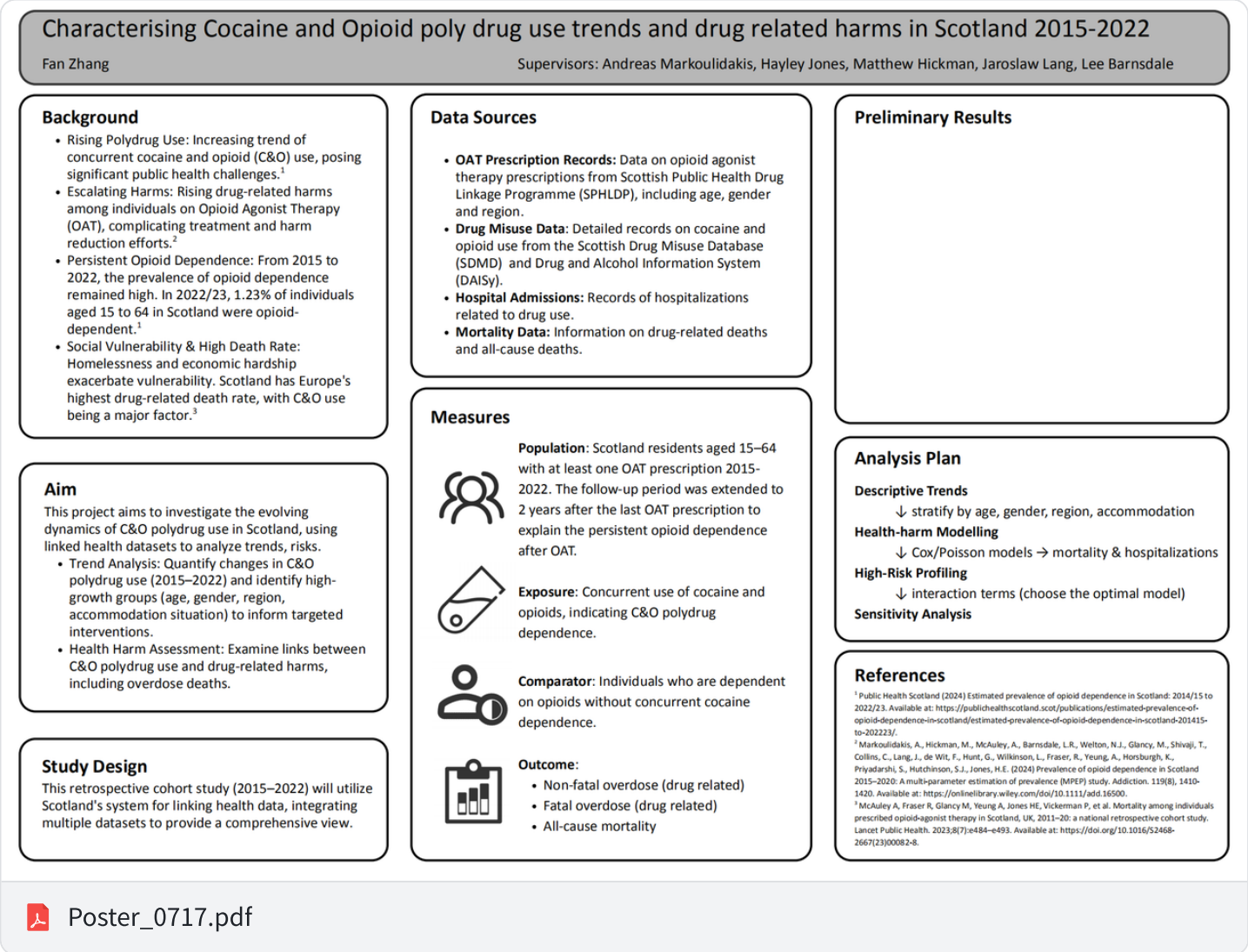
0717 Meeting Minutes



Characterising Cocaine and Opioid poly drug use trends and drug related harms in Scotland 2015-2022

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Background

- Rising Polydrug Use: Increasing trend of concurrent cocaine and opioid (C&O) use, posing significant public health challenges.[1]
- Escalating Harms: Rising drug-related harms among individuals on Opioid Agonist Therapy (OAT), complicating treatment and harm reduction efforts.[2]
- Persistent Opioid Dependence: From 2015 to 2022, the prevalence of opioid dependence remained high. In 2022/23, 1.23% of individuals aged 15 to 64 in Scotland were opioid-dependent.[1]
- Social Vulnerability & High Death Rate: Homelessness and economic hardship exacerbate vulnerability. Scotland has Europe's highest drug-related death rate, with C&O use being a major factor.[3]

Aim

This project aims to investigate the evolving dynamics of C&O polydrug use in Scotland, using linked health datasets to analyze trends, risks.

- Trend Analysis: Quantify changes in C&O polydrug use (2015–2022) and identify high-growth groups (age, gender, region, accommodation situation) to inform targeted interventions.
- Health Harm Assessment: Examine links between C&O polydrug use and drug-related harms, including overdose deaths.

Study Design

This retrospective cohort study (2015–2022) will utilize Scotland's system for linking health data, integrating multiple datasets to provide a comprehensive view.

Data Sources

- **OAT Prescription Records:** Data on opioid agonist therapy prescriptions from Scottish Public Health Drug Linkage Programme (SPHLDP), including age, gender and region.
- **Drug Misuse Data**: Detailed records on cocaine and opioid use from the Scottish Drug Misuse Database (SDMD) and Drug and Alcohol Information System (DAISy).
- **Hospital Admissions:** Records of hospitalizations related to drug use.
- **Mortality Data:** Information on drug-related deaths and all-cause deaths.

Measures

Population: Scotland residents aged 15–64 with at least one OAT prescription 2015-2022. The follow-up period was extended to 2 years after the last OAT prescription to explain the persistent opioid dependence after OAT.

Exposure: Concurrent use of cocaine and opioids, indicating C&O polydrug dependence.

Comparator: Individuals who are dependent on opioids without concurrent cocaine dependence.

Outcome:

- Non-fatal overdose (drug related)
- Fatal overdose (drug related)
- All-cause mortality

Preliminary Results

Analysis Plan

Descriptive Trends
↓ stratify by age, gender, region, accommodation

Health-harm Modelling
↓ Cox/Poisson models → mortality & hospitalizations

High-Risk Profiling
↓ interaction terms (choose the optimal model)

Sensitivity Analysis

References

[1] Public Health Scotland (2024) Estimated prevalence of opioid dependence in Scotland: 2014/15 to 2022/23. Available at: https://publichealthscotland.scot/publications/estimated-prevalence-of-opioid-dependence-in-scotland/estimated-prevalence-of-opioid-dependence-in-scotland-201415-to-202223/.

[2] Markoulidakis, A., Hickman, M., McAuley, A., Barnsdale, L.R., Welton, N.J., Glancy, M., Shivaji, T., Collins, C., Lang, J., de Wit, F., Hunt, G., Wilkinson, L., Fraser, R., Yeung, A., Horsburgh, K., Priyadarshi, S., Hutchinson, S.J., Jones, H.E. (2024) Prevalence of opioid dependence in Scotland 2015–2020: A multi-parameter estimation of prevalence (MPEP) study. Addiction. 119(8), 1410-1420. Available at: https://onlinelibrary.wiley.com/doi/10.1111/add.16500.

[3] McAuley A, Fraser R, Glancy M, Yeung A, Jones HE, Vickerman P, et al. Mortality among individuals prescribed opioid-agonist therapy in Scotland, UK, 2011–20: a national retrospective cohort study. Lancet Public Health. 2023;8(7):e484–e493. Available at: https://doi.org/10.1016/S2468-2667(23)00082-8.

Poster_0717.pdf

1. Data Quality Report

- **Data Overview**: The report covers a large volume of records from 9,000 individuals, including basic information such as age distribution and key findings on data quality.
- **Terminology Adjustment**: Andreas suggested avoiding the term "patients" in the final report to prevent misinterpretation, recommending "individuals" instead for clarity in the context of tracking studies.
- **Zero-Day Gap Issue**:
  - **Issue Description**: Fan Zhang highlighted the "zero-day gap" problem, where rule settings for at-risk individuals led to anomalies in time interval calculations.

- **Solution**: The issue was resolved by adjusting the gap to one day. Andreas confirmed that this is a common problem in other projects and can be fixed with rule modifications.

2. Analysis of Cocaine and Opioid Use

- **Drug-Related Mortality**:
  - Fan Zhang and Andreas analyzed the impact of cocaine and opioid use on mortality rates, including prevalence and correlations.
- **Trend Analysis Over Time**:
  - Matthew suggested longitudinal analysis to observe trends, noting that cocaine use has been increasing over time and that current data may underestimate actual usage due to recording methods.
- **Polydrug Use Clarification**:
  - Matthew emphasized the need to distinguish between cocaine and opioid use rather than generalizing as "polydrug use" to improve analytical accuracy.

3. Code Adjustment (Cocaine Flag Sorting)

- **Adjustment Required**: Andreas and Matthew recommended modifying the code to rank individuals by the cocaine flag in descending order, prioritizing high-flag data for analysis.
- **Follow-Up Support**: Andreas will send updated code lines, involving changes to the sorting logic in the initial lines.

Code block

```
sdmd_data <- sdmd_data %>% setDT(sdmd_data) %>%
                group_by(IAIN) %>%
                arrange(desc(ill_cocaine)) %>% # arrange in descending order
                slice(1) %>%
                select(IAIN,ill_cocaine)
 daisy_data <- daisy_data %>% setDT(daisy_data) %>%
                group_by(IAIN) %>%
                arrange(desc(ill_cocaine)) %>% # arrange in descending order
                slice(1) %>%
                select(IAIN,ill_cocaine)
```

4. Primary Analysis Report

- **Crude Mortality Rates**:

- Fan Zhang presented results on crude mortality rates associated with opioid and cocaine use.

- **Confidence Intervals**:
  - Andreas suggested adding confidence intervals to event rates for better comparison.
- **Polydrug Analysis Recommendation**:
  - Matthew proposed rechecking polydrug analysis after correcting cocaine exposure data and including all-cause mortality (ACM) and specific causes (e.g., cardiovascular diseases).

> 🎉 • Cardiovascular just look at I00-99 and most should be Hypertensive/ Ischaemic/ other heart disase...

5. Model Discussion (Cox vs. Poisson Models)

- **Cox Model Results**:
  - Fan Zhang’ s model showed significant associations between variables (drug type, age, non-fatal overdose count) and mortality risk.
- **Model Recommendations**:
  - **Poisson Model**: Andreas recommended switching to a Poisson model for easier interpretation in the final report.
  - **Interaction Terms**: When adding interaction terms, main effects must be retained. Model comparisons should use statistical criteria (e.g., deviance information criterion).

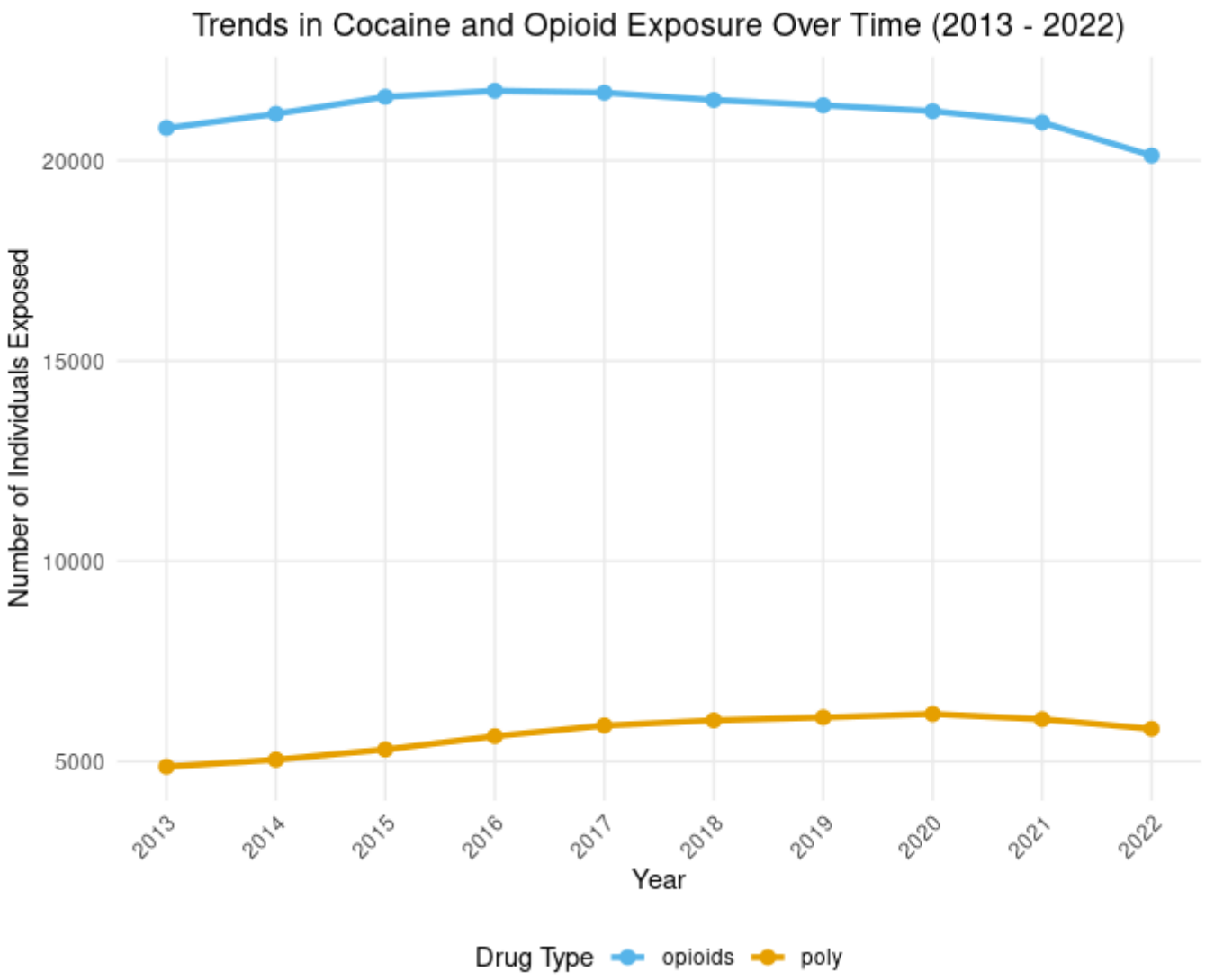
6. Poster Feedback and Revisions

- **Draft Discussion**:
  - Fan Zhang presented a poster draft, with Andreas and Matthew recommending explicit labeling (e.g., "cocaine and opioid use" instead of general "polydrug use").
- **Additional Visuals**:
  - Exposure Over Time: Matthew recommended including a figure showing the exposure to cocaine and opioids over time. This figure would help illustrate the trends and provide a clearer understanding of the data.

7. Next Steps

- **Fan Zhang’ s Tasks**:

a. **Results Review**: Walk through the analysis results in the shared PDF to ensure team understanding.
b. **Terminology Update**: Replace "patients" with "individuals" in the final report.
c. **Code Modification**: Reorder data by cocaine flag (descending) and prioritize the first record for analysis.
d. **Statistical Enhancement**: Generate confidence intervals for event rates.
e. **Cohort Validation**: Verify consistency after correcting cocaine exposure data.
f. **Cardiovascular Codes**: Finalize ICD-10 codes for cardiovascular-related analysis.
g. **Model Transition**: Switch to a Poisson model.
h. **Interaction Terms**: Ensure main effects are included when adding interaction terms.
i. **Poster Update**: Summarize meeting feedback and submit a revised poster draft.



"The poly drug use (cocaine and opioids) shows a concerning growth trend with an average annual increase of 1.4%, peaking at 6.2% growth in 2016, while opioid-only use demonstrates a

declining pattern (-1.0% annually)."