Reduction in Emergency Department (ED) Visits in Patients With Chronic Obstructive Pulmonary Disease (COPD): Analysis of the IMPACT Trial

Mapel D¹, Bogart M², Criner GJ³, Dransfield MT⁴, Gaeckle N⁵, Gotfried M⁶, Halpin DMG⁷, Han MK⁸, Jain RG², Kaul V⁹,¹⁰, Mammen MJ¹¹, Midwinter D¹², Singh D¹³, Wise R¹⁴, Lipson DA¹⁵,¹⁶

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Recording by Doug Mapel
This study was funded by GlaxoSmithKline (GSK; CTT116855; NCT02164513).

On behalf of all authors, an audio recording of this poster was prepared by Doug Mapel, who did not receive any payment for this recording.

The presenting author, Doug Mapel, reports research grant funding from AstraZeneca, Boehringer Ingelheim, Endo Pharmaceuticals, GSK, Sunovion, and Pfizer Pharmaceuticals, and personal fees from Mylan/Theravance Biopharma.

Editorial support (in the form of writing assistance, including preparation of the initial draft under the direction and guidance of the authors, collating and incorporating authors’ comments for each draft, assembling tables and figures, grammatical editing and referencing) was provided by Katie Baker, PhD, of Fishawack Indicia Ltd., UK, part of Fishawack Health, and was funded by GSK.
Objectives

- ED visits and hospitalizations associated with COPD place a high burden on patients and healthcare systems and account for most COPD-related healthcare costs in the United States.\(^1\)\(^{-4}\)

- The IMPACT trial showed that once-daily single-inhaler FF/UMEC/VI triple therapy resulted in a lower rate of severe exacerbations (resulting in hospitalization or death) versus dual therapy with UMEC/VI, in patients with symptomatic COPD and a history of exacerbations.\(^5\)

- The rate of ED visits in patients enrolled in IMPACT has not been published; this post hoc analysis of the IMPACT trial evaluated the annual rate of ED visits by treatment arm.
**Methods**

**Study**
- Randomized
- Double-blind
- Multicenter

**Phase III**
(CTT116855 [NCT02164513])

**Patients**
- ≥40 years of age
- Symptomatic COPD: CAT score ≥10 at screening
- FEV₁ <50% predicted at screening and ≥1 moderate/severe* exacerbation in prior 12 months
- OR
- FEV₁ 50–<80% at screening and ≥2 moderate or ≥1 severe exacerbation in prior 12 months

**Treatments**
- 2 : 2 : 1 randomization
- FF/UMEC/VI : FF/VI : UMEC/VI

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**Post hoc analysis**

- Fluticasone furoate 100 mcg
- Umeclidinium 62.5 mcg
- Vilanterol 25 mcg

**52 weeks**

**Patients**
- The ITT population comprised 10,355 patients. Data on ED visits were available for 10,351 patients (FF/UMEC/VI, n=4148; FF/VI, n=4134; UMEC/VI, n=2069)

**Quantification of on-treatment ED visits by treatment arm**
- Unscheduled healthcare resource utilization, including ED visits, was recorded in patients' electronic case report forms
- Comparisons were made using a generalized linear model assuming a negative binomial distribution

**Randomized Double-blind Multicenter Study**

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**Patients**
- The ITT population comprised 10,355 patients. Data on ED visits were available for 10,351 patients (FF/UMEC/VI, n=4148; FF/VI, n=4134; UMEC/VI, n=2069)
Baseline characteristics and demographics were similar between the treatment groups (ITT population)\(^1\)

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<tr>
<th>Characteristic</th>
<th>FF/UMEC/VI (N=4151)</th>
<th>FF/VI (N=4134)</th>
<th>UMEC/VI (N=2070)</th>
</tr>
</thead>
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<tr>
<td>Age, mean (SD) years</td>
<td>65.3 (8.2)</td>
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<td>65.2 (8.3)</td>
</tr>
<tr>
<td>Sex (male), n (%)</td>
<td>2766 (67)</td>
<td>2748 (66)</td>
<td>1356 (66)</td>
</tr>
<tr>
<td>BMI*, mean (SD) kg/m(^2)</td>
<td>26.6 (6.2)</td>
<td>26.7 (6.1)</td>
<td>26.6 (5.9)</td>
</tr>
<tr>
<td>Smoking status history, n (%)</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Current</td>
<td>1436 (35)</td>
<td>1423 (34)</td>
<td>728 (35)</td>
</tr>
<tr>
<td>Former</td>
<td>2715 (65)</td>
<td>2711 (66)</td>
<td>1342 (65)</td>
</tr>
<tr>
<td>Exacerbation history in the prior 12 months, n (%)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt;2 moderate/severe exacerbation</td>
<td>1855 (45)</td>
<td>1912 (46)</td>
<td>933 (45)</td>
</tr>
<tr>
<td>≥2 moderate/severe exacerbations</td>
<td>2296 (55)</td>
<td>2222 (54)</td>
<td>1137 (55)</td>
</tr>
<tr>
<td>CAT score(^†), mean (SD)</td>
<td>20.1 (6.1)</td>
<td>20.1 (6.1)</td>
<td>20.2 (6.2)</td>
</tr>
<tr>
<td>Post-bronchodilator % predicted FEV(_1), mean (SD)</td>
<td>45.7 (15.0)</td>
<td>45.5 (14.8)</td>
<td>45.4 (14.7)</td>
</tr>
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\(FF/UMEC/VI\) n=4148, FF/VI n=4134, UMEC/VI n=2070; \(FF/UMEC/VI\) n=4142, FF/VI n=4124, UMEC/VI n=2061; \(FF/UMEC/VI\) n=4145, FF/VI n=4133, UMEC/VI n=2069. BMI, body mass index; CAT, COPD assessment test; COPD, chronic obstructive pulmonary disease; ED, emergency department; FEV\(_1\), forced expiratory volume in 1 second; ITT, intent-to-treat; FF, fluticasone furoate; SD, standard deviation; UMEC, umeclidinium; VI, vilanterol.
The majority of patients had no on-treatment ED visits. Most patients with ED visits had 1 visit.
The rate of ED visits was significantly lower with FF/UMEC/VI vs UMEC/VI, with no statistically significant difference vs FF/VI.

The model estimated annual event rates (95% CI) were 0.27 (0.24, 0.29) for FF/UMEC/VI, 0.29 (0.26, 0.32) for FF/VI, and 0.33 (0.28, 0.37) for UMEC/VI.

Model estimated annual event rate (95% CI)

<table>
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<tr>
<th>Treatment arm</th>
<th>Event Rate</th>
<th>95% CI</th>
<th>P-value</th>
</tr>
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<tbody>
<tr>
<td>FF/UMEC/VI</td>
<td>0.27</td>
<td>(0.24, 0.29)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>FF/VI</td>
<td>0.29</td>
<td>(0.26, 0.32)</td>
<td>0.002</td>
</tr>
<tr>
<td>UMEC/VI</td>
<td>0.33</td>
<td>(0.28, 0.37)</td>
<td>0.017</td>
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18% reduction;
Rate ratio: 0.82; 95% CI: 0.70, 0.97; P=0.017

7% reduction
Rate ratio: 0.93; 95% CI: 0.81, 1.06; P=0.256
Conclusions

- The rate of ED visits was significantly lower for patients receiving FF/UMEC/VI compared with those receiving UMEC/VI.

- In addition to the reduction in severe exacerbation rates with FF/UMEC/VI versus UMEC/VI seen in the IMPACT trial, this reduction in ED visits highlights the benefits of single-inhaler FF/UMEC/VI triple therapy over UMEC/VI dual therapy in patients with symptomatic COPD and a history of exacerbations.
GJ Criner reports personal fees from Almirall, Amgen, AstraZeneca, Boehringer Ingelheim, Broncus Medical, Chiesi, CSA Medical, Eolo, Gala Therapeutics, GSK, Helios Medical, Medtronic, Merck, Mereo BioPharma, NGM Pharmaceuticals, Novartis, Nuvaira, Olympus, Philips Respironics, Pulmonx, Respivant Sciences, The Implementation Group, and Verona; he also has ownership interest in HGE Technologies. M Bogart, R Jain, D Midwinter, and DA Lipson are employees of GSK and hold stocks/shares in GSK. MT Dransfield has received personal fees from AstraZeneca, Boehringer Ingelheim, PneumRx/BTG, Quark Pharmaceuticals, and GSK, grant support from the American Lung Association, Department of Defense, Department of Veterans Affairs, and NIH, and contracted clinical trial support from Boehringer Ingelheim, Novartis, AstraZeneca, Yungjin, PneumRx/BTG, Pulmonx, Boston Scientific, Gala, Nuvaira, and GSK. N Gaeckle, V Kaul and MJ Mammen have no conflict of interest to disclose. M Gotfried has received personal fees from GSK and the France Foundation, research support from Merck, Idorsia, Galapagos, Fibrogen, Avillion, and Takeda. DMG Halpin has received personal fees from AstraZeneca, Boehringer Ingelheim, Chiesi, GSK, Novartis, Pfizer, and Sanofi, and nonfinancial support from Boehringer Ingelheim, and Novartis. MK Han has received personal fees from AstraZeneca, GSK, Mylan, and Boehringer Ingelheim, and research support from Novartis and Sunovion. D Singh has received personal fees from GSK, AstraZeneca, Boehringer Ingelheim, Chiesi, Cipla, Genentech, Glenmark, Menarini, Mundipharma, Novartis, Peptinnovate, Pfizer, Pulmatrix, Theravance, and Verona, and grant support from AstraZeneca, Boehringer Ingelheim, Chiesi, Glenmark, Menarini, Mundipharma, Novartis, Pfizer, Pulmatrix, Theravance, and Verona. R Wise reports financial and nonfinancial support from GSK, and financial support from AstraZeneca, Boehringer Ingelheim, Contrafect, Merck, Verona, Mylan/Theravance, Novartis, ChimRix, FSD Pharma, AbbVie, Bristol Myers Squibb, Puretech, Galderma, and Chiesi.