

# Real-world Effectiveness Of Umeclidinium And Umeclidinium/vilanterol For Chronic Obstructive Pulmonary Disease (COPD): A Singapore Database Study

Shannon YL NG<sup>1</sup>, Benjamin SK ONG<sup>1</sup>, Kwong NG<sup>1</sup>

<sup>1</sup>Agency for Care Effectiveness (ACE), Ministry of Health, Singapore

Email: Shannon\_NG@moh.gov.sg

## BACKGROUND

- Long-acting muscarinic antagonists (LAMA) monotherapy and in combination with long-acting beta<sub>2</sub> agonists (LAMA/LABA) are preferred over inhaled corticosteroids / long-acting beta<sub>2</sub>-agonists (ICS/LABAs) for Global Initiative for Chronic Obstructive Lung Disease Group B and C patients.
- In Singapore, some patients who are unable to afford LAMA and LAMA/LABA were prescribed subsidized ICS/LABA instead.
- There is high clinical need to subsidize LAMA and LAMA/LABA to drive appropriate care of COPD patients given that ICS/LABA are associated with increased risk of pneumonia.
- Following health technology assessment by the Agency for Care Effectiveness, umeclidinium (umec), a LAMA and umeclidinium/vilanterol (umec/vil), a LAMA/LABA were listed for subsidy from 2 July 2018.

## OBJECTIVE

- This study assesses impact of the subsidy decision of umec and umec/vil on Singapore's healthcare system.

## METHODS

- We conducted a retrospective propensity score-matched cohort study (Figure 1) using national health record databases.



Figure 1. Cohort design diagram

- Maintenance-naïve COPD patients, with no concurrent asthma, initiated on umec, umec/vil or ICS/LABA, were included.
- Poisson regression estimated the incidence rate ratio (IRR) of COPD exacerbations and pneumonia hospitalization.
- To derive potential cost savings, a Markov model was used to extrapolate the number of events avoided arising from the initiation of umec or umec/vil over ICS/LABA.

## RESULTS

- Consistent with the intent, subsidy listing increased prescription of umec and umec/vil, reducing the use of ICS/LABA among COPD patients with no concurrent asthma (Figure 2).

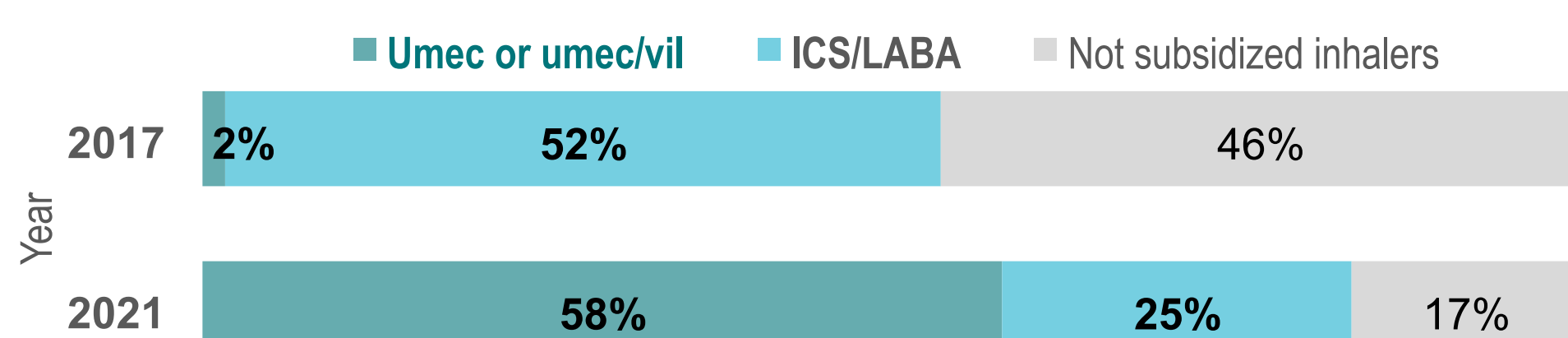


Figure 2. Proportion of patients on maintenance inhalers among COPD patients with no concurrent asthma.

## CONCLUSION

- As the largest real-world study conducted among COPD patients in Singapore, our findings contribute to the limited real-world evidence.
- Compared to ICS/LABA, umec or umec/vil were associated with better COPD control and reduced rates of pneumonia hospitalization, confirming the importance of appropriate prescribing of COPD therapies and validating the subsidy decision.

- Our cohort analysis included 1,019 and 1,206 eligible patients initiated on umec and umec/vil, respectively.
- Baseline patient characteristics were mostly matched with standardised difference < 0.1 (Table 1).

Table 1. Selected baseline characteristics of patients initiated on umec, umec/vil or ICS/LABA after propensity score matching

Variables	umec (n=1019)	ICS/LABA (n=1019)	d	umec/vil (n=1206)	ICS/LABA (n=1206)	d
Age at initiation, mean ± SD	69.5 ± 9.5	69.1 ± 10.3	-0.039	69.4 ± 9.6	69.8 ± 10.6	0.044
Male, %	94.4	93.9	-0.021	94.1	92.6	-0.060
Ethnicity, %						
Chinese	79.4	77.3	0.053	76.5	74.8	0.027
India	5.9	6.4		6.1	8.0	
Malay	10.0	10.6		10.4	9.3	
Others	4.7	5.7		6.9	7.9	
Charlson's co-morbidity index score, mean ± SD	3.83 ± 3.39	3.88 ± 3.48	0.013	4.24 ± 3.73	4.36 ± 3.68	0.032
Duration since first COPD diagnosis (years), mean ± SD	1.99 ± 3.43	1.87 ± 3.36	-0.035	1.85 ± 3.48	1.90 ± 3.67	0.014

d: Standardised difference; SD: standard deviation

## KEY FINDING



**Umec or umec/vil was associated with lower risk of COPD exacerbations and fewer pneumonia hospitalizations than ICS/LABA (Table 2).**

Table 2. Incidence rate ratio (IRR) of COPD exacerbations and pneumonia hospitalizations in two treatment cohorts (matched)

Outcomes	No. of patients with event (incidence per 100 person-years)		IRR <sup>a</sup> (95% CI)
<b>Umec (n=1019) vs ICS/LABA (n=1019)</b>			
Severe exacerbation	50 (4.7)	78 (7.5)	0.649 (0.438, 0.961)
Moderate exacerbation	439 (41.2)	622 (60.0)	0.713 (0.569, 0.892)
Pneumonia hospitalization	96 (9.0)	137 (13.2)	0.719 (0.532, 0.973)
<b>Umec/vil (n=1206) vs ICS/LABA (n=1206)</b>			
Severe exacerbation	84 (7.0)	121 (10.2)	0.713 (0.517, 0.985)
Moderate exacerbation	584 (48.5)	755 (63.4)	0.778 (0.642, 0.942)
Pneumonia hospitalization	176 (14.6)	233 (19.6)	0.781 (0.623, 0.980)

<sup>a</sup> Adjusted for covariates with a standardised mean difference of more than 0.1 after propensity score matching

- This difference in rate of events was applied to actual and projected number of COPD patients on umec or umec/vil.
- Coupled with reduced drug cost from value-based pricing, subsidy potentially resulted in SGD53 million (USD39 million) cost savings over 10 years.