

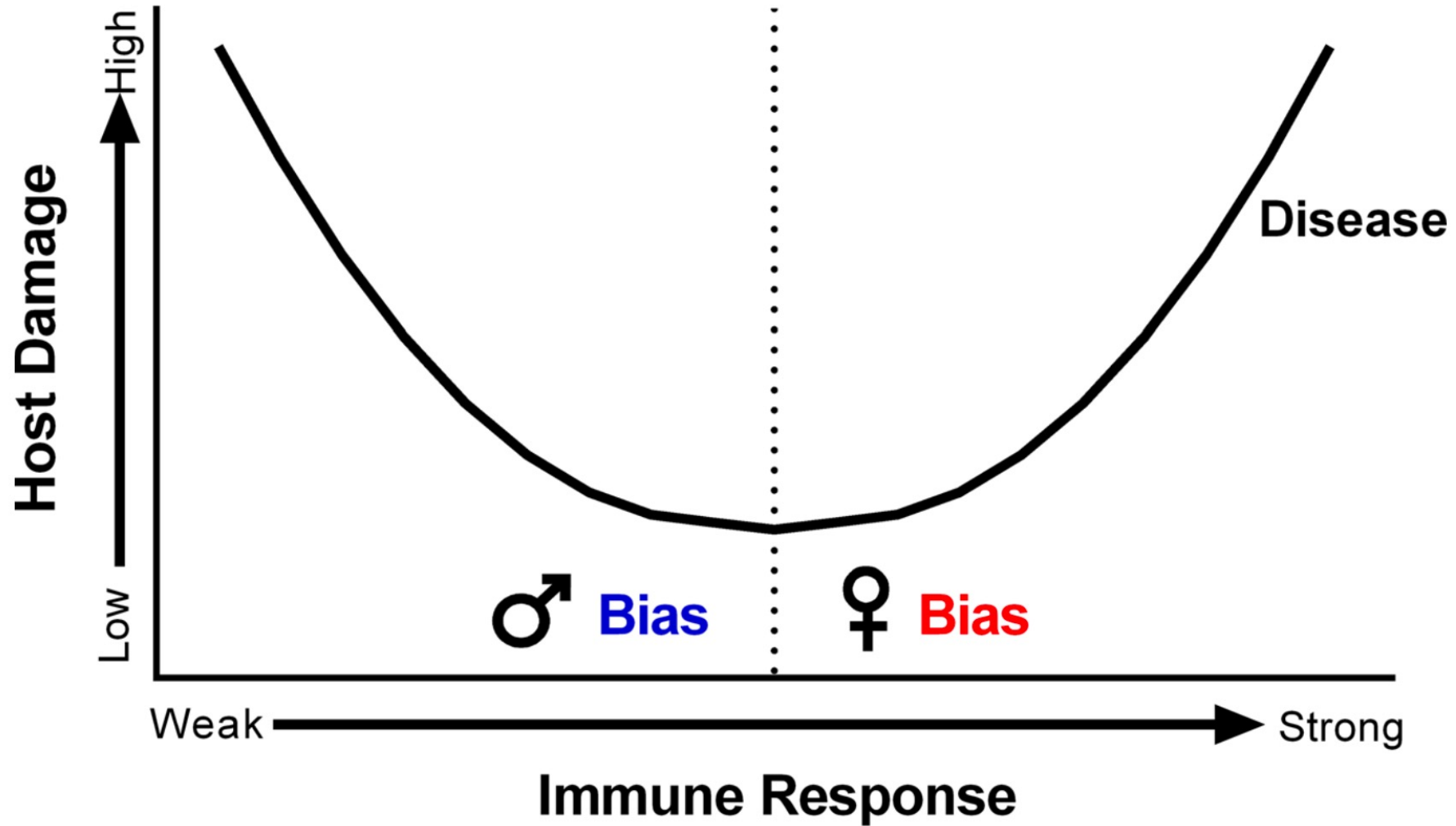
A photograph of a healthcare provider, a woman with dark hair wearing a white lab coat with a blue logo, examining a baby's ear with an otoscope. The baby is smiling and wearing a pink headband. A woman with curly hair is holding the baby and looking on. The background is slightly blurred, showing what appears to be a clinical setting.

COVID-19 Sex Differences

A study by the Women of OHDSI
group

Presenter: Maura Beaton

Mediators: sex chromosomes, sex hormones, behavior



Background

- No gender differences in COVID-19 infection rate
- Male COVID-19 patients have increased odds of ITU admissions and death
- Most studies on gender differences in COVID-19 have focused on ITU, requiring ventilation and mortality

Aim of this study:

- To characterize severe health outcomes associated with COVID-19 in male and female patients

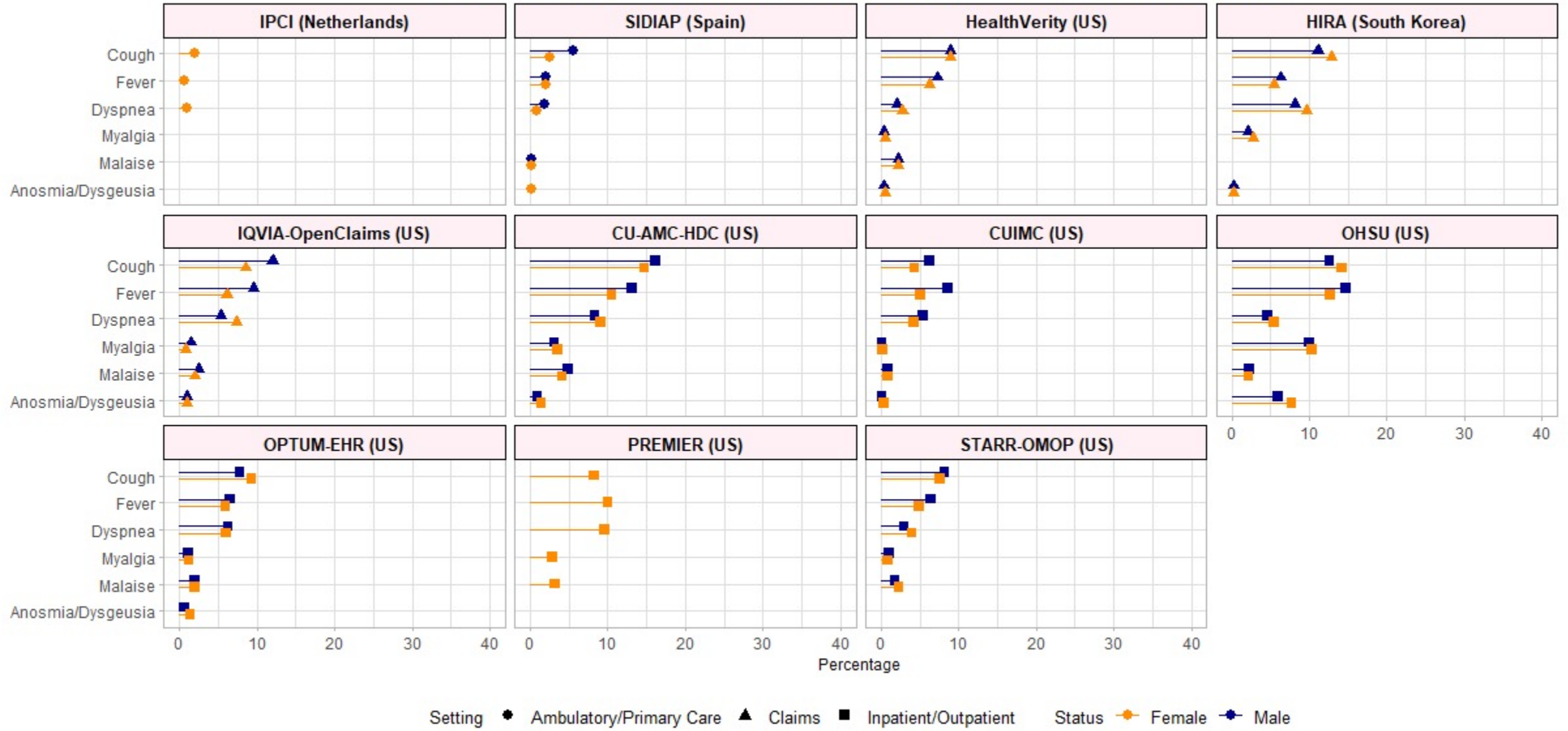
Methods

- Data collected as part of CHARYBDIS 1.0
 - Data submissions made between March 2020 to Feb 2021
- Cohorts Included:
 - **Diagnosed** - Persons with a COVID-19 diagnosis or a SARS-CoV-2 positive test with at least 365d prior observation
 - **Hospitalized** - Persons hospitalized with a COVID-19 diagnosis record or a SARS-CoV-2 positive test with at least 365d prior observation
- Analysis
 - Proportions & Standard Deviations (SD) – Stratified by gender
 - Standardized mean differences (SMD)

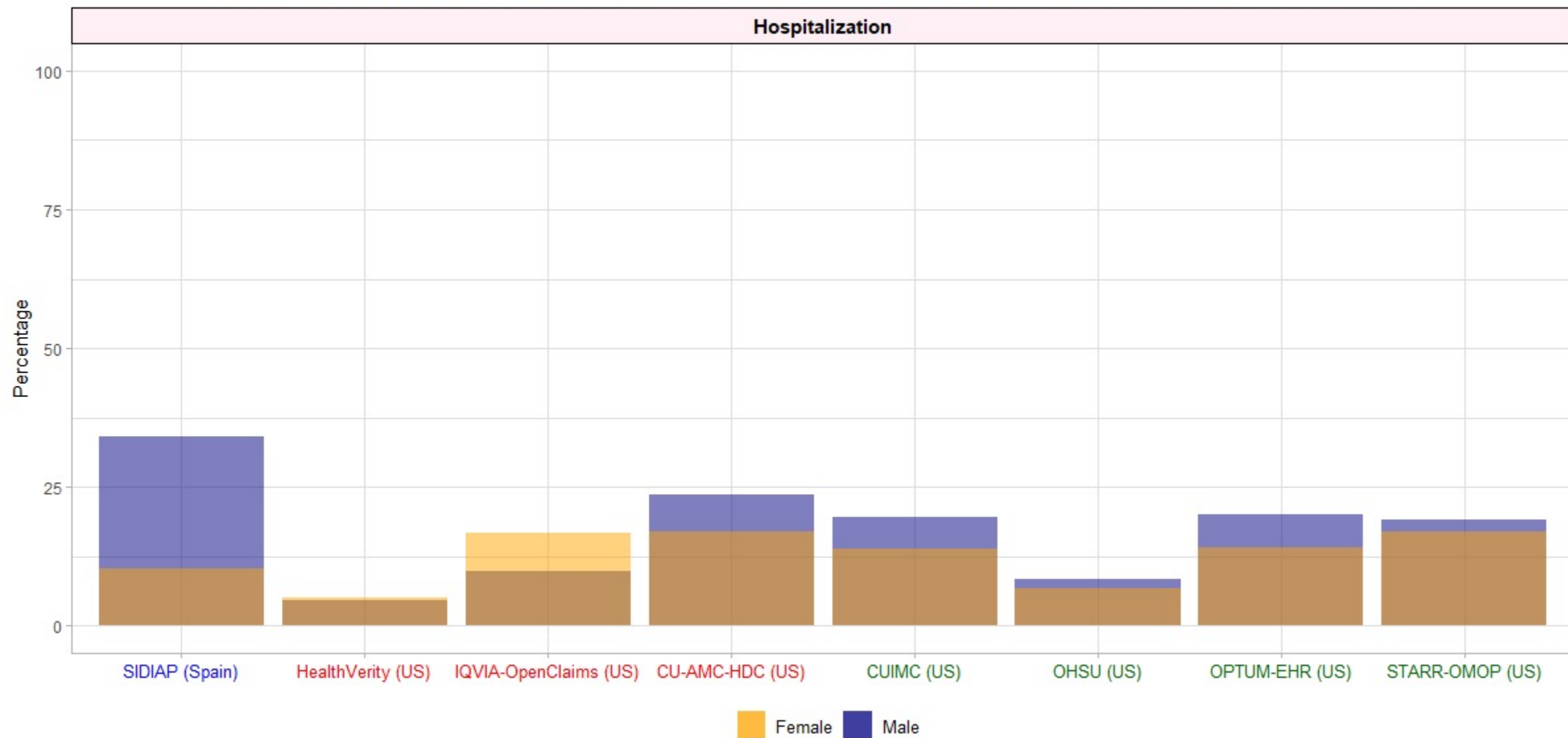
Outcomes

- Diagnosed
 - Symptoms – at index
 - Death
 - Hospitalization
- Hospitalized – 30 days post hospitalization
 - Pneumonia
 - ARDS
 - Cardiac Arrhythmia
 - Sepsis
 - Acute Kidney Injury
 - CV events
 - Heart Failure
 - Bleeding
 - Vein Thrombosis Events
 - Chest pain/angina
 - GI bleedings
 - Dialysis
 - Hepatic Failure
 - Pancreatitis

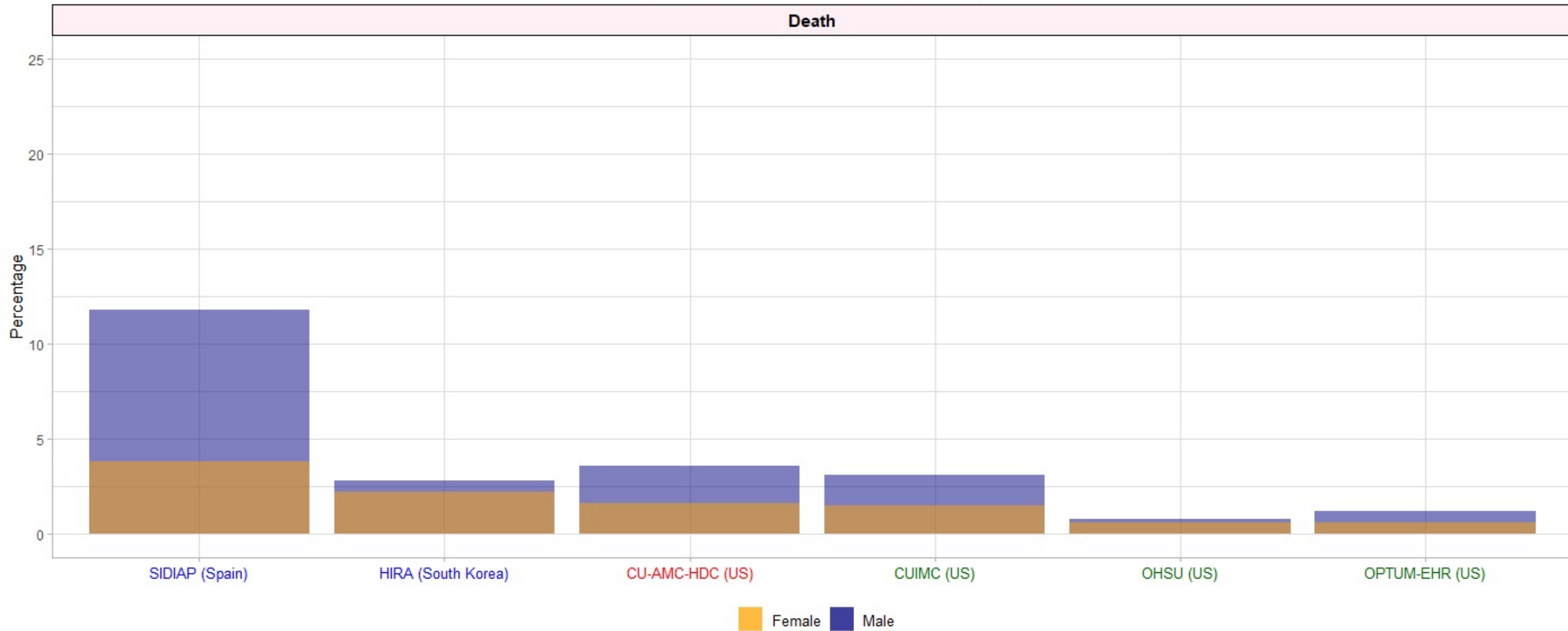
Comparison of COVID-19 symptoms at index date among males vs. females in various settings



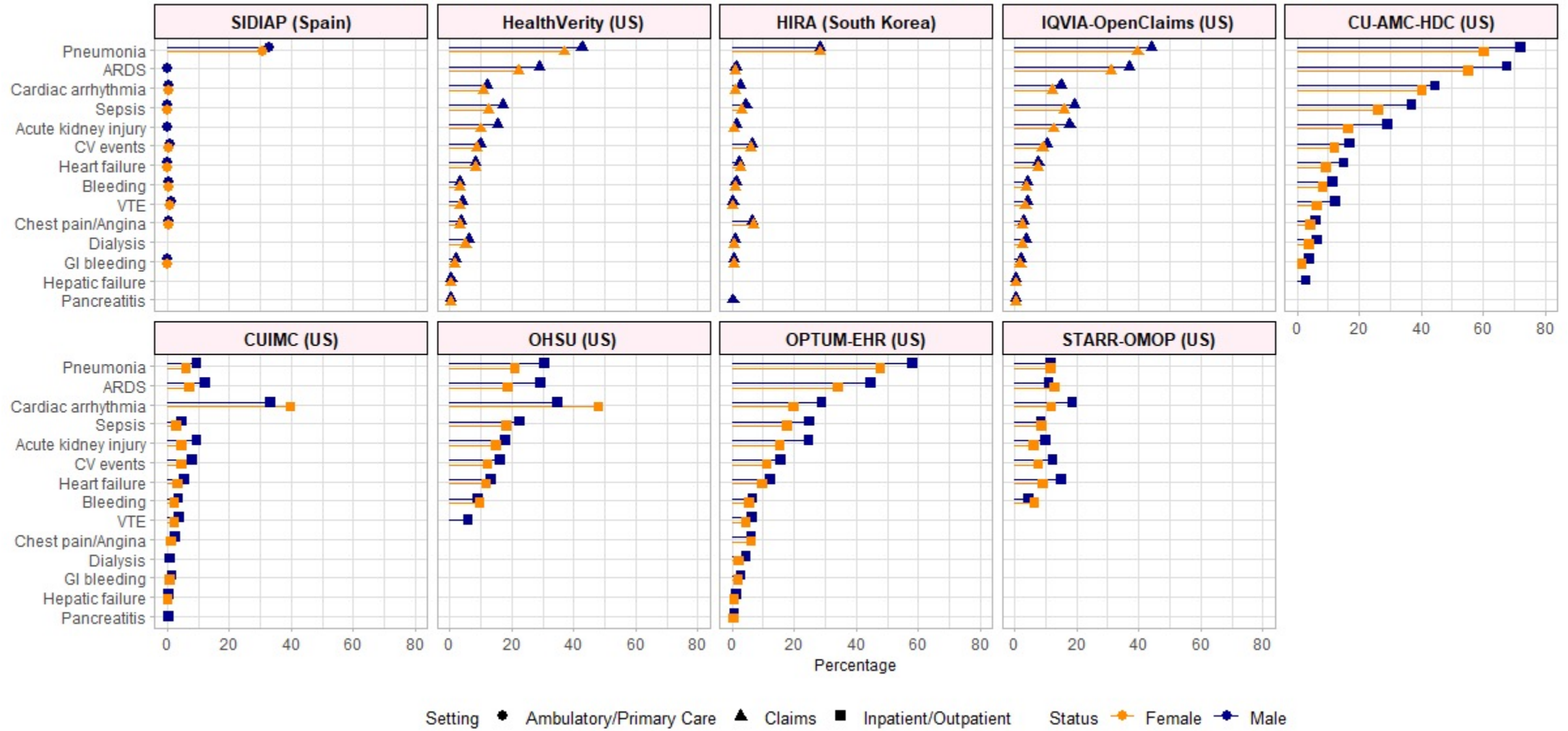
Hospitalization within 30 days of index date among males & females diagnosed with COVID-19 across various settings



Death within 30 days of index date among males & females diagnosed with COVID-19 across various settings



Comparison of clinical outcomes within 30 days of index date among males vs. females in various settings



Next Steps

- Database review
- Review sex differences at baseline
- Finalize manuscript

Future directions

- Investigate intersection of age & gender
 - Menopause as an independent risk factor for COVID-19
 - Faster immune aging in men

Thank you to the study team!

- Ru-Fong Cheng
- Lana Lai Yin Hui
- Maytal Bivas-Benita
- Asieh Golazar
- Kristin Kostka
- Paola Saroufim
- Fredrik Nyberg
- Adriana Campos



References

- Chakravarty, D., Nair, S. S., Hammouda, N., Ratnani, P., Gharib, Y., Wagaskar, V., Mohamed, N., London, D., Dovey, Z., Kyprianou, N., & Tewari, A. K. (2020). Sex differences in SARS-CoV-2 infection rates and the potential link to prostate cancer. *Communications Biology*, 3(374).
<https://doi.org/10.1038/s42003-020-1088-9>
- Ding, T., Zhang, J., Wang, T., Cui, P., Chen, Z., Jiang, J., Zhou, S., Dai, J., Wang, B., Yuan, S., Ma, W., Ma, L., Rong, Y., Chang, J., Miao, X., Ma, X., & Wang, S. (2020). A Multi-hospital Study in Wuhan, China: Protective Effects of Non-menopause and Female Hormones on SARS-CoV-2 infection. *MedArXiv*. <https://doi.org/10.1101/2020.03.26.20043943>
- Peckham, H., Gruijter, N.M., Raine, C., Radziszewska, A., Ciurtin, C., Wedderburn, L.R., Rosser, E.C., Webb, K. & Deakin, C.T. (2020). Male sex identified by global COVID-19 meta-analysis as a risk factor for death and ICU admission. *Nature Communications*, 11(6317).
<https://doi.org/10.1038/s41467-020-19741-6>
- vom Steeg, L. G., & Klein, S. L. (2016). Sex Matters in Infectious Disease Pathogenesis. *PLOS Pathogens*, 12(2), e1005374.
<https://doi.org/10.1371/journal.ppat.1005374>