## Supplementary material

### Acceptable task performance

| Task step                                    | Acceptable                                      | Unacceptable                                                                 |
|----------------------------------------------|------------------------------------------------|-------------------------------------------------------------------------------|
| **SMI**                                      |                                                |                                                                               |
| **Priming**                                  | Attempted                                      | Ignored, skipped                                                              |
| Do not rotate clear base until cartridge inserted | Ignored, skipped                               | Any rotation or attempt                                                      |
| Press safety catch                           | Pressed sufficient to release clear base        | Ignored, skipped                                                              |
|                                              | Pressed insufficient once                      | Pressed insufficient repeatedly                                              |
| Pull off clear base                           | Clear base removed entirely                    | Ignored, skipped                                                              |
| Do not touch piercing element                 | Ignored, skipped                               | Any attempt                                                                  |
| Push narrow end of cartridge into base of inhaler | Narrow end pushed, seal broken                 | Wrong end pushed sufficient to break seal                                    |
| Place cartridge on hard surface to push firmly (until 1/8 inch is visible) | Pushed in, 1/8 inch visible                    | Ignored, skipped                                                              |
| Replace clear base                            | Replaced, catch engaged                        | Ignored, skipped                                                              |
|                                              | Replaced, catch not engaged                    |                                                                               |
| Hold inhaler upright                          | Held ≤45° of upright                            | Held >45° of upright                                                         |
| Turn clear base in direction of arrows on label until it clicks (½ turn) | Rotated audible click                          | Ignored, skipped                                                              |
|                                              | Wrong way single attempt                       | Insufficient rotation, no click heard                                        |
|                                              |                                                | Wrong way, repeated attempts                                                 |
|                                              |                                                | Rotated >½ turn                                                              |
|                                              |                                                | Rotated >1 click audible                                                     |
|                                              |                                                | Finger on button & activates                                                 |
| Open cap                                     | Cap open enough to clear plume                  | Already opened                                                               |
|                                              |                                                | Ignored, skipped                                                             |
|                                              |                                                | Opened but plume impinged                                                   |
| Point device down, away from face and others | Held >45° of upright                            | Held ≤45° of upright                                                        |
|                                              | Held in fume hood                              | At point of activation...                                                     |
|                                              | Held away from face/others                     | outside fume hood                                                            |
|                                              |                                                | pointed at face/others                                                       |
| Press dose release button                     | Pressed sufficient to activate                 | Ignored, skipped                                                             |
|                                              | Pressed insufficient once                      | Pressed insufficient repeatedly                                              |
| Replace cap | Cap audible click | Ignored, skipped |
|-------------|-------------------|------------------|
| Repeat until spray is visible | Repeated, plume visible | Ignored, skipped |
| Repeat 3 more times | Repeated 3 times<sup>a</sup> | Ignored, skipped |
| [If not used for 3 days, spray 1 puff toward ground] | Observable recognition of 3 days | Ignored, skipped |
| [Reprime after 21 days of non-use]<sup>b</sup> | Observable recognition of ≤21 days | Ignored, skipped |
| Use | Attempted | Ignored, skipped |
| Hold inhaler upright | Held ≤45° of upright | Held >45° of upright |
| Turn clear base in direction of arrows on label until it clicks (½ turn) | Rotated audible click | Ignored, skipped |
| Open cap | Cap open enough to clear plume | Already opened |
| Breathe out fully from mouth | Any observable exhalation (audible, visible) [‘Fully’ not assessed] | Ignored, skipped |
| Close lips around mouthpiece | Observable seal of lips to mouthpiece | Observable gap(s) |
| Point inhaler to back of throat | Observable correct direction for >50% of inhalation | Wrong direction ≤50% of inhalation |
| Inhale slowly through mouth | Observable slow inhalation (i.e., >2 seconds) through mouth | Ignored/skipped |

<sup>a</sup> Repeated 3–6 times

<sup>b</sup> Repeated 3 times
| Step                                           | Action                                | Notes                                           |
|-----------------------------------------------|---------------------------------------|------------------------------------------------|
| Inhalation stops before press                 |                                       |                                                |
| No inhalation within 2 seconds of press       |                                       |                                                |
| Press down on top of inhaler (release puff)  | Pressed sufficient to activate        | Ignored, skipped                               |
|                                               | Pressed insufficient once              | Pressed insufficient repeatedly                |
|                                               |                                       | Pressed in wrong place                         |
| Remove mouthpiece                             | Mouth closed                          | Ignored, skipped                               |
|                                               |                                       | Plume evident from device or mouth             |
|                                               |                                       | Base turned during plume                       |
| AND                                           | Observable exhalation                  |                                                |
| Hold breath for 10 seconds                    | Observable breath hold >5 seconds     | Ignored, skipped                               |
|                                               |                                       | Exhalation after ≤5 seconds                    |
| Breathe out                                   | Observable breath                     | Through device                                 |
| Close cap                                     | Ignored, skipped                      |                                                |
| Repeat 1 more times (total 2)                 | Repeated                              | Ignored, skipped                               |
|                                               |                                       | Insufficient rotation, no click heard          |
|                                               |                                       | Wrong way, repeated attempts                  |
|                                               |                                       | Rotated >½ turn                                |
|                                               |                                       | Rotated >1 click audible                       |
|                                               |                                       | Finger on button and activates                |
|                                               |                                       | Repeated ≥2 times                              |
| Disposal                                      |                                       |                                                |
| [When dose indicator shows ≤14, i.e. red scale portion] | Mention reorder of new device | Ignored/skipped                               |
|                                               |                                       | No mention (when probed)                       |
|                                               | Mention when probed                   |                                                |
| [When dose indicator shows ≤0]                | Rejection of device                    | Observed rotation and use                      |
|                                               | Mention rejection                      | No mention (when probed)                       |
|                                               | Mention when probed                   |                                                |
| [When DISCARD BY: date exceeded]              | Rejection of device                    | Observed rotation and use                      |
|                                               | Mention rejection                      | No mention (when probed)                       |
|                                               | Mention when probed                   |                                                |
| [When EXP DATE: exceeded]                     | Rejection of device                    | Observed rotation and use                      |
|                                               | Mention rejection                      | No mention (when probed)                       |
|                                               | Mention when probed                   |                                                |

For this study, a single spray was considered acceptable; however, the instructions for use state that user should actuate the inhaler until an aerosol cloud is visible and then repeat the process three more times.

If not used for more than 21 days, patients are to actuate the inhaler until an aerosol cloud is visible and then repeat the process three more times to prepare the inhaler for use.
| Task step                                      | Acceptable          | Unacceptable                                      |
|-----------------------------------------------|---------------------|---------------------------------------------------|
| **Priming**                                   | Attempted           | Ignored, skipped                                  |
| Remove cap                                    | Cap removed         | Ignored, skipped                                  |
| Check inside mouthpiece                       | Observable check    | Ignored, skipped                                  |
| Hold device with mouthpiece pointing away from you and others | Held in fume hood  | At point of activation…                            |
|                                               | Held away from face/others | outside fume hood pointed at face/others         |
| Shake inhaler                                 | Observable shake $\geq 1$ second | Ignored, skipped                                 |
| Press down on top of inhaler (release puff)   | Pressed sufficient to activate | Ignored, skipped                                 |
| Repeat 3 more times (total 4)                 | Repeated 3 times    | Ignored, skipped                                  |
|                                               | Repeated 3–6 times  | Repeated 2–3 times                                 |
| Replace cap                                   | Cap replaced        | Ignored, skipped                                  |
| [Reprime after 7 days non-use]                | Observable recognition of $\leq 7$ days | Ignored, skipped                                 |
|                                               | Sprayed in fume hood | No recognition of 7 days                          |
|                                               | Sprayed away from face/others | Belief $>7$ days                                  |
|                                               |                     | Sprayed outside fume hood                         |
|                                               |                     | Sprayed pointed at face/others                    |
| **Use**                                       | Attempted           | Ignored, skipped                                  |
| Remove cap                                    | Cap removed         | Ignored, skipped                                  |
| Shake inhaler                                 | Observable shake $\geq 1$ second | Ignored, skipped                                 |
| Breathe out fully from mouth                  | Any observable exhalation (audible, visible) | Ignored, skipped                                 |
|                                               | [‘Fully’ not assessed] |                                                |
| Close lips around mouthpiece                  | Observable seal of lips to mouthpiece          | Observable gap(s)                                 |
|                                               |                     | Other part of device                              |
| Inhale slowly through mouth                   | Observable slow inhalation (i.e., $>2$ seconds) through mouth | Ignored/skipped                                 |
|                                               |                     | Rapid inhalation (i.e., $<2$ seconds) through mouth |                                        |
|                                               |                     | Observable nasal inhalation                       |
| **AND**                                       |                     | Inhalation stops before press                    |
| Press down on top of inhaler (release puff)   | Pressed sufficient to activate | Ignored, skipped                                 |
|                                               | Pressed insufficient once | Pressed insufficient repeatedly               |
|                                               |                     | Pressed in wrong place                            |
| Step                                      | Observation                              | Action                  |
|-------------------------------------------|------------------------------------------|-------------------------|
| Remove mouthpiece                         | Mouth closed                             | Ignored, skipped        |
| **AND**                                   |                                          | Plume evident from device or mouth |
| Hold breath for 10 secs                   | Observable breath hold >5 seconds        | Ignored, skipped        |
| Breathe out                               | Observable breath                        | Through device          |
| Repeat 1 more times (total 2)             | Repeated                                 | Ignored, skipped        |
| Replace cap                               | Replaced                                 | Ignored, skipped        |
| **Dispose**                               |                                          |                         |
| [When dose indicator shows ≤20 i.e., red scale portion] | Mention reorder of new device  | Ignored/skipped         |
|                                           | Mention when probed                      | No mention (when probed)|
| [When dose indicator shows ≤0]            | Rejection of device                      | Observed use            |
|                                           | Mention rejection                        | No mention (when probed)|
|                                           | Mention when probed                      |                         |
| [When EXP DATE: exceeded]                 | Rejection of device                      | Observed use            |
|                                           | Mention rejection                        | No mention (when probed)|
|                                           | Mention when probed                      |                         |