

APPENDIX

Appendix Figures 1 through **5** are snapshots of the interactive software and applications that visualized the descriptive statistics by OSCAR to facilitate the review process.

In **Appendix Figure 1**, each dot represents the number of records in the corresponding table and database. For example, the red dots represent records over time for the person table in the converted CDM, reflecting the sample size for each database (eg, about 2 million individuals in the CMS data). The trends also provide information: for example, the trend of the records in the drug_exposure table from Taiwan's NHIRD decreased over time, which may reflect changes in reimbursement guidelines and the control of drug uses in Taiwan during the period.

Appendix Figures 2 and **3** show the percentages of conditions and drug codes in the databases, respectively, by their rankings of the rates. Reviewers could select a dot for more detailed information about the conditions and drugs on their concept codes and prevalence rate for all databases. It is noteworthy that the data represented in the diagram do not provide information on the disease and drug comparisons among databases.

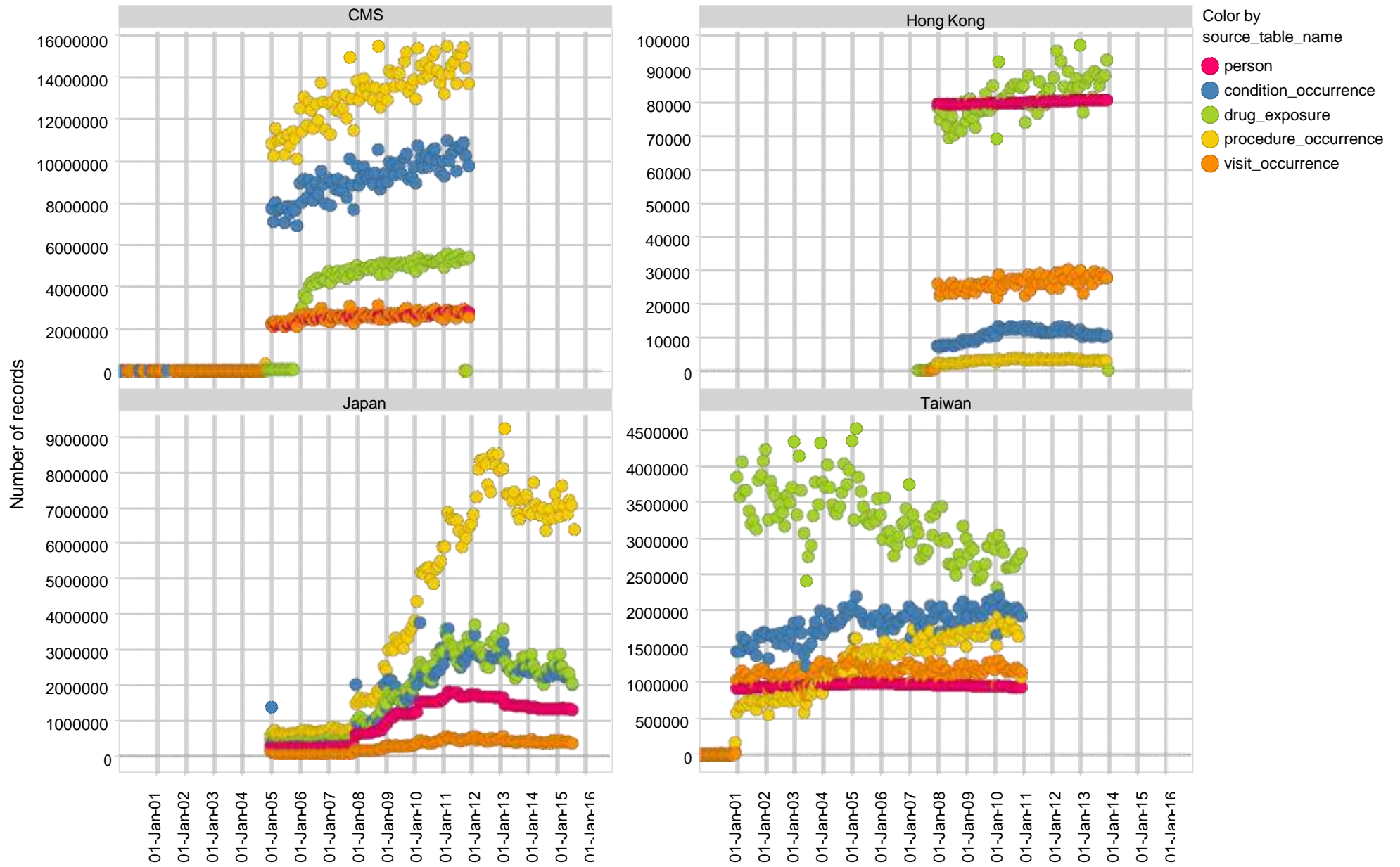
Comparing disease prevalence or drug use and understanding reasons behind observed differences is only possible after employing specific data preparation, study design, and selection of cohorts, as well as optimal definition of diseases and drug use using available information in the data.

Appendix Figures 4 and **5** show an example from the Korean AUSOM database and the results from the Achilles software. Appendix Figure 4 shows the distributions of table records over time. Appendix Figure 5 shows the records for condition codes. The box size represents the percentage of the conditions; colors represent the records per person

(blue to orange = low to high). Reviewers were able to click each piece for more information for specific conditions. For example, in the figure, we found there are 8066 patients with chronic viral hepatitis B and with an average of 11.09 records for each patient. The rate of chronic viral hepatitis B was 0.39% in Korean AUSOM database.

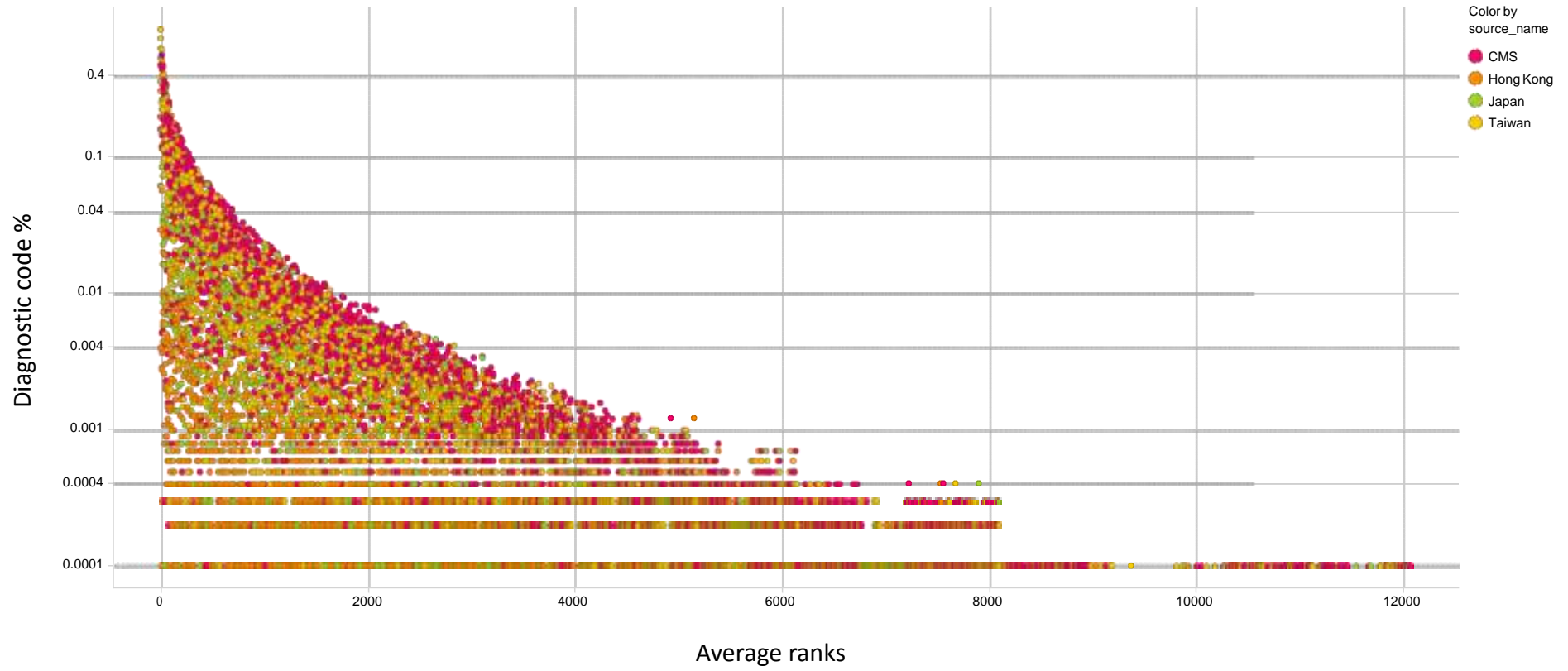
Appendix Table 1 is an example of unmapped medication codes in Taiwan's NHIRD. We found many of the unmapped medications belonged to miscellaneous categories. In particular, there were Taiwan-specific formulas combining ingredients for controlling cold or cough symptoms, or vitamin combinations that could not be mapped to standard terminology codes. As this was the initial attempt to map international drug codes to RxNorm, we focused our efforts to cover most medications that are commonly used in each country.

Appendix figure 1. OSCAR results -- The distributions of table records over time



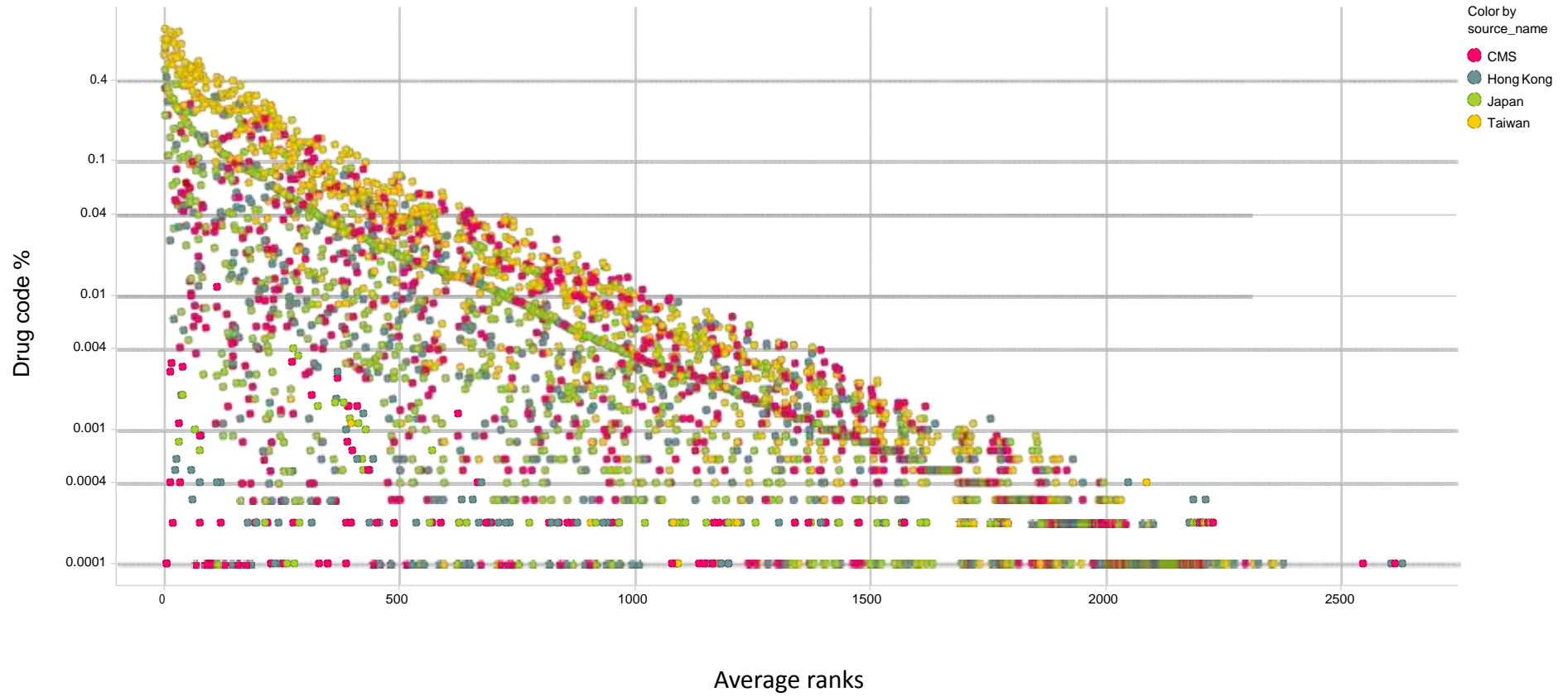
Appendix figure 2. Percentage of the codes for conditions

(number of persons with at least one occurrence / total population)



Appendix figure 3. Percentage of codes for drugs

(total with one exposure / total population)



Appendix figure 5. Results of Achilles Heel-- The codes for conditions (Korean AUSOM database as example)

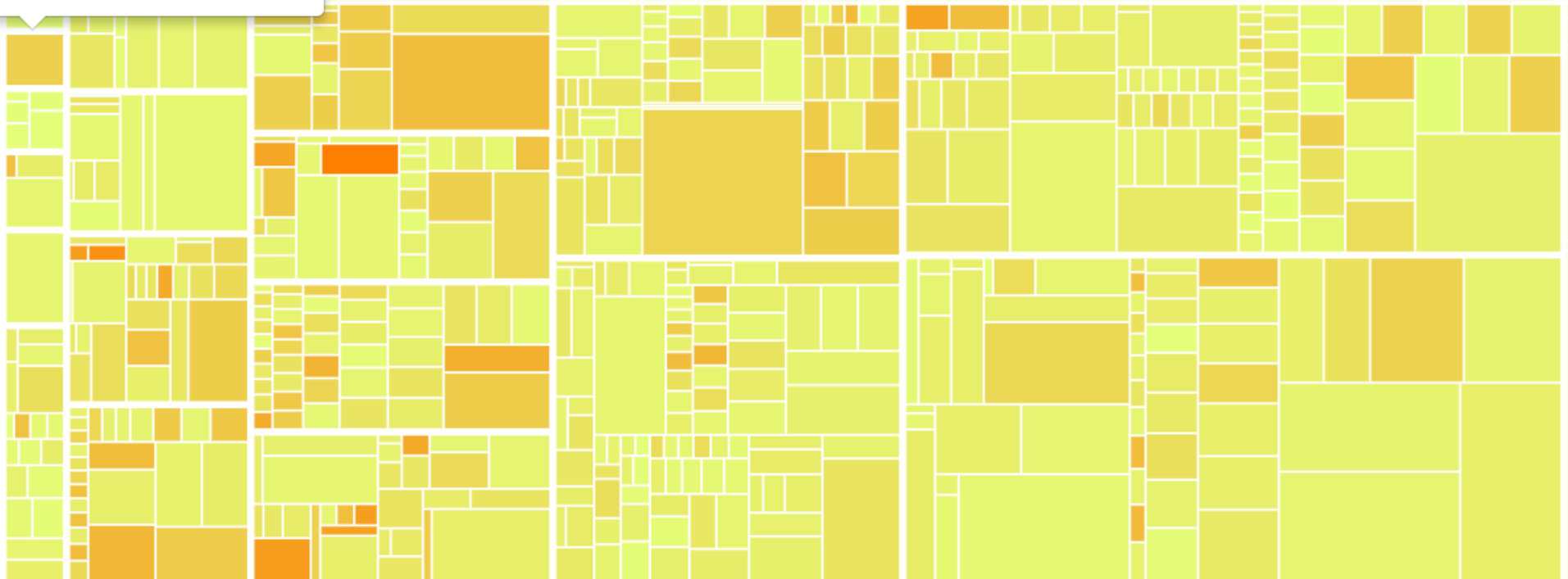
Infections and infestations
Viral infectious disorders
Hepatitis viral infections
Chronic hepatitis B

Chronic viral hepatitis B without delta-agent

Prevalence: 0.39%

Number of People: 8,066

Records per Person: 11.09



Box Size: Prevalence, Color: Records per Person (Blue to Orange = Low to High), Use Ctrl-Click to Zoom, Alt-Click to Reset Zoom

Appendix table 1. An example of unmapped medication codes in Taiwan’s National Health Insurance Research Database.

Drug Item	Frequency of Count	Percentage
VITAMIN B COMPLEX	115	10.35
ANTACIDS AND ADSORBENTS COMPOSITE	94	8.46
NONSTEROIDAL ANTI-INFLAMMATORY AGENTS	88	7.92
VITAMIN B COMPLEX COMPOSITE	79	7.11
RESPIRATORY SMOOTH MUSCLE RELAXANTS COMPOSITE	49	4.41
MISCELLANEOUS ANALGESICS AND ANTIPYRETICS	44	3.96
ANTITUSSIVES	38	3.42
QUINOLONES	35	3.15
ANTI-INFALMMATORY AGENTS COMPOSITE	29	2.61
MISCELLANEOUS LOCAL ANTI-INFECTIVES	29	2.61
ANTI-INFLAMMATORY AGENTS	25	2.25
ANTIBIOTICS	25	2.25
MULTIVITAMIN PREPARATIONS	24	2.16
ANTIMUSCARINICS/ANTISPASMODICS	21	1.89
HYPOTENSIVE AGENTS COMPOSITE	20	1.8
MISCELLANEOUS ANXIOLYTICS, SEDATIVES AND HYPNOTICS	20	1.8
ANTIHISTAMINE DRUGS	18	1.62
MUTIVITAMIN PREPARATIONS COMPOSITE	17	1.53
ANTI-INFLAMMATORY AGENTS COMPOSITE	15	1.35
COMMON COLD PREPARATIONS	13	1.17
PROGESTINS COMPOSITE	13	1.17
SYMPATHOMIMETIC OR ADRENERGIC AGENTS	13	1.17
OXYTOCICS	12	1.08
TRANQUILIZERS	12	1.08
ANTIDIARRHEA AGENTS COMPOSITE	11	0.99
CALORIC COMPOUND AGENTS COMPOSITE	11	0.99
ADRENALS COMPOSITE	10	0.9
ANTIHISTAMINE DRUGS COMPOSITE	10	0.9
ENTROGENS COMPOSITE	10	0.9
ANTIEMETICS COMPOSITE	9	0.81
COMMON COLD PRERATIONS	8	0.72
IRON PREPARATIONS	8	0.72
MISCELLANEOUS SKIN AND MUCOUS MEMBRANE AGENTS	7	0.63
VASODILATING AGENTS	7	0.63

ALLERGEN AND DIAGNOSTIC AGENTS FOR HYPERSENSITIVIT	6	0.54
ANTITUSSIVES COMPOSITE	6	0.54
CATHARTICS AND LAXATIVES COMPOSITE	6	0.54
CYTOPROTECTIVE AGENTS	6	0.54
HYPOTENSIVE AGENTS	6	0.54
KERATOLYTIC AGENTS	6	0.54
MUCOLYTIC AGENTS COMPOSITE	6	0.54
REPLACEMENT PREPARATIONS COMPOSITE	6	0.54
CEPHALOSPORINS	5	0.45
HEMOSTATICS	5	0.45
SKELETAL MUSCLE RELAXANTS COMPOSITE	5	0.45
SYMPATHOMIMETIC OR ADRENERGIC AGENTS	5	0.45
ANTIDIARRHEA AGENTS	4	0.36
ANTITUBERCULOSIS AGENTS	4	0.36
BASIC OINTMENTS AND PROTECTANTS	4	0.36
BENZODIAZEPINES	4	0.36
ENZYMES	4	0.36
MISCELLANEOUS GI DRUGS COMPOSITE	4	0.36
SYMPATHMIMETIC OR ADRENERGIC BLOCKING AGENTS COMPO	4	0.36
ANTIDEPRESSANTS	3	0.27
CONTRACEPTIVES COMPOSITE	3	0.27
EXPECTORANTS COMPOSITE	3	0.27
MISCEALLANEOUS THERAPEUTIC AGENT	3	0.27
MISCELLANEOUS GI DRUGS	3	0.27
MISCELLANEOUS SKIN AND MUCOUS MEMBRANE COMPOSITE	3	0.27
RESPIRATORY AND CEREBRAL STIMULANTS	3	0.27
SEROTONIN ANTAGONISTS	3	0.27
SERUMS	3	0.27
UNCLASSIFIED THERAPEUTIC AGENTS	3	0.27
VITAMIN C COMPOSITE	3	0.27
ANALGESICS AND ANTIPYRETICS COMPOSITE	2	0.18
ANTILIPEMIC AGENTS	2	0.18
ANTITUBERCULOSIS AGENTS COMPOSITE	2	0.18
CARDIAC DRUGS	2	0.18
DIGESTANTS COMPOSITE	2	0.18
LOCAL ANESTHETICS	2	0.18
MISCELLANEOUS ANTI-INFECTIVES	2	0.18
PENICILLINS	2	0.18

THROMBOLYTIC AGENTS COMPOSITE	2	0.18
ANDROGENS	1	0.09
ANDROGENS COMPOSITE	1	0.09
ANTICOAGULANTS	1	0.09
ANTIFUNGALS	1	0.09
ANTIVIRALS	1	0.09
CARDIAC DRUGS COMPOSITE	1	0.09
CATHARTICS AND LAXATIVES	1	0.09
DENTAL AGENTS COMPOSITE	1	0.09
DIGESTANTS	1	0.09
ESTROGENS	1	0.09
GONADOTROPINS	1	0.09
HORMONES AND SYNTHETIC SUBSTITUTES	1	0.09
KERATOLYTIC AGENTS COMPOSITE	1	0.09
MISCELLANEOUS ANTIBIOTICS	1	0.09
MISCELLANEOUS ANTI-INFECTIVES COMPOSITE	1	0.09
MISCELLANEOUS ANTIDIABETIC AGENTS	1	0.09
MISCELLANEOUS EENT DRUGS	1	0.09
MISCELLANEOUS EENT DRUGS COMPOSITE	1	0.09
MISCELLANEOUS THERAPEUTIC AGENT COMPOSITE	1	0.09
OPIATE AGONISTS	1	0.09
REPLACEMENT PREPARATIONS	1	0.09
SULFONAMIDES	1	0.09
SULFONAMIDES COMPOSITE	1	0.09
THROMBOLYTIC AGENTS	1	0.09
URINARY ANTI-INFECTIVES	1	0.09
<i>Total unmapped code</i>	1111	100