A pharmacoepidemiologic analysis of the impact of calendar packaging on adherence to self-administered medications for long-term use

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Background: Calendar blister packaging (CBP) that incorporates a day or date feature is a simple medication packaging technology that is designed to improve medication adherence and persistence.

Objective: To assess the effect of a new calendar packaging technology on prescription refill adherence and persistence for daily, self-administered, long-term medication use.

Data Source: Anonymized pharmacy dispensing data from a large US mass merchandiser.

Design and Sample: Retrospective cohort study of persons 18-75 years of age who filled prescriptions for oral lisinopril or enalapril (control group) at a study pharmacy during one year before and after switch of lisinopril packaging from vials to CBP. Cohorts were stratified into new and prevalent medication users.

Measures: We used linear and logistic regression and propensity score matching to assess the impact of CBP on refill adherence, using medication possession ratio (MPR) and proportion of days covered (PDC), and persistence using length of therapy (LOT).

Results: Our sample comprised 76,321 new users and 249,040 prevalent users. Across all user, medication, and packaging groups, the mean unadjusted LOT decreased in the follow-up year, possibly due to economic recession. The LOT decline was attenuated in the CBP cohort. After adjustment for covariates, CBP use in new and prevalent medication users was associated with significantly higher LOT and PDC but not MPR. Furthermore, the odds of achieving PDC > 80% were higher by 15% in new users (OR = 1.15; 95% CI: 1.09-1.21) and 12% in prevalent users (OR = 1.12; 95% CI: 1.09-1.15) who switched to CBP, compared with continued vial use.

Limitations: Primary limitations include the relatively few measured variables affecting refill adherence and persistence available in the retrospective prescription dispensing database, potential selection bias, and other unmeasured sources of bias that could confound the packaging effect and affect generalizability of the results.

Conclusions: Calendar blister packaging of medication prescribed for long-term, daily, self-administration was associated with modest improvement in prescription refill adherence and persistence. An adherence strategy of even small effect size that is broadly implemented on a population level could significantly leverage therapeutic effect and provide substantial cumulative public health benefit. Clinical benefit, or harm, associated with use of CBP should be investigated. Usability assessments of CBP in patient subgroups may provide insight about differential impact on adherence and persistence.