### Appendix

Table 1. The summary statistics of the clinical characteristics and the demographics of the UWM patients with asthma during 2011-2017.

| Variable                          | Data instances tied to asthma hospital visits at the UWM in the successive 12 months \( (N=1,184), n \( \% \) |
|-----------------------------------|-----------------------------------------------------------------------------------------------------------------------------------|
|                                   | Data instances tied to no asthma hospital visit at the UWM in the successive 12 months \( (N=67,060), n \( \% \) |
|                                   | Data instances \( (N=68,244), n \( \% \) |
| Age (years)                       |                                                                                                                                  |
| <40                               | 466 (39.36)                                                                                                                      |
|                                   | 22,993 (34.29)                                                                                                                  |
|                                   | 23,459 (34.38)                                                                                                                  |
| 40 to 65                          | 583 (49.24)                                                                                                                      |
|                                   | 33,306 (49.67)                                                                                                                  |
|                                   | 33,889 (49.66)                                                                                                                  |
| 65+                               | 135 (11.40)                                                                                                                      |
|                                   | 10,761 (16.05)                                                                                                                  |
|                                   | 10,896 (15.97)                                                                                                                  |
| Gender                            |                                                                                                                                  |
| Male                              | 551 (46.54)                                                                                                                      |
|                                   | 23,647 (35.26)                                                                                                                  |
|                                   | 24,198 (35.46)                                                                                                                  |
| Female                            | 633 (53.46)                                                                                                                      |
|                                   | 43,413 (64.74)                                                                                                                  |
|                                   | 44,046 (64.54)                                                                                                                  |
| Race                              |                                                                                                                                  |
| White                             | 507 (42.82)                                                                                                                      |
|                                   | 47,240 (70.44)                                                                                                                  |
|                                   | 47,747 (69.97)                                                                                                                  |
| Black or African American         | 520 (43.92)                                                                                                                      |
|                                   | 7,900 (11.78)                                                                                                                    |
|                                   | 8,420 (12.34)                                                                                                                    |
| Asian                             | 96 (8.11)                                                                                                                         |
|                                   | 5,625 (8.39)                                                                                                                      |
|                                   | 5,721 (8.38)                                                                                                                      |
| American Indian or Alaska native | 32 (2.70)                                                                                                                         |
|                                   | 1,326 (1.98)                                                                                                                      |
|                                   | 1,358 (1.99)                                                                                                                      |
| Native Hawaiian or other Pacific islander | 14 (1.18)                                                                                              |
|                                   | 659 (0.98)                                                                                                                        |
|                                   | 673 (0.99)                                                                                                                        |
| Unknown or not reported           | 15 (1.27)                                                                                                                         |
|                                   | 4,310 (6.43)                                                                                                                      |
|                                   | 4,325 (6.34)                                                                                                                      |
| Ethnicity                         |                                                                                                                                  |
| Non-Hispanic                      | 1,062 (89.70)                                                                                                                    |
|                                   | 55,247 (82.38)                                                                                                                   |
|                                   | 56,309 (82.51)                                                                                                                   |
| Hispanic                          | 82 (6.93)                                                                                                                         |
|                                   | 3,444 (5.14)                                                                                                                      |
|                                   | 3,526 (5.17)                                                                                                                      |
| Unknown or not reported           | 40 (3.38)                                                                                                                         |
|                                   | 8,369 (12.48)                                                                                                                     |
|                                   | 8,409 (12.32)                                                                                                                     |
| Insurance                         |                                                                                                                                  |
| Private                           | 424 (35.81)                                                                                                                       |
|                                   | 39,585 (59.03)                                                                                                                   |
|                                   | 40,009 (58.63)                                                                                                                   |
| Public                            | 756 (63.85)                                                                                                                       |
|                                   | 28,031 (41.80)                                                                                                                   |
|                                   | 28,787 (42.18)                                                                                                                   |
| Self-paid or charity              | 65 (5.49)                                                                                                                         |
|                                   | 1,301 (1.94)                                                                                                                      |
|                                   | 1,366 (2.00)                                                                                                                      |
| Number of years since the first asthma-related visit in the UWM data set |                                                                                                                                  |
| ≤3                                | 986 (83.28)                                                                                                                       |
|                                   | 59,887 (89.30)                                                                                                                   |
|                                   | 60,873 (89.20)                                                                                                                   |
| >3                                | 198 (16.72)                                                                                                                       |
|                                   | 7,173 (10.70)                                                                                                                     |
|                                   | 7,371 (10.80)                                                                                                                     |
| Asthma medication prescription    |                                                                                                                                  |
| Short-acting inhaled beta-2 agonist | 1,010 (85.30)                                                                                           |
|                                   | 46,798 (69.79)                                                                                                                   |
|                                   | 47,808 (70.05)                                                                                                                   |
| Inhaled corticosteroid            | 626 (52.88)                                                                                                                       |
|                                   | 28,263 (42.15)                                                                                                                   |
|                                   | 28,889 (42.33)                                                                                                                   |
| Long-acting beta-2 agonist and inhaled corticosteroid combination | 499 (42.15)                                                                                           |
|                                   | 21,516 (32.08)                                                                                                                   |
|                                   | 22,015 (32.26)                                                                                                                   |
| Systemic corticosteroid           | 614 (51.86)                                                                                                                       |
|                                   | 18,085 (26.97)                                                                                                                   |
|                                   | 18,699 (27.40)                                                                                                                   |
| Long-acting beta-2 agonist        | 374 (31.59)                                                                                                                       |
|                                   | 11,919 (17.77)                                                                                                                   |
|                                   | 12,293 (18.01)                                                                                                                   |
| Leukotriene modifier              | 201 (16.98)                                                                                                                       |
|                                   | 7,970 (11.88)                                                                                                                     |
|                                   | 8,171 (11.97)                                                                                                                    |
| Mast cell stabilizer              | 4 (0.34)                                                                                                                         |
|                                   | 43 (0.06)                                                                                                                        |
|                                   | 47 (0.07)                                                                                                                        |
| Comorbidity                       |                                                                                                                                  |
| Anxiety or depression             | 372 (31.42)                                                                                                                       |
|                                   | 19,513 (29.10)                                                                                                                   |
|                                   | 19,885 (29.14)                                                                                                                   |
| Gastroesophageal reflux           | 238 (20.10)                                                                                                                       |
|                                   | 12,053 (17.97)                                                                                                                   |
|                                   | 12,291 (18.01)                                                                                                                   |
| Allergic rhinitis                 | 172 (14.53)                                                                                                                       |
|                                   | 11,277 (16.82)                                                                                                                   |
|                                   | 11,449 (16.78)                                                                                                                   |
| Obesity                           | 177 (14.95)                                                                                                                       |
|                                   | 7,668 (11.43)                                                                                                                     |
|                                   | 7,845 (11.50)                                                                                                                     |
| Sinusitis                         | 89 (7.52)                                                                                                                         |
|                                   | 7,172 (10.69)                                                                                                                     |
|                                   | 7,261 (10.64)                                                                                                                     |
| Sleep apnea                       | 88 (7.43)                                                                                                                         |
|                                   | 4,468 (6.66)                                                                                                                      |
|                                   | 4,556 (6.68)                                                                                                                      |
| Eczema                            | 66 (5.57)                                                                                                                         |
|                                   | 3,825 (5.70)                                                                                                                      |
|                                   | 3,891 (5.70)                                                                                                                      |
| Chronic obstructive pulmonary disease | 133 (11.23)                                                                                           |
|                                   | 3,693 (5.51)                                                                                                                     |
|                                   | 3,826 (5.61)                                                                                                                     |
| Cystic fibrosis                   | 1 (0.08)                                                                                                                         |
|                                   | 60 (0.09)                                                                                                                         |
|                                   | 61 (0.09)                                                                                                                         |
| Variable                          | Data instances tied to asthma hospital visits at the UWM in the successive 12 months (N=218), n (%) | Data instances tied to no asthma hospital visit at the UWM in the successive 12 months (N=14,426), n (%) | Data instances (N=14,644), n (%) |
|----------------------------------|---------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------|----------------------------------|
| Smoking status                   |                                                                                                   |                                                                                                   |                                  |
| Former smoker                    | 221 (18.67)                                                                                       | 15,309 (22.83)                                                                                   | 15,530 (22.76)                   |
| Current smoker                   | 255 (21.54)                                                                                       | 13,826 (20.62)                                                                                   | 14,081 (20.63)                   |
| Never smoker or unknown          | 708 (59.80)                                                                                       | 37,925 (56.55)                                                                                   | 38,633 (56.61)                   |
| Age (years)                      |                                                                                                   |                                                                                                   |                                  |
| <40                              | 77 (35.3)                                                                                         | 4,746 (32.90)                                                                                   | 4,823 (32.94)                    |
| 40 to 65                         | 111 (50.9)                                                                                        | 6,683 (46.33)                                                                                   | 6,794 (46.39)                    |
| 65+                              | 30 (13.8)                                                                                         | 2,997 (20.78)                                                                                   | 3,027 (20.67)                    |
| Gender                           |                                                                                                   |                                                                                                   |                                  |
| Male                             | 100 (45.9)                                                                                        | 5,138 (35.62)                                                                                   | 5,238 (35.77)                    |
| Female                           | 118 (54.1)                                                                                        | 9,288 (64.38)                                                                                   | 9,406 (64.23)                    |
| Race                             |                                                                                                   |                                                                                                   |                                  |
| White                            | 110 (50.5)                                                                                        | 10,103 (70.03)                                                                                  | 10,213 (69.74)                   |
| Black or African American        | 79 (36.2)                                                                                         | 1,491 (10.34)                                                                                   | 1,570 (10.72)                    |
| Asian                            | 18 (8.3)                                                                                          | 1,307 (9.06)                                                                                   | 1,325 (9.05)                     |
| American Indian or Alaska native | 8 (3.7)                                                                                            | 273 (1.89)                                                                                      | 281 (1.92)                       |
| Native Hawaiian or other Pacific islander | 2 (0.9)                                                                 | 129 (0.89)                                                                                      | 131 (0.89)                       |
| Unknown or not reported          | 1 (0.5)                                                                                            | 1,123 (7.78)                                                                                   | 1,124 (7.68)                     |
| Ethnicity                        |                                                                                                   |                                                                                                   |                                  |
| Non-Hispanic                     | 196 (89.9)                                                                                        | 12,370 (85.75)                                                                                  | 12,566 (85.81)                   |
| Hispanic                         | 20 (9.2)                                                                                          | 830 (5.75)                                                                                      | 850 (5.80)                       |
| Unknown or not reported          | 2 (0.9)                                                                                            | 1,226 (8.50)                                                                                   | 1,228 (8.39)                     |
| Insurance                        |                                                                                                   |                                                                                                   |                                  |
| Private                          | 108 (49.5)                                                                                        | 10,692 (74.12)                                                                                  | 10,800 (73.75)                   |
| Public                           | 182 (83.5)                                                                                        | 7,841 (54.35)                                                                                   | 8,023 (54.79)                    |
| Self-paid or charity             | 25 (11.5)                                                                                         | 459 (3.18)                                                                                      | 484 (3.31)                       |
| Number of years since the first asthma-related visit in the UWM data set       |                                                                                                   |                                                                                                   |                                  |
| ≤3                               | 124 (56.9)                                                                                        | 10,442 (72.38)                                                                                  | 10,566 (72.15)                   |
| >3                               | 94 (43.1)                                                                                         | 3,984 (27.62)                                                                                   | 4,078 (27.85)                    |
| Asthma medication prescription   |                                                                                                   |                                                                                                   |                                  |
| Short-acting inhaled beta-2 agonist | 164 (75.2)                                                                                        | 9,540 (66.13)                                                                                   | 9,704 (66.27)                    |
| Inhaled corticosteroid           | 108 (49.5)                                                                                        | 6,069 (42.07)                                                                                   | 6,177 (42.18)                    |
| Long-acting beta-2 agonist and inhaled corticosteroid combination               | 83 (38.1)                                                                                         | 4,425 (30.67)                                                                                   | 4,508 (30.78)                    |
| Systemic corticosteroid          | 120 (55.1)                                                                                        | 4,043 (28.03)                                                                                   | 4,163 (28.43)                    |
| Long-acting beta-2 agonist       | 62 (28.4)                                                                                         | 2,456 (17.02)                                                                                   | 2,518 (17.19)                    |
| Leukotriene modifier             | 46 (21.1)                                                                                         | 2,130 (14.77)                                                                                   | 2,176 (14.86)                    |
| Mast cell stabilizer             | 1 (0.5)                                                                                            | 13 (0.09)                                                                                       | 14 (0.10)                       |
| Comorbidity                      |                                                                                                   |                                                                                                   |                                  |
| Anxiety or depression            | 62 (28.4)                                                                                         | 4,284 (29.70)                                                                                   | 4,346 (29.68)                    |
| Gastroesophageal reflux          | 46 (21.1)                                                                                         | 2,611 (18.10)                                                                                   | 2,657 (18.14)                    |
| Allergic rhinitis                | 26 (11.9)                                                                                         | 2,069 (14.34)                                                                                   | 2,095 (14.31)                    |
| Obesity                          | 25 (11.5)                                                                                         | 1,579 (10.95)                                                                                   | 1,604 (10.95)                    |
| Sinusitis                        | 15 (6.9)                                                                                          | 1,357 (9.41)                                                                                   | 1,372 (9.37)                     |
| Condition                                | % (N)       | % (N)       | % (N)       |
|-----------------------------------------|-------------|-------------|-------------|
| Sleep apnea                             | 24 (11.0)   | 1,475 (10.22) | 1,499 (10.24) |
| Eczema                                  | 11 (5.1)    | 732 (5.07)  | 743 (5.07)  |
| Chronic obstructive pulmonary disease   | 30 (13.8)   | 902 (6.25)  | 932 (6.36)  |
| Cystic fibrosis                         | 0 (0.0)     | 17 (0.12)   | 17 (0.12)   |
| Bronchopulmonary dysplasia              | 0 (0.0)     | 4 (0.03)    | 4 (0.03)    |
| **Smoking status**                      |             |             |             |
| Former smoker                           | 41 (18.8)   | 3,453 (23.94) | 3,494 (23.86) |
| Current smoker                          | 49 (22.5)   | 3,193 (22.13) | 3,242 (22.14) |
| Never smoker or unknown                 | 128 (58.7)  | 7,780 (53.93) | 7,908 (54.00) |