Measuring Adherence in Electronic Health Records

Sophie Eastwood

Diabetes UK Sir George Alberti Clinical Training Fellow

MRC Unit for Lifelong Health and Ageing at UCL

What is adherence?

WHO: "the extent to which the person's behaviour (including medication-taking) corresponds with agreed recommendations from a healthcare provider"

Why is it important?

- WHO estimates up to 50% those receiving Rx for NCD in developed countries non-adherent

- Non-adherence leads to: poorer health outcomes, wasted £

Why might you want to quantify medication adherence in your research?

Important for almost all pharmaco-epi lines of enquiry, whether studying it directly or not, particular research questions focusing on it are:

1.   Comparisons by drug/ population sub-group

2.   Real-world effectiveness studies

3.   Associations with outcomes

How is adherence measured?

Directly (gold standard):

- Serum/urine assays of drug/metabolites

Indirectly (proxy, therefore likely to overestimate):

- Self-report

- Electronic medication packaging devices

- Pill counts

- **Secondary database analysis**

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Medication possession ratio (MPR)

$$MPR = \left(\frac{\underline{\text{Sum of days' supply in period}}}{\text{No. of days in period}} \right) \times 100$$

where

Sum of days' supply = $\frac{\underline{\text{quantity prescribed}}}{\text{daily dose}}$*

Proportion of days covered (PDC)

$$PDC = \left(\frac{\underline{\text{No. of days in period "covered"}}}{\text{Number of days in period}} \right) \times 100$$

- Overlapping prescription dates not allowed, so cannot have PDC>100%

- Useful for assessing >1 drug

Further points

- Commonly dichotomised to ≥80% vs. <80%

- Varying approaches to inclusion and exclusion

- NB/ *>25% missing in CPRD

References

Methods

- Andrade SE, Kahler KH, Frech F, Chan KA. Methods for evaluation of medication adherence and persistence using automated databases. Pharmacoepidemiol Drug Saf. 2006 Aug;15(8):565-74; discussion 575-7.

- Raebel MA, Schmittdiel J, Karter AJ, Konieczny JL, Steiner JF. Standardizing terminology and definitions of medication adherence and persistence in research employing electronic databases. Med Care. 2013;51(8)(suppl 3):S11-S21.

Code resources

- **Stata** (medadhere command): https://journals.sagepub.com/doi/10.1177/1536867X19893625

- **R** (AdhereR package): https://cran.r-project.org/web/packages/AdhereR/vignettes/AdhereR-overview.html

Example papers

- Farmer AJ, Rodgers LR, Lonergan M, Shields B, Weedon MN et al. Adherence to Oral Glucose-Lowering Therapies and Associations With 1-Year HbA1c: A Retrospective Cohort Analysis in a Large Primary Care Database. Diabetes Care. 2016 Feb;39(2):258-26

- Bansilal S, Castellano JM, Garrido European, Wei HG, Freeman A et al. Assessing the impact of medication adherence on long-term cardiovascular outcomes. J Am Coll Cardiol. 2016 Aug 23; 68(8):789-810.