

To Pile or Not to Pile: How to Define Episodes of Use of COPD Medications in the CPRD

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DISCLOSURES

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BACKGROUND

Different approaches can be used to define episodes of medication use in electronic medical record databases.

OBJECTIVE

To assess, among new users of 4 chronic obstructive pulmonary disease (COPD) maintenance medication options (long-acting beta agonists [LABA], long-acting muscarinic agonists [LAMA], LABA/inhaled corticosteroids [ICS], LAMA/LABA), the impact on incidence rate (IR) and incidence rate ratio (IRR) of congestive heart failure (CHF) of different approaches to define episodes of use of these medications in the Clinical Practice Research Datalink (CPRD).

METHODS

- In a COPD population aged 40 years or older in the CPRD, in the United Kingdom, we identified new users of the 4 COPD medication options from September 2012 to 30 June 2017.
- We defined episodes of use for each COPD medication, allowing 7-day, 30-day, and 90-day gaps between the end of one prescription and the start of the next.
- We calculated the accumulated overlap for each patient as the sum of all overlapping duration for all overlapping prescriptions for each patient, separately by COPD medications.
- Then we calculated the 75th percentile as described in Figure 1. Based on an exploratory analysis, the 75th percentile was chosen as the cutoff value to define long duration of overlap of COPD medication use in the CPRD.
- We used four assumptions:
 - 0% stockpiling:** Disregarding any overlap between prescriptions.
 - 50%/100% stockpiling:** For patients below the 75th percentile of duration of overlapping prescriptions (overlap), we added 100% of the overlapping duration (stockpiling). For those above the 75th percentile, we added 50% of the overlap of all overlapping prescription.
 - 75%/100% stockpiling:** For patients below the 75th percentile of duration of overlapping prescriptions, we added 100% of overlapping duration. For those above the 75th percentile, we added 75% of the overlap of all overlapping prescription.
 - 100% stockpiling:** We added all overlapping duration for all overlapping prescriptions.
- Figure 2 describes examples of how to calculate the episodes using different scenarios of stockpiling.
- We estimated IRR of CHF using LABA as the reference group.

RESULTS

- Table 1 describes the increase in person-years (PYs) of exposure across COPD medications and the increase in the number of CHF events for the 12 different scenarios with different gaps and varying percentages of stockpiling.
- IR per 1,000 PYs of CHF among new users of the 4 COPD medications are displayed for each scenario in Figure 3.
- In Figure 4, description of the percentage change in IRR of CHF among new users of COPD medications versus LABA is depicted for the scenarios of different gaps and stockpiling, compared with 0% stockpiling.

Table 1. Percentage Change In PYs and Number of CHF Events for Different Scenarios of Gaps Compared With 0% Stockpiling

COPD Medication	Gap Between Rx	Stockpiling Scenarios							
		0%		50%/100%		75%/100%		100%	
		PY	Events	% Change PY	% Change Events	% Change PY	% Change Events	% Change PY	% Change Events
LABA	7 days	4,415.3	87	3.0%	3.4%	4.4%	4.6%	6.8%	6.9%
	30 days	5,361.8	98	1.3%	1.0%	2.2%	2.0%	3.6%	5.1%
	90 days	6,572.3	117	0.5%	0.9%	1.0%	0.9%	1.8%	1.7%
LABA/ICS	7 days	29,637.9	742	3.1%	2.2%	4.3%	3.5%	6.1%	6.3%
	30 days	35,361.9	859	1.2%	1.5%	1.8%	2.3%	2.7%	3.4%
	90 days	41,697.4	980	0.3%	0.2%	0.6%	0.3%	0.9%	0.6%
LAMA	7 days	39,693.2	776	6.2%	5.8%	7.4%	6.3%	9.2%	7.5%
	30 days	47,145.2	932	2.4%	0.9%	3.0%	1.1%	4.0%	1.7%
	90 days	54,386.3	1,051	0.8%	0.3%	1.1%	0.5%	1.6%	0.9%
LAMA/LABA	7 days	1,602.8	28	2.0%	3.6%	2.8%	3.6%	4.1%	3.6%
	30 days	1,899.5	35	0.6%	0.0%	1.0%	0.0%	1.5%	2.9%
	90 days	2,176.8	40	0.2%	0.0%	0.4%	0.0%	0.6%	2.5%

Figure 3. IR per 1,000 PYs of CHF Among New Users of COPD Medications for the Different Scenarios of Gaps and Stockpiling

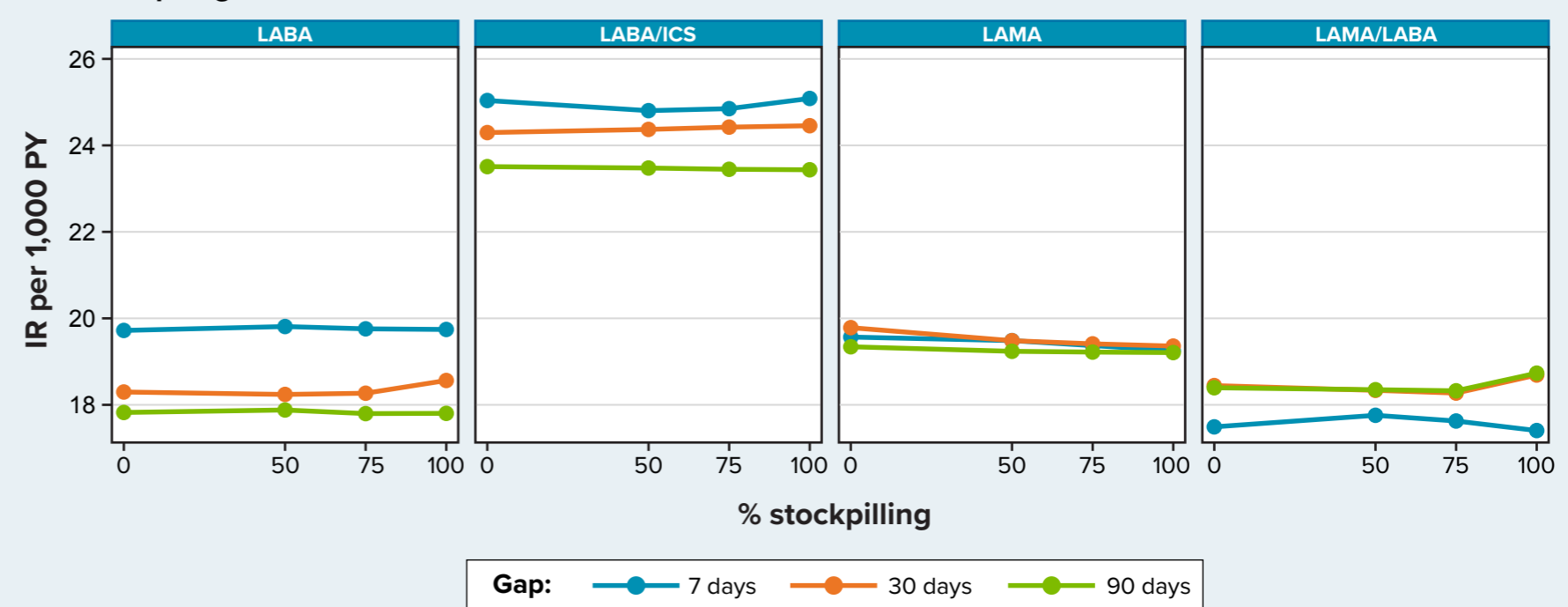


Figure 4. Percentage Change on IRR of CHF Among New Users of COPD Medication Versus LABA for the Different Scenarios of Gaps and Stockpiling

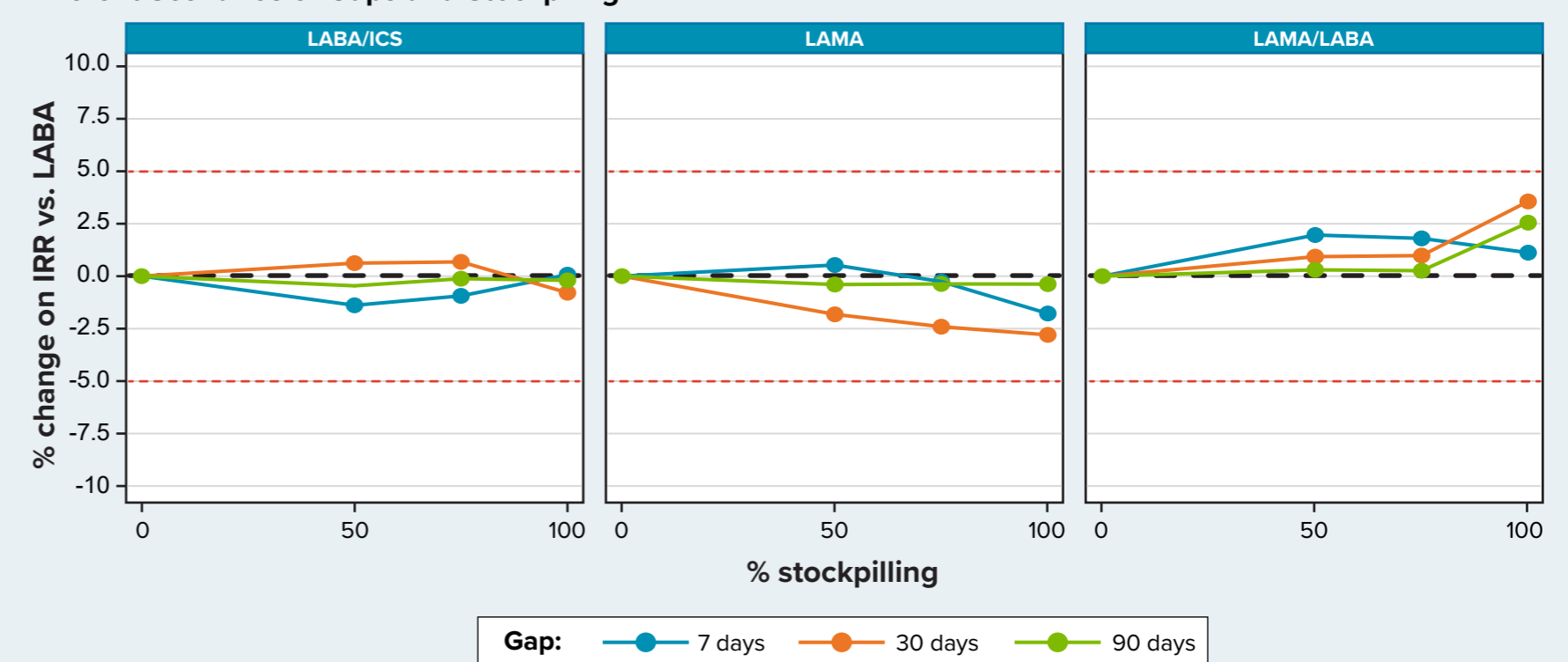


Figure 1. Derivation of the 75th Percentile of Overlapping Duration From Overlapping Prescriptions

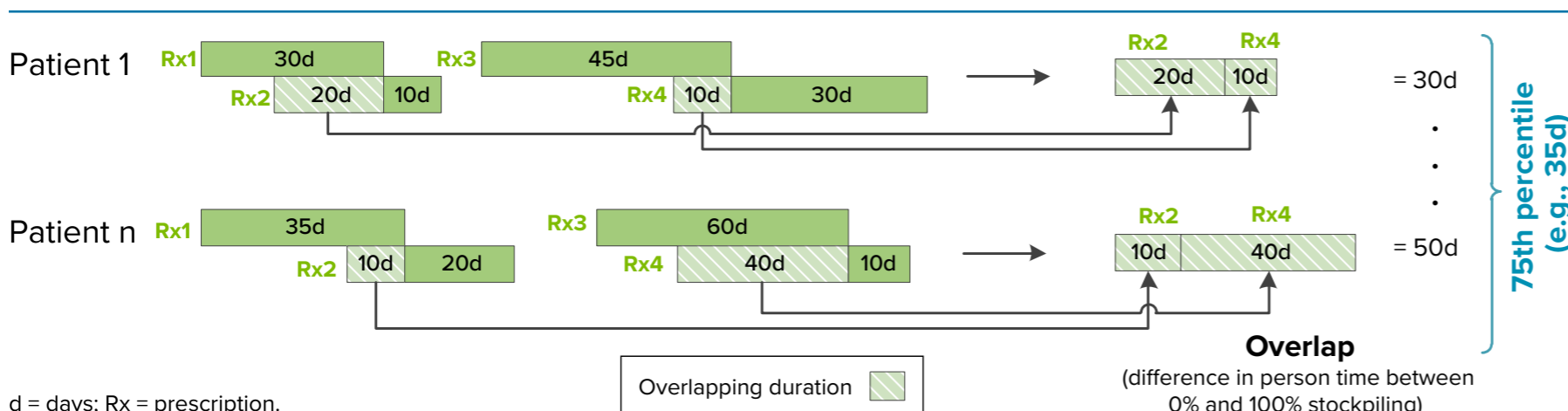
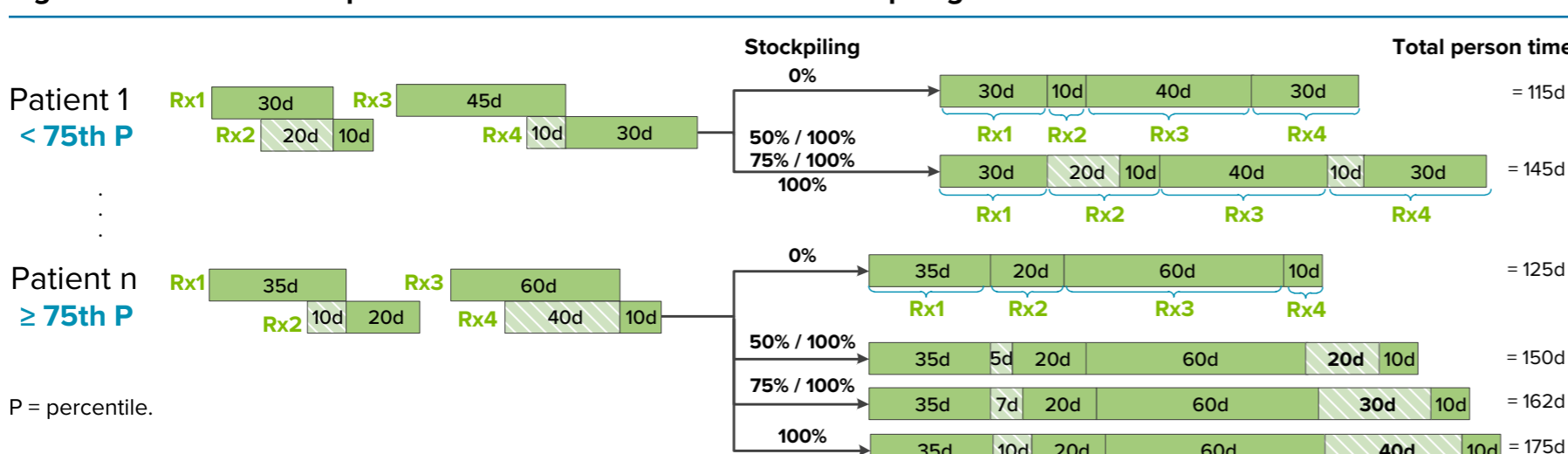


Figure 2. Derivation of Episodes for Different Scenarios of Stockpiling



CONCLUSIONS

- As expected, increasing PYs of exposure and number of events were observed for increasing stockpiling scenarios, with larger differences for the 7-day gap.
- Although the numerical change in IRs and IRRs when using different percentage of stockpiling versus 0% stockpiling were usually larger in the 30-day gap scenario, overall, the changes were small (i.e., $\leq 4.0\%$). When using a 90-day gap, the effect of changing the stockpiling approach is negligible.

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