

# COVID-19-related disruptions in health services and data: Tracing causes and effects

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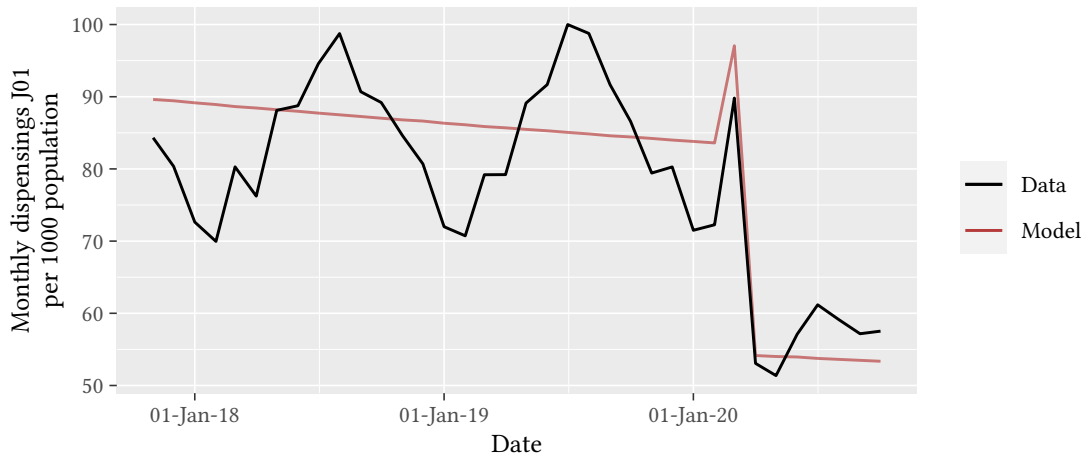
# Our partners



# Outline

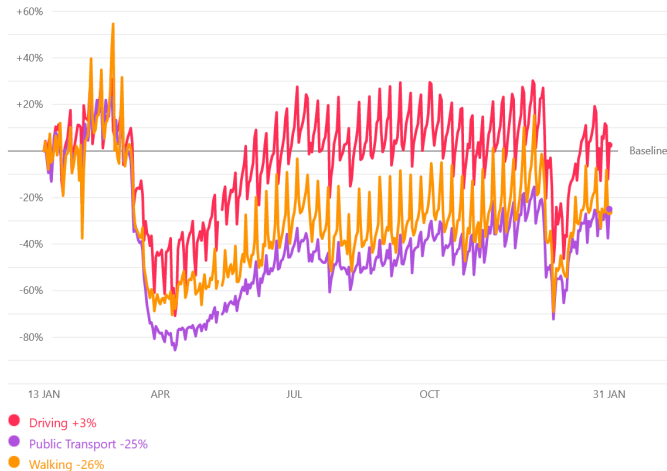
- Changes in antibiotic use in 2020
- Changes in antidepressant use in 2020
- *Why the changes?*
- *What happened exactly?*
- *How should we design future studies?*

# Study 1: PBS antibiotics in 2020

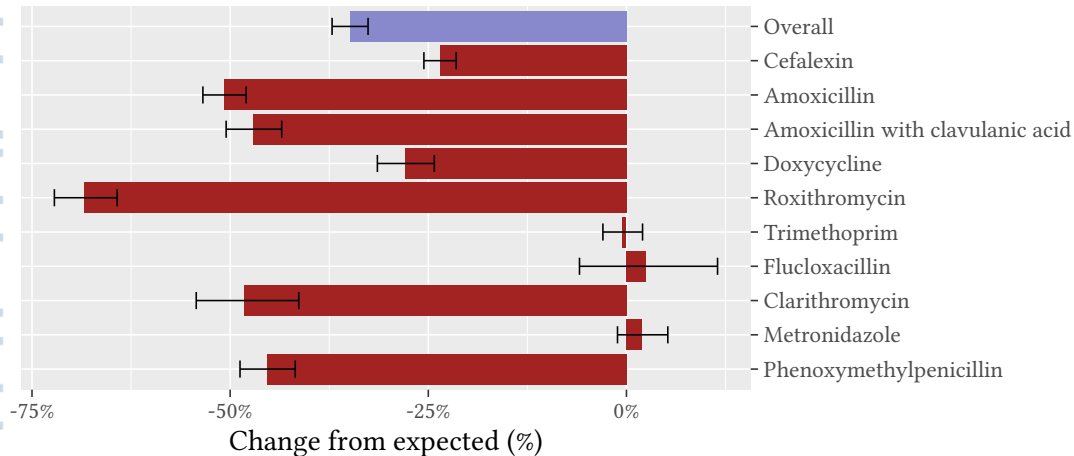




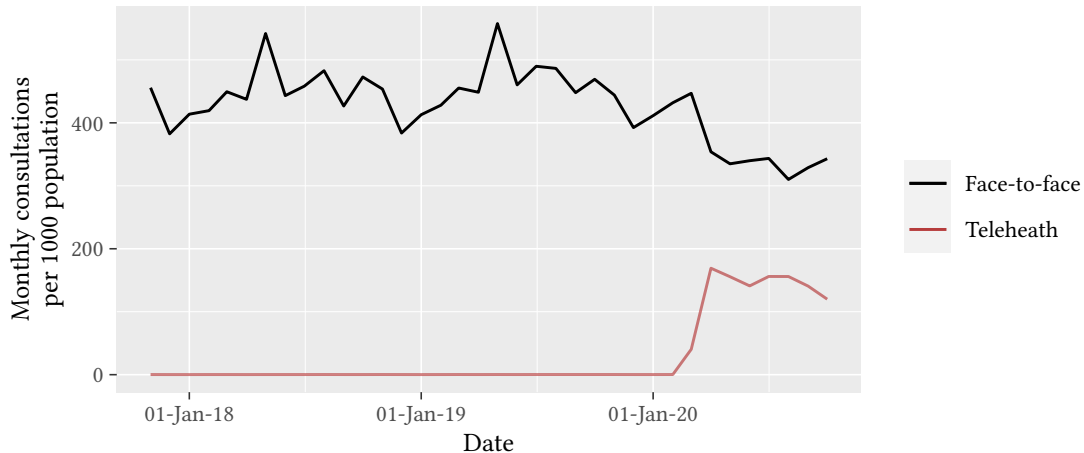
# Google mobility data, Sydney, 2020



# Top 10 antibiotics step changes

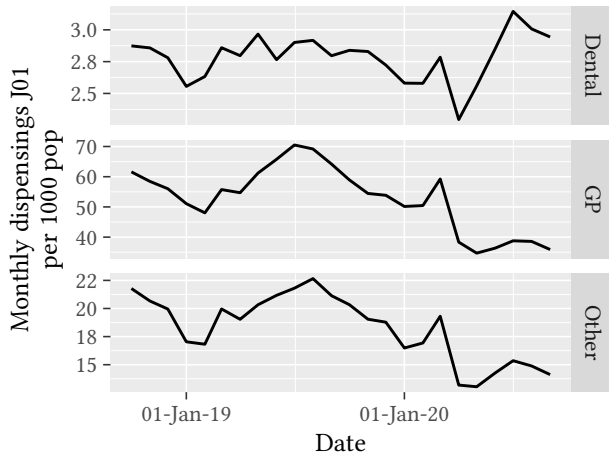


# Changes in primary care consultation rates

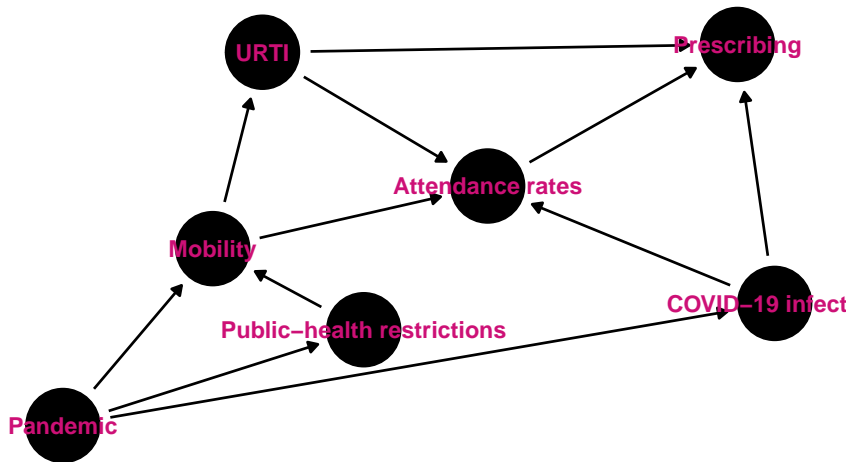




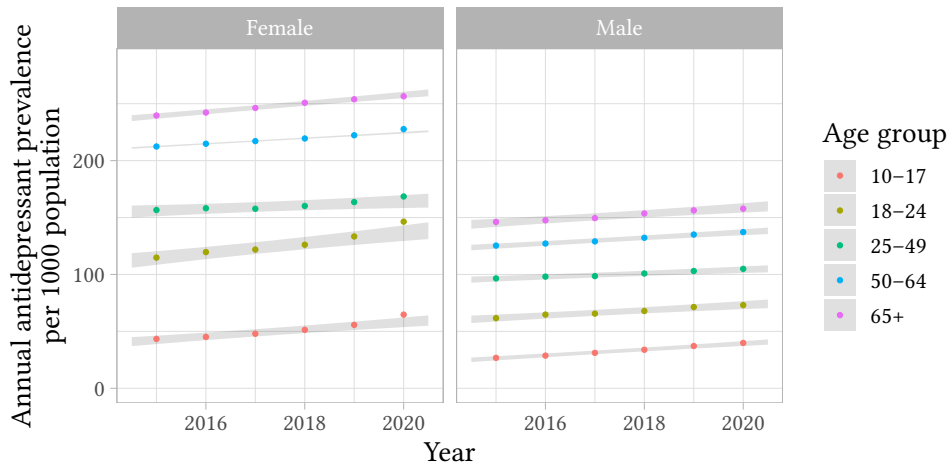
# Antibiotic changes by prescriber specialty



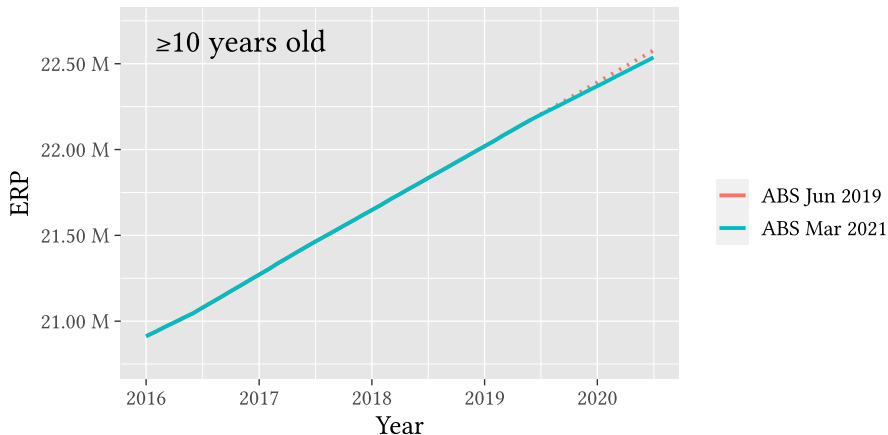
# What came first?



## Study 2: PBS antidepressants in 2020

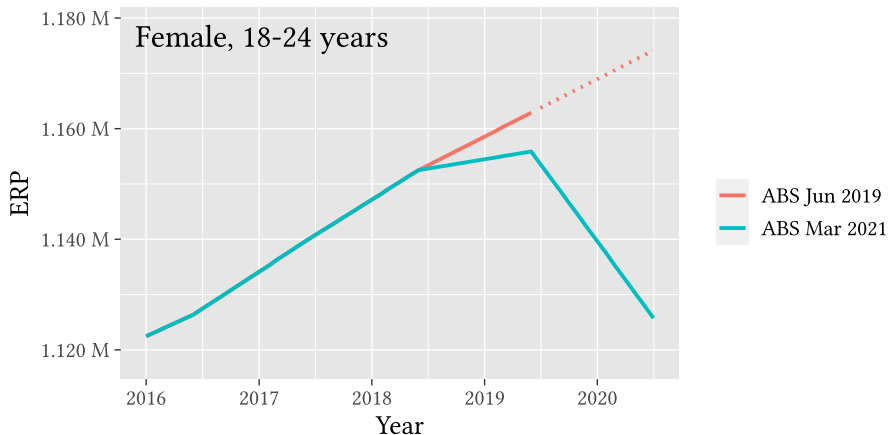


# ABS Estimated Resident Population: Projected vs Reported 1



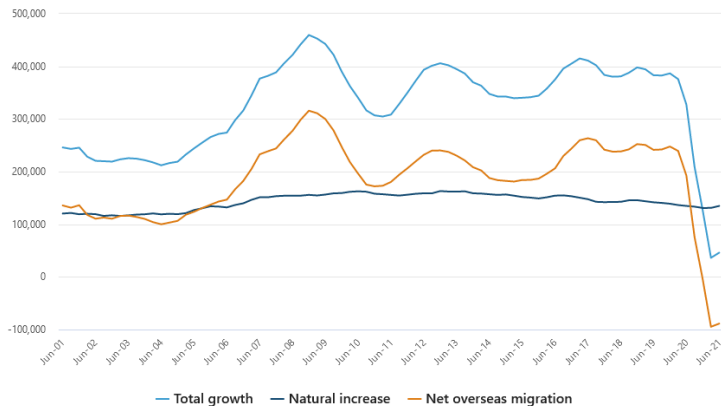
<https://www.abs.gov.au/statistics/people/population/national-state-and-territory-population>

# ABS Estimated Resident Population: Projected vs Reported 2



<https://www.abs.gov.au/statistics/people/population/national-state-and-territory-population>

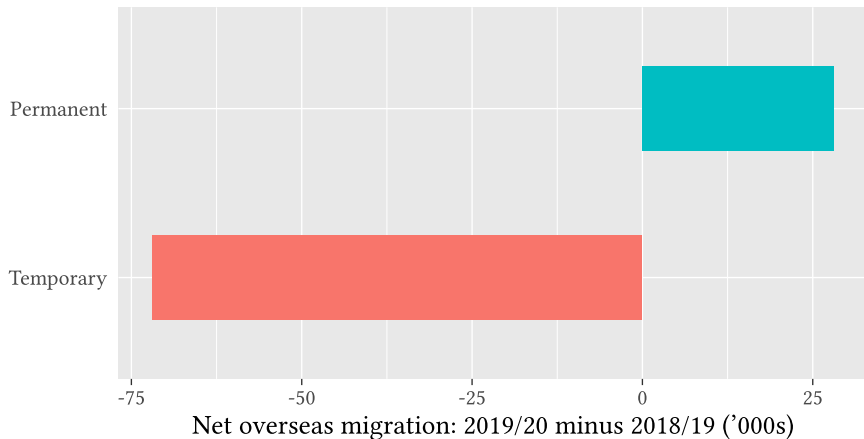
# ABS components of population growth



a. Annual components calculated at the end of each quarter.

<https://www.abs.gov.au/statistics/people/population/national-state-and-territory-population>

# Net overseas migration: PBS/MBS eligibility?



<https://www.abs.gov.au/statistics/people/population/migration-australia/latest-release>

# Some ideas about what to do

- A. M. Butler, M. Burcu, J. B. Christian, F. Tian, *et al.* Noninterventional studies in the COVID-19 era: methodological considerations for study design & analysis. *J Clin Epi*, 153:91–101, 2023.





# Study design elements to consider

- Participant selection
- Exposure assessment
- Outcome assessment
- Covariate assessment
- Competing risks

# Approaches to characterise or mitigate bias

- Assess confounder time trends
- Consider missing data strategies
- Use negative controls
- Consider COVID-19 infection Hx
- Censor on COVID-19 diagnosis
- Adjust for COVID-19 status
- Account for calendar time
- Account for factors with differential COVID-19 impact
- Do sensitivity analyses
- Replicate with different data sources
- Leverage additional data sources

# Our experience so far

- Interrupted time series analyses
- Simple approaches like deleting or aggregating
- TODO: Dealing with “phases” of the pandemic
- TODO: revisit denominator data

# Summary

- Think about causal mechanisms carefully
- Consider aggregate and disaggregate analyses
- Things are unpredictable and keep changing
- We need to share good practices

# Thanks

- Australian Government Services Australia for providing the data
- My co-authors, especially Juliana, Andrea and Helga
- Melisa Litchfield for assisting with data access and ethics approval
- All the other Medicines Intelligence Research Program people at SPH

# References

- A. M. Butler, M. Burcu, J. B. Christian, F. Tian, K. M. Andersen, W. A. Blumentals, K. E. Joynt Maddox, and G. C. Alexander. Noninterventional studies in the COVID-19 era: methodological considerations for study design and analysis. *J Clin Epi*, 153:91–101, 2023. doi: 10.1016/j.jclinepi.2022.11.011. URL <https://www.sciencedirect.com/science/article/pii/S0895435622002918>.
- J. de Oliveira Costa, M. B. Gillies, A. L. Schaffer, D. Peiris, H. Zoega, and S.-A. Pearson. Changes in antidepressant use in Australia: A nationwide analysis (2015–2021). *Aust N Z J Psychiatry*, 57(1):49–57, 2023. doi: 10.1177/00048674221079740. URL <https://doi.org/10.1177/00048674221079740>.
- M. B. Gillies, D. P. Burgner, L. Ivancic, N. Nassar, J. E. Miller, S. G. Sullivan, I. M. F. Todd, S.-A. Pearson, A. L. Schaffer, and H. Zoega. Changes in antibiotic prescribing following COVID-19 restrictions: Lessons for post-pandemic antibiotic stewardship. *Br J Clin Pharmacol*, 88(3):1143–1151, 2022. doi: 10.1111/bcp.15000. URL <https://onlinelibrary.wiley.com/doi/abs/10.1111/bcp.15000>.