**DATA ANALYTICS AND VISUALISATION BOOTCAMP**

**PROJECT 1**

**Group Members:**

Ale -- Phuong -- Nathan -- Amber

**Project Proposal**

Our project is to uncover patterns in birth rates around Australia. We'll examine relationships between economic indicators and birth rates over a seven year period (from 2012-2019); birth rates and location (between capital cities / between capital cities and regional areas); mother’s age, and related questions, as the data admits.

**Jupyter Notebook Analysis**

Australia - Ale

Melbourne / Vic - Amber

Sydney / NSW - Ale

Adelaide / SA - Amber

Perth / WA - Phuong

Darwin / NT - Nathan

Brisbane / QLD - Phuong

Hobart / TAS - Nathan

**The National Level**

**Q1: How do birth rates/numbers differ over time for the following Australian cities?**

Birth Rates in Australia – capital cities

declining over time (2012-2019)

**-------------------------------------------------------------------------------------------------------------------------------**

**The State Level**

**Q2: How do birth rates/numbers differ over time between capital cities and their respective regional areas?**

**Examples of hypotheses we could test:**

1. **Economic Factors**

* **Ha1:** Economic factors are influencing the birth rate

1. **Metropolitan capital cities vs regional areas (rest of the state) over a 7-year period (2012-2019)**

* **Ha2:** Mothers in regional areas are likely to have babies at a younger age than mothers in capital cities.  
  (So, we should find that the mean age of mothers in regional areas is younger than the mean age of mothers in capital cities.)
* **Ha3:** The fertility rate of regionally-based young mothers will be higher than the fertility rate of capital city-based young mothers.
* **Ha4:** The fertility rate of capital city-based older mothers will be higher than the fertility rate of regionally-based older mothers.

1. **Comparing the age of mothers across Australian capital cities over a 7-year period (2012-2019)**

* Sydney and Melbourne are similar sized cities and the two biggest cities in Australia. So:  
  **Ha5:** Mothers in Sydney and Melbourne will have a similar median age.  
  **Ha6:** The median age of mothers in Sydney and Melbourne will be older than other capital cities.
* Mothers in more remote capital cities will have a younger median age than mothers in other capital cities in Australia. So:  
  **Ha7:** The median age of mothers in Darwin and Perth will be younger than mothers in the other capital cities.
* **Ha8:** The median age of mothers in medium-sized, less remote cities (i.e. Adelaide, Brisbane and Hobart) will be in between the median age of mothers in the big capital cities and the more remote capital cities.

1. **Exploring how the median age of young and old mothers, across all Australian capitals and regions, varies over time (i.e. 2012-2019)**

* We predict an emerging trend where:
* **Ha9:** The median age of mothers will increase over time in all areas across Australia.
* **Ha10:** The fertility rate of young mothers will decrease over time in all areas across Australia.
* **Ha11:** The fertility rate of older mothers will decrease over time in all areas across Australia.

Note:

To test any of these hypotheses we would need to isolate the variable of interest to us (e.g. profession) to make sure some other variable (e.g. culture) does not distort our results.

For this example, a hypothesis to test could be: ‘Professionals have babies at an older age than non-professionals, regardless of their cultural background.’

We’d need to sample people from the same cultural background (to keep culture constant) and then compare the number of babies from professionals versus non-professionals within that sample.

We would then need to do the same for another 2 to 4 groupings (i.e samples) of different cultures and try to show that the same trend (professional vs non-professional) is apparent within the various cultural backgrounds we examined.

**Useful Materials / Apis / Links**

<https://www.abs.gov.au/ausstats/abs@.nsf/mf/1406.0.55.005> (table builder guide)

[Births, by year and month of occurrence, by state (abs.gov.au)](https://stat.data.abs.gov.au/Index.aspx?DataSetCode=BIRTHS_MONTH_OCCURRENCE)

[Research and data services | Births Deaths and Marriages Victoria (bdm.vic.gov.au)](https://www.bdm.vic.gov.au/research-and-family-history/research-and-data-services)

<https://stat.data.abs.gov.au/Index.aspx?DatasetCode=PATERNITY_AGE_STATE>

<https://api.gov.au/service/715cdfd0-4742-402e-8729-086a7fd42a51/Worked%20Examples#explore-a-dataset-and-construct-a-data-request>

<https://www.ons.gov.uk/peoplepopulationandcommunity/birthsdeathsandmarriages/livebirths>

<https://www.nber.org/research/data/vital-statistics-natality-birth-data>

**Presentation Structure**

1. Title Slide
2. Hypotheses / Core Message
3. Questions we were interested in
4. Data Sources - Where was the data found?
5. Data exploration and clean up
6. The analysis process
7. Conclusions

**Economic Factors:**

* The rate of births appears to be in decline, relative to the period for which data has been analysed. Although the actual number of births and population continue in an upward direction.
* There does not appear to be a correlation between economic indicators and birth rate.
* More data points are required over a longer period to make a more definitive conclusion that the birth rate is in decline.