**Supplementary materials**

Supplementary Table 1. Search terms used in the identification of immune deficiencies a

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| **Search terms** |
| transplant |
| immunodeficien |
| immunocomprom |
| immunosuppress |
| Immune deficien |
| Immune suppress |
| HIV |
| asplenia |
| purpura |
| Thyroiditis, subacute |
| Subacute thyroiditis |
| autoimmun |
| Lupus erythematosus |
| Inflammatory bowel disease |
| Multiple sclerosis |
| Myasthenia gravis |
| cirrhosis |
| Ankylosing spondylitis |

a. We searched the “encounter reason” field in the Encounter dataset, “diagnosis reason” field in the Diagnosis dataset, and “reason” field in the Prescription dataset. Those records containing any one of the terms in the list were defined as immune deficiencies. Patients with Crohn’s disease, rheumatoid arthritis, and ulcerative colitis were also regarded as immunocompromised patients.

Supplementary Table 2. Search terms used in the identification of systemic antibiotic prescriptions a

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| **Search terms** | **Search terms** |
| DOXYCYCLINE | AMPICILLIN |
| CHLORTETRACYCLINE | AMOXICILLIN |
| TETRACYCLINE | AMOXYCILLIN |
| MINOCYCLINE | PIPERACILLIN |
| TIGECYCLINE | TICARCILLIN |
| CHLORAMPHENICOL | PENICILLIN |
| CLOXACILLIN | DICLOXACILLIN |
| TAZOBACTAM | MEROPENEM |
| CEFALEXIN | ERTAPENEM |
| CEPHALEXIN | IMIPENEM |
| CEFALOTIN | TRIMETHOPRIM |
| CEFAZOLIN | SULFAMETHIZOLE |
| CEFOXITIN | SULFATHIAZOLE |
| CEFUROXIME | SULFAMETHOXAZOLE |
| CEFACLOR | SULFADIAZINE |
| CEFOTAXIME | ERYTHROMYCIN |
| CEFTAZIDIME | ROXITHROMYCIN |
| CEFTRIAXONE | CLARITHROMYCIN |
| CEFEPIME | AZITHROMYCIN |
| AZTREONAM | CLINDAMYCIN |
| LINCOMYCIN | OFLOXACIN |
| TOBRAMYCIN | NORFLOXACIN |
| GENTAMICIN | MOXIFLOXACIN |
| NEOMYCIN | GATIFLOXACIN |
| AMIKACIN | NALIDIXIC |
| VANCOMYCIN | COLISTIN |
| TEICOPLANIN | POLYMYXIN |
| NITROFURANTOIN | METRONIDAZOLE |
| FOSFOMYCIN | TINIDAZOLE |
| SPECTINOMYCIN | DAPTOMYCIN |
| METHENAMINE | BACITRACIN |
| LINEZOLID |  |

a. We searched the “medicine active ingredient” field in the Script Item dataset. Those records containing any one of the terms in the list were defined as antibiotic prescriptions. To exclude topical antibiotics, episodes with prescriptions of topical antibiotics were excluded from the analysis. Topical antibiotics were defined as containing any one of the following terms in the “medicine active ingredient” field: “chloramphenicol”, “neomycin”, or “ofloxacin”, or any one of the following terms in the “medicine name” field: “ear drop”, “eye drop”, “oint”, or “topical”.

Supplementary Table 3. The distribution of antibiotic classes in the URTI episodes

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| **Antibiotic classes** | **N of prescriptions (%)** |
| Total | 172605 (100) |
| Narrow-spectrum penicillins | 100773 (58) |
| Co-amoxiclav | 26098 (15) |
| Doxycycline | 6041 (3) |
| First-generation cephalosporins | 10977 (6) |
| Second-generation cephalosporins | 4739 (3) |
| Macrolides | 21209 (12) |
| Others | 2768 (2) |