Supplemental Table 1.

Diagnoses and the International Classification of Diseases, Tenth Revision code (ICD-10 code)

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| Diagnoses | Lists of ICD-10 code |
| Inclusion criteria |  |
| Asthma | J45x, J46 |
| Acute respiratory failure | J96x |
| Exclusion criteria |  |
| Pneumonia | A010, A022, A162, A379, A48x, A49x, A500, A548, A698, A70, B012, B052, B068, B206, B221, B250, B371, B38x, B39x, B441, B49, B583, B59, B778, C349, J110, J12x, J13x, J14, J15x, J160, J18x, J202, J440, J67x, J680, J69x, J70x, J82, J83x, J85x, J958, K650, M0019, M0510, M32x, M33x, M351, 0290, P23x, Ps49, P361, U049 |
| Sinusitis | J014, J019, J111, J32x, T701, T889 |
| Lymphadenitis | A182, A210, A318, D763, D898, I88x, L04x |
| Abscess formation | A06x, A16x, A178, A18x, A54x, B43x, D733, E060, E236, E321, G06x, G09, H043, H050, H163, H278, H440, H600, H700, J329, J340, J36, J38x, J39x, J85x, K04x, K05x, K102, K113, K122, K130, K140, K20, K353, K572, K578, K610, K612, K614, K630, K650, K750, K810, K859, L02x, L030, L040, L100, L663, L748, M0099, N151, N288, N308, N340, N412, N450, N482, N492, N61, N709, N719, N732, N735, N751, N760, N764, 0860, 091x. T814 |
| Sepsis | A021, A207, A227, A241, A267, A282, A327, A394, A40x, A41x, A427, A548, B007, B349, B377, D71, I301, I330, I400, I776, J020, J039, J209, J950, L029, L080, O080, O753, O85, O883, P36x, T814, R880 |
| Bacteremia | A39x, A499, B49 |
| Influenza | J09, J10x, J11x |
| Urinary tract infection | N30x, N390, 0862, P393, T835, N10, N11x, N12, N209, A003, A191, T835, A181, A540, A560, B374, B901 |
| Skin and subcutaneous infection | L089, P394, H0x, H601, K340, J36, J387, J391, K122, K291, K358, L03x, L983, N450, N730, N731 |
| Septic arthritis | M009 |
| Osteomyelitis | A022, A180, A318, A544, B672, D898, H050, K102, M462x, M86x, |
| Pre-existing comorbidity |  |
| Food allergy | T781, T782 |
| Atopic dermatitis/eczema | L208, L209, |
| Allergic rhinitis | J301–304 |

Supplemental Table 2. Classifications and lists of antibiotics

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| Classification | Details |
| Penicillin | Benzylpenicillin potassium, benzylpenicillin benzathine hydrate, ampicillin, bacampicillin hydrochloride, amoxicillin hydrate |
| Penicillin with beta-lactamase inhibitors | Amoxicillin clavulanate, ampicillin sulbactam, piperacillin sodium, piperacillin tazobactam |
| First-generation cephalosporin | Cephazolin, cefalexin, cefroxadine, cefaclor |
| Second-generation cephalosporin | Cefotiam, cefmetazole, cefminox, flomoxef, cefuroxime |
| Third-generation cephalosporin | Cefotaxime, cefmnoxime, ceftriaxione, ceftadizime, cefdinir, ceftibuten, cefditren pivoxil, cefixime, cefteram pivoxil, cefpodoxime proxetil, cefcapene pivoxil, ceftizoxime, |
| Fourth-generation cephalosporin | Cefpirome, cefozopran, cefepime |
| Carbapenem and oral penem | Inipenem cilastatin, panipenem betamipron, meropenem, biapenem, doripenem, tebipenem pivoxil, faropenem |
| Macrolide | Erythromicin, clarithromycin, roxithromycin, azithromycin, josamycin |
| Tetracycline | Tetracycline, doxycycline, minocycline, tigecycline |
| Quinolone | Norfloxacin, ofloxacin, levofloxacin, ciproxacin, lomeofloxacin, tosufloxacin, pazufloxacin, prulifloxacin, moxifloxacin, garenoxacin, sitafloxacin |
| Trimethoprim-sulfamethoxazole | Trimethoprim-sulfamethoxazole |
| Aminoglycoside | Streptomycin, kanamycin, gentamicin, tobramycin, dibekacin, amikacin, isepamicin, arbekacin |
| Lincomycin | Lincomycin, clindamycin, |
| Glycopeptide and lipopeptide | Vancomycin, teicoplanin, daptomycin |
| Fosfomycin | Fosfomycin |
| Other types | Quinoupristin dalfopristin, linezolid, chloramphenicol, colistin, polymyxin B, azreonam, metronidazole, |

Supplemental Table 3. List of medications other than antibiotics

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| Classification | Details |
| Antitussives | Codeine (\*55 observation; excluded from the analyses), dextromethorphan hydrobromide hidrate. tipepidine hibenzate, others (dimemorphan phosphate, eprazinone hydrochloride, pentoxyverine citrate, cloperastine, clofedanol, noscapine, guaifenesin, Senega®︎, cheery bark extract) |
| Mucolytics | L-cysteine hydrochloride, bromhexine hydrochloride, dornasealfa, carbocisteine, fudosteine |
| Airway lubricant | Ambroxol hydrochloride |
| First-generation antihistamine1 | Diphenhydramine, clemastine fumarate, chlorpheniramine maleate, promethazine hydrochloride, alimemazine tartrate, hydroxyzine, homochlorcyclizine hydrochloride, cyproheptadine hydrochloride |
| Second-generation sedative antihistamine1 | Ketotifen fumarate, azelastine hydrochloride, oxatomide, mequitazine |
| Second-generation non- sedative antihistamine1 | Fexofenadine hydrochloride, epinastine hydrochloride, ebastine, cetiridine hydrochloride, levocetirizine hydrochloride, bepotastine besilate, emedastine fumarate, olopadadine hydrochloride, loratadine, desloratadine, bilastine rupatadine fumarate |
| Leukotriene receptor antagonist | Montelukast, pranlukast |
| Other types of antiallergic medications | Thromboxane A1 receptor antagonist (seratrodast, ramatroban), Th2 cytokine inhibitors (suplatast tosilate), mediator release inhibitors (sodium cromoglicate, tranilast, amlexanox, ibudilast, pemirolast potassium) |
| Xanthine | Theophylline, diprophylline, proxyphylline, aminophylline |
| Short-acting beta-stimulant inhaler | Isoprenaline hydrochloride, salbutamol sulfate, fenoterol hydrobromide, procaterol hydrochloride, |
| Intravenous beta-stimulant | Isoprenaline hydrochloride, terbutaline sulfate, |
| Oral beta-stimulant | Isoprenaline hydrochloride, salbutamol sulfate, terbutaline sulfate, fenoterol hydrobromide, procaterol hydrochloride, turobuterol |
| Tape beta-stimulant | Turobuterol |
| Inhaled corticosteroid | Beclomethasone dipropionate, fluticasone propionate, budesonide, ciclesonide, mometasone furoate, fluticasone furoate |
| Long-acting beta-stimulant inhaler | Clebuterol hydrochloride, salmeterol xinafoate, indacaterol malate, formoterol fumarate hydrate (\*8 observations were excluded) |
| Anticholinergics inhalers | Tiotropium bromide hydrate, glycopyronium bromide, aclidinium bromide, umeclidinium bromide (\*only 16 patients used anticholinergic inhalers; we excluded these patients from the analyses) |
| Intravenous magnesium | Magnesium sulfate  (\*Only 7 patients received NSAIDs; we excluded these patients from the analysis) |