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MDGuidelines® API: Case v4

Specification 2.3

Date: December 6, 2023

1 Overview

1.1 Purpose and Intended Audience

The purpose of this document is to provide detailed descriptions and specifications for the MDGuidelines Case (v4) API.

The Case API is intended to be used by MDGuidelines clients and partners that have integrated MDGuidelines into their own products and wish to display case-specific durations within their application(s).

The Case API is part of the MDGuidelines API product offering.

The version number of this document refers to the Specification version. See Section 2.3 Version Information below for information related to the API version.

1.2 Description

Case Durations may be obtained via the Case API. There are two parts to obtaining the final calculated duration: *Case Fit* and *Case*.

Case Fit API may be optionally used to pre-identify when a Case Duration is available, and which Comorbid Group Codes are significant for the case. This functionality can be used to create an interactive UI for an end user of the integrated application.

The Case API accepts several parameters and returns a predicted Case Duration for a supplied ICD-9-CM, ICD-10-CM, or CPT® medical code, along with a breakdown of all the factors that were used to derive that duration.

Terminology

Term	Definition
Case Duration	A prediction for the length of disability of a case, based on a mathematical predictive model using MDGuidelines' Population Database of disability claims.
Case Frequency	A categorization for how frequently the Primary Diagnosis Code occurs within MDGuidelines' Population Database. Values are High, Medium, or Low. Diagnoses with a Low Case Frequency will not have a predicted Case Duration. See the Duration Views Help Resource for more details.
Comorbid Group	A group of comorbidities defined by Quan et al (2005) (see Duration Views Help Resource), to simplify the implementation of comorbidities. For more information see Comorbid Groups, below.

Factor	A characteristic of a particular case which may contribute to the predicted Case Duration. Factors currently considered by the Case Duration's predictive model are: Age, Sex, Job Class, Program Type, and Comorbidities.
Job Class	The job classes correspond to the Strength Factor classifications described in the U.S. Department of Labor's Dictionary of Occupational Titles. For more information about job class definitions, visit this help resource in MDGuidelines.
Population	The MDGuidelines Population Database includes more than 15 million disability leave records for over 11,000 unique conditions with information on length of time from date of absence to return to full duty, sex, age, job class (level of job exertion), and coexisting conditions. These records represent employers, insurers, healthcare providers, and government agencies. Both short-term disability and workers' compensation records have been used.
Primary Diagnosis Code	The primary medical code for the patient's condition. The Case Duration supports the use of diagnosis codes in ICD-9-CM or ICD-10-CM, or procedure codes in ICD-9-CM or CPT®.

2 API Specification

This section documents the technical usage of the Case API. General information about any of the MDGuidelines APIs can be found at https://api.mdguidelines.com/help.

MDGuidelines APIs are RESTful.

Responses may be formatted as XML or JSON (see Section 2.4 Input Parameters, below).

2.1 Endpoint

The Durations Case API endpoint is: https://api.mdguidelines.com/api/v4/durations/case

2.2 Authentication

The Organization's API license key must be provided via the request headers as "RG-LICENSE-KEY". This key will be provided by the client's MDGuidelines Account Executive.

2.3 Authorization

The client's API license key provides access to all API end points without requiring additional configuration. Some of the APIs optionally include content related to CPT® treatment codes. To obtain use of APIs for CPT® content, an additional licensing agreement is required. Clients can obtain additional information and licensing through their MDGuidelines Account Executive.

2.4 Version Information

The current version of this API is v4. Old versions are no longer supported, effective February 17, 2024.

2.5 Input Parameters

Data Element	Data Type	Req?	Data Element Description	Default Value
primaryMedicalCode	String	Yes	The medical code is provided as part of the end point URI. Case fit accepts ICD-9-CM (diagnosis or procedure), ICD-10-CM (diagnosis), or CPT® (procedure) values. The value is not case-sensitive. Note: CPT® medical code use requires additional license. See Authorization, above. Example:	N/A

			`/api/v4/durations/case/354.0`	
sex	String	No	The sex of the patient. The value is not case-sensitive. Valid values: male female When no sex is specified, the model will consider all sexes.	N/A
age	Integer	No	The age of the patient. Valid values may be between 16 and 99, inclusive. When no age is specified, the model will consider all ages.	N/A
jobClass	String	No	Job Class for the patient. See the Job Class definition in Section 1.2 above. Values are not case-sensitive. Valid values: sedentar y light medium heavy very heavy When no Job Class is specified, the model will consider all Job Classes.	N/A
programType	String	No	Benefit program type for the claim, either Short Term Disability (“s td”) or Worker Compensation (“wc”). The value is not case- sensitive. Values std wc When no Program Type is specified, the model will consider all program types.	N/A

Data Element	Data Type	Req?	Data Element Description	Default Value
comorbidities	String	No	A comma-delimited list of comorbid conditions. The values are not case-sensitive. Key points: • The comorbidities may be specified as medical codes or as Comorbid Group Codes (obtained from Case Fit or Medical Code Search v4). • The request will accept up to five (5) comorbidities, but only three (3) will be used in the calculation. • The comorbidities may be requested in any order. The response will provide a ranking and use up to three (3) according to ranking. See section About Ranking below. When comorbidities include medical codes, they must be of the same medical code type as the Primary Diagnosis. If a comorbidity is specified in the wrong code type, it will be ignored as irrelevant to the model. When the Primary Diagnosis is a procedural ICD-9-CM code, the comorbidity medical codes include only ICD-9-CM diagnosis codes. If a comorbid condition is a medical code that belongs to a Comorbid Group, this service will automatically translate the request to use the Comorbid Group Code. This translation will be communicated in the response. Multiple individual comorbid medical codes may relate to a single Comorbid Group. For more information see Mapped Medical Codes, below. When no comorbidities are specified, the model assumes that there are explicitly NO comorbidity factors.	N/A

2.6 Response

Data can be returned as JSON or XML.

If using XML, the XSD may be found here: https://api.mdguidelines.com/xsd/caseV4.xsd

Data Element	Data Type	Req?	Data Element Description
primaryDiagnosis	Complex	Yes	A complex data element providing data related to the Primary Diagnosis Code requested. Elements included: medicalCode medicalCodeType description

Data Element	Data Type	Req?	Data Element Description
medicalCode	String	Yes	A medical code Examples: 354.0, G56.01. 04.43, 64721
medicalCodeType	String	Yes	Indicator of medical code type. This code type applies to all medical codes for the request, including the primary medical code and any comorbid codes. The value is not case-sensitive. Valid values: ICD-9-CM ICD-10-CM CPT® The primary diagnosis may use ICD-9-CM or CPT® procedural codes, however comorbidity codes include only diagnosis code types. Note: CPT® medical code use requires additional license. See Authorization, above.
description	String	Yes	Description for a medical code or Comorbid Group.
BaseDuration	Integer	Yes	The geometric mean of all cases related to the primary diagnosis.
Factors	Complex	No	A collection of data related to any Factors from the request input parameters. Notes: Up to three comorbidities can be returned in Factors. For more information see About Ranking, below. If the request does not include any parameters, the Factors element will be empty.
Factor	Complex	Yes	A single Factor. Elements include: FactorType FactorValue Rank CodeType (when FactorType = MedCode) Description (when FactorType = MedCode or ComorbidGroup) MappedMedCodes (when FactorType = ComorbidGroup)

Data Element	Data Type	Req?	Data Element Description
FactorType	String	Yes	The name of the Factor, correlating to the request parameter. Values include: Age Sex JobClass ProgramType MedCode ComorbidGroup Invalid Notes: If a comorbidity value is not a medical code or a Comorbid Group code, it will be ignored by the model and marked as invalid in the response. In this way, the other input values can be considered. Clients may decide whether to use the calculation based on partial inputs or to reject the whole case scenario by inspecting for “Invalid” FactorTypes. If a non-comorbidity request value is invalid, the service will return an error response status. See Response Status Codes below. If one or more requested comorbidity medical codes belong(s) to a Comorbid Group, the service will replace the medical code(s) with the relevant Comorbid Group. See Mapped Medical Codes below. If the request includes more than 3 comorbidities, only the 3 most impactful will be returned as a factor in the response. See About Ranking below.
FactorValue	String	Yes	The value of the Factor as requested.
Rank	Integer	Yes	The relative rank of the Factors in the response. Although all Factors are ranked from 0 to N, the intended use for the ranking is to provide a sort order for the comorbidity list, if desired. The MDGuidelines website does not use this ranking. Instead, the Factors are ordered based on their input order. When Rank = 0 means that the Factor was insignificant in the calculation of overall predicted Case Duration. Invalid and MedCode factors will always have Rank = 0 because they have been ignored by the model. When the requested Comorbidities list includes 4 or 5 values, all values will be evaluated and ranked prior to calculation. Only the top 3 comorbidities will be considered and returned in the Factors response. See About Ranking below.
CodeType	String	No	The medical code type for a comorbid medical code factor (when FactorType = MedCode). see medicalCodeType, above.

Data Element	Data Type	Req?	Data Element Description
MappedMedCodes	Complex	No	When FactorType = ComorbidGroup and when the requested comorbidity code belongs to a Comorbid Group, this element will include a list of any medical codes from the request which have been mapped to their related Comorbid Group. Use this field to confirm the rank of requested comorbidity medical codes. Elements include: code: see medicalCode, above medicalCodeType: see CodeType above description: see description above The MappedMedCodes element will only be present when one or more of the requested comorbidity medical codes have been mapped to the Comorbid Group.
Total PredictedDuration	Integer	Yes	The total predicted Case Duration for the given requested Case Factors. When the value returned is -1, it means that the prediction is indefinite. In the MDGuidelines website, this scenario will cause the display of a warning: “The Case Duration for this case is determined to be too long to be predicted with any meaningful value and represents a high risk case that should be closely managed.” Clients may decide how to handle their system response in this scenario.

2.7 About Ranking

The Case Duration calculation applies a mathematical algorithm to calculate the total days for the particular combination of Factors on the case. For a given Primary Diagnosis Code, the relative impact of any potential case Factor has already been calculated. This means that any Factor on the case can be relatively ranked against each other. The relative ranking of each Factor is provided in the Case API response.

Comorbidity Ranking

The Population Database includes claims with a maximum of three (3) comorbid conditions. Therefore, the model that Case Durations are built on will only generate a prediction for cases up to 3 comorbidities because it could only be tested and trained against real world cases with a maximum of 3.

Even with this limitation, the Case Durations calculation can be used to identify the most impactful comorbidities for the requested Primary Diagnosis Code. The algorithm will rank the comorbidities according to their relative impact to the overall total duration and use the three most impactful. Any additional comorbidities that were not used in the calculation will not be included in the response Factors list.

In the case of a tie in the relative impacts for each Factor, the Case API uses a sorting algorithm to ensure the same results are returned each time the same set of inputs is used.

2.8 Mapped Medical Codes

If one or more provided comorbidity medical codes belongs to a Comorbid Group, the service will replace the medical code(s) with the relevant ComorbidGroup. The response will return the ComorbidGroup factor type, and include the mapped medical codes in an array of MappedMedCodes. Any mapped medical code will not be returned separately as a MedCode factor, since it is included in the ComorbidGroup factor for the case predicted duration.

The medical code mapping to Comorbid Group is provided as a convenience in this web service. The mapping can also be done prior to the Case service call by using the Medical Code Search v4 (or later) so that the request includes the already-mapped Comorbid Group value.

The MappedMedCodes element will only be present when one or more of the requested comorbidity medical codes have been mapped to the Comorbid Group.

Example

Request:

```
/api/v4/durations/case/M51.26?sex=male&age=58&jobClass=medium&
comorbidities=F17.200,dm,E66.9&programType=WC
```

Response, where E66.9 belongs to the ComorbidGroup of “Obesity”:


```
{
    "PrimaryDiagnosis": {
        "MedicalCode": "M51.26",
        "MedicalCodeType": "ICD10CM",
        "Description": "Other intervertebral disc displacement, lumbar region"
    },
    "BaseDuration": 77,
    "Factors": [
        {
            "FactorType": "Age",
            "FactorValue": "58",
            "Rank": 3
        },
        {
            "FactorType": "Sex",
            "FactorValue": "Male",
            "Rank": 5
        },
        {
            "FactorType": "JobClass",
            "FactorValue": "medium",
            "Rank": 6
        },
        {
            "FactorType": "ProgramType",
            "FactorValue":  "wc",
            "Rank": 1
        },
```

```
            {
                "FactorType": "MedCode",
                "FactorValue": "F17.200",
                "Rank": 0,
                "CodeType": "ICD10CM",
                "Description": "Nicotine dependence, unspecified, uncomplicated"
            },
            {
                "FactorType": "ComorbidGroup",
                "FactorValue": "DM",
                "Rank": 2,
                "Description": "Diabetes, uncomplicated",
                "MappedMedCodes": []
            },
            {
                "FactorType": "ComorbidGroup",
                "FactorValue": "Obesity",
                "Rank": 4,
                "Description": "Obesity",
                "MappedMedCodes": [
                  {
                        "code": "E66.9",
                        "medicalCodeType": "ICD-10-CM",
                        "description": "Obesity, unspecified"
                  }
                  ]
            }
        ],
        "TotalPredictedDuration": 197
    }
```


2.9 Exception Conditions and Troubleshooting

The service may provide response codes, for success or errors. The common response codes implemented in the MDGuidelines API are documented at https://api.mdguidelines.com/help.

Response Status

Status Code	Cause(s)
400	Messages: • Invalid parameter specified: [parameter name] • The following parameter is required: [parameter name]

Status Code	Cause(s)
401	Message: • License code not authorized. This response will be returned in the following scenarios: • License key is expired • License key is missing • License key is otherwise invalid
404	Message: • Predictive Model data not found for supplied medical code: [medical code input] This response will be returned in the following scenarios: • Invalid medical code • No data found for the requested medical code
406	There are two messages for this status code. Message 1: • Case prediction not available for [medical code input] due to insufficient records. This response will be returned in the following scenarios: • There are insufficient records to support a meaningful prediction. Message 2: • Case prediction not available for [medical code input] due to low return to work probability (<60%). This response will be returned in the following scenarios: • The return to work probability is < 60%.
500	Server error. If the server, API site, or this service failed, the response will be a 500 Server error.

2.10 Testing

MDGuidelines offers a test harness for integration testing:

https://api.mdguidelines.com/help/durationsCase-v4.html

Note: use of the test harness requires production license key configuration (RG-LICENSE-KEY).

2.11 Sample Code

JQUERY

```
var uri = "https://api.mdguidelines.com/api/v4/durations/case/";
uri += "354.0";
uri += "?sex=male";
uri += "&age=45";
uri += "&jobClass=medium";
uri += "&programType=wc";
uri += "&comorbidities=305.1,depression";

$.ajax({
    url: uri,
    type: 'GET',
    dataType: 'json',
    headers: { 'RG-LICENSE-KEY': 'XXXXXXXX-XXXX-XXXX-XXXX-XXXXXXXXXXXX', },
    success: function (data) { handleData(data) },
    error: function (xhr, status, error) { handleError(xhr, status, error) }
})
```

Document Revision History

Date	Reason For Changes	Document Version
06/08/2017	Initial version – Upgrade from Case v3 to add support for automatically mapping comorbidity medical codes to Comorbid Group codes. • Additional response fields in Factor element • Explanation of medical code mapping to Comorbid Group codes, section 2.7.	1.0
08/03/2017	Additional case scenarios are supported with the release of MDGuidelines' Population Database version 4.1. No changes to the data schema. • Support for Pregnancy-related diagnoses (e.g., 650) • Support for ICD-9-CM Procedures as Primary Diagnosis (e.g., 81.54 Total Knee Replacement) • Improved messaging for when no Case Prediction is a vailable (Status Code 406) • Reduced the threshold for Return-to-Work probability from 75% to 60% in order to increase the availability of case prediction scenarios. Clarifications about Comorbidity Ranking: • Although the request can include up to 5 comorbidities, the response list of Factors will include only up to 3.	2.0
08/16/2017	Minor clarification of language related to content and data changes. See Section 2.3 Version Information.	2.1
10/05/2017	Corrected typo in section 1.2.	2.2
12/6/2023	Misc. Changes and Corrections	2.3