1. **Overview**

This document describes the design, data, and computational specifications for ***BCDS Model No. 001 – Auto-assignment of Combined Disability Determinations for Ear related issues.*** The model conforms to BCDS requirements by defining the specifications for the three core components of BCDS models: 1) the Decision Determination Matrix (DDM); 2) the Target Claim Feature-Set Data and Computational Specifications; and 3) the Claimant Feature-Set Data and Computational Specifications. Each of these components are summarized below. **The related data and computational specifications are provided as Appendices 1 through 2 (Made available via the GitHub).**

1. **Ear Model Decision Determination Matrix**

The Ear Model DDM is a 27 by 114,393 matrix composed of a series of claim characteristic patterns that, when satisfied, yield a CDD for a set of EAR issues that is consistent with that produced by VBA’s RVSRs (81 to 86%) of the time (this number can be as high as 99.5%). The columns represent a set of predictive characteristics or “feature set.” The rows constitute a predictive patterns – the various combinations of these feature-sets, and a specific CDD that results when the pattern is satisfied.

The DDM is a static reference. The same predictive characteristics for a target claim (i.e., one for which the CDD will be assigned systematically using the model) are first derived and then compared to the DDM to identify the matching pattern. The associated CDD is then assigned.

The complete DDM for the Ear Model is attached as DDM\_001.csv. Table 1 below provides a basic description of each of the Ear Model Feature Set. The related data and computational specifications for each, is provided subsequent sections.

**Table 1: Feature Set Definitions**

| **Feature** | **Definition** |
| --- | --- |
| Claimant Age | The age of the claimant when the target claim was filed (Range in units of 10 beginning at 20) |
| Sequential Number of Ear claims | The number of supplemental claims previously adjudicated containing at least one Ear Contention. |
| Number of Ear Contentions | The number of ear related contentions included in the target claim. |
| Prior Ear CDD | The ear-related CDD resulting from the claim most recently adjudicated by VBA for ear related issues. |
| Age of the Ear CDD | The period of time between the date of claim for the target claim and the effective date of the prior ear related CDD (in Years, rounded to whole numbers) |
| Age of the Claim | The elapsed time between the date of auto-adjudication and the date of claim for the target claim (in Years, rounded to whole numbers) |
| Contention Code 2200 | The number of occurrences in the target claim and previous claims of the **Ear Condition** code |
| Contention Code 2210 | The number of occurrences in the target claim and previous claims of the **Ear Infection** code within the Target Claim |
| Contention Code 3140 | The number of occurrences in the target claim and previous claims of the **Hearing Loss** code within the Target Claim |
| Contention Code 3150 | The number of occurrences in the target claim and previous claims of the **Hearing loss, sensorineural** code within the Target Claim |
| Contention Code 4130 | The number of occurrences in the target claim and previous claims of the **Mastoiditis** code within the Target Claim |
| Contention Code 4210 | The number of occurrences in the target claim and previous claims of the **Meniere's disease** code within the Target Claim |
| Contention Code 4700 | The number of occurrences in the target claim and previous claims of the **Non-Specific Ear Condition** code within the Target Claim |
| Contention Code 4920 | The number of occurrences in the target claim and previous claims of the **otitis externa** code within the Target Claim |
| Contention Code 6850 | The number of occurrences in the target claim and previous claims of the **tinnitus** code within the Target Claim |
| Diagnostic Code 6100 | The number of occurrences in previously adjudicated claims for the **Hearing Loss** diagnostic code for disability determinations for the ear. |
| Diagnostic Code 6200 | The number of occurrences in previously adjudicated claims for the **Otitus Media (Chronic Ear Infection)** diagnostic code in the preceding disability determination for the ear. |
| Diagnostic Code 6210 | The number of occurrences in previously adjudicated claims for the **Disease of the Auditory Canal** disability code in previous disability determinations for the ear. |
| Diagnostic Code 6202 | The number of occurrences in previously adjudicated claims for the **Otosclerosis** disability code in previous disability determinations for the ear. |
| Diagnostic Code 6204 | The number of occurrences in previously adjudicated claims for the **Labyrinthitis** diagnostic code in previous disability determinations for the ear. |
| Diagnostic Code 6205 | The number of occurrences in previously adjudicated claims for the **Meniere's Syndrome** disability code in previous disability determinations for the ear. |
| Diagnostic Code 6207 | The number of occurrences in previously adjudicated claims for the **Loss or partial loss of Ear** diagnostic code in previous disability determinations for the ear. |
| Diagnostic Code 6209 | The number of occurrences in previously adjudicated claims for the **Benign growth of Ear** diagnostic code in previous disability determinations for the ear. |
| Diagnostic Code 6201 | The number of occurrences in previously adjudicated claims for the **Otitis Media** diagnostic code in previous disability determinations for the ear. |
| Diagnostic Code 6211 | The number of occurrences in previously adjudicated claims for the **Perforated ear drum** diagnostic code in previous disability determinations for the ear. |
| Diagnostic Code 6260 | The number of occurrences in previously adjudicated claims for the **Tinnitus** diagnostic code in previous disability determinations for the ear. |

1. **Target Claim Feature-Set Data and Computational Specifications**

As Table 1 (above) suggests, some – but not all – predictive characteristics are derived from data contained in the claim that is to be adjudicated (the Target Claim). Primarily, these features characterize the claimant at the time of filing, as well as claimant perceived changes in the status or severity of the ear related disability, which are captured within “contention” related data. Additionally, claim-specific data is captured to provide reference and descriptive information that will allow the authorized VA personnel to easily identify the claim in other systems, and evaluate the CDD for the ear generated by the BCDS system. The specifications for each feature are defined in Table 2 below.

**Table 2: Target Claim Computational Specifications**

| **Feature** | **Field Name (s)** | **Purpose** | **Calculation** |
| --- | --- | --- | --- |
| *Veteran Identifier* | *VET\_ID* | *Reference Only* | *Direct Extract (SSN - alpha numeric)* |
| *Veteran Name* | *XXXXXXXXXXXX* | *Reference Only* | *Direct Extract (Alpha-numeric)* |
| *Regional Office* | *RO\_Number* | *Reference Only* | *Direct Extract (Numeric)* |
| *Claim Identifier* | *CLAIM\_ID* | *Reference Only* | *Direct Extract (Alpha-numeric)* |
| *EP Code* | *END\_PRODUCT\_CODE* | *Reference Only* | *Direct Extract (Alpha-numeric)* |
| *Date of Claim* | *DATE\_OF\_CLAIM* | *Reference Only* | *Direct Extract (Date)* |
| Age of the Veteran | DATE\_OF\_BIRTH | Predictive Characteristic | ([Date of claim] – [Date of birth]) / 365 rounded to the nearest year. ***NOTE: the original development date provided DOB as a year and not a date.*** |
| Number of Ear Contentions |  | Predictive Characteristic | A numeric count of the contentions associated with the target claim\_ID that are Ear Related (See\_\_\_\_\_\_\_\_\_\_\_\_) |
| Number of Contentions |  | Predictive Characteristic | A numeric count of the contentions associated with the target claim\_ID. |
| Age of the Claim | DATE\_OF\_CLAIM | Predictive Characteristic | ([Current\_Date]-[date\_of\_claim]) / 365 rounded to the nearest year. |
| Contention Codes (2200 through 6850) |  | Predictive Characteristic | Stored as the count of previous occurrences of the codes assigned, including the target claim. |

1. **Claimant Feature-Set Data and Computational Specifications**

Claimant related features are derived by identifying related disability determination decisions and supporting data for the claimant identified in the target claim. For the Ear Model, these data relate primarily to the most recent rating profile adjudicated for ear related issues (defined as records for the claimant with a rating profile date immediately preceding the date of claim for the target claim). These data include key attributes and findings of the disability determination, including proximity in time to the current claim, and the previous determination as to the validity and severity of the disability. Almost all claimant features are calculated. The specifications for each are provided in Table 3 below.

**Target 3: Claimant Feature-Set Computational Specifications**

|  |  |  |  |
| --- | --- | --- | --- |
| **Feature** | **Field Name (s)** | **Purpose** | **Calculation** |
| Prior Ear CDD | Constraint: Maximum Profile\_Date where less than target claim\_date | Predictive Characteristic | CDD={100X(1 – (1-R1/100)(1-R2/100)…(1-Rn/100)} / 100 |
| Age of Ear CDD | Constraint: Maximum Profile\_Date where less than target claim\_date | Predictive Characteristic | [current\_date]-[begin\_date]/365 rounded to nearest year, for the most recent ear-related rating profile and decision prior to the target claim date. |
| Diagnostic Codes | Constraint: Maximum Profile\_Date where less than target claim\_date | Predictive Characteristic | Stored as the count of previous occurrences of the diagnostic codes assigned by the fully adjudicated claim immediately prior to the target claim |