Using a Multi-Parameter Estimation of Prevalence (MPEP) model to estimate the prevalence of opioid dependence in Scotland

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Background/introduction: As the number of drug-related deaths in Scotland increased, and estimates of prevalence using "capture-recapture" approach used in the past are not feasible due to some datasets are no longer available, we deployed a Multi Parameter Estimation of Prevalence (MPEP) modelling approach. The MPEP approach involves administrative record linkage between opioid agonist treatment (OAT) prescriptions and adverse events (e.g., deaths and hospitalisations) data, using a Bayesian statistical model with simultaneous regressions on aggregated data to estimate prevalence.

Methods: The MPEP approach operates under the assumptions: 1) the adverse events modeled (opioid-related deaths and hospitalizations) are specific to the population of interest (i.e. people with opioid dependence), 2) the baseline cohort includes everyone receiving Opioid Agonist Treatment (OAT), and 3) everyone in the baseline cohort is opioid-dependent. Simultaneous Poisson regressions were fitted to the counts of deaths and hospitalizations within the observed cohort, stratified by age group, sex, region, year, and treatment status. A regression structure was fitted to latent prevalence on the log-odds scale, under the key assumption that rates of adverse events among the unobserved part of the population are equal to the rates observed among the baseline cohort during periods not on OAT. The model was extended to account for the fact that part of the target population will die during the year. In this presentation, we will discuss how we approached our application of the MPEP approach to estimate the number of people with opioid dependence in Scotland from 2014 to 2019. Given that our prevalence estimates relied on joint modeling of opioid-related deaths and hospitalisations, we conducted sensitivity analyses by systematically excluding each of these two data sources.

Results: In 2019/20, the estimated number of individuals with opioid dependence in Scotland was 47,100 (95% Credible Interval, CrI, 45,700 to 48,600), with a prevalence of 1.32% (95% CrI 1.28% to 1.37%). In general, prevalence estimates derived from a single data source exhibited minimal divergence from estimates combining both sources, except for males aged 15 to 34 years, where variations ranged from 0.31% to 0.54%. Our findings suggest a slight decrease of -0.07% (95% CrI -0.14% to 0.00%) in prevalence between 2014/15 and 2019/20.

Conclusions: The flexibility of the MPEP approach allows for adaptation to local settings and circumstances, incorporating a built-in test for the consistency of information regarding the size of the known population and drug-related harm.