

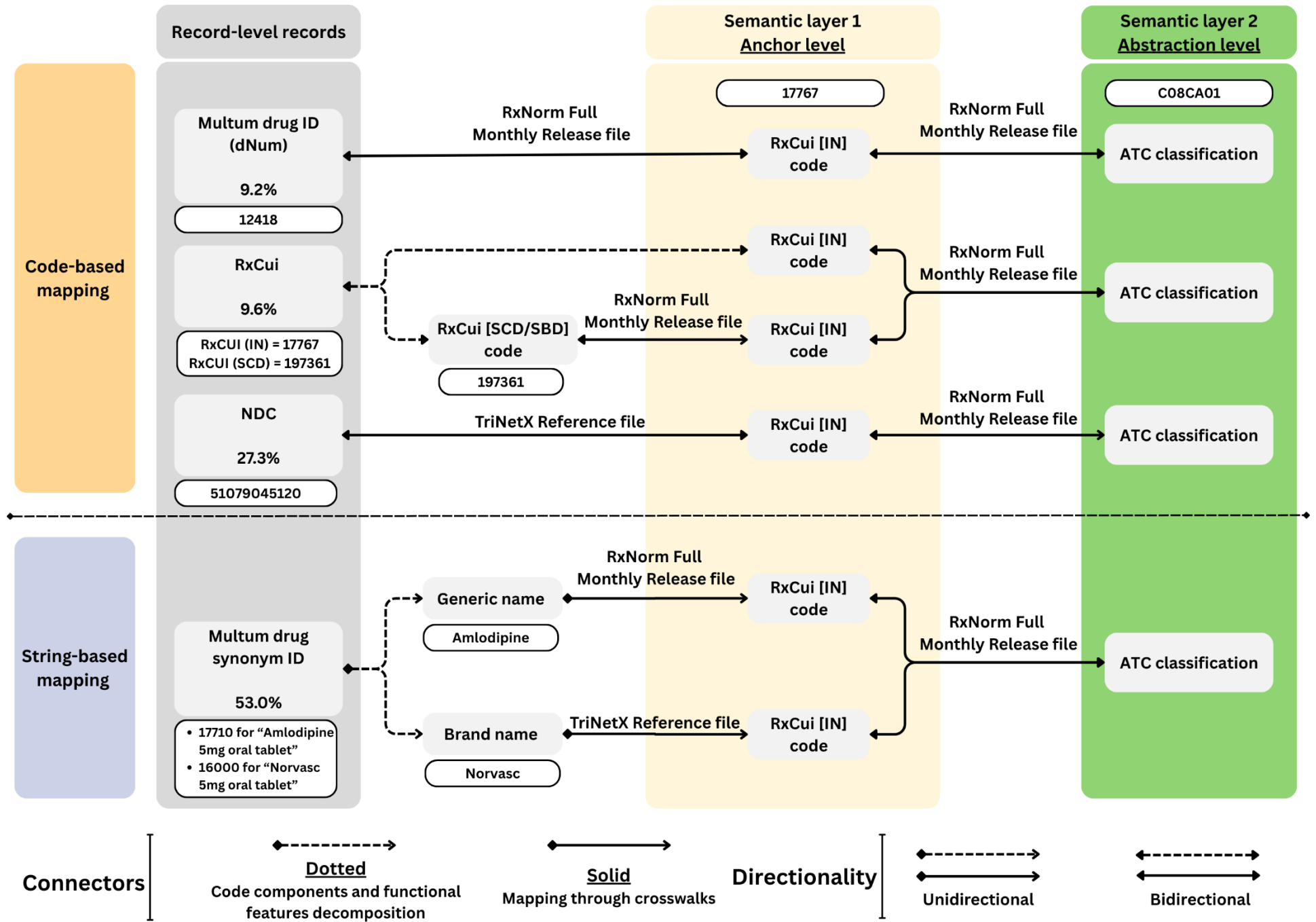
**The probability of specific level-2 ATC codes in individual clusters**

Cell colors: Red → 100% probability, Green → Highest probability, and Blue → Second highest probability

In percentage %	<b>Cluster 1 Inflammatory / Respiratory</b>	<b>Cluster 2 Pain management</b>	<b>Cluster 3 Multimorbidity</b>	<b>Cluster 4 Infection</b>	<b>Cluster 5 Cardiovascular</b>	<b>Cluster 6 Antithrombotics</b>
<b>A02</b> Drugs for acid-related disorders	12.15	5.04	34.60	1.31	8.45	8.67
<b>A06</b> Drugs for constipation	11.35	46.71	58.26	2.83	6.61	2.05
<b>A10</b> Drugs used in diabetes	7.00	2.34	28.81	0.78	14.47	1.75
<b>B01</b> Antithrombotic agents	7.53	11.85	61.35	2.89	61.68	100.00
<b>C01</b> Cardiac therapy	5.14	0.74	20.10	0.22	21.06	1.42
<b>C03</b> Diuretics	14.16	2.39	32.92	0.78	35.10	0.74
<b>C07</b> Beta blockers	13.05	2.13	46.52	1.03	58.93	4.91
<b>C08</b> Calcium channel blockers	9.80	1.91	24.37	0.26	14.98	4.32
<b>C09</b> ACEI, ARB, renin inhibitors	6.52	0.98	20.30	0.07	34.75	0.00
<b>C10</b> Lipid-modifying agent	4.40	1.58	41.78	0.39	42.09	12.56
<b>D04</b>	2.46	3.79	13.16	0.20	0.97	0.40

Antipruritics (antihistamines or anesthetics for local use)						
<b>G04</b> Urologicals	2.56	2.90	13.17	2.22	3.25	0.30
<b>H02</b> Corticosteroids for systemic use	15.61	2.26	9.04	6.38	0.76	0.00
<b>N02</b> Analgesics	12.08	81.00	72.80	7.32	16.39	6.57
<b>N03</b> Antiepileptics	5.60	2.52	8.33	0.00	0.99	0.22
<b>N05</b> Psycholeptics	6.82	8.68	30.60	0.30	1.88	0.58
<b>N06</b> Psychoanaleptics	3.10	0.85	19.97	0.42	1.86	0.80
<b>R03</b> Drugs for obstructive airway diseases	9.45	1.52	22.96	2.30	2.62	0.48
<b>R05</b> Cough and cold preparations	6.57	1.06	7.58	3.60	0.05	0.00
<b>J01</b> Antibacterials for systemic use	17.23	12.40	13.08	100.00	8.04	4.28

# The mapping framework for raw medication entries to ATC representations



Cluster	Proposed Name	Key Characteristics & Reasoning
Cluster 1	Inflammatory / Respiratory	This cluster has the highest probability of <b>Corticosteroids (H02)</b> usage (15.61%) among all clusters, along with distinctively moderate usage of <b>Antibacterials (J01)</b> and <b>Airway drugs (R03)</b> . It likely represents patients with inflammatory conditions or respiratory issues (e.g., COPD/Asthma exacerbations) managed with steroids.
Cluster 2	Pain Management	Defined by a very high probability of <b>Analgesics (N02)</b> (81.00%) and <b>Drugs for Constipation (A06)</b> (46.71%). The high co-occurrence of constipation medication suggests opioid-induced constipation, pointing strongly to patients managing significant pain.
Cluster 3	Multimorbidity	This cluster shows high probabilities across almost <b>all</b> categories (Green/Blue shading everywhere). From Cardiovascular drugs to Pain, Diabetes, and Respiratory meds, patients in this cluster appear to have multiple concurrent chronic conditions requiring complex drug regimens.
Cluster 4	Infection	Defined almost exclusively by the <b>100.00%</b> probability of <b>Antibacterials (J01)</b> (Red cell). Usage of other chronic maintenance drugs is very low (<3%).
Cluster 5	Cardiovascular	Characterized by high probabilities of a broad range of cardiac medications, including <b>Beta blockers (C07)</b> , <b>Lipid-modifying agents (C10)</b> , <b>ACEI/ARB (C09)</b> , and <b>Antithrombotics (B01)</b> . Unlike Cluster 3, these patients have relatively lower usage of non-cardiac drugs like analgesics.
Cluster 6	Antithrombotic	Defined by a <b>100.00%</b> probability of <b>Antithrombotic agents (B01)</b> with very low usage of other medications. This likely represents patients on maintenance therapy for coagulation disorders (e.g., AFib history or DVT prophylaxis) without other active major comorbidities.