SUPPLEMENTARY MATERIAL

Title: Validation of Patient Identification Algorithms for Atopic Dermatitis Using Healthcare Databases

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Supplementary Table 1: Frequency of medical conditions and dispensed drugs meriting exclusion in the Modified AD algorithm in the pediatric population

| Condition                                                                 | Diagnosis code | False negatives (N=34,042) | True negative (N=416,163) |
|---------------------------------------------------------------------------|----------------|-----------------------------|---------------------------|
| At least one diagnosis of at least one of the below conditions during the whole study period (1 July 2005 - 31 December 2018): |                | n (%)                        |                           |
| Seborrhoeic dermatitis                                                   | L21+           | 737 (2.2%)                  | 526 (0.1%)                |
| Diaper dermatitis                                                        | L22+           | 122 (0.4%)                  | 37 (0.0%)                 |
| Allergic contact dermatitis                                              | L23+           | 161 (0.5%)                  | 45 (0.0%)                 |
| Irritant contact dermatitis                                              | L24+           | 66 (0.2%)                   | 43 (0.0%)                 |
| Unspecified contact dermatitis                                           | L25+           | 125 (0.4%)                  | 44 (0.0%)                 |
| Exfoliative dermatitis                                                   | L26+           | 2 (0.0%)                    | 0 (0.0%)                  |
| Dermatitis due to substances taken internally                            | L27+           | 408 (1.2%)                  | 65 (0.0%)                 |
| Lichen simplex chronicus and prurigo”                                   | L28+           | 86 (0.3%)                   | 25 (0.0%)                 |
| Pruritus                                                                  | L29+           | 2126 (6.2%)                 | 1308 (0.3%)               |
| Other dermatitis                                                         | L30+           | 5429 (15.9%)                | 3114 (0.7%)               |
| Papulosquamous disorders                                                | L40-L45+       | 426 (1.3%)                  | 326 (0.1%)                |
| Other erythematous conditions                                            | L53+           | 297 (0.9%)                  | 189 (0.0%)                |
| Sunburn                                                                  | L55+           | 3 (0.0%)                    | 2 (0.0%)                  |
| Other acute skin changes due to ultraviolet radiation                    | L56+           | 49 (0.1%)                   | 13 (0.0%)                 |
| Vitiligo                                                                 | L80+           | 94 (0.3%)                   | 34 (0.0%)                 |
| Atrophic disorders of the skin                                           | L90+           | 109 (0.3%)                  | 36 (0.0%)                 |
| Lupus erythematosus                                                      | L93+           | 7 (0.0%)                    | 2 (0.0%)                  |
| Perioral dermatitis                                                      | L710+          | 96 (0.3%)                   | 38 (0.0%)                 |
| Alopecia areata                                                          | L63+           | 96 (0.3%)                   | 34 (0.0%)                 |
| Any diagnosis                                                            |                | 8,121 (23.9%)               | 5,073 (1.2%)              |
Supplementary Table 6: Frequency of dispensed drugs meriting exclusion in the Modified AD algorithm in the pediatric population

| Drug group                                                                 | ATC-code          | False negatives (N=34,042) | True negative (N=416,163) |
|---------------------------------------------------------------------------|-------------------|-----------------------------|----------------------------|
| At least one dispensed prescription of at least one of the drug groups below, from 1 July 2005 until the day before index date: |                   |                             |                            |
| Antipsoriatrics                                                           | D05+              | 33 (0.1%)                   | 95 (0.0%)                  |
| Salicylates for dermatological use                                         | D02AF             | 68 (0.2%)                   | 150 (0.0%)                 |
| Corticosteroids other combinations, moderate or potent                      | D07X B+           | 31 (0.1%)                   | 50 (0.0%)                  |
| Corticosteroids other combinations, moderate or potent                      | D07X C+           | 27 (0.1%)                   | 67 (0.0%)                  |
| Clobetasol and antibiotics and antifungals                                 | D07CD01 and D01+  | (0.0%)                      | (0.0%)                     |
| Corticosteroids (group IV) clobetasol and antifungals                      | D07AD01 and D01+  | 5 (0.0%)                    | 8 (0.0%)                   |
| **Any prescription**                                                       |                   | **136 (0.4%)**              | **284 (0.1%)**             |
Supplementary Table 7: Frequency of medical conditions meriting exclusion in the Modified AD algorithm in the adult population

| Condition                                                                 | Diagnosis code | False negatives (N=40,344) | True negative (N=1,996,079) |
|--------------------------------------------------------------------------|----------------|-----------------------------|-----------------------------|
| At least one diagnosis of at least one of the below conditions during the whole study period (1 July 2005 - 31 December 2018): |                |                             |                             |
| Seborrhoeic dermatitis                                                  | L21+           | 2,935 (7.3%)                | 11,172 (0.6%)               |
| Diaper dermatitis                                                       | L22+           | 16 (0.0%)                   | 33 (0.0%)                   |
| Allergic contact dermatitis                                             | L23+           | 1,132 (2.8%)                | 549 (0.0%)                  |
| Irritant contact dermatitis                                             | L24+           | 626 (1.6%)                  | 984 (0.0%)                  |
| Unspecified contact dermatitis                                         | L25+           | 940 (2.3%)                  | 835 (0.0%)                  |
| Exfoliative dermatitis                                                  | L26+           | 6 (0.0%)                    | 6 (0.0%)                    |
| Dermatitis due to substances taken internally                           | L27+           | 285 (0.7%)                  | 539 (0.0%)                  |
| Lichen simplex chronicus and prurigo”                                   | L28+           | 798 (2.0%)                  | 861 (0.0%)                  |
| Pruritus                                                                | L29+           | 4,872 (12.1%)               | 15,807 (0.8%)               |
| Other dermatitis                                                        | L30+           | 14,058 (34.8%)              | 41,507 (2.1%)               |
| Papulosquamous disorders                                                | L40-L45+       | 2,550 (6.3%)                | 11,785 (0.6%)               |
| Other erythematous conditions                                           | L53+           | 467 (1.2%)                  | 2,060 (0.1%)                |
| Sunburn                                                                 | L55+           | 11 (0.0%)                   | 12 (0.0%)                   |
| Other acute skin changes due to ultraviolet radiation                   | L56+           | 195 (0.5%)                  | 258 (0.0%)                  |
| Vitiligo                                                                | L80+           | 139 (0.3%)                  | 351 (0.0%)                  |
| Atrophic disorders of the skin                                          | L90+           | 716 (1.8%)                  | 876 (0.0%)                  |
| Lupus erythematous                                                      | L93+           | 57 (0.1%)                   | 62 (0.0%)                   |
| Perioral dermatitis                                                     | L710+          | 312 (0.8%)                  | 553 (0.0%)                  |
| Alopecia areata                                                         | L63+           | 250 (0.6%)                  | 320 (0.0%)                  |
| **Any diagnosis**                                                       |                | **19,143 (47.4%)**          | **70,106 (3.5%)**           |
Supplementary Table 8: Frequency of dispensed drugs meriting exclusion in the Modified AD algorithm in the adult population

| Drug group                                                                 | ATC-code | False negatives (N=40,344) | True negative (N=1,996,079) |
|----------------------------------------------------------------------------|----------|-----------------------------|------------------------------|
| **At least one dispensed prescription of at least one of the drug groups below, from 1 July 2005 until the day before index date:** |          |                            |                              |
| Antipsoriatcs                                                             | D05+     | 33 (0.1%)                   | 95 (0.0%)                    |
| Salicylates for dermatological use                                         | D02AF    | 68 (0.2%)                   | 150 (0.0%)                   |
| Corticosteroids other combinations, moderate or potent                     | D07XB+   | 31 (0.1%)                   | 50 (0.0%)                    |
| Corticosteroids other combinations, moderate or potent                      | D07XC+   | 27 (0.1%)                   | 67 (0.0%)                    |
| Clobetasol and antibiotics and antifungals                                 | D07CD01 and D01+ | 0 (0.0%)                  | 0 (0.0%)                     |
| Corticosteroids (group IV) clobetasol and antifungals                      | D07AD01 and D01+ | 5 (0.0%)                  | 8 (0.0%)                     |
| **Any prescription**                                                       |          | **136 (0.4%)**              | **284 (0.1%)**               |
| Metric                | Calculation of outcome                                      |
|-----------------------|-------------------------------------------------------------|
| Sensitivity (%)       | True positive * 100 / (True positive + False negative)      |
| Specificity (%)       | True negative * 100 / (True negative + False positive)      |
| PPV (%)               | True positive * 100 / (True positive + False positive)      |
| NPV (%)               | True negative * 100 / (True negative + False negative)      |
| Correctly predicted (%)| Correctly predicted * 100 / True positive                   |

*PPV: Positive predictive value, NPV: Negative predictive value*