Benefits-Risks of Pfizer-BioNTech COVID-19 Vaccine for Ages 5 to 11 Years

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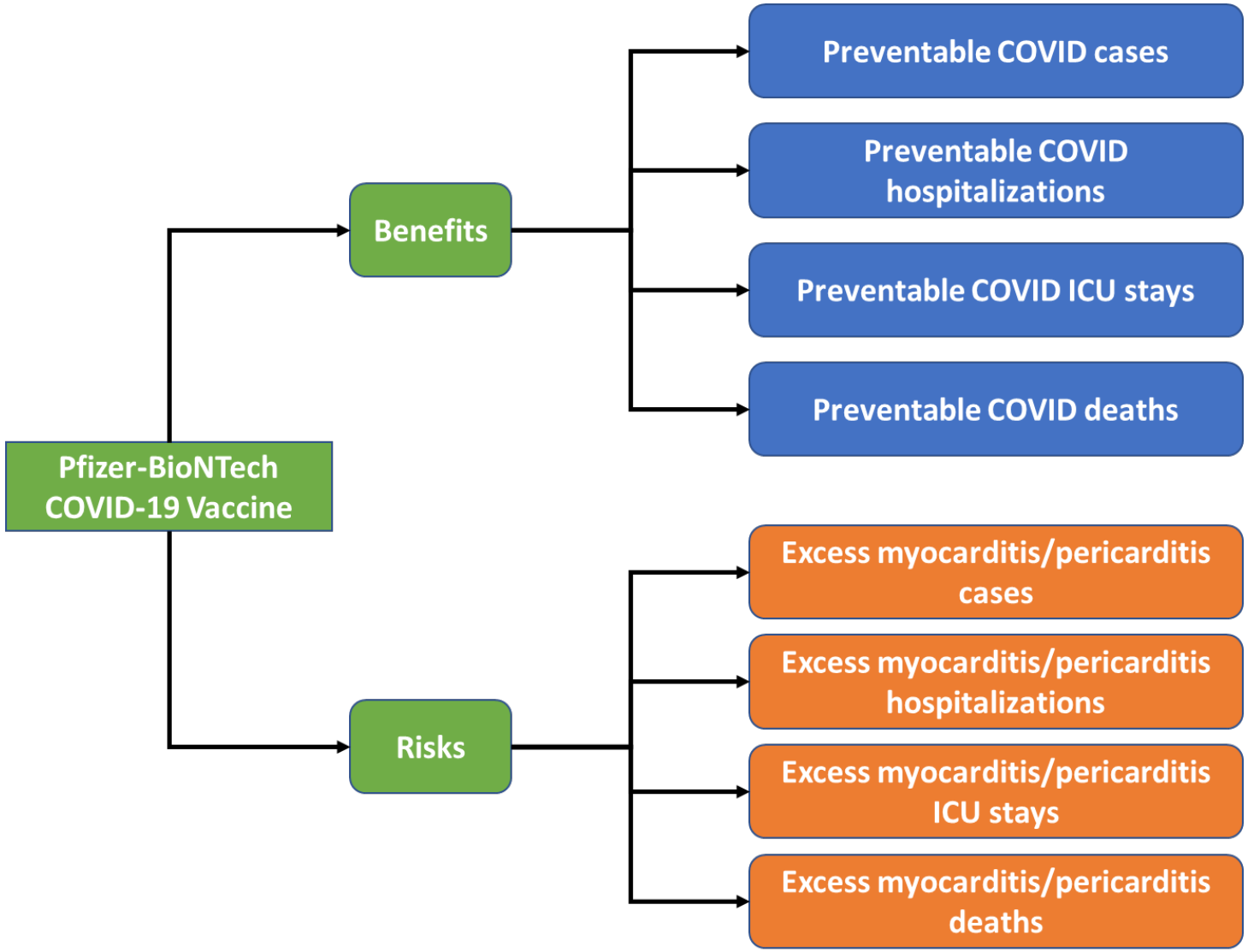
Benefits and Risks Per 1 Million Fully- Vaccinated

(Ages 5 to 11 years/male, female and all sexes)



Assumptions and Model Inputs - Scenario 1 (Base)

General assumptions

- ❑ Duration of vaccine protection: 6 months post 2nd dose (constant vaccine efficacy)
- ❑ Stable COVID-19 pandemic for 6-month period (constant incidence rates for COVID-19 cases, hospitalizations, ICU stays and deaths)

Benefits

- ❑ COVID-19 related incidence rates:
  - Case: the week of September 11, 2021 from CDC
  - Hospitalization: average of four weeks prior to September 11, 2021 from COVID NET[1]
  - ICU stay and death: historical average rates among those hospitalized from COVID NET[1]
- ❑ Vaccine efficacy: 70% against case and 80% against hospitalization, ages 20-64 years (Pfizer vaccine efficacy study[2])

Risks

- ❑ Incidence of excess myocarditis/pericarditis: OPTUM data for ages 12-15 years through July 10
- ❑ Rate of hospitalization and ICU stay due to vaccine related myocarditis for ages 12-17 years: from Vaccine Safety Datalink (VSD)[3]
  - Hospitalization: 87%
  - ICU stay: 32%
- ❑ Myocarditis death rate: zero

[1]COVID NET https://www.cdc.gov/coronavirus/2019-ncov/covid-data/covid-net/purpose-methods.html
[2]CDC vaccine effectivness study: https://www.cdc.gov/vaccines/acip/meetings/downloads/slides-2021-09-22/04-COVID-Link-Gelles-508.pdf
[3]ACIP Meeting August 30, 2021: https://www.cdc.gov/vaccines/acip/meetings/downloads/slides-2021-08-30/04-COVID-Klein-508.pdf

Key Uncertainties & Alternative Model Scenarios

- **COVID-19 incidence rates**
  - Uncertainty in pandemic
    - **Scenario 2 (Recent COVID-19 Peak Incidence):** incidences of cases & hospitalizations are 20% and 30% higher than incidences the week of September 11, 2021
    - **Scenario 3 (The Lowest COVID-19 Incidence):** incidences of cases & hospitalizations are 5% and 10% of the incidences the week of September 11, 2021
- **COVID-19 death rate**
  - Reported death rate by CDC Data Tracker is about 3x higher than the rate from COVID NET
    - **Scenario 5 (Higher COVID-19 Death Rate):** death rate from CDC Data Tracker

Key Uncertainties & Alternative Model Scenarios (continued)

- **Vaccine efficacy**
  - A sponsor's supportive efficacy analysis[1] suggests 90.7% efficacy against infection among ages 5-11 years (data accrued through Oct. 8, 2021)
    - **Scenario 4 (Higher Vaccine Efficacy):** 90% against case and 100% against hospitalization
- **Incidence of excess myocarditis cases**
  - The rate for ages 12-17 years is applied to ages 5-11 years for whom the data is not available
  - large variation on the incidence of excess myocarditis cases among different data sources (such as OPTUM, VSD and VAERS)
    - **Scenario 6 (Lower Excess Myocarditis Rate):** rate of excess myocarditis cases is 50% lower than that for ages 12-17 years from OPTUM

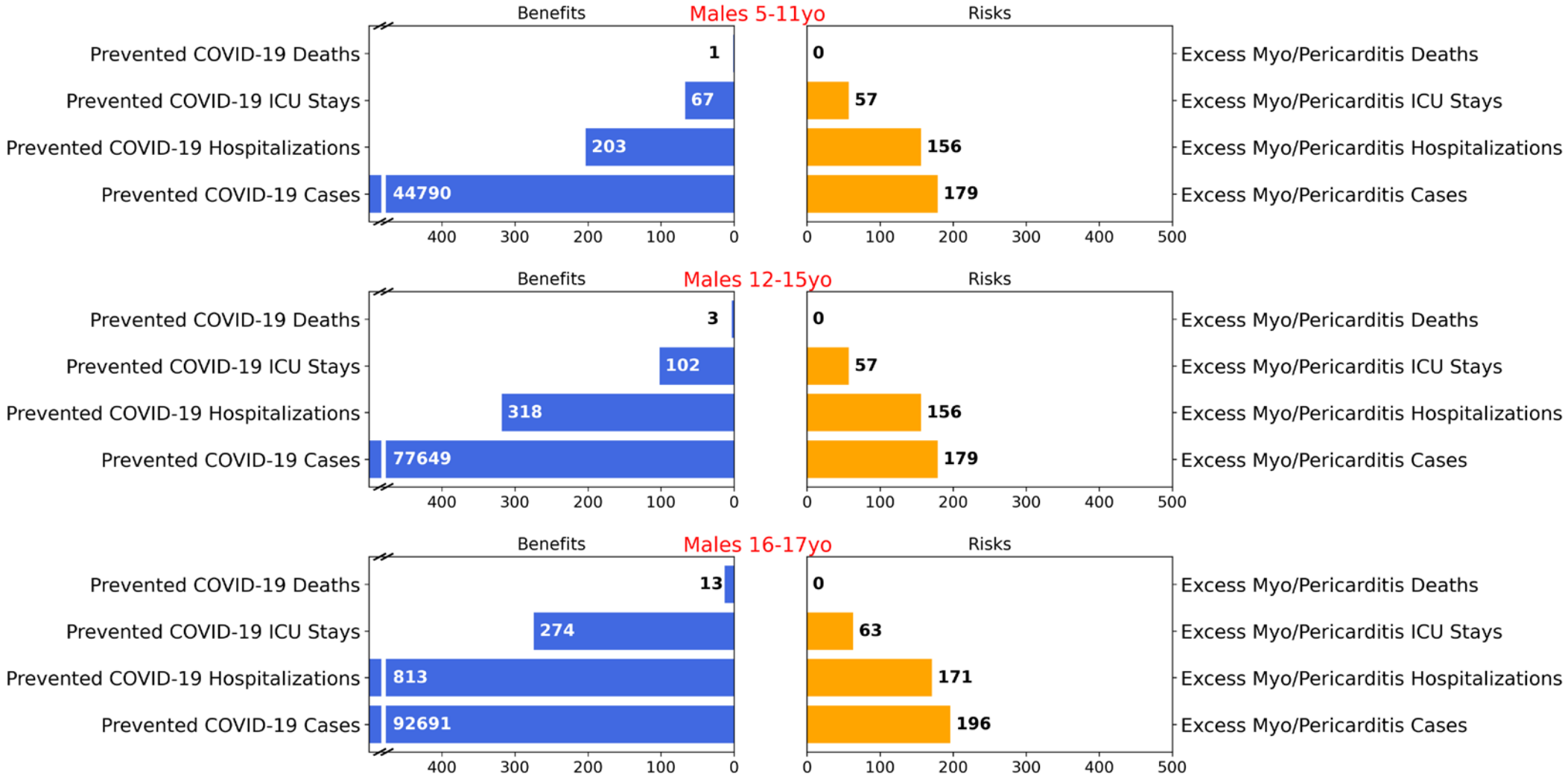
[1]Pfizer's Vaccines and Related Biological Products Advisory Committee Briefing Document on BNT162B2 Retrieved from https://www.fda.gov/media/153409/download on October 24, 2021

Benefit Risk Assessment Results

Scenario 1 (Base)

- COVID incidences the week of September 11, 2021
- Vaccine efficacy 70% against case and 80% against hospitalization
- Rate of excess myocarditis: OPTUM data for ages 12-15 years

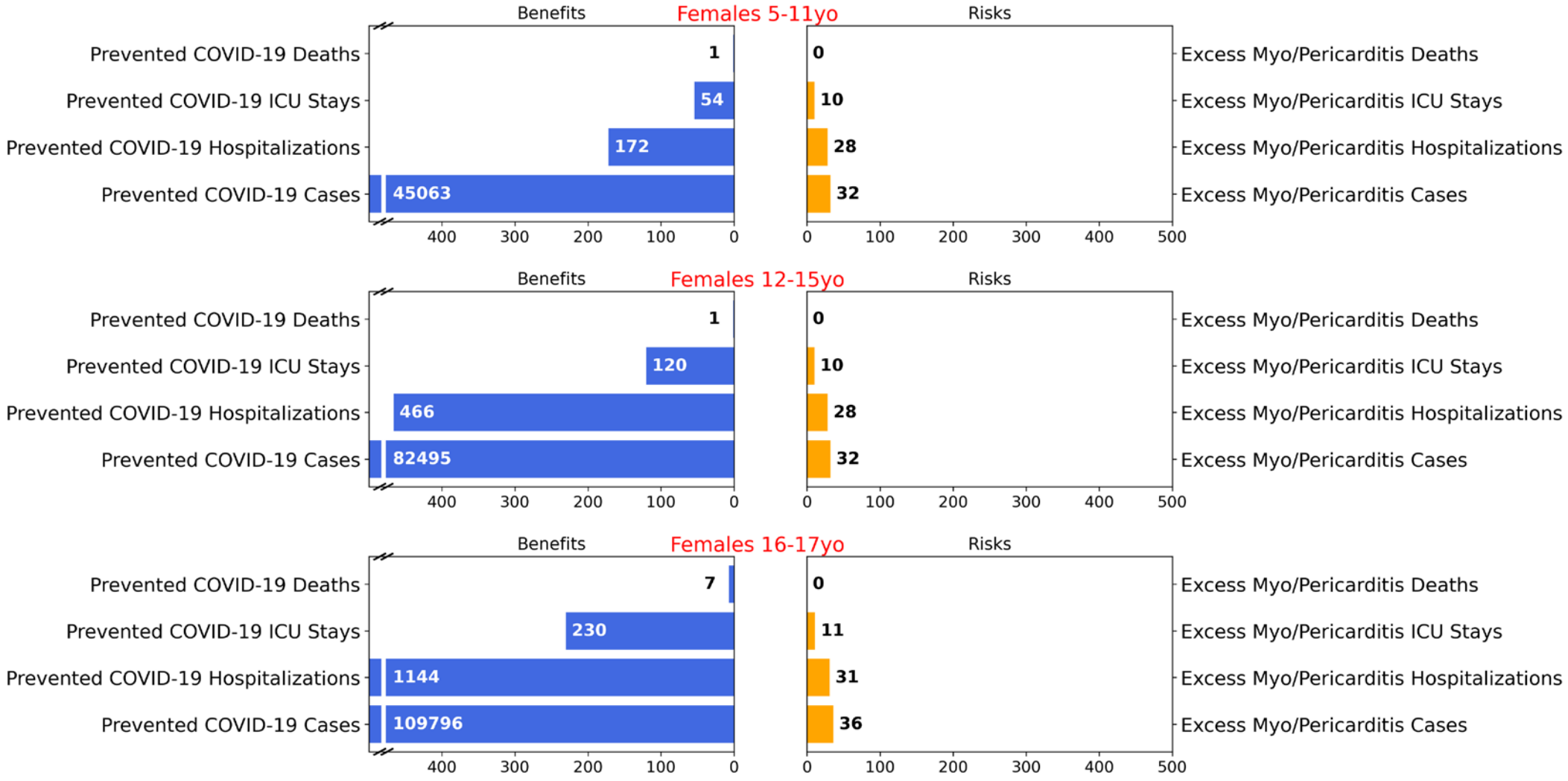
MALES (Cases Per Million)



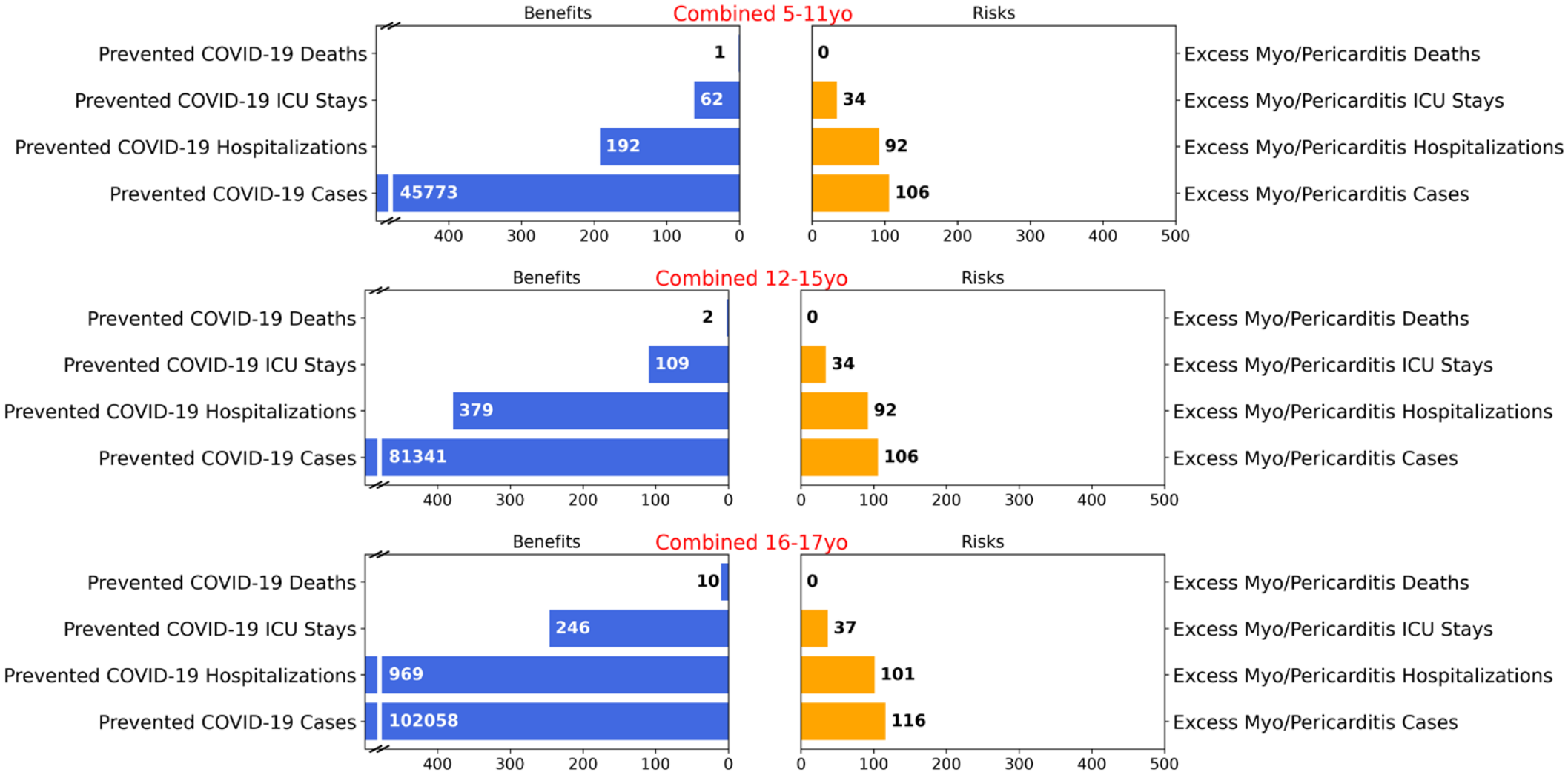
Note:

- Median hospitalization length of stay is 6 days for COVID and 1 day for vaccine related myocarditis

FEMALES (Cases Per Million)



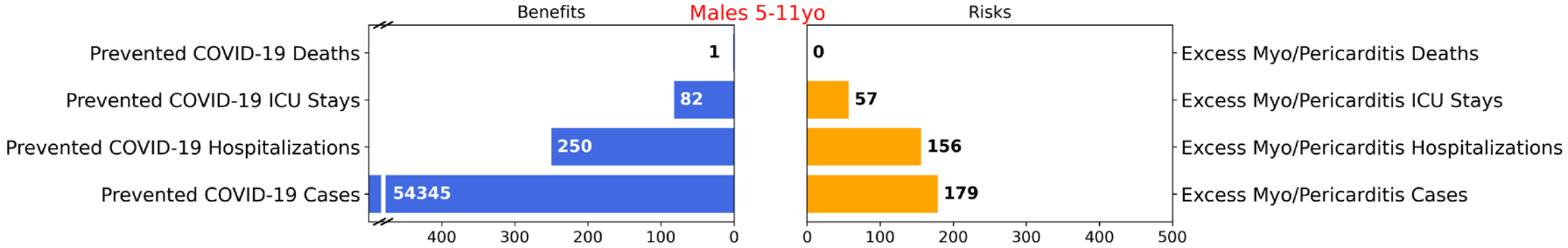
MALES AND FEMALES (Cases Per Million)

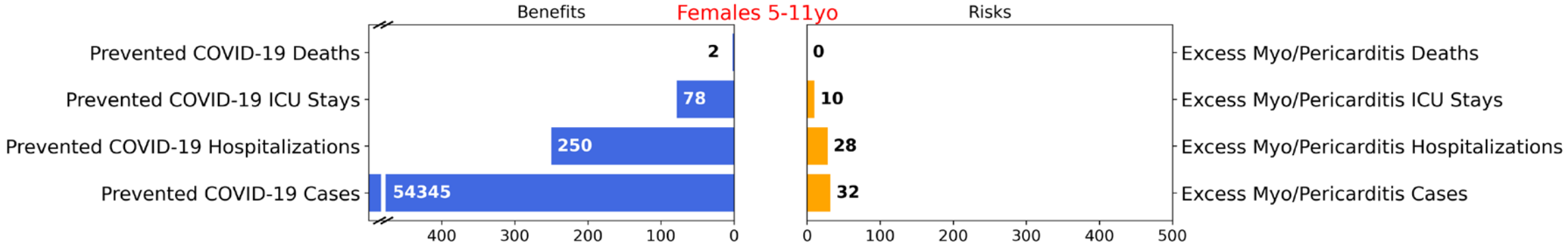


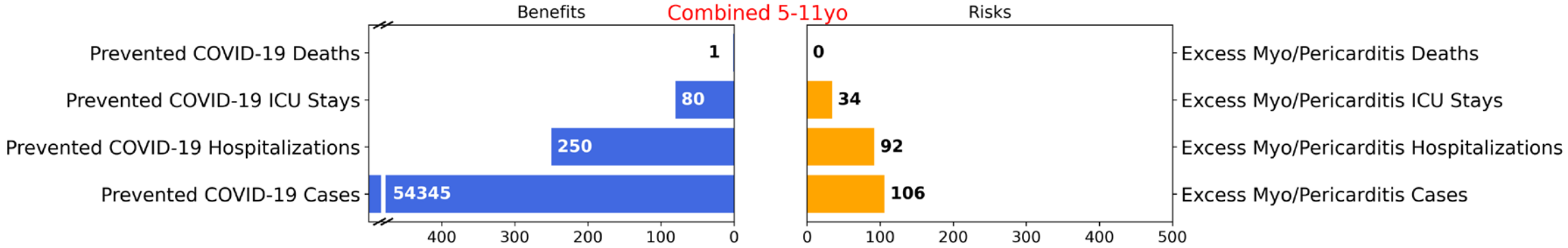
Scenario 2 (Recent COVID-19 Peak Incidence)

COVID cases are 20% and Hospitalizations are 30% higher than the week September 11, 2021

Scenario 2: Cases Per 1 Million Fully- Vaccinated



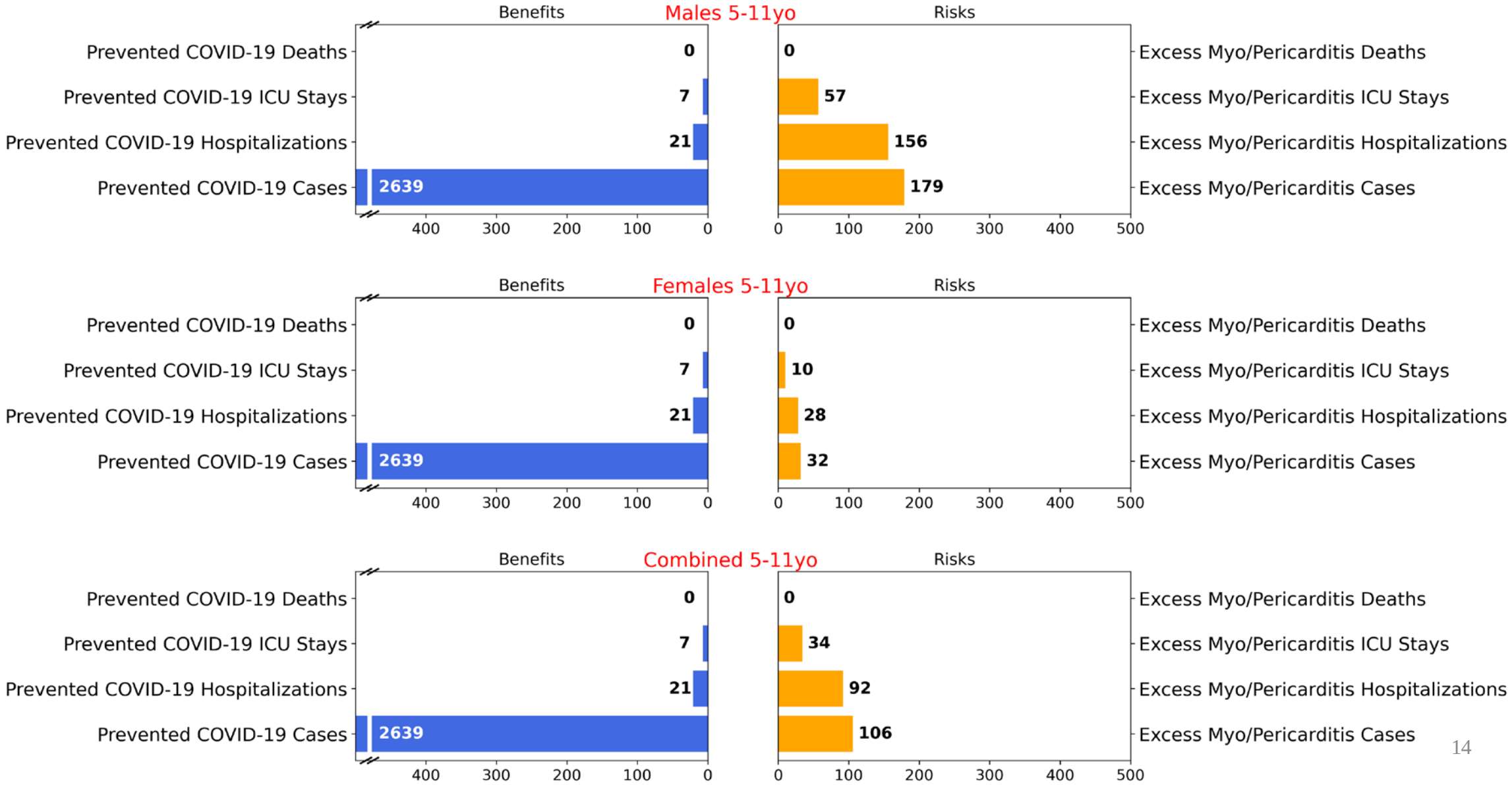




Scenario 3 (The Lowest COVID-19 Incidence)

COVID cases are 5% and Hospitalizations are 10% of September 11, 2021

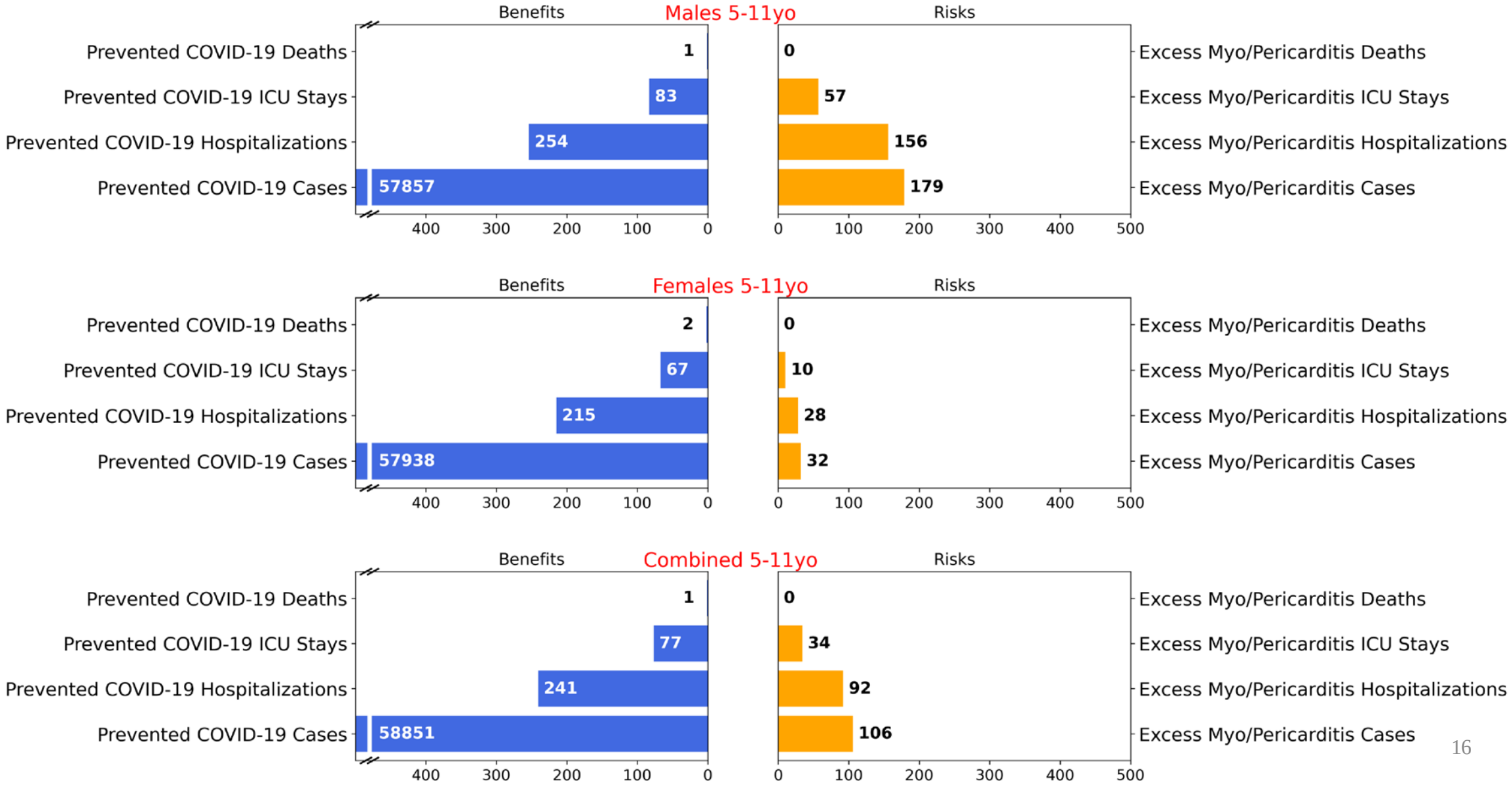
Scenario 3: Cases Per 1 Million Fully- Vaccinated



Scenario 4 (Higher Vaccine Efficacy)

Vaccine efficacy of 90% against case and 100% against hospitalization

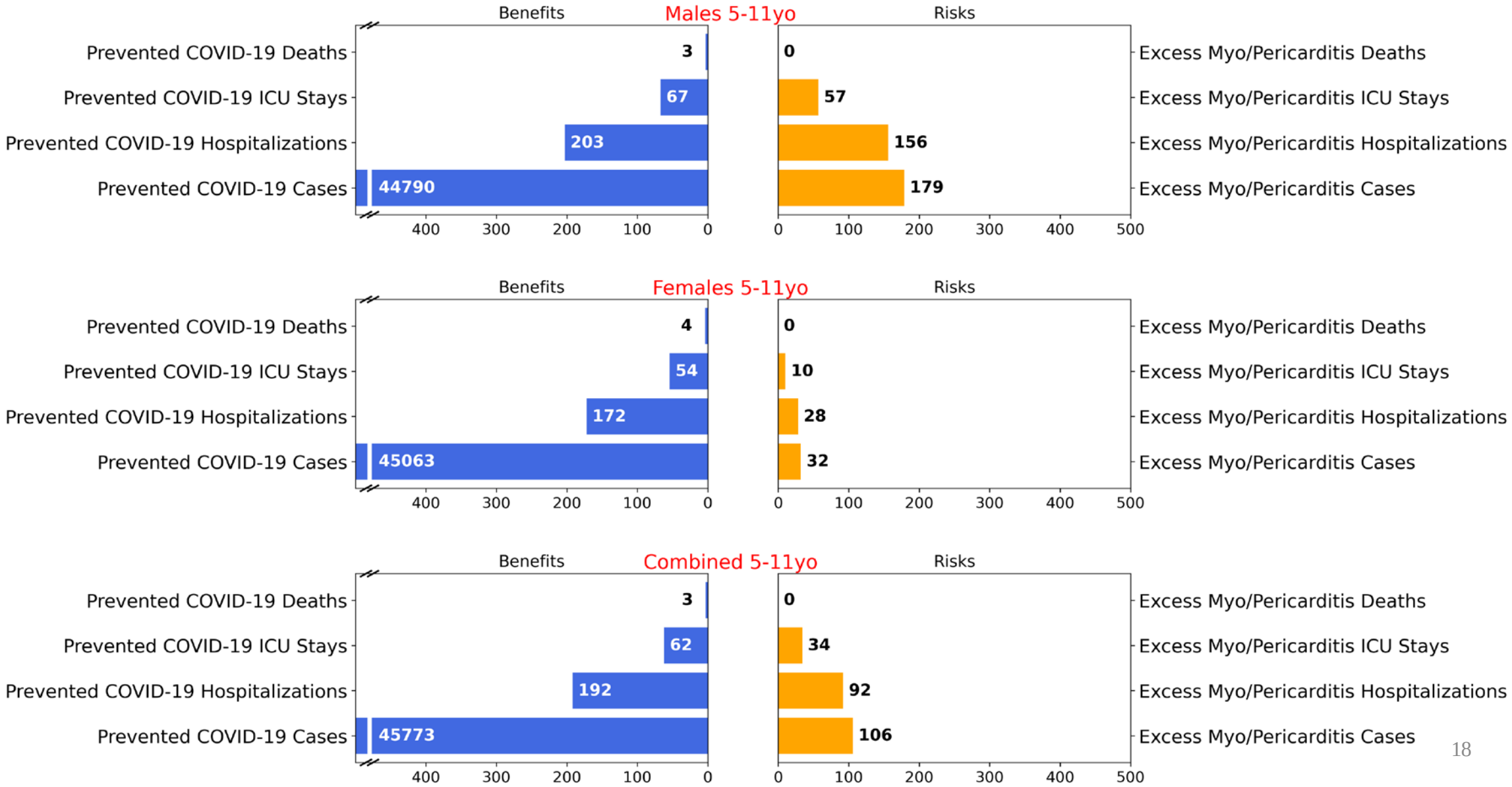
Scenario 4: Cases Per 1 Million Fully- Vaccinated



Scenario 5 (Higher COVID Death Rate)

COVID-19 death rate from CDC Data Tracker

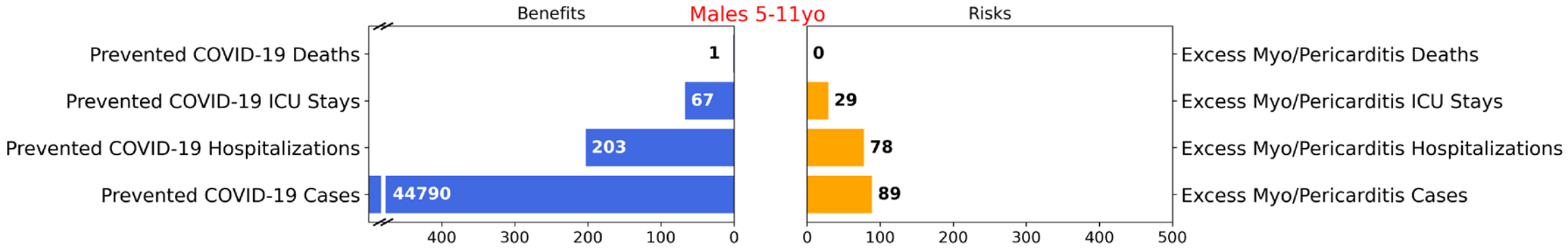
Scenario 5: Cases Per 1 Million Fully- Vaccinated

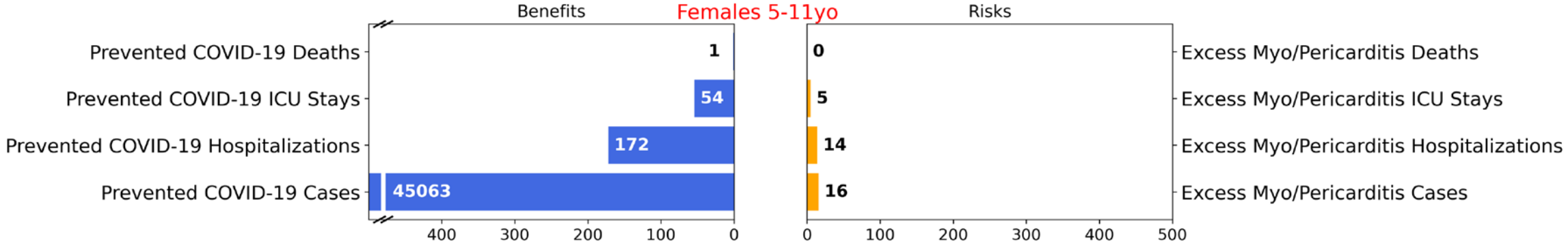


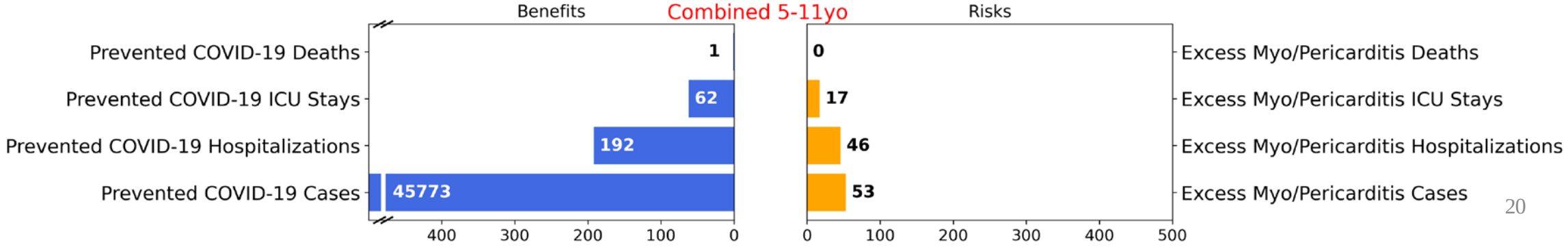
Scenario 6 (Lower Excess Myocarditis Rate)

50% lower myocarditis case rate compared to data for ages 12-17 years from OPTUM

Scenario 6: Cases Per 1 Million Fully- Vaccinated







Major Limitations

- Model assumption about constant incidence rate generates great uncertainty on the estimate of benefits.
- Vaccine efficacy may change due to new emerging variants of virus
- Hospitalizations and ICU stays from COVID-19 and myocarditis are not equivalent and cannot directly compared
- The benefit of reducing COVID related multisystem inflammatory syndrome in children may not be fully captured by preventable hospitalizations, ICU stays and deaths due to COVID-19
- This BR risk assessment does not consider potential long-term adverse effects due to either COVID-19 or myocarditis
- This BR assessment does not include secondary benefits (reducing COVID-19 disease transmission) and risks

Conclusions

- For Scenarios 1 (Base), 2 (Recent COVID-19 Peak Incidence), 4 (Higher Vaccine Efficacy), 5 (Higher COVID-19 Death Rate), and 6 (Lower Excess Myocarditis Rate) the model predicts that benefits of the Pfizer-BioNTech COVID-19 Vaccine 2-dose primary series clearly outweigh the risks for ages 5-11 years.
- For Scenario 3 (The Lowest COVID-19 Incidence), the model predicts more excess hospitalizations and ICU stays due to vaccine-related myocarditis/pericarditis compared to prevented hospitalizations and ICU stays due to COVID-19 in males and in both sexes combined.
- Considering the different implications and length of stay for COVID-19 hospitalization versus hospitalization for vaccine-associated myocarditis/pericarditis, and benefits related to prevention of cases of COVID-19 with significant morbidity, the overall benefits of the vaccine may still outweigh the risks under this lowest incidence scenario.
- If the myocarditis/pericarditis risk in this age group is lower than the conservative assumption used in the model, the benefit-risk balance would be even more favorable.

Acknowledgements

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