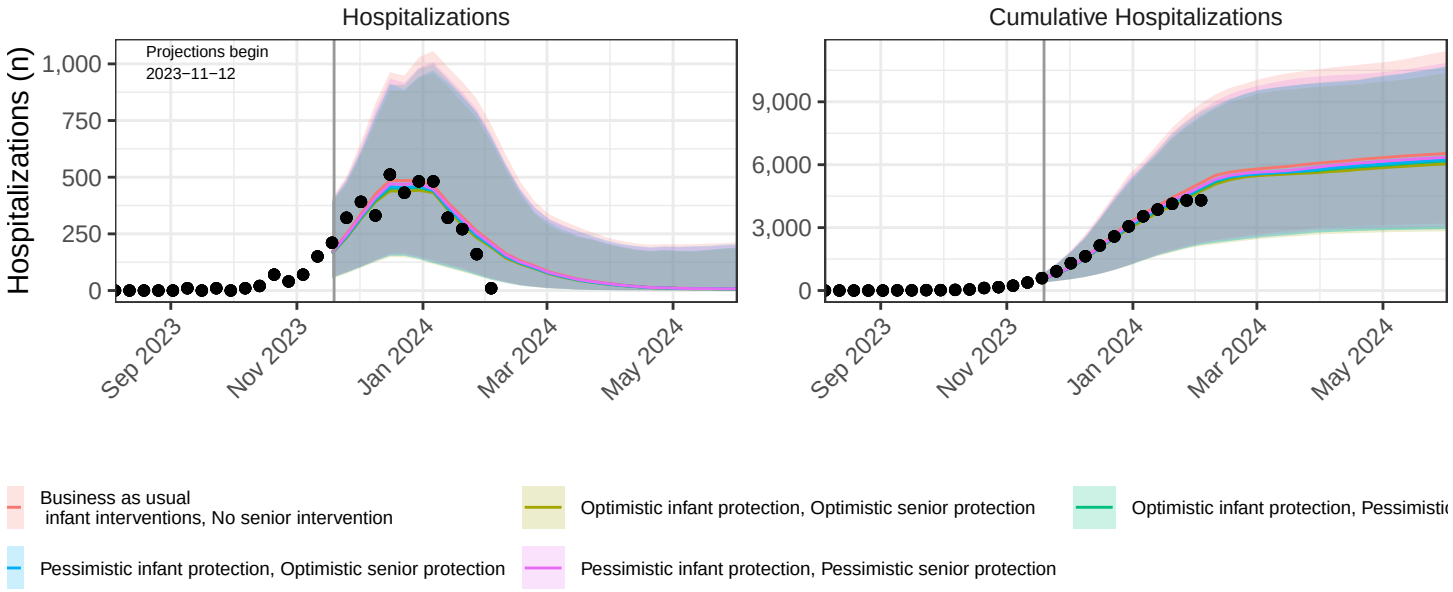
Georgia, Ensemble projections for incident and cumulative hospitalizations by scenario, all ages.



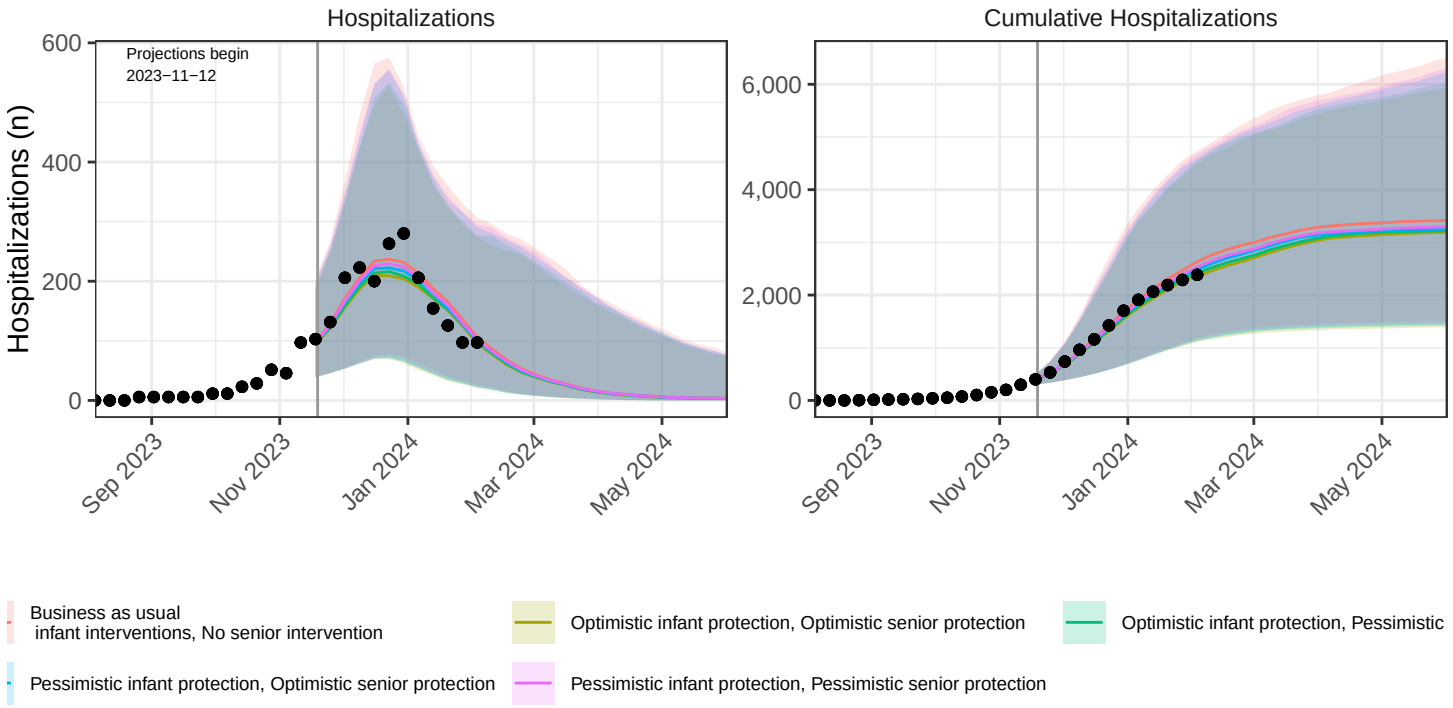
Maryland, Ensemble projections for incident and cumulative hospitalizations by scenario, all ages.



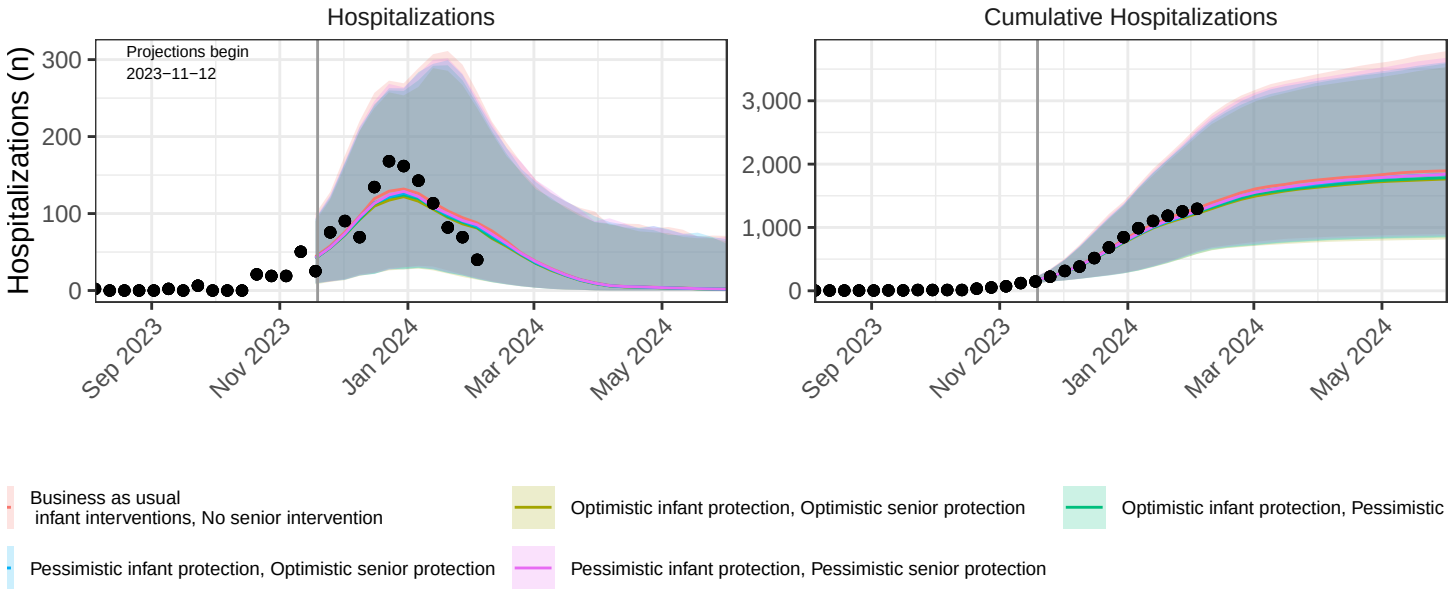
Michigan, Ensemble projections for incident and cumulative hospitalizations by scenario, all ages.



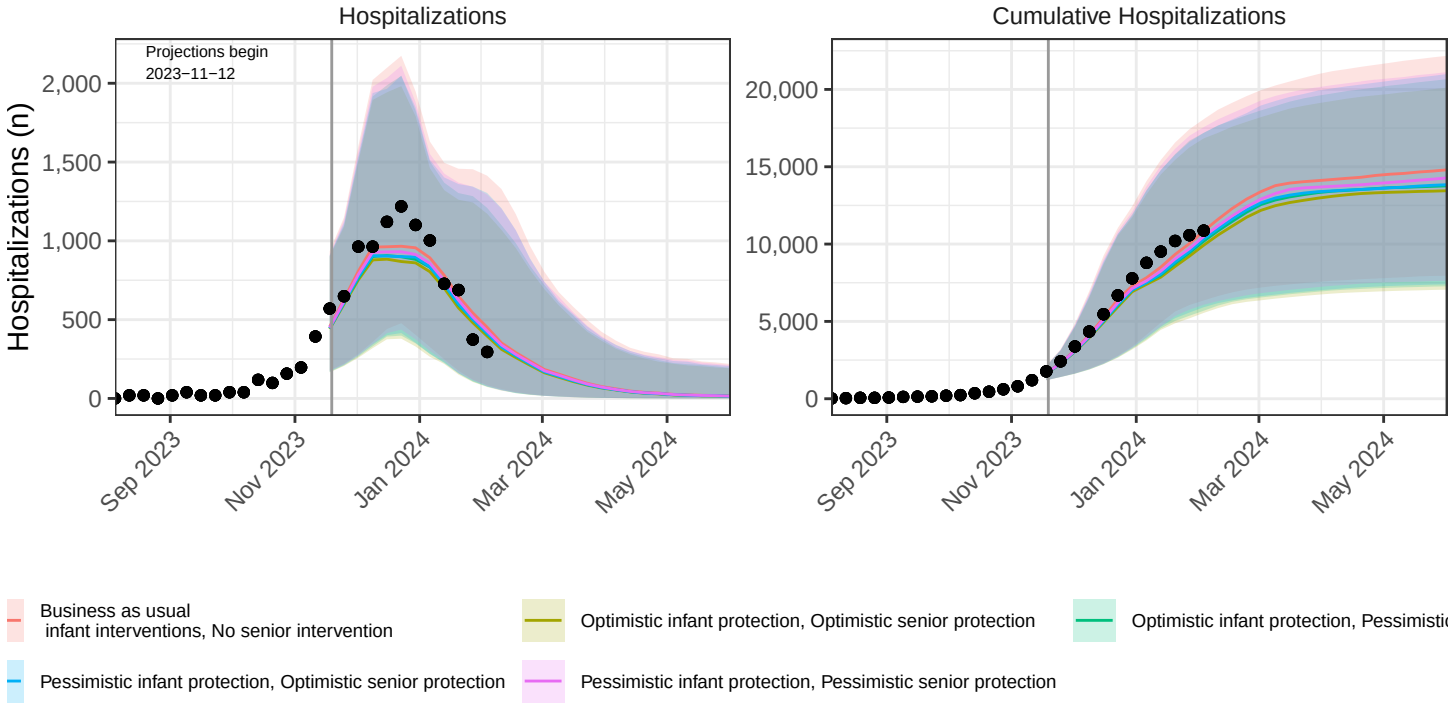
Minnesota, Ensemble projections for incident and cumulative hospitalizations by scenario, all ages.



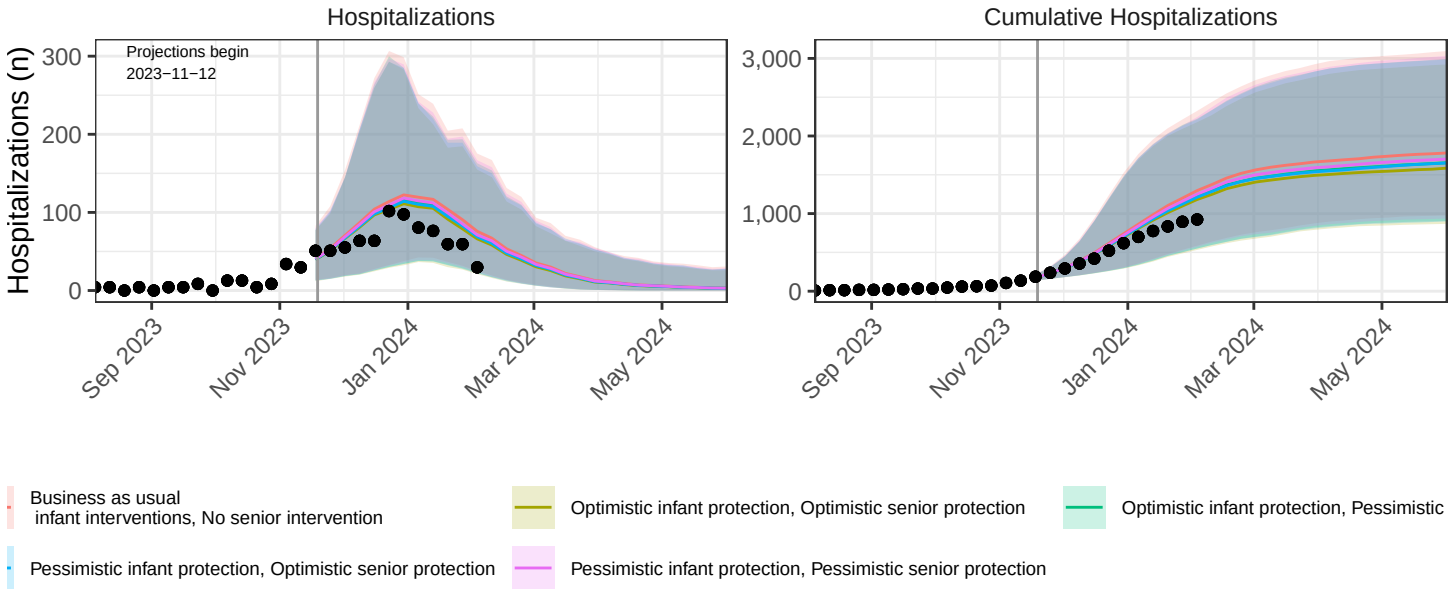
New Mexico, Ensemble projections for incident and cumulative hospitalizations by scenario, all ages.



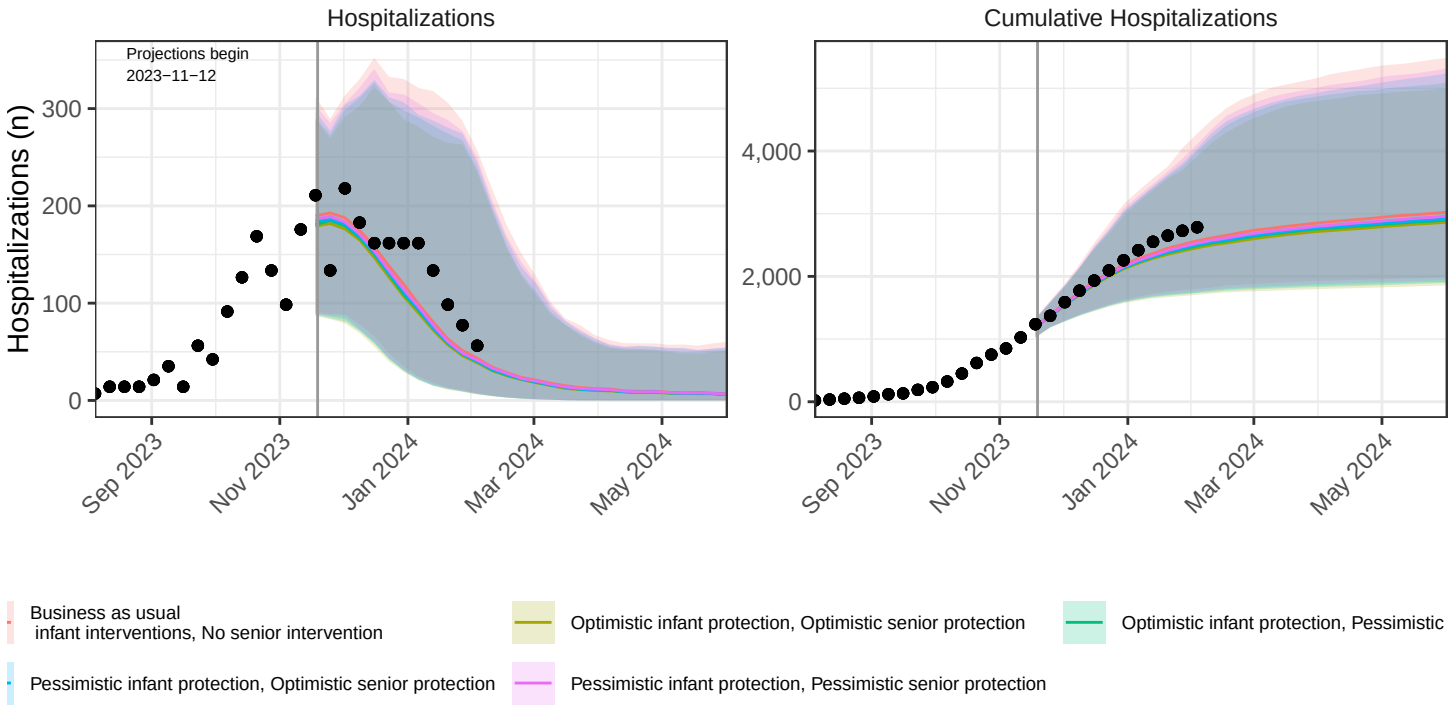
New York, Ensemble projections for incident and cumulative hospitalizations by scenario, all ages.



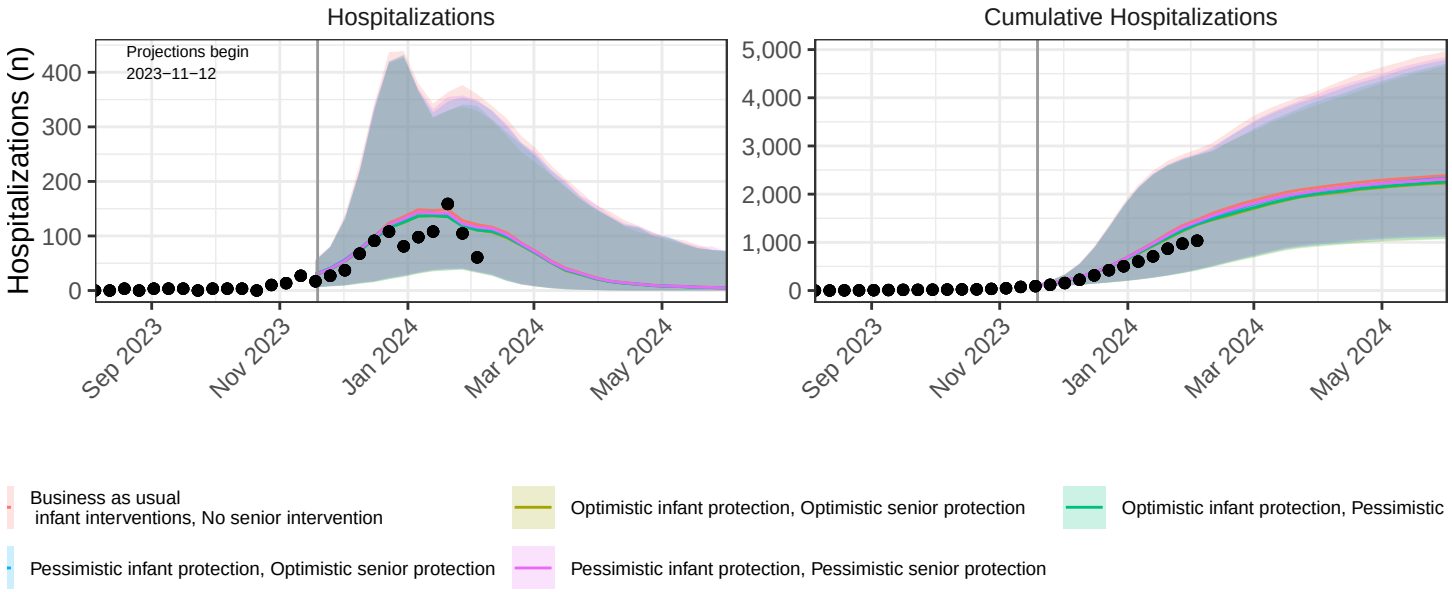
Oregon, Ensemble projections for incident and cumulative hospitalizations by scenario, all ages.



Tennessee, Ensemble projections for incident and cumulative hospitalizations by scenario, all ages.

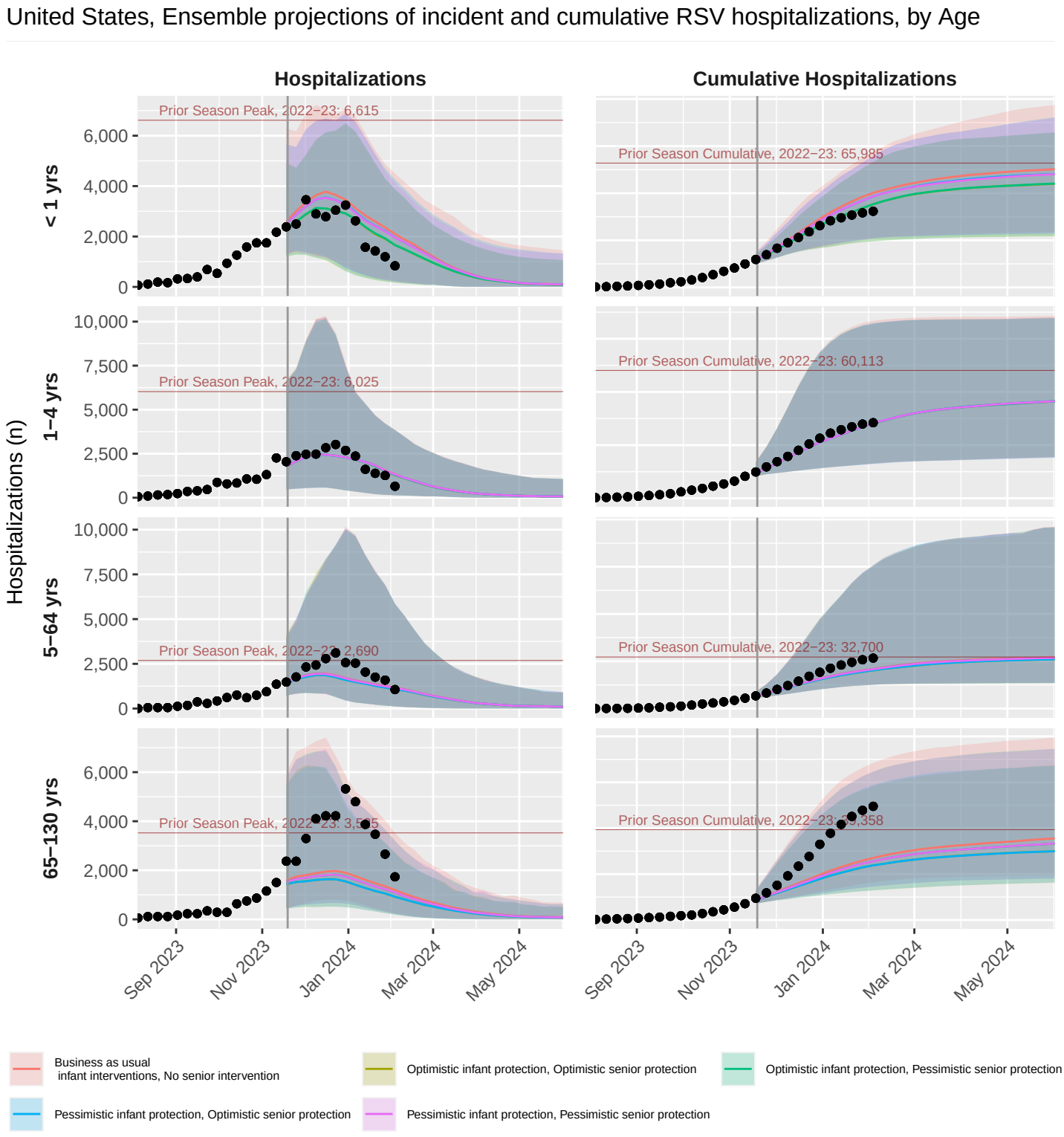


Utah, Ensemble projections for incident and cumulative hospitalizations by scenario, all ages.

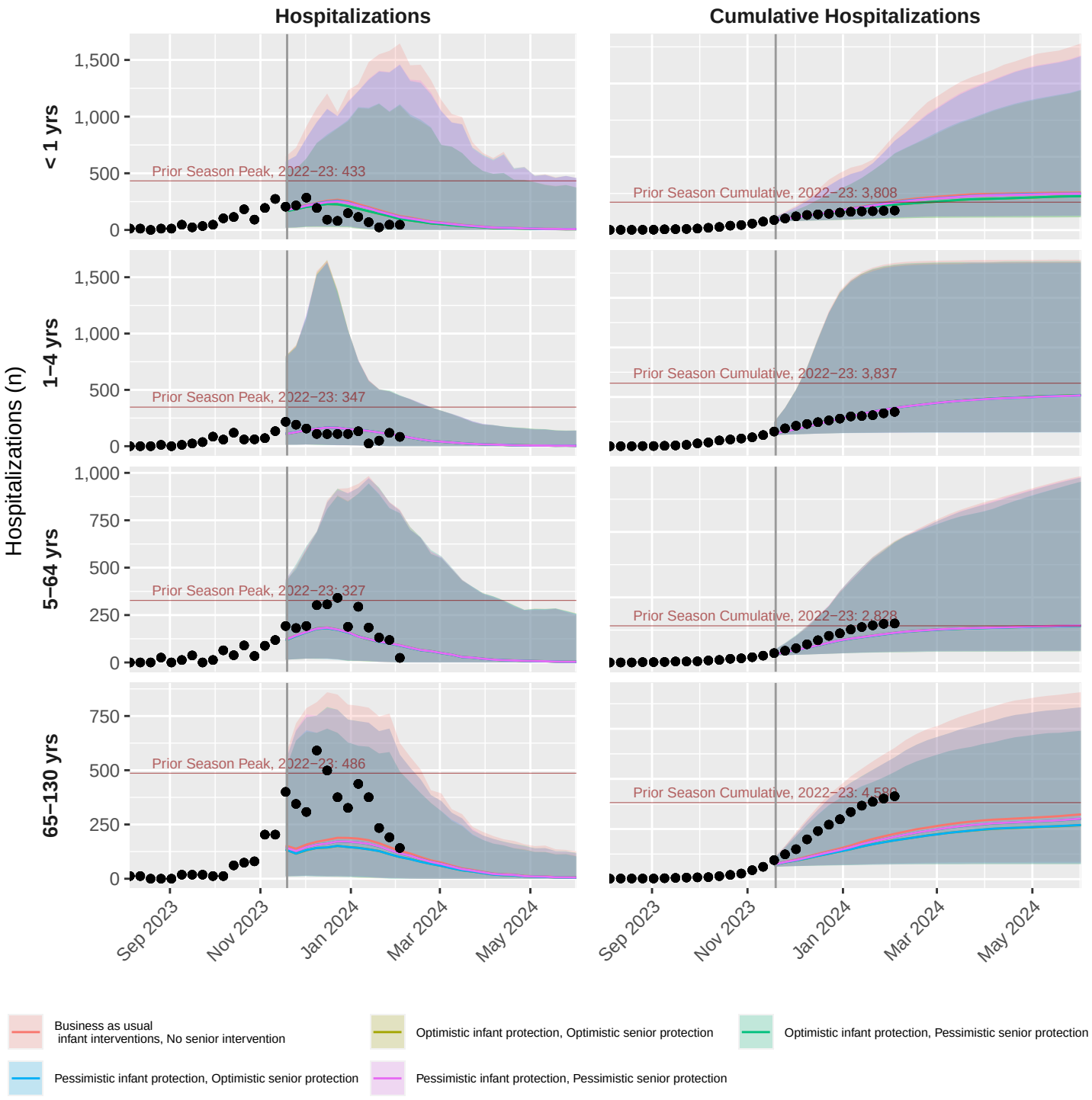


State Scenario Comparisons by Age

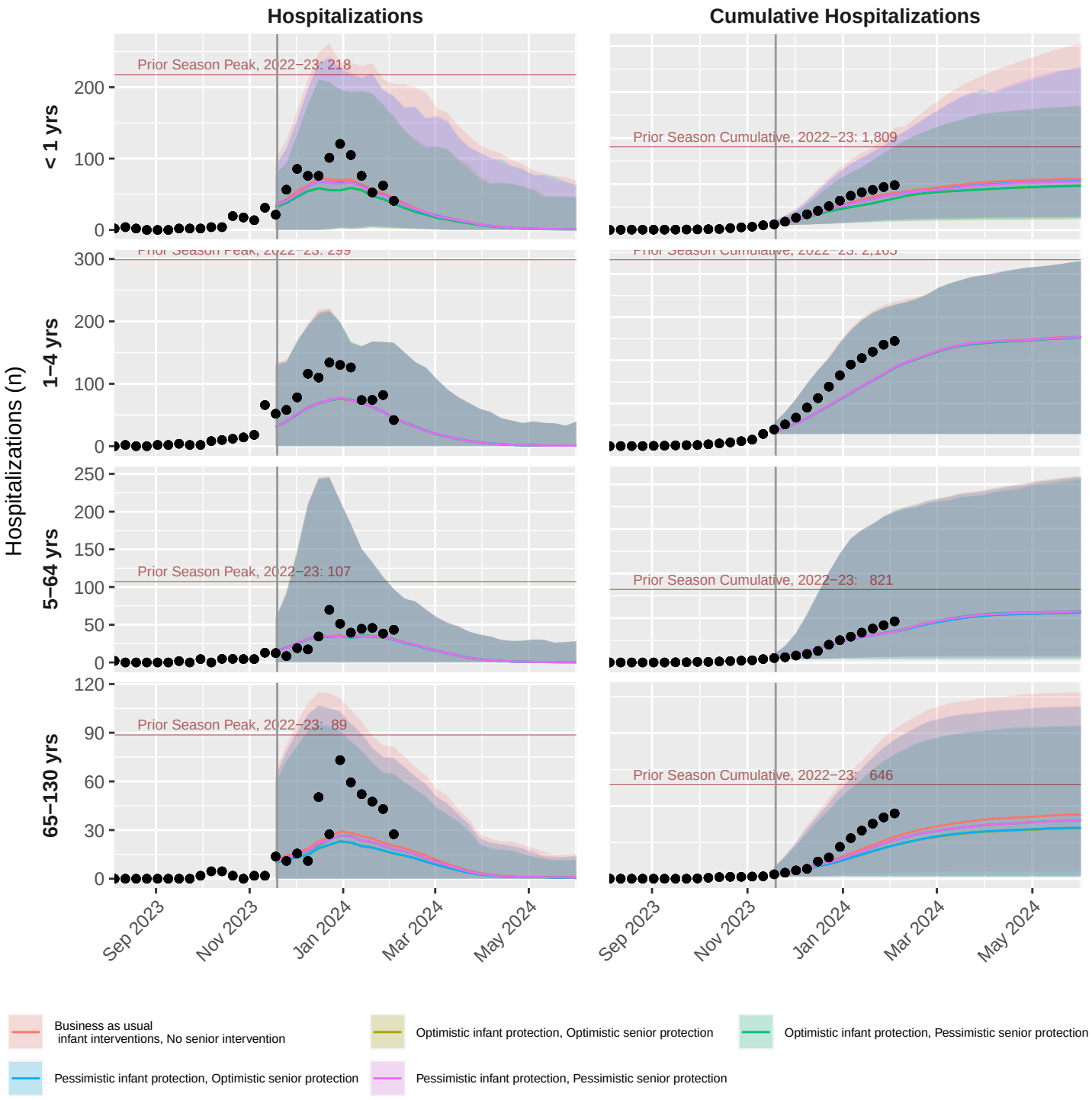
The scenario projections by age group were also very similar between scenarios within each state, with increased peak and cumulative size as scenarios became more pessimistic. The state projections also follow the empirical age-specific hospitalizations well for the younger age groups, however, as with the national projections, there is significant under-projection of hospitalizations in the 65-130 year age group, though the 95% projection intervals of the cumulative do contain the empirical data. This age group also substantially exceeded both peak and cumulative hospitalizations from the 2022-23 season, which was considered substantially larger; this may indicate a change in testing or reporting among this age group, and not a difference in infection or disease. Horizontal lines are given for prior peak incident and cumulative hospitalizations from the 2022-23 season, taken from RSV-NET (which is used as a proxy for hospitalizations). Lines represent the median ensemble projections, and shaded regions represent the 95% prediction intervals.



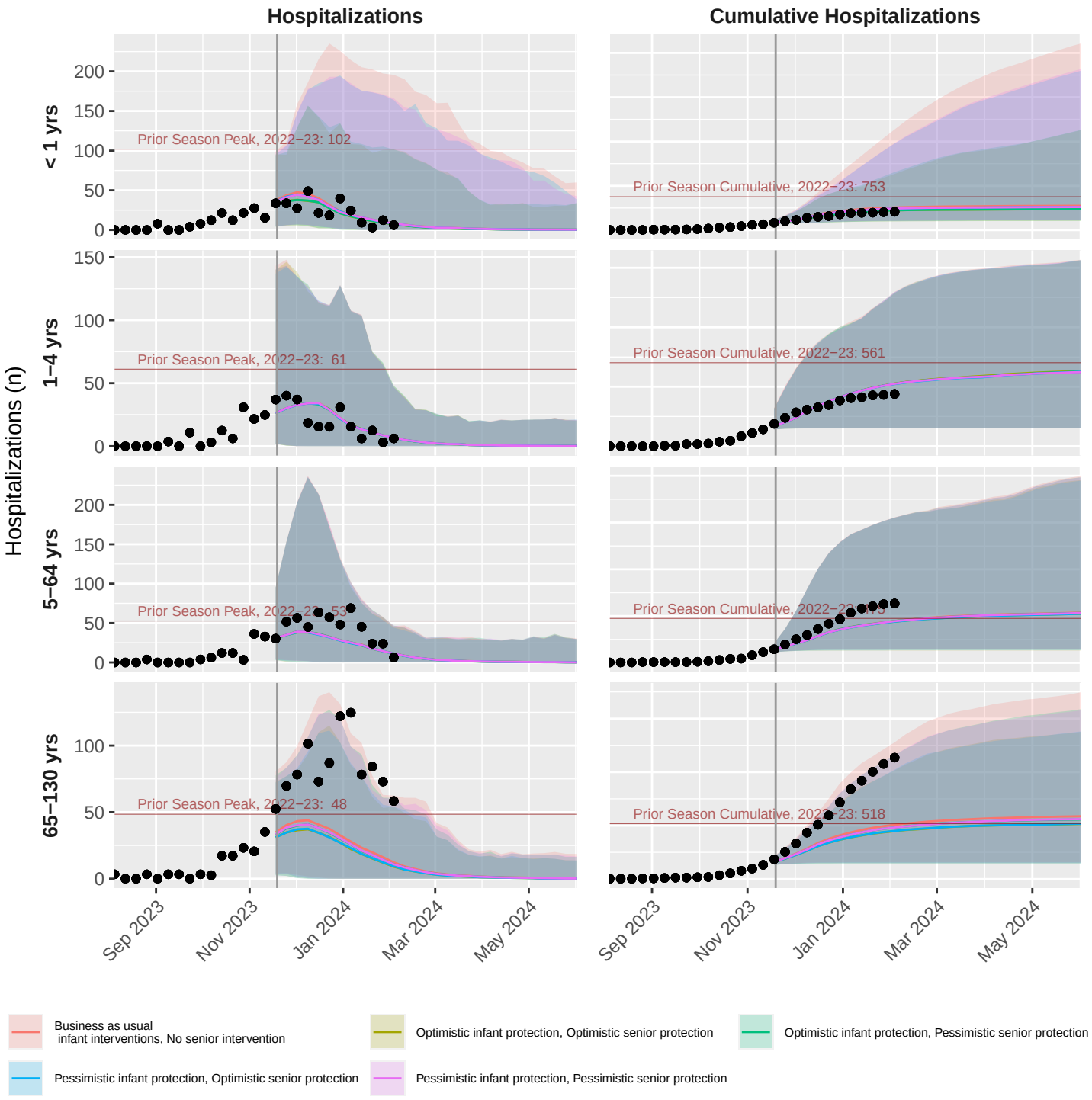
California, Ensemble projections of incident and cumulative RSV hospitalizations, by Age



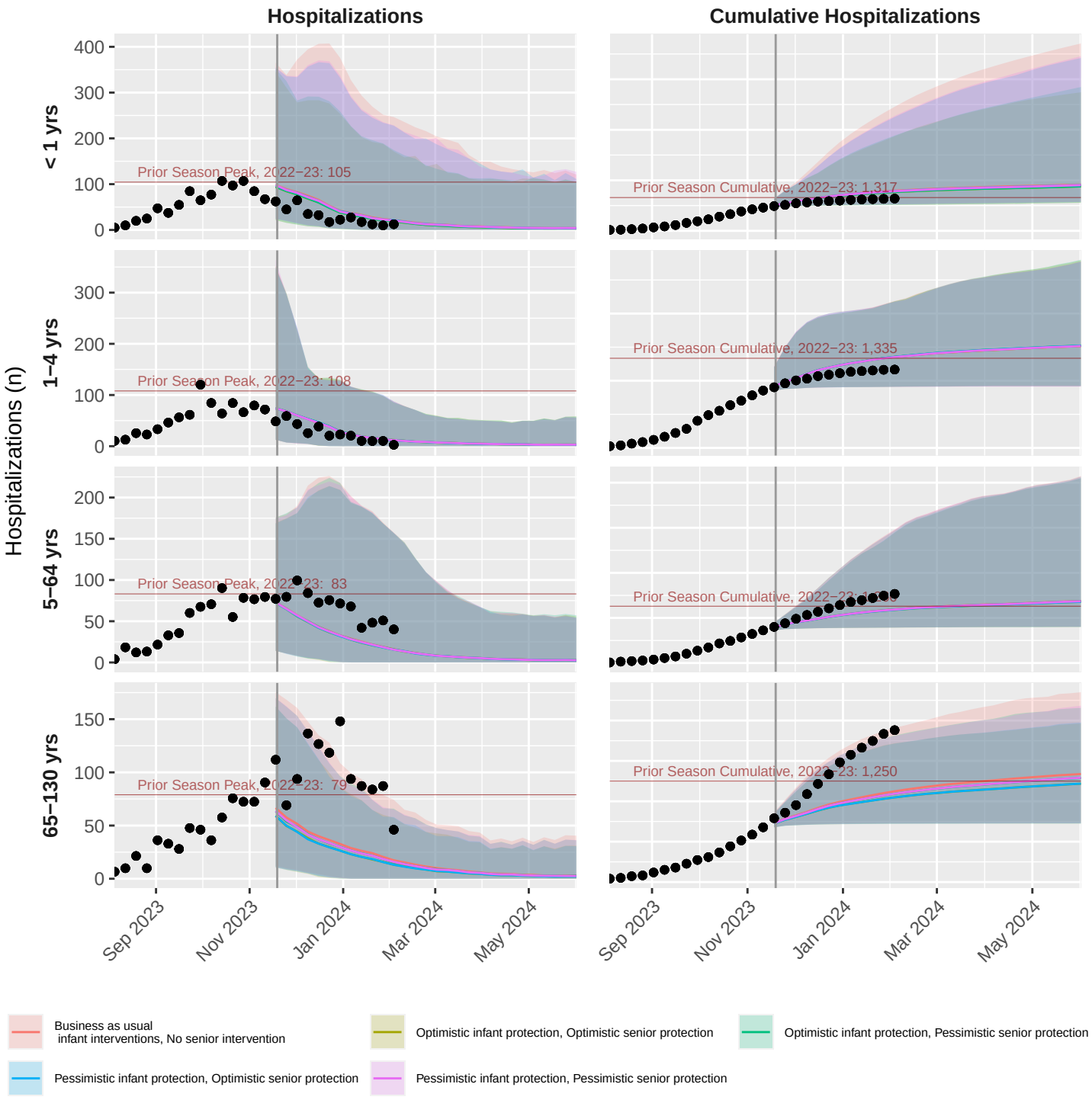
Colorado, Ensemble projections of incident and cumulative RSV hospitalizations, by Age



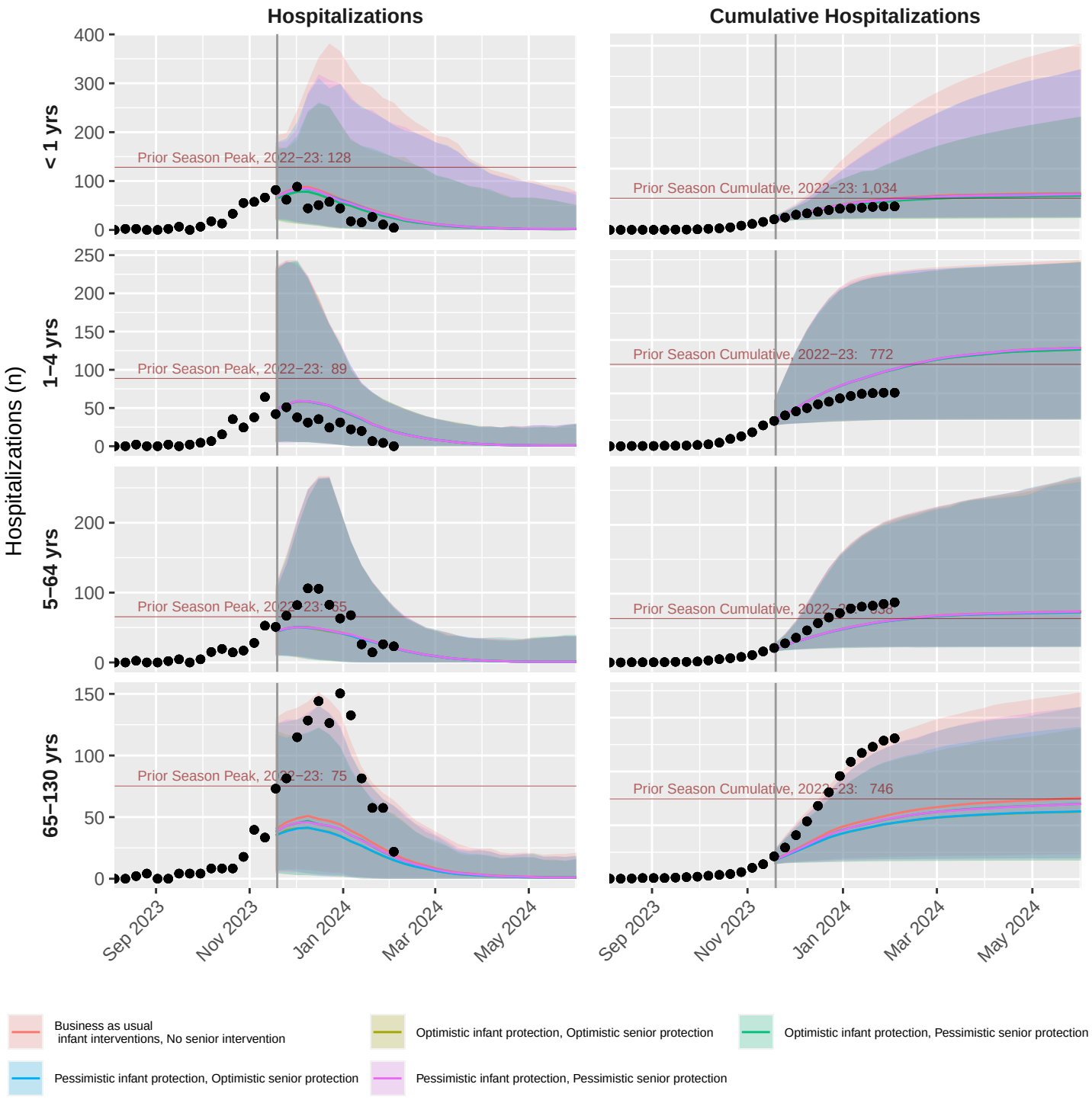
Connecticut, Ensemble projections of incident and cumulative RSV hospitalizations, by Age



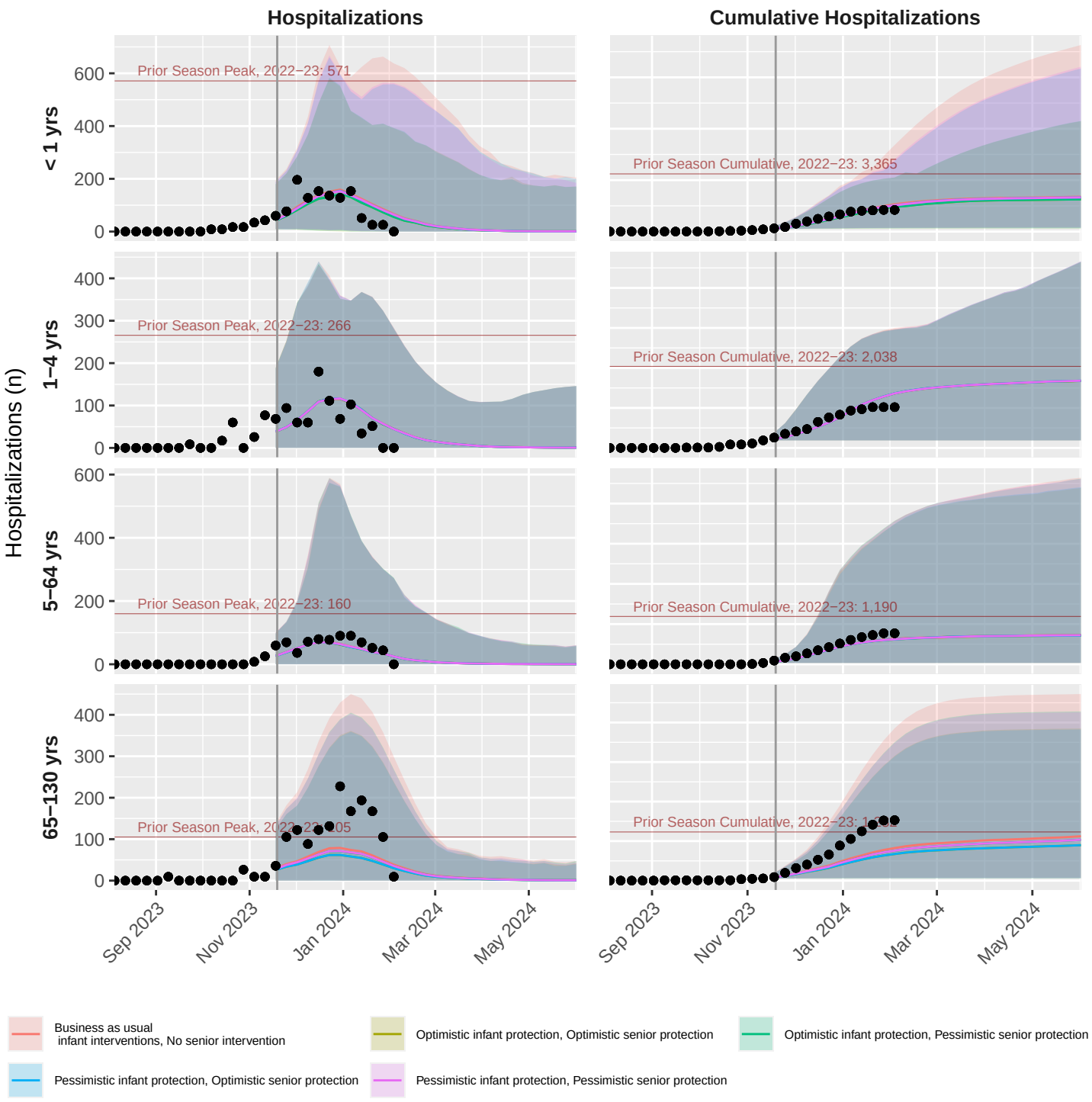
Georgia, Ensemble projections of incident and cumulative RSV hospitalizations, by Age



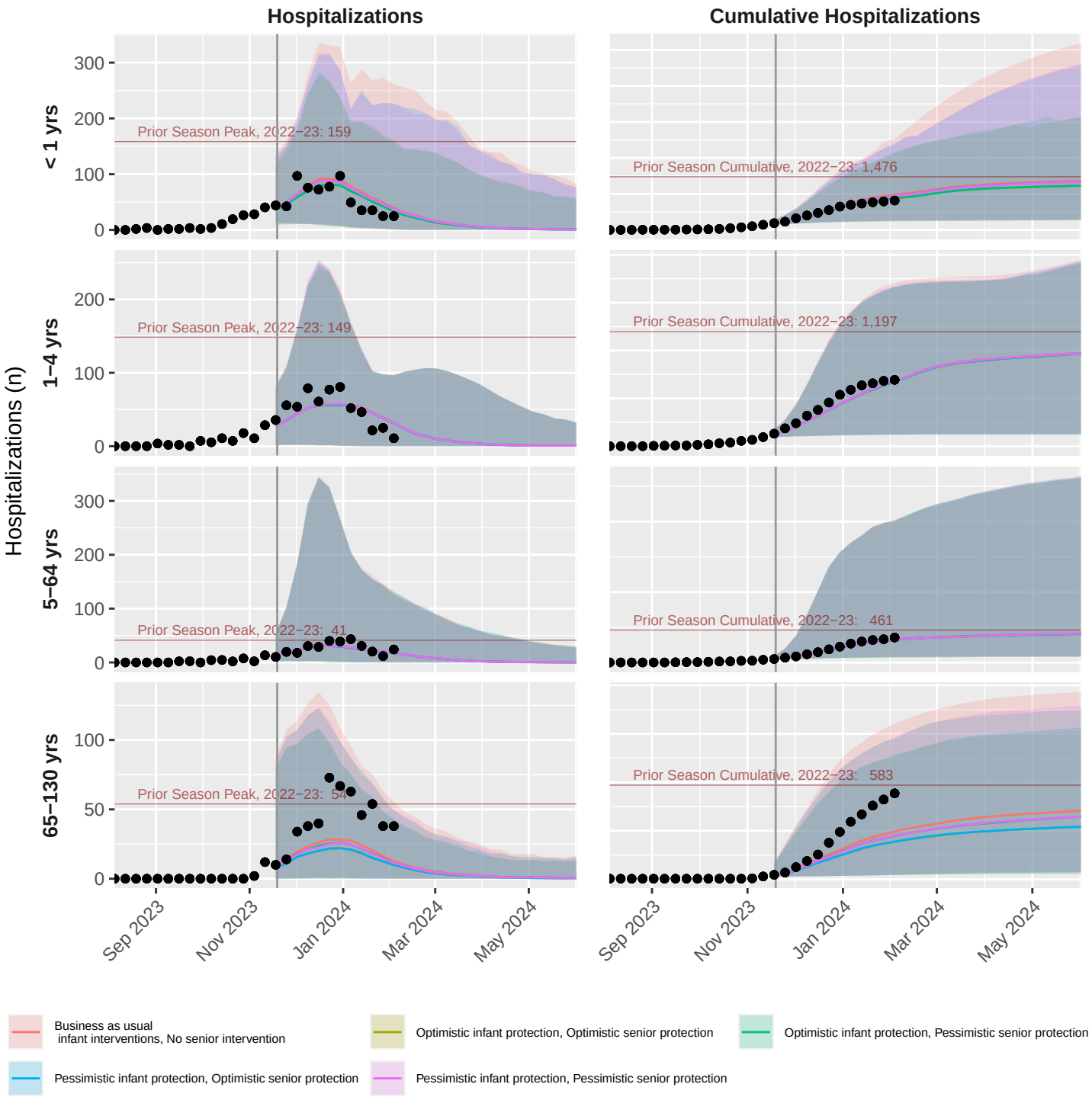
Maryland, Ensemble projections of incident and cumulative RSV hospitalizations, by Age



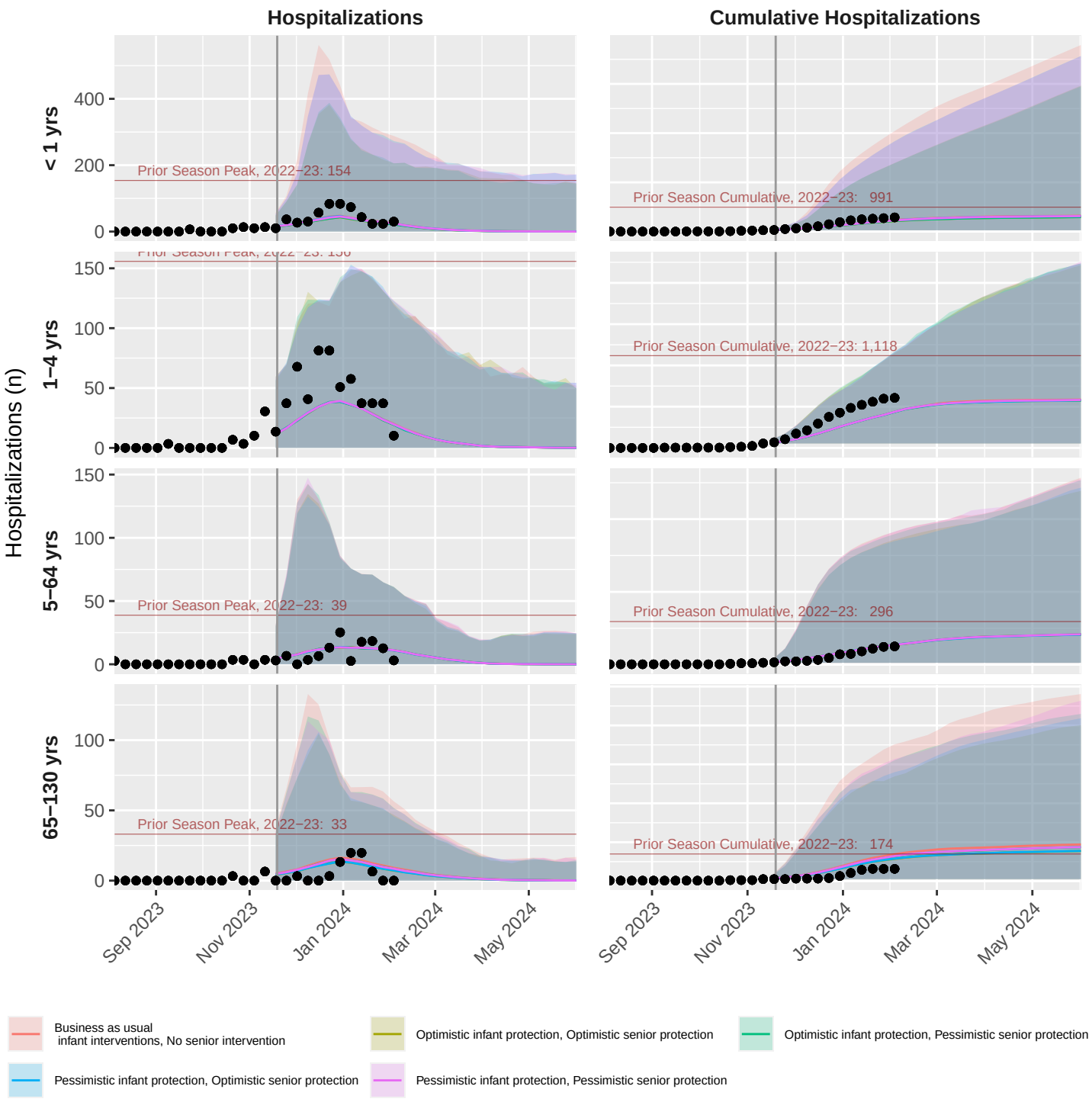
Michigan, Ensemble projections of incident and cumulative RSV hospitalizations, by Age



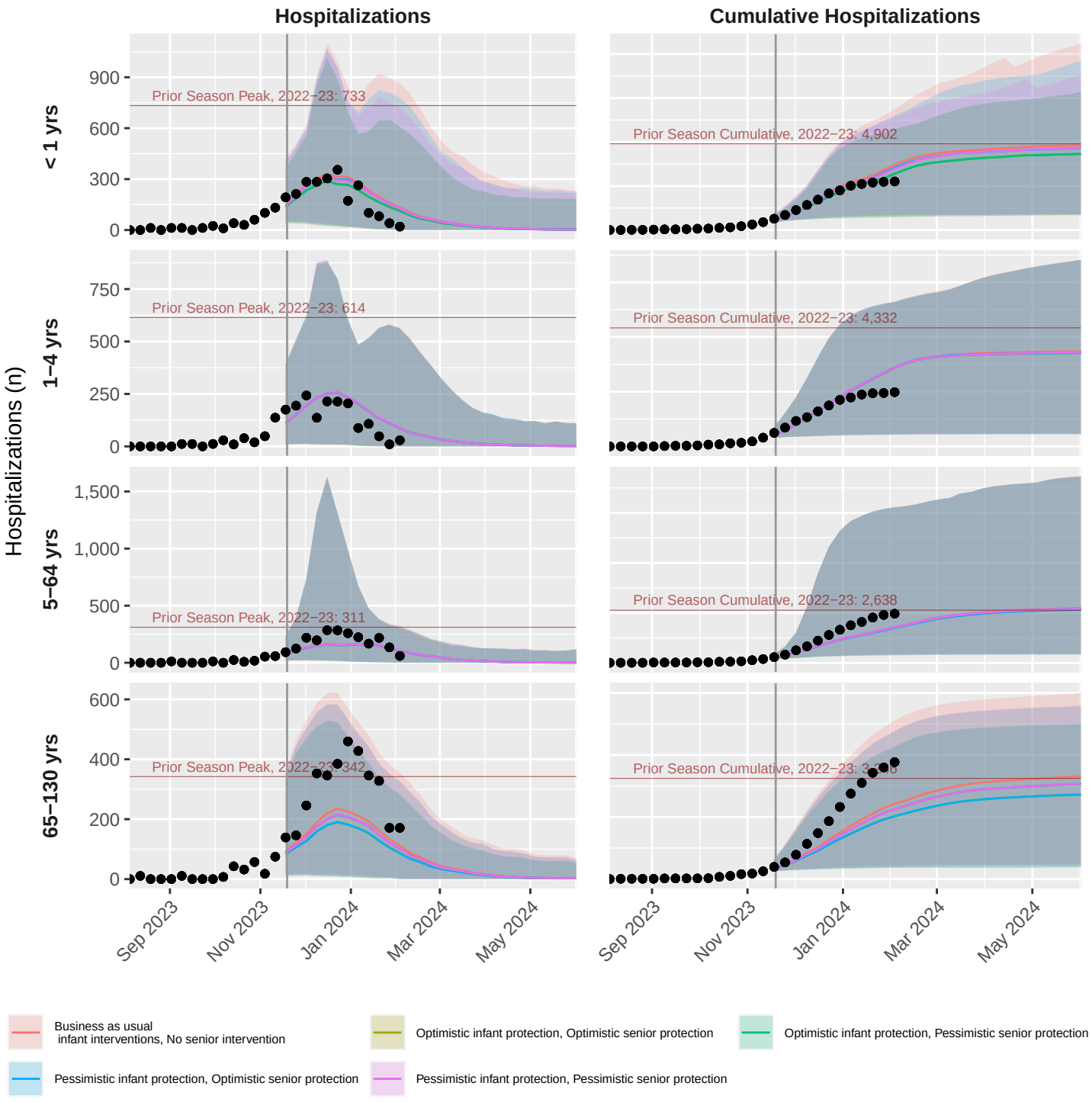
Minnesota, Ensemble projections of incident and cumulative RSV hospitalizations, by Age



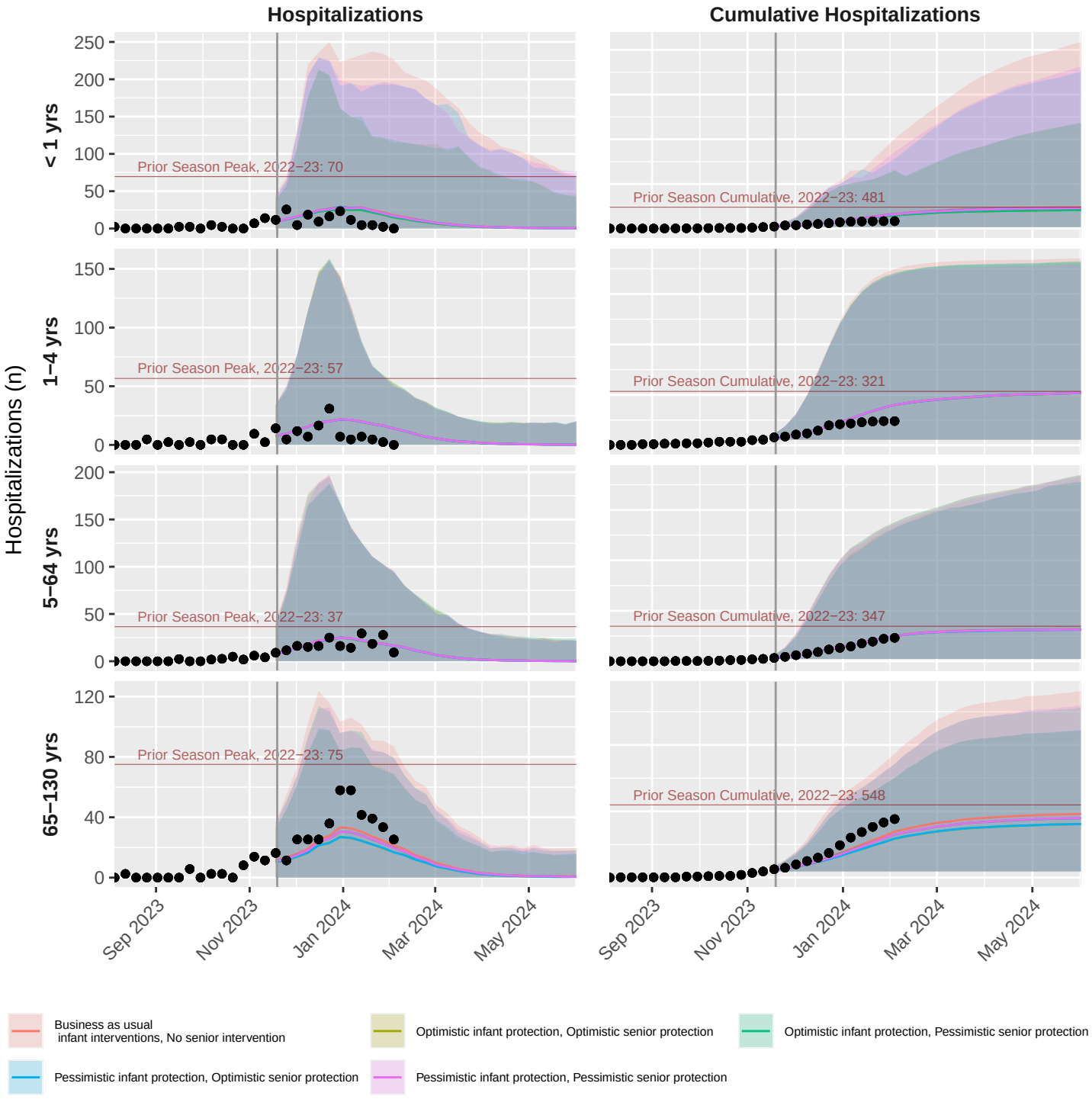
New Mexico, Ensemble projections of incident and cumulative RSV hospitalizations, by Age



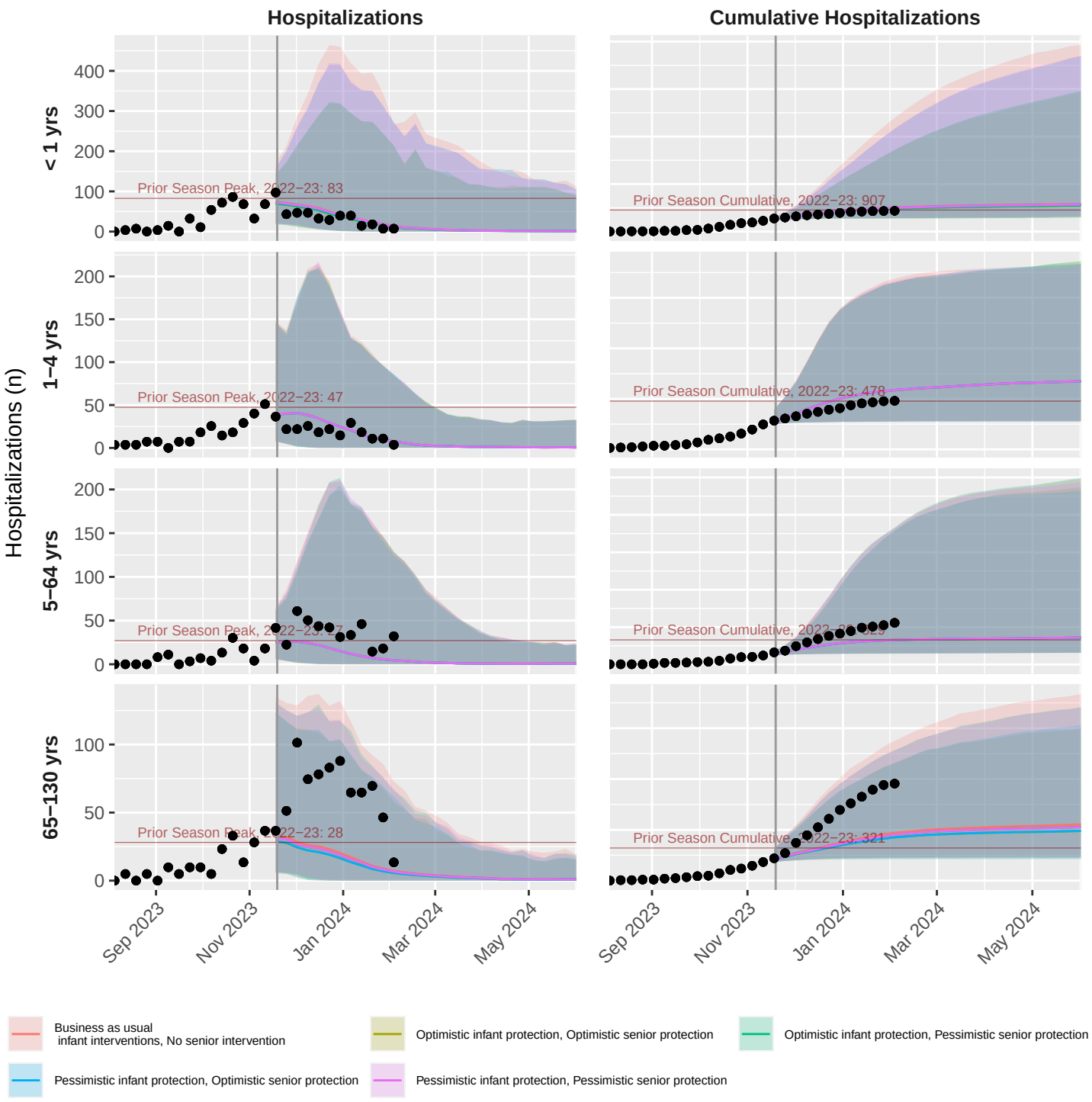
New York, Ensemble projections of incident and cumulative RSV hospitalizations, by Age



Oregon, Ensemble projections of incident and cumulative RSV hospitalizations, by Age



Tennessee, Ensemble projections of incident and cumulative RSV hospitalizations, by Age



Utah, Ensemble projections of incident and cumulative RSV hospitalizations, by Age