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| **eTable 7a.** Bayesian mixed model with a random factor for individual patient and monotonic effect for intra–abdominal pressure with **Lung compliance (logarithmic transformation)** as dependent variable and group as main independent variable. |
| Variable | **Estimate** | **Std Error** | **Lower 95% CI** | **Upper** **95% CI** |
| **(Intercept)** | 4.87 | 0.52 | 3.85 | 5.89 |
| **Group (Targeted PEEP)** | 0.32 | 0.17 | 0.47 | 0.47 |
| **Intra–abdominal pressure** (mm Hg) | - 0.18 | 0.08 | - 0.35 | - 0.01 |
| **Baseline lung compliance** | 0.37 | 0.10 | 0.18 | 0.58 |
| **Body Mass Index** (Kg ∙ m-2) | - 0.03 | 0.02 | - 0.06 | 0.01 |
| **Interaction Group\*Intra–abdominal pressure**  | - 0.07 | 0.12 | - 0.16 | 0.29 |
| *Widely Applicable Information Criterion*: 783.84; *PEEP*, positive end–expiratory pressure; *CI,* Credible Interval;Baseline compliance is introduced in the model after logarithmic transformation. |

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| **eTable 7b.** Bayesian model simplex parameters that estimate the normalized distances between consecutive predictor categories. |
| Parameter | **Estimate** | **Std Error** | **Lower 95% CI** | **Upper 95% CI** |
| **Intra–abdominal pressure [1] (8 to 9 mm Hg)** | 0.12 | 0.10 | 0.00 | 0.38 |
| **Intra–abdominal pressure [2] (9 to 10 mm Hg)** | 0.12 | 0.11 | 0.00 | 0.40 |
| **Intra–abdominal pressure [3] (10 to 11 mm Hg)** | 0.12 | 0.10 | 0.00 | 0.37 |
| **Intra–abdominal pressure [4] (11 to 12 mm Hg)** | 0.12 | 0.10 | 0.00 | 0.38 |
| **Intra–abdominal pressure [5] (12 to 13 mm Hg)** | 0.18 | 0.14 | 0.01 | 0.53 |
| **Intra–abdominal pressure [5] (13 to 14 mm Hg)** | 0.18 | 0.14 | 0.01 | 0.52 |
| **Intra–abdominal pressure [5] (14 to 15 mm Hg)** | 0.18 | 0.14 | 0.01 | 0.50 |
| **Group\*Intra–abdominal pressure [1]** | 0.15 | 0.13 | 0.00 | 0.48 |
| **Group\*Intra–abdominal pressure [2]** | 0.15 | 0.13 | 0.00 | 0.46 |
| **Group\*Intra–abdominal pressure [3]** | 0.15 | 0.13 | 0.00 | 0.48 |
| **Group\*Intra–abdominal pressure [4]** | 0.15 | 0.13 | 0.00 | 0.47 |
| **Group\*Intra–abdominal pressure [5]** | 0.13 | 0.12 | 0.00 | 0.44 |
| **Group\*Intra–abdominal pressure [6]** | 0.14 | 0.12 | 0.00 | 0.45 |
| **Group\*Intra–abdominal pressure [7]** | 0.13 | 0.12 | 0.00 | 0.44 |
| *Widely Applicable Information Criterion (WAIC)*: 126.23; *CI,* Credible Interval;  |