

## NDC Properties in RxNorm

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### Motivation

The National Drug Code (NDC) is a universal product identifier for human drugs in the United States. NDCs can be found on drug packaging and are listed on the Food and Drug Administration (FDA) Structured Product Labels (SPLs). NDCs are used by pharmacists for inventory management and for drug information exchange, as well as in claims data. From a clinical perspective, however, NDCs are too detailed (e.g., packaging information) and need to be mapped to clinical drugs or ingredients (e.g., for medication reconciliation). It is therefore not surprising that the most used query from users in the RxNorm Application Program Interface (API) [<https://rxnav.nlm.nih.gov/RxNormAPIs.html>] is to map NDCs to the corresponding RxNorm concepts. RxNorm currently contains over 200,000 NDCs, most of which come from SPLs and the rest from First Data Bank. However, until recently, the RxNorm API did not expose the properties associated with NDC (extracted from SPLs). The new API function described here now provides this information.

### NDC Properties

NDCs are multi-segment identifiers, with codes for manufacturer, drug, and packaging information. NDCs come in multiple flavors, namely 3-segment, 2-segment (manufacturer-drug), and an 11-digit format combining the 3 segments. NDCs are associated with other codes, such as the Abbreviated New Drug Application (ANDA) code and the identifier for the SPL (“SPL set id”). Other information linked to the NDC include pill characteristics (e.g., color, shape, size), as well administrative information (e.g., marketing category, labeler, schedule). The RxNorm API function *getNDCProperties* takes as input an NDC (any flavor), an SPL set id or an RxNorm identifier and returns the properties associated with the NDC (for all NDCs from SPLs). While most of the properties are extracted from RxNorm, packaging information is acquired from DailyMed. NDC properties for 0781-1506-10 (Atenolol 50 MG Oral Tablet) are listed in Table 1.

**Table 1** – NDC properties returned by the RxNorm API

Property	Example	Property	Example
RxCUI	197381	Labeler	Sandoz Inc
2-segment identifier	0781-1506	Packaging	1000 in 1 BOTTLE
3-segment identifier	0781-1506-10	Shape	ROUND
11-digit NDC	00781150610	Color	WHITE
ANDA	ANDA073025	Imprint	GG263
SPL set identifier	b900115a-faac-4244-94bc-c1ef2f88aa38	Size	7 mm
Marketing Category	ANDA	Score	2
Marketing Status	active		
Marketing Effective Time	19910917		
Label Type	HUMAN PRESCRIPTION DRUG LABEL		

### Use Cases

The RxNorm API function *getNDCProperties* was designed to support several use cases.

- *Finding the NDC properties for a clinical or branded drug.* For a clinical or branded drug in RxNorm, the NDC properties of all the NDCs for that drug can be returned from a single call to the API.
- *Finding the NDCs and properties for a Structured Product Label.* The API function will return all the NDCs and their properties for a given Structured Product Label.
- *Finding the characteristics of oral solid dose form medications (pills).* The NDC properties returned include color, shape, size, and imprint code.
- *Finding the labeler/manufacturer information for a drug.* For a given NDC, the labeler/manufacturer is returned. By specifying an RxNorm identifier as input, the labeler/manufacturer information is returned for each associated NDC.

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