Supplemental Table 1. ICD-10-CM codes for respiratory tract diagnoses.

Tier	ICD-10 Diagnostic Codes
Tier 1 (antibiotics almost always indicated)	A20.2 (pneumonic plague); A21.2 (pulmonary tularemia); A22.1 (pulmonary anthrax); A36.0, A36.1 (diphtheria); A37 (whooping cough); A48.1 (Legionnaire's disease); A70 (*Chlamydia psittaci* pneumonia); D57.01, D57.211, D57.411, D57.811 (acute chest syndrome); H70 (mastoiditis); J02.0, J03.0 (streptococcal pharyngitis/tonsillitis); J13-J18 (bacterial pneumonia); J36 (peritonsillar abscess); J39.0 (retropharyngeal/parapharyngeal abscess); J39.1 (abscess of pharynx); J85 (lung abscess); J86 (pyothorax); J95.02 (tracheostomy infection); J95.851 (ventilator-associated pneumonia); J98.51 (mediastinitis)
Tier 2 (antibiotics sometimes indicated)	A38 (scarlet fever); H66, H67 (otitis media); J01 (acute sinusitis); J02.8, J02.9 (acute pharyngitis); J03.8, J03.9 (acute tonsillitis); J31.2 (chronic tonsillitis); J32 (chronic sinusitis); J44.1 (chronic obstructive pulmonary disease with acute exacerbation) J47.0, J47.1 (bronchiectasis with acute exacerbation); O29.01, O74.0, O89.0 (aspiration pneumonitis)
Tier 3 (antibiotics rarely indicated)	B01.2, B05.2, B25.0, J12 (viral pneumonia/pneumonitis); B34.0, B34.2, B97.0, B97.21, B97.29, B97.4, B97.81, B97.89 (viral infection); B44.8 (aspergillosis); D86.0, D86.2 (sarcoidosis), H65 (serous/chronic otitis media); H68, H69 (Eustachian tube disorder); J00 (acute nasopharyngitis), J04 (acute laryngotracheitis), J05 (acute obstructive laryngitis); J06 (acute upper respiratory infection); J09-J11 (influenza); J20-J22 (acute bronchitis/bronchiolitis); J30, J31.0 (rhinitis); J31.1 (chronic nasopharyngitis); J33, J34 (disorders of nose and sinuses), J35 (disorders of tonsils); J37, J38, J39.2-J39.9 (disorders of larynx/pharynx/trachea); J40 (bronchitis unspecified); J41, J42 (chronic bronchitis); J43, J44.9 (chronic obstructive pulmonary disease); J45 (asthma); J47.9 (bronchiectasis without exacerbation), J60-J66 (pneumoconiosis); J67-J70 (pneumonitis); J80 (acute respiratory distress syndrome); J81 (pulmonary edema); J82 (pulmonary eosinophilia); J84 (pulmonary fibrosis); J90-J94 (disorders of pleura); J95 except J95.811 (respiratory complications following surgery); J96 (acute respiratory failure); J98 except J98.51, J99 (other respiratory disorders); M34.81 (nasal mucositis); R04.2, R04.8, R04.9 (bleeding in respiratory tract); R05 (cough); R06 (abnormalities of breathing); R07.0 (throat pain); R09.0 (hypoxia); R09.1 (pleurisy); R09.3 (abnormal sputum); R09.81 (nasal congestion); R09.82 (post-nasal drip); T78.4 (allergy)

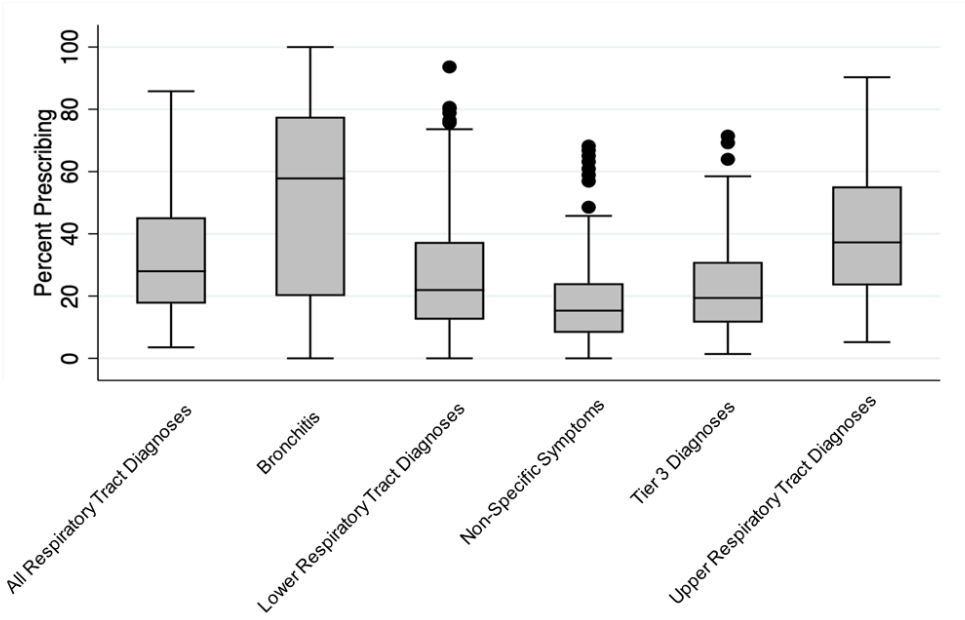
Adapted from: Fleming-Dutra KE, Hersh AL, Shapiro DJ, et al. Prevalence of inappropriate antibiotic prescriptions among US ambulatory care visits, 2010-2011. JAMA. 2016;315(17):1864-1873.

Supplemental Table 2. Antibiotics prescribed in all RTD office visits in which an antibiotic was prescribed in entire study cohort and random subset of 1,200 patients.

Antibiotic	All RTD Office Visits with Antibiotic Prescribed (N=26,671) n (%)	Randomly Selected RTD Office Visits with Antibiotic Prescribed for Manual Review (N=1,200) n (%)
Amoxicillin	2,667 (10%)	112 (9%)
Amoxicillin-clavulanate	5,792 (22%)	297 (25%)
Azithromycin	10,668 (40%)	477 (40%)
Cefaclor	8 (0.03%)	0 (0%)
Cefadroxil	5 (0.02%)	1 (0.1%)
Cefdinir	267 (1%)	2 (0.2%)
Cefixime	5 (0.02%)	1 (0.1%)
Cefpodoxime	23 (0.1%)	2 (0.2%)
Cefuroxime	800 (3%)	38 (3%)
Cephalexin	265 (1%)	14 (1%)
Ciprofloxacin	470 (2%)	24 (2%)
Clarithromycin	360 (1%)	5 (0.4%)
Clindamycin	210 (1%)	13 (1%)
Doxycycline	1,337 (5%)	75 (6%)
Erythromycin	22 (0.1%)	3 (0.3%)
Levofloxacin	2,402 (9%)	92 (8%)
Minocycline	25 (0.1%)	0 (0%)
Moxifloxacin	140 (0.5%)	6 (1%)
Penicillin	398 (1%)	7 (1%)
TMP-SMX	807 (3%)	31 (3%)

TMP-SMX – trimethoprim-sulfamethoxazole

Supplemental Figure 1. Distribution of proportion of office visits in which an antibiotic was prescribed by primary care provider for RTD metrics for the entire study cohort.



Supplemental Table 3. Multivariate analyses of different combinations of RTD metrics and association with appropriateness of antibiotic prescribing as determined by manual chart review for 60 randomly selected primary care providers.

Metric	β-coefficient	95% confidence interval	p-value	R^2
Prescribing for tier 3 RTDs	0.7	0.4-1.1	<0.01	0.32
+				
Provider CCI	-7.1	(-11.8)-(-2.4)	0.04	
Prescribing for all RTDs	0.5	0.3-1.0	<0.01	0.27
+				
Provider CCI	-5.6	-10.5-0.1	0.07	
Prescribing for upper RTDs	0.5	0.2-0.7	<0.01	0.23
+				
Provider CCI	-5.2	-10.1-0.2	0.14	
Prescribing for lower RTDs	0.5	0.2-0.7	<0.01	0.23
+				
Provider CCI	-5.8	-10.7-0.1	0.07	
Prescribing for bronchitis	0.2	0.1-0.4	0.02	0.14
+				
Provider CCI	-5.4	-10.6-0.1	0.13	
Prescribing for non-specific symptoms	0.5	0.1-1.0	0.03	0.13
+				
Provider CCI	-5.8	-11.0-0.1	0.07	