

## Supplementary Material

### Treatment Patterns and Negative Health Outcomes in Palmoplantar Pustulosis Patients in Germany and the US

Alvan Cheng, PhD, MPH<sup>1</sup>, Xinqing Deng, MPH<sup>2</sup>, Fang Yang, MPH<sup>2</sup>, Cici Liu, MS<sup>2</sup>, David Neasham, PhD, MSc<sup>3</sup>, Thomas Kilcoyne, MMath<sup>4</sup>, Michael Duxbury, BSc<sup>5</sup>, Myriam Cordey, PhD, MPH<sup>1</sup>, Boni E. Elewski, MD<sup>6</sup>

<sup>1</sup>Amgen, Inc., Center for Observational Research, Thousand Oaks, California, United States;

<sup>2</sup>SimulStat Inc., Solana Beach, California, United States; <sup>3</sup>Amgen, Ltd, Center for Observational Research, Uxbridge, United Kingdom; <sup>4</sup>Hobson Prior, Tunbridge Wells, United Kingdom; <sup>5</sup>Kelly Services, Inc., Kingston, United Kingdom; <sup>6</sup>Department of Dermatology, University of Alabama at Birmingham, Birmingham, Alabama, United States

**Corresponding author:** Alvan Cheng, PhD, MPH, Amgen, Inc., Center for Observational Research, Thousand Oaks, California, United States ([acheng02@amgen.com](mailto:acheng02@amgen.com))

**eTable 1. List of Medications by Treatment Category**

| Treatment Category   | Drug Class and Ingredient  |
|--|--|
| <b>Topical agents</b>  | <i>Topical steroid</i><br>Alclometasone dipropionate<br>Amcinonide<br>Beclometasone<br>Betamethasone<br>Clobetasol<br>Desonide<br>Desoximetasone<br>Dexamethasone<br>Diflorasone diacetate<br>Difluprednate<br>Fluocinolone<br>Flurandrenolide<br>Fluticasone<br>Halcinonide<br>Halobetasol propionate<br>Hydrocortisone<br>Mometasone furoate<br>Prednicarbate<br>Triamcinolone |
|  | <i>Topical vitamin A derivative</i><br>Tazarotene  |
|  | <i>Topical vitamin D derivative</i><br>Calcipotriene<br>Calcitriol   |
|  | <i>Other topical agent</i><br>Anthralin<br>Coal tar<br>Soybean oil<br>Tacrolimus   |
|  | <b>Oral agents</b>   |
| <i>Janus kinase inhibitor</i><br>Tofacitinib   |  |
| <i>Oral immunosuppressive</i><br>Cyclosporine<br>Mycophenolate mofetil                                 |  |
| <i>Oral steroid</i><br>Budesonide<br>Dexamethasone<br>Methylprednisolone<br>Prednisolone<br>Prednisone |  |
| <i>Phosphodiesterase-4 inhibitor</i><br>Apremilast   |  |
| <i>Oral vitamin A derivative</i><br>Acitretin<br>Isotretinoin  |  |
| <i>Oral vitamin B derivative</i><br>Biotin   |  |

| Treatment Category     | Drug Class and Ingredient  |
|------------------------|--|
| <b>Biologic agents</b> | <i>Other oral agent</i><br>Dimethyl fumarate<br>Etretinate<br>Hydroxyurea<br>Thioguanine   |
|                        | <i>Interleukin-12/Interleukin -23 inhibitor</i><br>Ustekinumab   |
|                        | <i>Interleukin-17A inhibitor</i><br>Brodalumab<br>Ixekizumab<br>Secukinumab  |
|                        | <i>Interleukin-23 inhibitor</i><br>Guselkumab<br>Risankizumab<br>Tildrakizumab   |
|                        | <i>Tumor necrosis factor inhibitor</i><br>Adalimumab<br>Certolizumab pegol<br>Etanercept<br>Golimumab<br>Infliximab                            |
| <b>Phototherapy</b>    | <i>Other biologic agent</i><br>Abatacept<br>Rituximab  |
|                        | <i>Excimer laser</i><br><i>Psoralen and long-wave ultraviolet (UV) radiation (PUVA)</i><br><i>UV light B</i><br><i>UV therapy, unspecified</i> |

**eTable 2. Treatment History by Drug Class Among Patients With PPP, Stratified by Plaque PsO Comorbidity and Database**

| Medication History n (%) <sup>a</sup>            | US MarketScan         |                                |                                      | German Disease Analyzer |                                |                                      |
|--|-----------------------|--------------------------------|--------------------------------------|-------------------------|--------------------------------|--------------------------------------|
|  | All Patients With PPP | Patients With PPP & Plaque PsO | Patients With PPP Without Plaque PsO | All Patients With PPP   | Patients With PPP & Plaque PsO | Patients With PPP Without Plaque PsO |
| <b>Topical agents</b>                            | 1,037 (63.7)          | 306 (78.1)                     | 731 (59.1)                           | 1,334 (34.5)            | 356 (74.0)                     | 978 (28.9)                           |
| <i>Topical steroid</i>                           | 1,011 (62.1)          | 300 (76.5)                     | 711 (57.5)                           | 1,273 (32.9)            | 340 (70.7)                     | 933 (27.6)                           |
| <i>Topical vitamin A derivative (tazarotene)</i> | 28 (1.7)              | 14 (3.6)                       | 14 (1.1)                             | <1%                     | -                              | <1%                                  |
| <i>Topical vitamin D derivative</i>              | 206 (12.6)            | 95 (24.2)                      | 111 (9.0)                            | 875 (22.6)              | 290 (60.3)                     | 585 (17.3)                           |
| <i>Other topical agent</i>                       | 44 (2.7)              | 13 (3.3)                       | 31 (2.5)                             | 71 (1.8)                | 13 (2.7)                       | 58 (1.7)                             |
| <b>Oral agents</b>                               | 777 (47.7)            | 219 (55.9)                     | 558 (45.1)                           | 481 (12.4)              | 121 (25.2)                     | 360 (10.6)                           |
| <i>DMARD</i>                                     | 181 (11.1)            | 66 (16.8)                      | 115 (9.3)                            | 148 (3.8)               | 48 (10.0)                      | 100 (3.0)                            |
| <i>JAK inhibitor (tofacitinib)</i>               | <1%                   | <1%                            | <1%                                  | <1%                     | -                              | <1%                                  |
| <i>Oral immunosuppressive</i>                    | 34 (2.1)              | 20 (5.1)                       | 14 (1.1)                             | <1%                     | <1%                            | <1%                                  |
| <i>Oral steroid</i>                              | 555 (34.1)            | 126 (32.1)                     | 429 (34.7)                           | 245 (6.3)               | 33 (6.9)                       | 212 (6.3)                            |
| <i>Oral vitamin A derivative</i>                 | 101 (6.2)             | 47 (12.0)                      | 54 (4.4)                             | 86 (2.2)                | 23 (4.8)                       | 63 (1.9)                             |
| <i>Oral vitamin B derivative (biotin)</i>        | -                     | -                              | -                                    | <1%                     | <1%                            | <1%                                  |
| <i>PDE4 inhibitor (apremilast)</i>               | 98 (6.0)              | 40 (10.2)                      | 58 (4.7)                             | <1%                     | 6 (1.2)                        | <1%                                  |
| <i>Other oral agent</i>                          | <1%                   | <1%                            | <1%                                  | <1%                     | 20 (4.2)                       | <1%                                  |
| <b>Biologic agents</b>                           | 284 (17.4)            | 126 (32.1)                     | 158 (12.8)                           | 81 (2.1)                | 35 (7.3)                       | 46 (1.4)                             |
| <i>IL-12/IL-23 inhibitor (ustekinumab)</i>       | 47 (2.9)              | 28 (7.1)                       | 19 (1.5)                             | <1%                     | 5 (1.0)                        | <1%                                  |
| <i>IL-17A inhibitor</i>                          | 58 (3.6)              | 34 (8.7)                       | 24 (1.9)                             | <1%                     | 18 (3.7)                       | <1%                                  |
| <i>IL-23 inhibitor</i>                           | <1%                   | 4 (1.0)                        | <1%                                  | <1%                     | <1%                            | -                                    |
| <i>TNF inhibitor</i>                             | 210 (12.9)            | 88 (22.4)                      | 122 (9.9)                            | 47 (1.2)                | 14 (2.9)                       | 33 (1.0)                             |
| <i>Other biologic agent</i>                      | <1%                   | <1%                            | <1%                                  | <1%                     | -                              | <1%                                  |
| <b>Phototherapy</b>                              | 81 (5.0)              | 50 (12.8)                      | 31 (2.5)                             | -                       | -                              | -                                    |
| <i>Excimer laser</i>                             | 36 (2.2)              | 25 (6.4)                       | <1%                                  | -                       | -                              | -                                    |
| <i>PUVA</i>                                      | <1%                   | 10 (2.6)                       | <1%                                  | -                       | -                              | -                                    |
| <i>UV light B</i>                                | 32 (2.0)              | 18 (4.6)                       | 14 (1.1)                             | -                       | -                              | -                                    |

| Medication History<br>n (%) <sup>a</sup> | US MarketScan         |                                |                                      | German Disease Analyzer |                                |                                      |
|--|-----------------------|--------------------------------|--------------------------------------|-------------------------|--------------------------------|--------------------------------------|
|  | All Patients With PPP | Patients With PPP & Plaque PsO | Patients With PPP Without Plaque PsO | All Patients With PPP   | Patients With PPP & Plaque PsO | Patients With PPP Without Plaque PsO |
| <i>UV therapy, unspecified</i>           | 19 (1.2)              | 11 (2.8)                       | <1%                                  | -                       | -                              | -                                    |

Abbreviations: PPP, palmoplantar pustulosis; PsO, plaque psoriasis; DMARD, disease-modifying anti-rheumatic drugs; PDE4, phosphodiesterase-4; JAK, janus kinase; TNF, tumor necrosis factor; IL, interleukin; UV, ultraviolet; PUVA, psoralen and long-wave ultraviolet radiation.

<sup>a</sup>Patient numbers are excluded if the proportion is <1%.

**eTable 3. Treatment Patterns Among Patients With PPP in the US MarketScan Database, Stratified by Plaque PsO Comorbidity and Drug Class**

| List of Treatments                               | N     | Treatment Length <sup>a</sup> (Days) |        | Treatment Pattern, <sup>a,b</sup> n (%) |                 |                 |               |            |                     |
|--|-------|--------------------------------------|--------|---|-----------------|-----------------|---------------|------------|---------------------|
|  |       | Mean (SD)                            | Median | Adherence                               | Non-persistence | Discontinuation | Re-initiation | Switching  | Combination Therapy |
| <b>All PPP Patients</b>                          |       |                                      |        |   |                 |                 |               |            |                     |
| <b>Topical agents</b>                            | 1,261 | 117.4 (116.9)                        | 80.0   | 51 (4.0)                                | 1,047 (83.0)    | 491 (38.9)      | 556 (44.1)    | 624 (49.5) | 786 (62.3)          |
| <i>Topical steroid</i>                           | 1,234 | 108.3 (109.7)                        | 70.0   | 37 (3.0)                                | 1,037 (84.0)    | 489 (39.6)      | 548 (44.4)    | 673 (54.5) | 904 (73.3)          |
| <i>Topical vitamin D derivative</i>              | 399   | 81.9 (84.8)                          | 55.0   | 25 (6.3)                                | 342 (85.7)      | 231 (57.9)      | 111 (27.8)    | 280 (70.2) | 360 (90.2)          |
| <i>Topical vitamin A derivative (tazarotene)</i> | 100   | 59.1 (49.4)                          | 30.0   | 8 (8.0)                                 | 78 (78.0)       | 58 (58.0)       | 20 (20.0)     | 70 (70.0)  | 91 (91.0)           |
| <i>Other topical agent</i>                       | 75    | 63.1 (67.0)                          | 30.0   | 5 (6.7)                                 | 65 (86.7)       | 48 (64.0)       | 17 (22.7)     | 54 (72.0)  | 66 (88.0)           |
| <b>Oral agents</b>                               | 1,015 | 223.0 (266.1)                        | 126.0  | 289 (28.5)                              | 593 (58.4)      | 357 (35.2)      | 236 (23.3)    | 382 (37.6) | 665 (65.5)          |
| <i>Oral steroid</i>                              | 646   | 42.5 (89.5)                          | 14.5   | 19 (2.9)                                | 567 (87.8)      | 370 (57.3)      | 197 (30.5)    | 447 (69.2) | 463 (71.7)          |
| <i>DMARD</i>                                     | 316   | 248.1 (260.2)                        | 154.0  | 124 (39.2)                              | 147 (46.5)      | 115 (36.4)      | 32 (10.1)     | 117 (37.0) | 263 (83.2)          |
| <i>PDE4 inhibitor (apremilast)</i>               | 285   | 288.9 (272.4)                        | 189.0  | 130 (45.6)                              | 116 (40.7)      | 95 (33.3)       | 21 (7.4)      | 87 (30.5)  | 201 (70.5)          |
| <i>Oral vitamin A derivative</i>                 | 197   | 193.3 (195.6)                        | 137.0  | 46 (23.4)                               | 127 (64.5)      | 94 (47.7)       | 33 (16.8)     | 97 (49.2)  | 159 (80.7)          |
| <i>Oral immunosuppressive</i>                    | 54    | 198.3 (282.6)                        | 72.5   | 9 (16.7)                                | 38 (70.4)       | 29 (53.7)       | 9 (16.7)      | 35 (64.8)  | 50 (92.6)           |
| <i>JAK inhibitor (tofacitinib)</i>               | 19    | 277.7 (283.7)                        | 170.0  | 11 (57.9)                               | 5 (26.3)        | 5 (26.3)        | 0 (0.0)       | 4 (21.1)   | 16 (84.2)           |
| <i>Other oral agent</i>                          | 3     | 330.3 (303.9)                        | 229.0  | 2 (66.7)                                | 1 (33.3)        | 1 (33.3)        | 0 (0.0)       | 1 (33.3)   | 2 (66.7)            |

| List of Treatments                         | N   | Treatment Length <sup>a</sup> (Days) |        | Treatment Pattern, <sup>a,b</sup> n (%) |                 |                 |               |            |                     |
|--|-----|--------------------------------------|--------|---|-----------------|-----------------|---------------|------------|---------------------|
|  |     | Mean (SD)                            | Median | Adherence                               | Non-persistence | Discontinuation | Re-initiation | Switching  | Combination Therapy |
| <i>Oral vitamin B derivative (biotin)</i>  | 0   | -                                    | -      | -                                       | -               | -               | -             | -          | -                   |
| <b>Biologic agents</b>                     | 491 | 342.7 (291.5)                        | 280.0  | 256 (52.1)                              | 169 (34.5)      | 101 (20.6)      | 68 (13.9)     | 128 (26.1) | 401 (81.7)          |
| <i>TNF inhibitor</i>                       | 275 | 293.7 (288.8)                        | 184.0  | 131 (47.6)                              | 120 (43.6)      | 101 (36.7)      | 19 (6.9)      | 101 (36.7) | 236 (85.8)          |
| <i>IL-17A inhibitor</i>                    | 185 | 250.2 (223.0)                        | 189.0  | 80 (43.2)                               | 76 (41.3)       | 63 (34.1)       | 13 (7.0)      | 67 (36.2)  | 158 (85.4)          |
| <i>IL-23 inhibitor</i>                     | 96  | 184.3 (155.9)                        | 131.5  | 46 (47.9)                               | 36 (37.5)       | 24 (25.0)       | 12 (12.5)     | 26 (27.1)  | 64 (66.7)           |
| <i>IL-12/IL-23 inhibitor (ustekinumab)</i> | 88  | 220.3 (187.4)                        | 175.0  | 31 (35.2)                               | 50 (56.8)       | 31 (35.2)       | 19 (21.6)     | 44 (50.0)  | 69 (78.4)           |
| <i>Other biologic agent</i>                | 19  | 281.4 (264.6)                        | 237.0  | 7 (36.8)                                | 9 (47.4)        | 8 (42.1)        | 1 (5.3)       | 8 (42.1)   | 15 (79.0)           |
| <b>Phototherapy</b>                        | 186 | 180.5 (151.6)                        | 128.5  | 53 (28.5)                               | 127 (68.3)      | 119 (64.0)      | 8 (4.3)       | 94 (50.5)  | 153 (82.3)          |
| <i>Excimer laser</i>                       | 74  | 175.9 (140.4)                        | 127.5  | 20 (27.0)                               | 53 (71.6)       | 50 (67.6)       | 3 (4.1)       | 42 (56.8)  | 62 (83.8)           |
| <i>UV light B</i>                          | 64  | 177.8 (179.6)                        | 102.5  | 17 (26.6)                               | 45 (70.3)       | 41 (64.1)       | 4 (6.3)       | 30 (46.9)  | 53 (82.8)           |
| <i>UV therapy, unspecified</i>             | 44  | 135.2 (103.5)                        | 97.5   | 14 (31.8)                               | 28 (63.6)       | 27 (61.4)       | 1 (2.3)       | 21 (47.7)  | 40 (90.9)           |
| <i>PUVA</i>                                | 33  | 167.9 (99.0)                         | 151.0  | 9 (27.3)                                | 22 (66.7)       | 21 (63.6)       | 1 (3.0)       | 18 (54.6)  | 28 (84.9)           |
| <b>PPP Patients <u>With</u> Plaque PsO</b> |     |                                      |        |   |                 |                 |               |            |                     |
| <b>Topical agents</b>                      | 315 | 124.8 (122.2)                        | 85.0   | 18 (5.7)                                | 247 (78.4)      | 105 (33.3)      | 142 (45.1)    | 175 (55.6) | 229 (72.7)          |
| <i>Topical steroid</i>                     | 312 | 116.7 (118.1)                        | 82.5   | 16 (5.1)                                | 246 (78.9)      | 108 (34.6)      | 138 (44.2)    | 181 (58.0) | 254 (81.4)          |
| <i>Topical vitamin D derivative</i>        | 99  | 78.4 (69.9)                          | 60.0   | 4 (4.0)                                 | 86 (86.9)       | 57 (57.6)       | 29 (29.3)     | 72 (72.7)  | 93 (93.9)           |

| List of Treatments                               | N   | Treatment Length <sup>a</sup> (Days) |        | Treatment Pattern, <sup>a,b</sup> n (%) |                 |                 |               |            |                     |
|--|-----|--------------------------------------|--------|---|-----------------|-----------------|---------------|------------|---------------------|
|  |     | Mean (SD)                            | Median | Adherence                               | Non-persistence | Discontinuation | Re-initiation | Switching  | Combination Therapy |
| <i>Topical vitamin A derivative (tazarotene)</i> | 28  | 57.8 (51.5)                          | 32.0   | 4 (14.3)                                | 19 (67.9)       | 13 (46.4)       | 6 (21.4)      | 19 (67.9)  | 26 (92.9)           |
| <i>Other topical agent</i>                       | 19  | 51.1 (46.9)                          | 30.0   | 0 (0.0)                                 | 17 (89.5)       | 14 (73.7)       | 3 (15.8)      | 14 (73.7)  | 17 (89.5)           |
| <b>Oral agents</b>                               | 261 | 255.7 (265.0)                        | 170.0  | 95 (36.4)                               | 128 (49.0)      | 74 (28.4)       | 54 (20.7)     | 94 (36.0)  | 196 (75.1)          |
| <i>Oral steroid</i>                              | 137 | 39.7 (89.4)                          | 14.0   | 7 (5.1)                                 | 116 (84.7)      | 78 (56.9)       | 38 (27.7)     | 102 (74.5) | 108 (78.8)          |
| <i>DMARD</i>                                     | 88  | 268.4 (255.6)                        | 187.5  | 37 (42.1)                               | 38 (43.2)       | 27 (30.7)       | 11 (12.5)     | 30 (34.1)  | 77 (87.5)           |
| <i>PDE4 inhibitor (apremilast)</i>               | 79  | 282.3 (239.1)                        | 184.0  | 35 (44.3)                               | 31 (39.2)       | 25 (31.7)       | 6 (7.6)       | 23 (29.1)  | 60 (76.0)           |
| <i>Oral vitamin A derivative</i>                 | 58  | 238.5 (232.3)                        | 155.0  | 13 (22.4)                               | 34 (58.6)       | 24 (41.4)       | 10 (17.2)     | 28 (48.3)  | 48 (82.8)           |
| <i>Oral immunosuppressive</i>                    | 27  | 222.1 (272.8)                        | 109.0  | 6 (22.2)                                | 18 (66.7)       | 12 (44.4)       | 6 (22.2)      | 16 (59.3)  | 26 (96.3)           |
| <i>JAK inhibitor (tofacitinib)</i>               | 4   | 71.8 (52.4)                          | 72.5   | 2 (50.0)                                | 2 (50.0)        | 2 (50.0)        | 0 (0.0)       | 2 (50.0)   | 3 (75.0)            |
| <i>Oral vitamin B derivative (biotin)</i>        | 0   | -                                    | -      | -                                       | -               | -               | -             | -          | -                   |
| <i>Other oral agent</i>                          | 0   | -                                    | -      | -                                       | -               | -               | -             | -          | -                   |
| <b>Biologic agents</b>                           | 178 | 353.5 (295.2)                        | 323.0  | 84 (47.2)                               | 66 (37.1)       | 38 (21.4)       | 28 (15.7)     | 49 (27.5)  | 146 (82.0)          |
| <i>TNF inhibitor</i>                             | 93  | 283.8 (292.7)                        | 166.0  | 44 (47.3)                               | 43 (46.2)       | 36 (38.7)       | 7 (7.5)       | 37 (39.8)  | 81 (87.1)           |
| <i>IL-17A inhibitor</i>                          | 71  | 289.2 (244.0)                        | 234.0  | 31 (43.7)                               | 30 (42.3)       | 27 (38.0)       | 3 (4.2)       | 26 (36.6)  | 61 (85.9)           |
| <i>IL-23 inhibitor</i>                           | 45  | 166.0 (139.8)                        | 116.0  | 17 (37.8)                               | 18 (40.0)       | 10 (22.2)       | 8 (17.8)      | 11 (24.4)  | 31 (68.9)           |



| List of Treatments                               | N   | Treatment Length <sup>a</sup> (Days) |        | Treatment Pattern, <sup>a,b</sup> n (%) |                 |                 |               |            |                     |
|--|-----|--------------------------------------|--------|---|-----------------|-----------------|---------------|------------|---------------------|
|  |     | Mean (SD)                            | Median | Adherence                               | Non-persistence | Discontinuation | Re-initiation | Switching  | Combination Therapy |
| <i>IL-12/IL-23 inhibitor (ustekinumab)</i>       | 38  | 203.1 (186.2)                        | 118.5  | 13 (34.2)                               | 23 (60.5)       | 14 (36.8)       | 9 (23.7)      | 21 (55.3)  | 25 (65.8)           |
| <i>Other biologic agent</i>                      | 4   | 320.3 (284.6)                        | 221.5  | 2 (50.0)                                | 2 (50.0)        | 2 (50.0)        | 0 (0.0)       | 2 (50.0)   | 4 (100.0)           |
| <b>Phototherapy</b>                              | 61  | 210.4 (162.9)                        | 140.0  | 21 (34.4)                               | 39 (63.9)       | 37 (60.7)       | 2 (3.3)       | 31 (50.8)  | 55 (90.2)           |
| <i>UV light B</i>                                | 25  | 168.0 (141.8)                        | 91.0   | 7 (28.0)                                | 18 (72.0)       | 16 (64.0)       | 2 (8.0)       | 15 (60.0)  | 24 (96.0)           |
| <i>Excimer laser</i>                             | 23  | 223.6 (193.5)                        | 153.0  | 6 (26.1)                                | 17 (73.9)       | 17 (73.9)       | 0 (0.0)       | 12 (52.2)  | 20 (87.0)           |
| <i>PUVA</i>                                      | 13  | 215.9 (112.7)                        | 201.0  | 4 (30.8)                                | 8 (61.5)        | 7 (53.9)        | 1 (7.7)       | 7 (53.9)   | 13 (100.0)          |
| <i>UV therapy, unspecified</i>                   | 10  | 177.5 (129.1)                        | 105.5  | 5 (50.0)                                | 4 (40.0)        | 4 (40.0)        | 0 (0.0)       | 4 (40.0)   | 10 (100.0)          |
| <b>PPP Patients Without Plaque PsO</b>           |     |                                      |        |   |                 |                 |               |            |                     |
| <b>Topical agents</b>                            | 946 | 114.9 (115.0)                        | 74.0   | 33 (3.5)                                | 800 (84.6)      | 386 (40.8)      | 414 (43.8)    | 449 (47.5) | 557 (58.9)          |
| <i>Topical steroid</i>                           | 922 | 105.4 (106.7)                        | 64.0   | 21 (2.3)                                | 791 (85.8)      | 381 (41.3)      | 410 (44.5)    | 492 (53.4) | 650 (70.5)          |
| <i>Topical vitamin D derivative</i>              | 300 | 83.1 (89.3)                          | 53.5   | 21 (7.0)                                | 256 (85.3)      | 174 (58.0)      | 82 (27.3)     | 208 (69.3) | 267 (89.0)          |
| <i>Topical vitamin A derivative (tazarotene)</i> | 72  | 59.5 (49.0)                          | 30.0   | 4 (5.6)                                 | 59 (81.9)       | 45 (62.5)       | 14 (19.4)     | 51 (70.8)  | 65 (90.3)           |
| <i>Other topical agent</i>                       | 56  | 67.2 (72.5)                          | 30.0   | 5 (8.9)                                 | 48 (85.7)       | 34 (60.7)       | 14 (25.0)     | 40 (71.4)  | 49 (87.5)           |
| <b>Oral agents</b>                               | 754 | 211.7 (265.8)                        | 111.5  | 194 (25.7)                              | 465 (61.7)      | 283 (37.5)      | 182 (24.1)    | 288 (38.2) | 469 (62.2)          |
| <i>Oral steroid</i>                              | 509 | 43.3 (89.6)                          | 15.0   | 12 (2.4)                                | 451 (88.6)      | 292 (57.4)      | 159 (31.2)    | 345 (67.8) | 355 (69.7)          |

| List of Treatments                        | N   | Treatment Length <sup>a</sup> (Days) |        | Treatment Pattern, <sup>a,b</sup> n (%) |                 |                 |               |           |                     |
|---|-----|--------------------------------------|--------|---|-----------------|-----------------|---------------|-----------|---------------------|
|   |     | Mean (SD)                            | Median | Adherence                               | Non-persistence | Discontinuation | Re-initiation | Switching | Combination Therapy |
| <i>DMARD</i>                              | 228 | 240.2 (262.2)                        | 145.5  | 87 (38.2)                               | 109 (47.8)      | 88 (38.6)       | 21 (9.2)      | 87 (38.2) | 186 (81.6)          |
| <i>PDE4 inhibitor (apremilast)</i>        | 206 | 291.4 (284.6)                        | 192.5  | 95 (46.1)                               | 85 (41.3)       | 70 (34.0)       | 15 (7.3)      | 64 (31.1) | 141 (68.5)          |
| <i>Oral vitamin A derivative</i>          | 139 | 174.4 (175.6)                        | 120.0  | 33 (23.7)                               | 93 (66.9)       | 70 (50.4)       | 23 (16.6)     | 69 (49.6) | 111 (79.9)          |
| <i>Oral immunosuppressive</i>             | 27  | 174.5 (295.4)                        | 70.0   | 3 (11.1)                                | 20 (74.1)       | 17 (63.0)       | 3 (11.1)      | 19 (70.4) | 24 (88.9)           |
| <i>JAK inhibitor (tofacitinib)</i>        | 15  | 332.7 (295.9)                        | 305.0  | 9 (60.0)                                | 3 (20.0)        | 3 (20.0)        | 0 (0.0)       | 2 (13.3)  | 13 (86.7)           |
| <i>Other oral agent</i>                   | 3   | 330.3 (303.9)                        | 229.0  | 2 (66.7)                                | 1 (33.3)        | 1 (33.3)        | 0 (0.0)       | 1 (33.3)  | 2 (66.7)            |
| <i>Oral vitamin B derivative (biotin)</i> | 0   | -                                    | -      | -                                       | -               | -               | -             | -         | -                   |
| <b>Biologic agents</b>                    | 313 | 336.6 (289.7)                        | 271.0  | 172 (55.0)                              | 103 (33.0)      | 63 (20.1)       | 40 (12.8)     | 79 (25.2) | 255 (81.5)          |
| <i>TNF inhibitor</i>                      | 182 | 298.8 (287.5)                        | 190.5  | 87 (47.8)                               | 77 (42.3)       | 65 (35.7)       | 12 (6.6)      | 64 (35.2) | 155 (85.2)          |
| <i>IL-17A inhibitor</i>                   | 114 | 225.8 (206.3)                        | 164.5  | 49 (43.0)                               | 46 (40.7)       | 36 (31.6)       | 10 (8.8)      | 41 (36.0) | 97 (85.1)           |
| <i>IL-23 inhibitor</i>                    | 51  | 200.5 (168.5)                        | 165.0  | 29 (56.9)                               | 18 (35.3)       | 14 (27.5)       | 4 (7.8)       | 15 (29.4) | 33 (64.7)           |
| <i>IL-12/23 inhibitor (ustekinumab)</i>   | 50  | 233.4 (189.1)                        | 186.5  | 18 (36.0)                               | 27 (54.0)       | 17 (34.0)       | 10 (20.0)     | 23 (46.0) | 44 (88.0)           |
| <i>Other biologic agent</i>               | 15  | 271.1 (268.6)                        | 237.0  | 5 (33.3)                                | 7 (46.7)        | 6 (40.0)        | 1 (6.7)       | 6 (40.0)  | 11 (73.3)           |
| <b>Phototherapy</b>                       | 125 | 165.8 (144.2)                        | 120.0  | 32 (25.6)                               | 88 (70.4)       | 82 (65.6)       | 6 (4.8)       | 63 (50.4) | 98 (78.4)           |
| <i>Excimer laser</i>                      | 51  | 154.4 (103.8)                        | 119.0  | 14 (27.5)                               | 36 (70.6)       | 33 (64.7)       | 3 (5.9)       | 30 (58.8) | 42 (82.4)           |

| List of Treatments             | N  | Treatment Length <sup>a</sup> (Days) |        | Treatment Pattern, <sup>a,b</sup> n (%) |                 |                 |               |           |                     |
|--------------------------------|----|--------------------------------------|--------|---|-----------------|-----------------|---------------|-----------|---------------------|
|                                |    | Mean (SD)                            | Median | Adherence                               | Non-persistence | Discontinuation | Re-initiation | Switching | Combination Therapy |
| <i>UV light B</i>              | 39 | 184.1 (201.7)                        | 109.0  | 10 (25.6)                               | 27 (69.2)       | 25 (64.1)       | 2 (5.1)       | 15 (38.5) | 29 (74.4)           |
| <i>UV therapy, unspecified</i> | 34 | 122.7 (93.3)                         | 97.5   | 9 (26.5)                                | 24 (70.6)       | 23 (67.7)       | 1 (2.9)       | 17 (50.0) | 30 (88.2)           |
| <i>PUVA</i>                    | 20 | 136.7 (76.6)                         | 121.5  | 5 (25.0)                                | 14 (70.0)       | 14 (70.0)       | 0 (0.0)       | 11 (55.0) | 15 (75.0)           |

Abbreviations: SD, standard deviation; PPP, palmoplantar pustulosis; PsO, psoriasis; DMARD, disease-modifying anti-rheumatic drugs; PDE4, phosphodiesterase-4; JAK, janus kinase; TNF, tumor necrosis factor; IL, interleukin; UV, ultraviolet; PUVA, psoralen and long-wave ultraviolet radiation.

<sup>a</sup>For the overall treatment categories (ie, topical, oral, biologic, phototherapy), any use of treatments within that category was considered as continuous treatment of that category. For example, if a patient switched from an oral steroid to a JAK inhibitor, that was considered as continued use of oral therapy.

<sup>b</sup>Treatment patterns assessed at 1 year after treatment initiation.

**eTable 4. Sensitivity Analyses of Treatment Patterns for Select Biologics With an 85-Day Allowable Gap, US MarketScan**

| List of Treatments                            | N  | Treatment Length (Days) |        | Treatment Pattern, <sup>a</sup> n (%) |                 |                 |               |           |                     |
|---|----|-------------------------|--------|---------------------------------------|-----------------|-----------------|---------------|-----------|---------------------|
|   |    | Mean (SD)               | Median | Adherence                             | Non-persistence | Discontinuation | Re-initiation | Switching | Combination Therapy |
| <b>All PPP Patients</b>                       |    |                         |        |                                       |                 |                 |               |           |                     |
| Ustekinumab                                   | 88 | 220.3<br>(187.4)        | 175.0  | 31 (35.2)                             | 38 (43.2)       | 31 (35.2)       | 7 (8.0)       | 34 (38.6) | 70 (79.6)           |
| Risankizumab                                  | 46 | 174.5<br>(130.2)        | 121.5  | 24 (52.2)                             | 10 (21.7)       | 10 (21.7)       | 0 (0.0)       | 9 (19.6)  | 34 (73.9)           |
| Tildrakizumab                                 | 3  | 151.0<br>(89.8)         | 116    | 2 (66.7)                              | 1 (33.3)        | 1 (33.3)        | 0 (0.0)       | 1 (33.3)  | 2 (66.7)            |
| <b>PPP Patients <u>With</u> Plaque PsO</b>    |    |                         |        |                                       |                 |                 |               |           |                     |
| Ustekinumab                                   | 38 | 203.1<br>(186.2)        | 118.5  | 13 (34.2)                             | 23 (60.5)       | 14 (36.8)       | 4 (10.5)      | 17 (44.7) | 26 (68.4)           |
| Risankizumab                                  | 19 | 145.1<br>(109.6)        | 108.0  | 9 (47.4)                              | 7 (36.8)        | 3 (15.8)        | 0 (0.0)       | 2 (10.5)  | 15 (79.0)           |
| Tildrakizumab                                 | 2  | 184.5<br>(96.9)         | 184.5  | 2 (100.0)                             | 0 (0.0)         | 0 (0.0)         | 0 (0.0)       | 0 (0.0)   | 1 (50.0)            |
| <b>PPP Patients <u>Without</u> Plaque PsO</b> |    |                         |        |                                       |                 |                 |               |           |                     |
| Ustekinumab                                   | 50 | 233.4<br>(189.1)        | 186.5  | 18 (36.0)                             | 27 (54.0)       | 17 (34.0)       | 3 (6.0)       | 17 (34.0) | 44 (88.0)           |
| Risankizumab                                  | 27 | 195.2<br>(141.2)        | 174.0  | 15 (55.6)                             | 10 (37.0)       | 7 (25.9)        | 0 (0.0)       | 7 (25.9)  | 19 (70.4)           |
| Tildrakizumab                                 | 1  | 84.0<br>(0.0)           | 84.0   | 0 (0.0)                               | 1 (100.0)       | 1 (100.0)       | 0 (0.0)       | 1 (100.0) | 1 (100.0)           |

Abbreviations: SD, standard deviation; PPP, palmoplantar pustulosis; PsO, psoriasis.

<sup>a</sup>Treatment measures assessed at 1 year after treatment initiation.

**eTable 5. Treatment Patterns Among Patients With PPP in the German Disease Analyzer, Stratified by Plaque PsO Comorbidity and Drug Class**

| List of Treatments                               | N     | Treatment Length <sup>a</sup> (Days) |        | Treatment Pattern, <sup>a,b</sup> n (%) |                 |                 |               |            |                     |
|--|-------|--------------------------------------|--------|---|-----------------|-----------------|---------------|------------|---------------------|
|  |       | Mean (SD)                            | Median | Adherence                               | Non-persistence | Discontinuation | Re-initiation | Switching  | Combination Therapy |
| <b>All PPP Patients</b>                          |       |                                      |        |   |                 |                 |               |            |                     |
| <b>Topical agents</b>                            | 2,524 | 133.1 (134.7)                        | 120    | 492 (19.5)                              | 1,590 (63.0)    | 960 (38.0)      | 630 (25.0)    | 289 (11.5) | 488 (19.3)          |
| <i>Topical steroid</i>                           | 2,439 | 128.6 (131.8)                        | 120    | 473 (19.4)                              | 1,541 (63.2)    | 949 (38.9)      | 592 (24.3)    | 348 (14.3) | 1,835 (75.2)        |
| <i>Topical vitamin D derivative</i>              | 1,854 | 119.3 (117.5)                        | 120    | 355 (19.1)                              | 1,195 (64.5)    | 776 (41.9)      | 419 (22.6)    | 399 (21.5) | 1,774 (95.7)        |
| <i>Other topical agent</i>                       | 129   | 117.8 (97.0)                         | 120    | 13 (10.1)                               | 97 (75.2)       | 68 (52.7)       | 29 (22.5)     | 49 (38.0)  | 83 (64.3)           |
| <i>Topical vitamin A derivative (tazarotene)</i> | 2     | 75.0 (63.6)                          | 75     | 1 (50.0)                                | 1 (50.0)        | 1 (50.0)        | 0 (0.0)       | 1 (50.0)   | 0 (0.0)             |
| <b>Oral agents</b>                               | 910   | 273.0 (324.9)                        | 144.5  | 263 (28.9)                              | 475 (52.2)      | 367 (40.3)      | 108 (11.9)    | 219 (24.1) | 545 (59.9)          |
| <i>Oral steroid</i>                              | 421   | 148.3 (224.1)                        | 100    | 77 (18.3)                               | 290 (68.9)      | 240 (57.0)      | 50 (11.9)     | 158 (37.5) | 280 (66.5)          |
| <i>DMARD</i>                                     | 261   | 364.1 (355.5)                        | 244    | 82 (31.4)                               | 92 (35.2)       | 75 (28.7)       | 17 (6.5)      | 49 (18.8)  | 176 (67.4)          |
| <i>Oral vitamin A derivative</i>                 | 210   | 264.1 (319.1)                        | 140    | 70 (33.3)                               | 107 (51.0)      | 87 (41.4)       | 20 (9.5)      | 58 (27.6)  | 140 (66.7)          |
| <i>Other oral agent</i>                          | 81    | 283.6 (298.4)                        | 180    | 35 (43.2)                               | 38 (46.9)       | 27 (33.3)       | 11 (13.6)     | 23 (28.4)  | 56 (69.1)           |
| <i>PDE4 inhibitor (apremilast)</i>               | 60    | 351.9 (365.0)                        | 212.5  | 28 (46.7)                               | 25 (41.7)       | 20 (33.3)       | 5 (8.3)       | 15 (25.0)  | 42 (70.0)           |
| <i>Oral vitamin B derivative (biotin)</i>        | 25    | 149.3 (77.3)                         | 161    | 0 (0.0)                                 | 23 (92.0)       | 23 (92.0)       | 0 (0.0)       | 16 (64.0)  | 21 (84.0)           |
| <i>Oral immunosuppressive</i>                    | 23    | 368.2 (364.1)                        | 233    | 5 (21.7)                                | 11 (47.8)       | 11 (47.8)       | 0 (0.0)       | 9 (39.1)   | 20 (87.0)           |

| List of Treatments                         | N   | Treatment Length <sup>a</sup> (Days) |        | Treatment Pattern, <sup>a,b</sup> n (%) |                 |                 |               |           |                     |
|--|-----|--------------------------------------|--------|---|-----------------|-----------------|---------------|-----------|---------------------|
|  |     | Mean (SD)                            | Median | Adherence                               | Non-persistence | Discontinuation | Re-initiation | Switching | Combination Therapy |
| <i>JAK inhibitor (tofacitinib)</i>         | 4   | 284.0 (280.5)                        | 236    | 2 (50.0)                                | 2 (50.0)        | 2 (50.0)        | 0 (0.0)       | 2 (50.0)  | 4 (100.0)           |
| <b>Biologic agents</b>                     | 148 | 422.1 (392.6)                        | 278.5  | 66 (44.6)                               | 43 (29.1)       | 24 (16.2)       | 19 (12.8)     | 22 (14.9) | 112 (75.7)          |
| <i>IL-17A inhibitor</i>                    | 75  | 340.3 (344.2)                        | 196    | 30 (40.0)                               | 32 (42.7)       | 27 (36.0)       | 5 (6.7)       | 22 (29.3) | 62 (82.7)           |
| <i>TNF inhibitor</i>                       | 60  | 422.2 (418.3)                        | 272    | 28 (46.7)                               | 21 (35.0)       | 15 (25.0)       | 6 (10.0)      | 15 (25.0) | 48 (80.0)           |
| <i>IL-23 inhibitor</i>                     | 34  | 242.6 (214.2)                        | 185    | 6 (17.6)                                | 16 (47.1)       | 8 (23.5)        | 8 (23.5)      | 9 (26.5)  | 29 (85.3)           |
| <i>IL-12/IL-23 inhibitor (ustekinumab)</i> | 9   | 402.4 (315.2)                        | 387    | 8 (88.9)                                | 1 (11.1)        | 1 (11.1)        | 0 (0.0)       | 0 (0.0)   | 6 (66.7)            |
| <i>Other biologic agent</i>                | 4   | 332.8 (197.2)                        | 314.5  | 0 (0.0)                                 | 1 (25.0)        | 0 (0.0)         | 1 (25.0)      | 0 (0.0)   | 3 (75.0)            |
| <b>Phototherapy</b>                        | 0   | -                                    | -      | -                                       | -               | -               | -             | -         | -                   |
| <i>Excimer laser</i>                       | 0   | -                                    | -      | -                                       | -               | -               | -             | -         | -                   |
| <i>UV light B</i>                          | 0   | -                                    | -      | -                                       | -               | -               | -             | -         | -                   |
| <i>UV therapy, unspecified</i>             | 0   | -                                    | -      | -                                       | -               | -               | -             | -         | -                   |
| <i>PUVA</i>                                | 0   | -                                    | -      | -                                       | -               | -               | -             | -         | -                   |
| <b>PPP Patients <u>With</u> Plaque PsO</b> |     |                                      |        |   |                 |                 |               |           |                     |
| <b>Topical agents</b>                      | 348 | 156.4 (160.4)                        | 120    | 38 (10.9)                               | 235 (67.5)      | 121 (34.8)      | 114 (32.8)    | 69 (19.8) | 123 (35.3)          |
| <i>Topical steroid</i>                     | 338 | 145.5 (154.6)                        | 120    | 35 (10.4)                               | 235 (69.5)      | 123 (36.4)      | 112 (33.1)    | 82 (24.3) | 274 (81.1)          |
| <i>Topical vitamin D derivative</i>        | 273 | 139.6 (136.6)                        | 120    | 33 (12.1)                               | 183 (67.0)      | 99 (36.3)       | 84 (30.8)     | 85 (31.1) | 262 (96.0)          |

| List of Treatments                               | N   | Treatment Length <sup>a</sup> (Days) |        | Treatment Pattern, <sup>a,b</sup> n (%) |                 |                 |               |           |                     |
|--|-----|--------------------------------------|--------|---|-----------------|-----------------|---------------|-----------|---------------------|
|  |     | Mean (SD)                            | Median | Adherence                               | Non-persistence | Discontinuation | Re-initiation | Switching | Combination Therapy |
| <i>Other topical agent</i>                       | 25  | 137.2 (120.7)                        | 120    | 2 (8.0)                                 | 19 (76.0)       | 16 (64.0)       | 3 (12.0)      | 12 (48.0) | 18 (72.0)           |
| <i>Topical vitamin A derivative (tazarotene)</i> | 0   | -                                    | -      | -                                       | -               | -               | -             | -         | -                   |
| <b>Oral agents</b>                               | 179 | 376.1 (384.9)                        | 212    | 62 (34.6)                               | 77 (43.0)       | 61 (34.1)       | 16 (8.9)      | 44 (24.6) | 121 (67.6)          |
| <i>DMARD</i>                                     | 72  | 457.9 (422.2)                        | 350.5  | 23 (31.9)                               | 21 (29.2)       | 19 (26.4)       | 2 (2.8)       | 13 (18.1) | 53 (73.6)           |
| <i>Oral steroid</i>                              | 58  | 98.2 (144.3)                         | 64     | 7 (12.1)                                | 46 (79.3)       | 40 (69.0)       | 6 (10.3)      | 33 (56.9) | 44 (75.9)           |
| <i>Oral vitamin A derivative</i>                 | 37  | 313.3 (360.4)                        | 140    | 13 (35.1)                               | 20 (54.1)       | 16 (43.2)       | 4 (10.8)      | 13 (35.1) | 26 (70.3)           |
| <i>Other oral agent</i>                          | 26  | 299.8 (327.0)                        | 179    | 11 (42.3)                               | 13 (50.0)       | 8 (30.8)        | 5 (19.2)      | 8 (30.8)  | 20 (76.9)           |
| <i>PDE4 inhibitor (apremilast)</i>               | 23  | 436.1 (422.3)                        | 299    | 12 (52.2)                               | 8 (34.8)        | 6 (26.1)        | 2 (8.7)       | 7 (30.4)  | 18 (78.3)           |
| <i>Oral immunosuppressive</i>                    | 7   | 500.9 (451.6)                        | 272    | 1 (14.3)                                | 4 (57.1)        | 4 (57.1)        | 0 (0.0)       | 4 (57.1)  | 7 (100.0)           |
| <i>Oral vitamin B derivative (biotin)</i>        | 7   | 98.6 (68.4)                          | 76     | 0 (0.0)                                 | 7 (100.0)       | 7 (100.0)       | 0 (0.0)       | 7 (100.0) | 7 (100.0)           |
| <i>JAK inhibitor (tofacitinib)</i>               | 1   | 381.0 (-)                            | 381    | 1 (100.0)                               | 0 (0.0)         | 0 (0.0)         | 0 (0.0)       | 0 (0.0)   | 1 (100.0)           |
| <b>Biologic agents</b>                           | 56  | 372.6 (290.3)                        | 285.5  | 25 (44.6)                               | 16 (28.6)       | 9 (16.1)        | 7 (12.5)      | 7 (12.5)  | 47 (83.9)           |
| <i>IL-17A inhibitor</i>                          | 34  | 348.6 (307.8)                        | 234    | 16 (47.1)                               | 13 (38.2)       | 10 (29.4)       | 3 (8.8)       | 8 (23.5)  | 27 (79.4)           |
| <i>IL-23 inhibitor</i>                           | 19  | 259.1 (210.5)                        | 217    | 1 (5.3)                                 | 9 (47.4)        | 4 (21.1)        | 5 (26.3)      | 5 (26.3)  | 18 (94.7)           |
| <i>TNF inhibitor</i>                             | 14  | 279.3 (214.3)                        | 177    | 6 (42.9)                                | 7 (50.0)        | 6 (42.9)        | 1 (7.1)       | 6 (42.9)  | 14 (100.0)          |

| List of Treatments                               | N     | Treatment Length <sup>a</sup> (Days) |        | Treatment Pattern, <sup>a,b</sup> n (%) |                 |                 |               |            |                     |
|--|-------|--------------------------------------|--------|---|-----------------|-----------------|---------------|------------|---------------------|
|  |       | Mean (SD)                            | Median | Adherence                               | Non-persistence | Discontinuation | Re-initiation | Switching  | Combination Therapy |
| <i>IL-12/IL-23 inhibitor (ustekinumab)</i>       | 2     | 337.0 (70.7)                         | 337    | 2 (100.0)                               | 0 (0.0)         | 0 (0.0)         | 0 (0.0)       | 0 (0.0)    | 2 (100.0)           |
| <i>Other biologic agent</i>                      | 0     | -                                    | -      | -                                       | -               | -               | -             | -          | -                   |
| <b>Phototherapy</b>                              | 0     | -                                    | -      | -                                       | -               | -               | -             | -          | -                   |
| <i>Excimer laser</i>                             | 0     | -                                    | -      | -                                       | -               | -               | -             | -          | -                   |
| <i>UV light B</i>                                | 0     | -                                    | -      | -                                       | -               | -               | -             | -          | -                   |
| <i>UV therapy, unspecified</i>                   | 0     | -                                    | -      | -                                       | -               | -               | -             | -          | -                   |
| <i>PUVA</i>                                      | 0     | -                                    | -      | -                                       | -               | -               | -             | -          | -                   |
| <b>PPP Patients Without Plaque PsO</b>           |       |                                      |        |   |                 |                 |               |            |                     |
| <b>Topical agents</b>                            | 2,176 | 129.4 (129.7)                        | 120    | 454 (20.9)                              | 1,355 (62.3)    | 839 (38.6)      | 516 (23.7)    | 220 (10.1) | 365 (16.8)          |
| <i>Topical steroid</i>                           | 2,101 | 125.9 (127.5)                        | 120    | 438 (20.8)                              | 1,306 (62.2)    | 826 (39.3)      | 480 (22.8)    | 266 (12.7) | 1,561 (74.3)        |
| <i>Topical vitamin D derivative</i>              | 1,581 | 115.8 (113.5)                        | 120    | 322 (20.4)                              | 1,012 (64.0)    | 677 (42.8)      | 335 (21.2)    | 314 (19.9) | 1,512 (95.6)        |
| <i>Other topical agent</i>                       | 104   | 113.1 (90.5)                         | 120    | 11 (10.6)                               | 78 (75.0)       | 52 (50.0)       | 26 (25.0)     | 37 (35.6)  | 65 (62.5)           |
| <i>Topical vitamin A derivative (tazarotene)</i> | 2     | 75.0 (63.6)                          | 75     | 1 (50.0)                                | 1 (50.0)        | 1 (50.0)        | 0 (0.0)       | 1 (50.0)   | 0 (0.0)             |
| <b>Oral agents</b>                               | 731   | 247.8 (303.4)                        | 140    | 201 (27.5)                              | 398 (54.4)      | 306 (41.9)      | 92 (12.6)     | 175 (23.9) | 424 (58.0)          |
| <i>Oral steroid</i>                              | 363   | 156.3 (233.5)                        | 100    | 70 (19.3)                               | 244 (67.2)      | 200 (55.1)      | 44 (12.1)     | 125 (34.4) | 236 (65.0)          |



| List of Treatments                         | N   | Treatment Length <sup>a</sup> (Days) |        | Treatment Pattern, <sup>a,b</sup> n (%) |                 |                 |               |           |                     |
|--|-----|--------------------------------------|--------|---|-----------------|-----------------|---------------|-----------|---------------------|
|  |     | Mean (SD)                            | Median | Adherence                               | Non-persistence | Discontinuation | Re-initiation | Switching | Combination Therapy |
| <i>DMARD</i>                               | 189 | 328.3 (320.6)                        | 215    | 59 (31.2)                               | 71 (37.6)       | 56 (29.6)       | 15 (7.9)      | 36 (19.0) | 123 (65.1)          |
| <i>Oral vitamin A derivative</i>           | 173 | 253.6 (309.7)                        | 140    | 57 (32.9)                               | 87 (50.3)       | 71 (41.0)       | 16 (9.2)      | 45 (26.0) | 114 (65.9)          |
| <i>Other oral agent</i>                    | 55  | 275.9 (286.7)                        | 180    | 24 (43.6)                               | 25 (45.5)       | 19 (34.5)       | 6 (10.9)      | 15 (27.3) | 36 (65.5)           |
| <i>PDE4 inhibitor (apremilast)</i>         | 37  | 299.6 (319.5)                        | 202    | 16 (43.2)                               | 17 (45.9)       | 14 (37.8)       | 3 (8.1)       | 8 (21.6)  | 24 (64.9)           |
| <i>Oral vitamin B derivative (biotin)</i>  | 18  | 169.0 (72.8)                         | 172.5  | 0 (0.0)                                 | 16 (88.9)       | 16 (88.9)       | 0 (0.0)       | 9 (50.0)  | 14 (77.8)           |
| <i>Oral immunosuppressive</i>              | 16  | 310.1 (317.8)                        | 205.5  | 4 (25.0)                                | 7 (43.8)        | 7 (43.8)        | 0 (0.0)       | 5 (31.3)  | 13 (81.3)           |
| <i>JAK inhibitor (tofacitinib)</i>         | 3   | 251.7 (334.3)                        | 91     | 1 (33.3)                                | 2 (66.7)        | 2 (66.7)        | 0 (0.0)       | 2 (66.7)  | 3 (100.0)           |
| <b>Biologic agents</b>                     | 92  | 452.2 (442.4)                        | 271    | 41 (44.6)                               | 27 (29.3)       | 15 (16.3)       | 12 (13.0)     | 15 (16.3) | 65 (70.7)           |
| <i>TNF inhibitor</i>                       | 46  | 465.7 (455.9)                        | 315    | 22 (47.8)                               | 14 (30.4)       | 9 (19.6)        | 5 (10.9)      | 9 (19.6)  | 34 (73.9)           |
| <i>IL-17A inhibitor</i>                    | 41  | 333.4 (375.5)                        | 182    | 14 (34.1)                               | 19 (46.3)       | 17 (41.5)       | 2 (4.9)       | 14 (34.1) | 35 (85.4)           |
| <i>IL-23 inhibitor</i>                     | 15  | 221.8 (224.2)                        | 166    | 5 (33.3)                                | 7 (46.7)        | 4 (26.7)        | 3 (20.0)      | 4 (26.7)  | 11 (73.3)           |
| <i>IL-12/IL-23 inhibitor (ustekinumab)</i> | 7   | 421.1 (360.3)                        | 444    | 6 (85.7)                                | 1 (14.3)        | 1 (14.3)        | 0 (0.0)       | 0 (0.0)   | 4 (57.1)            |
| <i>Other biologic agent</i>                | 4   | 332.8 (197.2)                        | 314.5  | 0 (0.0)                                 | 1 (25.0)        | 0 (0.0)         | 1 (25.0)      | 0 (0.0)   | 3 (75.0)            |
| <b>Phototherapy</b>                        | 0   | -                                    | -      | -                                       | -               | -               | -             | -         | -                   |
| <i>Excimer laser</i>                       | 0   | -                                    | -      | -                                       | -               | -               | -             | -         | -                   |
| <i>UV light B</i>                          | 0   | -                                    | -      | -                                       | -               | -               | -             | -         | -                   |
| <i>UV therapy, unspecified</i>             | 0   | -                                    | -      | -                                       | -               | -               | -             | -         | -                   |

| List of Treatments | N | Treatment Length <sup>a</sup> (Days) |        | Treatment Pattern, <sup>a,b</sup> n (%) |                 |                 |               |           |                     |
|--------------------|---|--------------------------------------|--------|---|-----------------|-----------------|---------------|-----------|---------------------|
|                    |   | Mean (SD)                            | Median | Adherence                               | Non-persistence | Discontinuation | Re-initiation | Switching | Combination Therapy |
| <i>PUVA</i>        | 0 | -                                    | -      | -                                       | -               | -               | -             | -         | -                   |

Abbreviations: SD, standard deviation; PPP, palmoplantar pustulosis; PsO, psoriasis; DMARD, disease-modifying anti-rheumatic drugs; PDE4, phosphodiesterase-4; JAK, janus kinase; TNF, tumor necrosis factor; IL, interleukin; UV, ultraviolet; PUVA, psoralen and long-wave ultraviolet radiation.

<sup>a</sup>For the overall treatment categories (ie, topical, oral, biologic, phototherapy), any use of treatments within that category was considered as continuous treatment of that category. For example, if a patient switched from an oral steroid to a JAK inhibitor, that was considered as continued use of oral therapy.

<sup>b</sup>Treatment measures assessed at 1 year after treatment initiation.

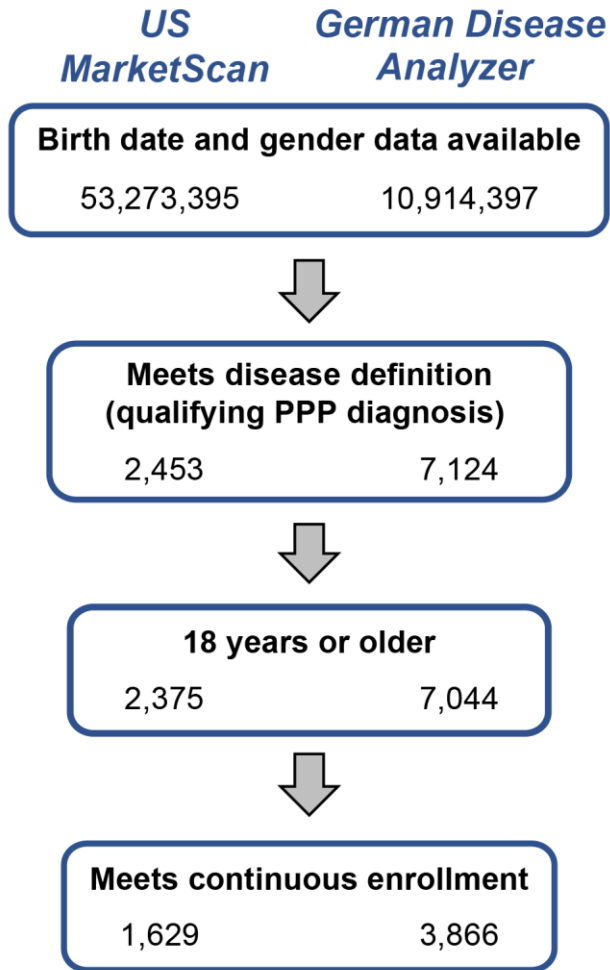
**eTable 6. Outcome Rates per 100 Person-Years Among Patients With PPP by Treatment Status, Stratified by Database**

| Outcome                             | Rate (95% CI)                                |  |   |   |
|-------------------------------------|--|--|---|---|
|                                     | Treatment-Naïve Without Treatment Post-index | Treatment-Experienced Without Treatment Post-index | Treatment-Naïve With Treatment Post-index | Treatment-Experienced With Treatment Post-index |
| <b>US MarketScan</b>                |  |  |   |   |
| Anxiety                             | 8.7 (3.9, 19.4)                              | 8.5 (3.5, 20.5)                                    | 5.5 (3.6, 8.4)                            | 9.2 (7.9, 10.7)                                 |
| Back pain                           | 7.2 (3.0, 17.4)                              | 10.1 (4.5, 22.5)                                   | 6.6 (4.5, 9.7)                            | 8.3 (7.1, 9.7)                                  |
| Cancer                              | 7.1 (3.0, 17.2)                              | 5.2 (1.7, 16.0)                                    | 2.1 (1.1, 4.1)                            | 3.2 (2.5, 4.1)                                  |
| Cough                               | 2.7 (0.7, 10.8)                              | 6.8 (2.6, 18.1)                                    | 2.4 (1.3, 4.5)                            | 3.1 (2.4, 4)                                    |
| Depression                          | 5.5 (2.1, 14.6)                              | 8.7 (3.6, 20.9)                                    | 5.5 (3.6, 8.4)                            | 7.5 (6.4, 8.8)                                  |
| Diarrhea                            | 0 (-)  | 1.6 (0.2, 11.4)                                    | 0.2 (0, 1.7)                              | 1.2 (0.8, 1.8)                                  |
| Fatigue                             | 0 (-)  | 0 (-)  | 0 (-)                                     | 0 (-)   |
| Folliculitis                        | 0 (-)  | 0 (-)  | 0 (-)                                     | 0.3 (0.1, 0.6)                                  |
| Gastroesophageal reflux disease     | 10.2 (4.9, 21.4)                             | 8.9 (3.7, 21.4)                                    | 4.5 (2.9, 7.2)                            | 5.7 (4.7, 6.9)                                  |
| Headache                            | 0 (-)  | 0 (-)  | 0.9 (0.4, 2.5)                            | 1.2 (0.8, 1.8)                                  |
| Hypersensitivity                    | 1.4 (0.2, 9.6)                               | 0 (-)  | 0.9 (0.4, 2.5)                            | 0.5 (0.3, 0.9)                                  |
| Infection                           | 90.0 (63.6, 127.2)                           | 39.2 (24.3, 63.0)                                  | 20.6 (16.2, 26.2)                         | 31.2 (28.4, 34.3)                               |
| Insomnia                            | 1.3 (0.2, 9.5)                               | 0 (-)  | 0.9 (0.4, 2.5)                            | 2.9 (2.2, 3.7)                                  |
| Major adverse cardiovascular events | 5.6 (2.1, 14.8)                              | 8.3 (3.5, 20.0)                                    | 2.6 (1.5, 4.7)                            | 2.1 (1.5, 2.8)                                  |
| Migraine                            | 0 (-)  | 1.6 (0.2, 11.5)                                    | 1.2 (0.5, 2.8)                            | 2.1 (1.6, 2.9)                                  |
| Nausea                              | 0 (-)  | 1.6 (0.2, 11.5)                                    | 1.2 (0.5, 2.8)                            | 1.6 (1.1, 2.2)                                  |
| Suicide behaviors                   | 0 (-)  | 0 (-)  | 0 (-)                                     | 0.1 (0, 0.3)                                    |
| Tachyarrhythmia                     | 0 (-)  | 0 (-)  | 0.5 (0.1, 1.9)                            | 0.4 (0.2, 0.8)                                  |
| Upper abdominal pain                | 0 (-)  | 0 (-)  | 0 (-)                                     | 0.2 (0.1, 0.5)                                  |
| Vasculitis                          | 0 (-)  | 1.6 (0.2, 11.4)                                    | 0 (-)                                     | 1.0 (0.7, 1.6)                                  |
| Vomiting                            | 0 (-)  | 3.3 (0.8, 13.1)                                    | 0.5 (0.1, 1.9)                            | 0.9 (0.5, 1.3)                                  |
| <b>German Disease Analyzer</b>      |  |  |   |   |
| Anxiety                             | 2.1 (1.4, 3.3)                               | 2.2 (1.0, 4.9)                                     | 1.0 (0.6, 1.5)                            | 0.8 (0.5, 1.3)                                  |
| Back pain                           | 4.3 (3.2, 5.9)                               | 3.8 (2.0, 7.0)                                     | 2.6 (2.0, 3.4)                            | 2.1 (1.6, 2.8)                                  |
| Cancer                              | 1.7 (1.1, 2.8)                               | 2.2 (1.0, 4.9)                                     | 1.0 (0.6, 1.5)                            | 0.7 (0.4, 1.1)                                  |
| Cough                               | 1.4 (0.8, 2.4)                               | 0.7 (0.2, 2.8)                                     | 0.9 (0.6, 1.4)                            | 0.7 (0.5, 1.1)                                  |
| Depression                          | 5.8 (4.4, 7.5)                               | 7.3 (4.7, 11.5)                                    | 3.6 (2.9, 4.5)                            | 3.4 (2.8, 4.2)                                  |
| Diarrhea                            | 0 (-)  | 0 (-)  | 0 (-)                                     | 0 (-)   |
| Fatigue                             | 2.0 (1.3, 3.1)                               | 1.8 (0.8, 4.3)                                     | 0.7 (0.5, 1.2)                            | 0.9 (0.6, 1.3)                                  |
| Folliculitis                        | 1.0 (0.5, 1.8)                               | 1.1 (0.3, 3.3)                                     | 1.3 (0.9, 1.8)                            | 1.5 (1.1, 2.0)                                  |

| Outcome                             | Rate (95% CI)                                |  |   |   |
|-------------------------------------|--|--|---|---|
|                                     | Treatment-Naïve Without Treatment Post-index | Treatment-Experienced Without Treatment Post-index | Treatment-Naïve With Treatment Post-index | Treatment-Experienced With Treatment Post-index |
| Gastroesophageal reflux disease     | 0.8 (0.4, 1.6)                               | 0.7 (0.2, 2.8)                                     | 0.7 (0.4, 1.1)                            | 0.6 (0.4, 1.0)                                  |
| Headache                            | 1.4 (0.8, 2.4)                               | 2.6 (1.2, 5.4)                                     | 0.8 (0.5, 1.3)                            | 0.3 (0.1, 0.6)                                  |
| Hypersensitivity                    | 2.0 (1.3, 3.1)                               | 1.8 (0.8, 4.4)                                     | 2.4 (1.8, 3.1)                            | 1.7 (1.3, 2.3)                                  |
| Infection                           | 28.6 (25.0, 32.8)                            | 28.8 (22.3, 37.1)                                  | 21.0 (18.9, 23.3)                         | 17.8 (16.0, 19.7)                               |
| Insomnia                            | 0.9 (0.5, 1.7)                               | 0.7 (0.2, 2.8)                                     | 0.1 (0.0, 0.4)                            | 0.4 (0.3, 0.8)                                  |
| Major adverse cardiovascular events | 1.9 (1.2, 3.0)                               | 2.2 (1.0, 4.9)                                     | 1.3 (0.9, 1.9)                            | 0.9 (0.6, 1.4)                                  |
| Migraine                            | 0.4 (0.2, 1.1)                               | 0.7 (0.2, 2.8)                                     | 0.7 (0.5, 1.2)                            | 0.2 (0.1, 0.5)                                  |
| Nausea                              | 1.3 (0.8, 2.3)                               | 1.1 (0.3, 3.4)                                     | 0.5 (0.3, 0.9)                            | 0.5 (0.3, 0.9)                                  |
| Suicide behaviors                   | 0.4 (0.2, 1.1)                               | 0.7 (0.2, 2.9)                                     | 0.8 (0.5, 1.3)                            | 0.4 (0.2, 0.7)                                  |
| Tachyarrhythmia                     | 0.3 (0.1, 0.9)                               | 0.4 (0.0, 2.5)                                     | 0.1 (0.0, 0.3)                            | 0.1 (0.0, 0.3)                                  |
| Upper abdominal pain                | 0.6 (0.3, 1.3)                               | 1.1 (0.3, 3.3)                                     | 0.3 (0.2, 0.7)                            | 0.3 (0.1, 0.5)                                  |
| Vasculitis                          | 1.5 (0.9, 2.5)                               | 1.4 (0.5, 3.8)                                     | 1.5 (1.1, 2.1)                            | 1.7 (1.3, 2.3)                                  |
| Vomiting                            | 1.3 (0.8, 2.3)                               | 1.1 (0.3, 3.4)                                     | 0.5 (0.3, 0.9)                            | 0.5 (0.3, 0.9)                                  |

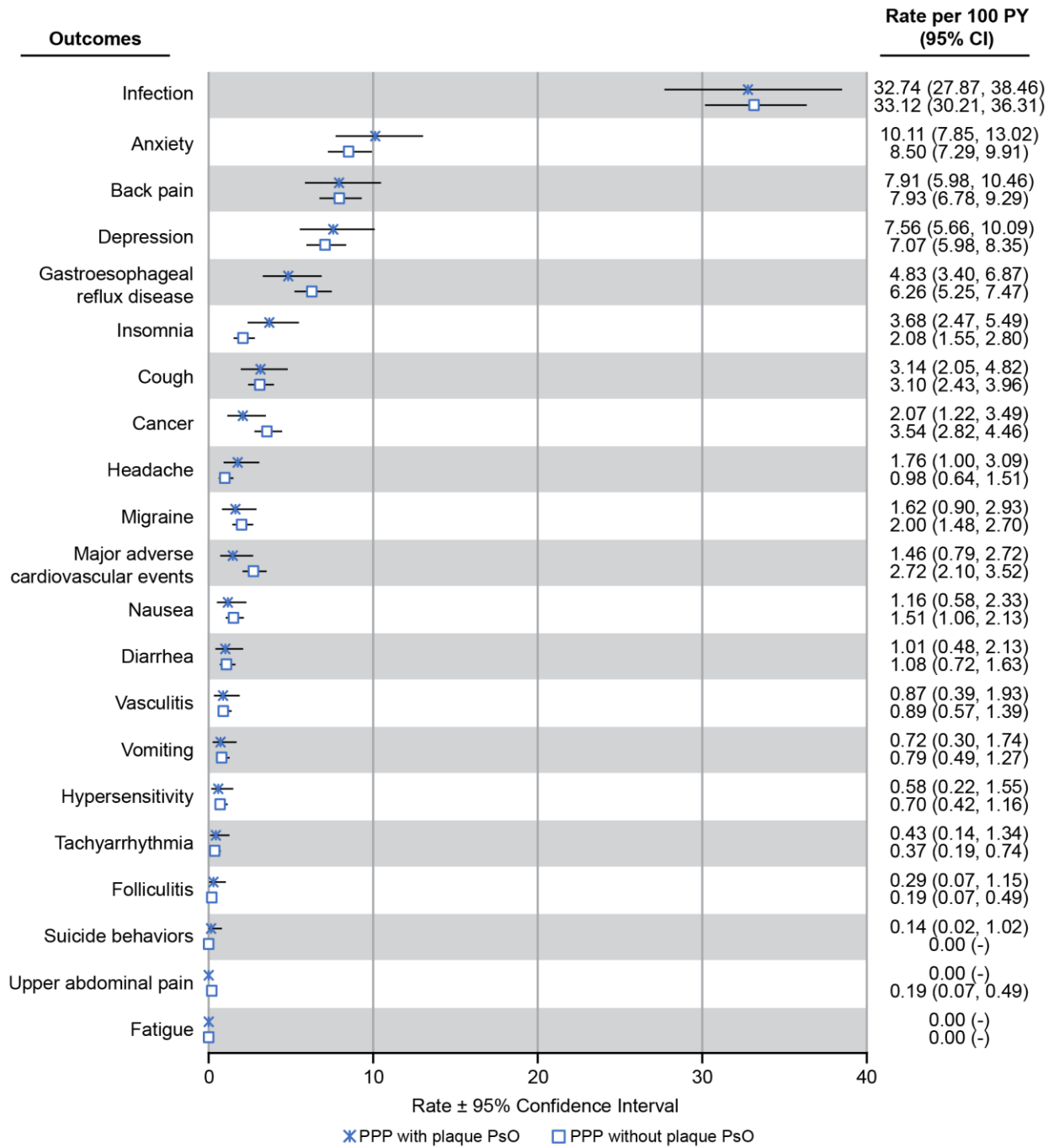
Abbreviations: CI, confidence interval.

eFigure 1. Cohort Attrition



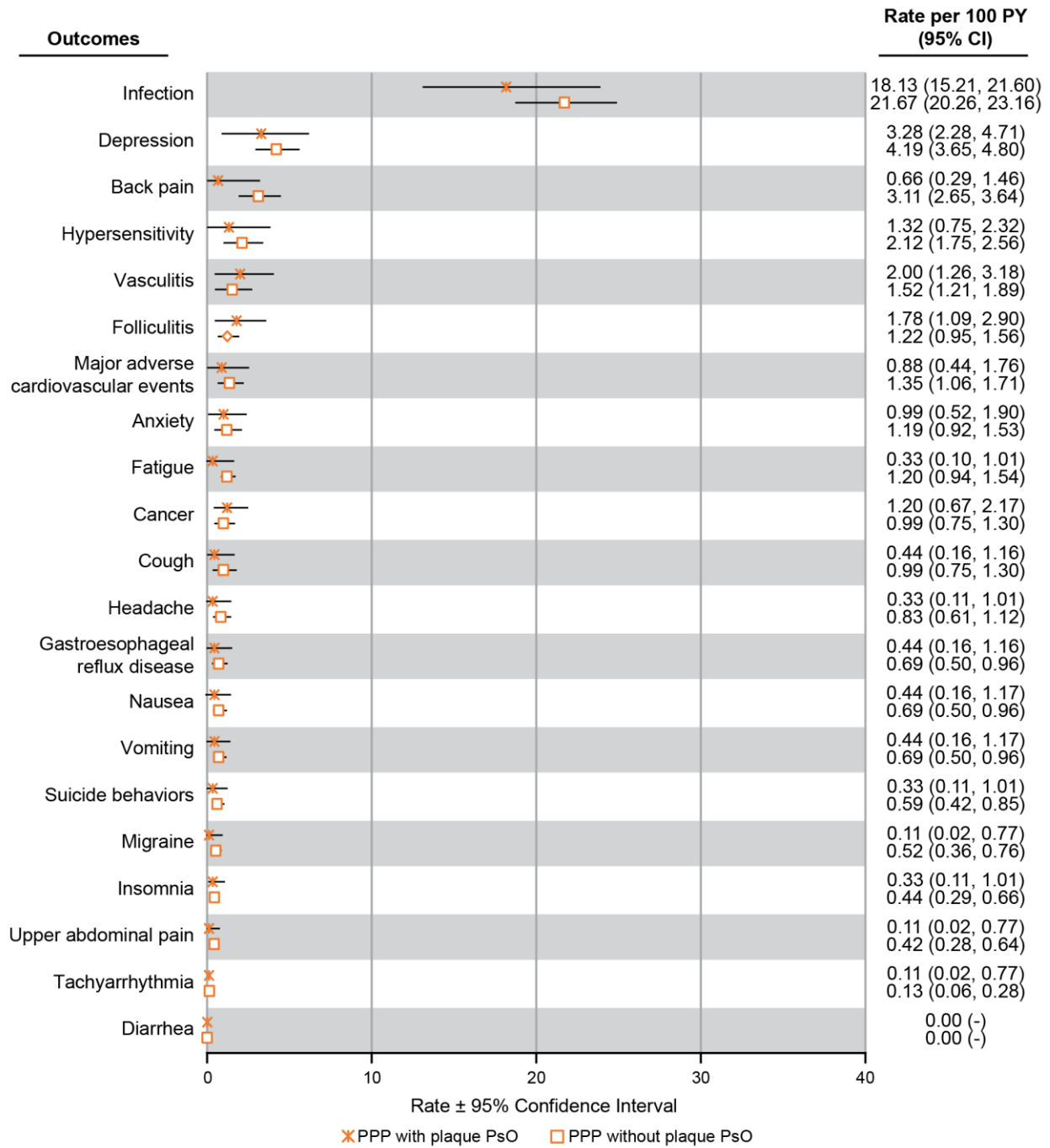
Abbreviations: PPP, palmoplantar pustulosis.

**eFigure 2. Negative Health Outcome Rates in the US MarketScan Database, Stratified by Plaque PsO Comorbidity**



Abbreviations: PY, person-years; CI, confidence interval; PPP, palmoplantar pustulosis; PsO, psoriasis.

**eFigure 3. Negative Health Outcome Rates in the German Disease Analyzer, Stratified by Plaque PsO Comorbidity**



Abbreviations: PY, person-years; CI, confidence interval; PPP, palmoplantar pustulosis; PsO, psoriasis.