Documentation of

The 2013 IDI Valuation Table Workbook Version 1.0.xlsm

Joint American Academy of Actuaries/Society of Actuaries Individual Disability Tables Work Group

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Introduction

This document describes the layout and functionality of the workbook called *2013 IDI Valuation Table Workbook Version 1.0.xlsm*. The workbook was developed by the Individual Disability Table Work Group (IDTWG) of the American Academy of Actuaries to calculate individual disability income (IDI) claim costs, net premiums, active life reserves, and disabled life reserves using the 2013 IDI Valuation Table and to compare these values to those based on the 85 Commissioners Individual Disability Tables (CIDA and CIDC).

The workbook calculates claim costs, active life reserves and disabled life reserves for the various tables from first principles. There may be future revisions to this workbook as the 2013 IDI valuation table is revised, additional functionality is added, or corrections are made.

The workbook is being released with no cell protections. Any user modifications to the workbook are the user's responsibility. Users should store an unmodified version of this workbook before making any modifications that might support their analysis of the 2013 IDI valuation table.

The workbook requires at least 16 megabytes of storage. It is designed to run on Excel® 2007 and later versions.

Any questions, feedback or suggested corrections regarding the workbook should be directed to Bob Beal, who may be reached at 207-771-1201 or by email, bob.beal@milliman.com.

The remainder of this document describes the content of the various tabs comprising the workbook.

Tab: ALR Calc - Calculates Active Life Reserves

This tab calculates active life reserves (ALR) based on the specified input, which are provided in cells D9 to D29. The following describes the input parameters, which are in blue cells in the workbook:

- *Contract Type (cell D9).* The user selects accident and sickness (AS) or overhead expense (OE);

- *Occupation Class (cell D10).* The user selects an occupation class of M, 1, 2, 3, or 4;

- *Issue Age (cell D11).* The user selects any issue age from 20 to 69;

- *Cause (cell D12).* The user selects Accident (Acc), Sickness (Sck), or Combined (Com). [Note: To produce ALRs for the 0-day elimination period (EP), the user should set cause to Acc;

- *Gender (cell D13).* The user selects either male or female;

- *Smoker Status (cell D14).* The user selects nonsmoker (NS), smoker (SM), or aggregate (AG). No *Smoker Status* adjustments are applied to the 85CIDA claim incidence and termination rates;

- *Elimination Period (cell D15).* The user selects an EP of 0, 7, 14, 30, 60, 90, 180, 360, or 720 days. Note that 0-day EP is for accident only;

- *Benefit Period (cell D16).* The user selects a benefit period (BP) of 6M, 12M, 18M, 30M, 36M, 60M, to 65, to 70, or life;

- *Interest Rate (cell D17).* The user may input any interest rate;

- *Select COLA (cell D18).* The user may choose to inflate benefits using a cost-of-living adjustment;

- *COLA% (cell D19).* The user may input any annual inflation rate. This will be applied on a compound basis without any cap until age 65. [Note: The cost-of-living benefit adjustments do not increase after age 65;

- *Market (cell D20).* The user selects employer sponsored (ER Spons) or individual billed (Individual). No market adjustments are applied to the 85CIDA incidence or termination rates;

- *Issue State (cell D22).* The user selects California (CA), Florida (FL), New York (NY), all other states (other), or aggregate (AG) to determine the issue state to be represented. No state adjustments are applied to the 85CIDA incidence or termination rates;

- *Premium Pay to Age (cell D23).* Calculated net premiums are level at issue and are paid until the premium pay to age (e.g., 65). The user can input any premium pay to age greater than the issue age, not to exceed age 70;

- *Coverage to Age (cell D24).* This is the age at which disability coverage ceases. The user can input any coverage to age greater than the issue age, not to exceed age 70. Typically, the premium pay to age and the coverage to age are the same, but they do not have to be;

- *Minimum BP (cell D25).* The user inputs the number of days in the minimum BP (e.g., 720). This is applicable to benefit periods to 65, to 67 and to 70. The benefit period cannot be less than the EP plus the minimum BP;

- *Select Limiting BP (cell D26).* The user selects yes or no. This limiting BP applies to the shorter term BP (e.g., 60M). This option is provided because some IDI products limit the BP for a short-term BP so that it does not exceed the long-term BP (e.g., to 65) at the higher attained ages;

- *If Yes.* (cell D27). If "yes" is selected in cell D20, the user selects the limiting BP from to 65, to 67, or to 70.

The last two input parameters apply to the ALR calculation methodology:

- *ALR Method (cell D28).* The user selects net level premium (NLP) or 2-year preliminary term (2PT).

- *Mortality / Lapse (cell D29).* The user selects from the follow mortality or lapse assumptions to be used in the calculation of the net premiums and ALRs:

    1. 58CSO—the 1958 Commissioner's standard ordinary mortality table;
    2. 80CSO—the 1980 Commissioner's standard ordinary mortality table;
    3. 01CSO—the 2001 Commissioner's standard ordinary mortality table;
    4. Policy Lapse—Sample policy lapse rates are stored in the mortality and lapse tab be used in lieu of the CSO tables;
    5. Policy Lapse GR—The sample policy lapses (from #4), capped using the statutory minimum reserve limitations on pricing policy lapses for guaranteed renewable policies.

Please note the following:
- The CSO mortality tables stored in the workbook do not vary by smoker status.
- The stored policy lapse rates in the mortality and lapse sheets should not be viewed as endorsed assumptions; they are hypothetical. The stored policy lapse rates vary only by issue age and policy year. The user will need to modify the workbook if more differentiation in the policy lapse rates is preferred.

Once the input parameters are specified, the user hits the **Run Claim Cost Calcs** macro button, which causes the claim costs and the ALRs to be calculated. The claim costs are calculated in the CC and DLR tab and pasted back into the ALR Calc tab.

The key output in the ALR Calc tab is as follows:

- A comparison of active life terminal reserves based on 85CIDA and the 2013 IDI valuation tables, reflecting the user's input specifications (columns H, I, and J). The ALRs reflect the ALR method specified by the user;

- A comparison of the claim costs based on 85 CIDA, the 2013 IDI base, and 2013 IDI valuation tables, reflecting the user's input specifications that were used in the derivation of the active life terminal reserves. See columns M, N, and O. [Note: The 2013 IDI base table claim costs do not include the valuation basis margins];

- A comparison of net premiums based on 85CIDA table and the 2013 IDI valuation table, reflecting the user's input specifications. [Note: Net premiums for both the NLP and 2PT methods are calculated, even though only ALRs reflecting the specified ALR method are displayed, as described above];

- Graphs of the active life reserves and claim costs under the two sets of morbidity assumptions are provided beginning in cell A62.

Users may need to revise the scales in the graphs depending on the displayed values. There are intentionally no print areas in the workbook. Users will need to set their own print areas if they wish to print.

The details to the active life reserve calculations are provided to the right of column U. Users are encouraged to become familiar with the formulas.

Tab: CC and DLR - Calculates Claim Costs and Disabled Life Reserves

This tab calculates the claim cost for a single attained age based on the 2013 IDI valuation table adjusted by the specified input parameters and for the 85CIDA table. The sheet also projects the resulting disabled life reserves for the 2013 IDI valuation, 85CIDA, and 85CIDC tables.

The input parameters in cells C7 to C23 are defined similar to the input parameters in ALR calc; diagnosis has been added in cell C21 and is used only in the calculation of DLRs. Note that when

the **Run Claim Cost Calcs** macro is run in the ALR Calc sheet, diagnosis is automatically set to AG, except if cause is set to Acc, in which case diagnosis is automatically set to "Other Injury."

When the macro **Run Claim Cost Calcs** is run in ALR calc, the input parameters specified in that sheet are pasted in this sheet.

The user can run single attained age calculations in CC for ALR without having to use the macro in ALR calc by simply changing the input parameters, which are in blue cells in the workbook. The resulting claim incidence modifiers are displayed in cell D30 to D34. The combined incidence modifier in cell D35 is the product of the adjustment factors in cells D20 to D24.

The resulting claim termination rate (CTR) adjustments are found in columns AY to BB.

The detail calculations behind the claim costs and DLRs are to the right column N. Users are encouraged to become familiar with the formulas.

The following are key output in the CC for ALR tab:

- The resulting claim costs, along with the incidence rates and present value of future benefits (PVFB) for the specified attained age are displayed in cells G17 and I23;

- Projected DLRs for the specified age at disablement, based on 85CIDA and 85CIDC claim termination rates, are shown in columns AO and AP; those based on the 2103 IDI valuation table are shown in columns BT and BU.

Tab: Incidence Modifiers

This tab consists of tables containing the various claim incidence modifiers:

Contract Modifier. This varies between accident and sickness and overhead expense contracts.

Market Modifier. These vary between employer-sponsored and individually billed.

State Modifier. These vary for California, Florida, New York, and all other states combined.

Benefit Period Modifier. These vary by benefit period, occupation classes, and elimination period.

Smoker Status Modifiers. These vary by smoker status, occupation class, gender, and elimination period.

Tab: Termination Modifiers

This tab contains the various CTR modifiers. These factors are by annual claim durations: Year 1, year 2, years 3-5, years 6-10. They are not applied to the ultimate durations (i.e., years 11+).

Contract Modifiers. This varies between accident and sickness and overhead expense contracts.

Benefit Period and COLA Modifiers. These vary by type of benefit period, with and without cost of living adjustment (COLA).

Issue State Modifiers. These vary by Florida and all other states combined.

Diagnosis Modifiers. Diagnoses are grouped into five CTR levels: Very high, high, mid, low, and very low. The mapping of ICD9 diagnoses to these five CTR groups is provided in the diagnosis grouping tab.

Tab: Diagnosis Groupings

This tab shows the various ICD9 diagnosis groupings and their mapping to the five CTR modifier groups.

Tab: Incidence Compare – Compares Incidence Rates

Columns A to R in this sheet allow the user to compare the unmodified IDI base table incidence rates to the 85CIDA incidence rates for specified occupation class (cell C3), gender (cell E3), and elimination period (cell G3). Please note that the incidence rates for the new SOA Individual Disability Experience Committee (IDEC) occupation class M are compared to the 85CIDA occupation class 1 rates.

To the right of column T, the sheet compares the unmodified 2013 IDI Base Table incidence rates by occupation class for the specified gender (cell W2) and elimination period (cell Y2).

Tab: CTR Compare - Compares Claim Termination Rates

This tab allows the user to compare the CTRs at all durations for eight specified scenarios, by inputting values in columns C – J, rows 11 – 22. The user also specifies the CTR basis (CIDA, 85CIDC, or IDEC) in cell C8 and then hits the **Paste CTRs** macro button to compute the CTRs for each scenario. The specified CTR adjustment factors are applied if the IDEC basis is selected. The CTRs reflect the termination modifiers for the selected parameters. The user may change the number of scenarios to be displayed by adding or deleting columns.

Tab: Claim Cost Compare – Compares Claim Costs

This tab allows the user to compare the claim costs at all policy years from the specified issue age to age 69, for the specified eight scenarios represented by each of columns D through K. The user specifies the morbidity basis (85CIDA, 2013 IDI Base, 2013 IDI Valuation) in cell D7. The difference between the 2013 IDI base and valuation claim costs is the presence of reserve margins in the 2013 IDI valuation claim costs. The user hits the **Compare CCs** macro button to compute the claim costs. The appropriate incidence and termination rate are applied to the base IDEC incidence and CTRs to derive the claim costs that are displayed. The user may change the number of scenarios to be displayed by adding or deleting columns.

Tab: ALR Compare – Compares Active Life Reserves

This tab allows the user to compare ALR terminal factors under various scenarios. The user specifies the morbidity basis (85CIDA, 2013 IDI valuation) in cell D7. The user hits the **Paste ALRs** button to compute the ALRs.

Tab: DLR Compare – Compares Disabled Life Reserves

This tab allows the user to compare DLRs under various scenarios. The user specifies the morbidity basis (85CIDA, CIDA, 2013 IDI valuation) in cell C7. The user hits the **Paste DLRs** button to compute the DLRs.

Tab: 2013 IDI Base Incidence Rates

This tab contains all of the 2013 IDI base claim incidence rates for attained ages 20 to 69. They vary by occupation class, gender, elimination period, and cause (accident vs. sickness). These incidence rates are before the application of any incidence modifiers or reserve margins.

Tab: 2013 IDI Base CTRs - Select

This tab contains the 2013 IDI base CTRs for the select durations. These termination rates are before the application of the termination modifiers or reserve margins.

Tab: 2013 IDI Base CTRs - Ultimate

This tab contains the 2013 IDI base ultimate CTRs. These termination rates are before the application of reserve margins.

Tab: 85CIDA Incidence Rates

This tab contains all of the 85CIDA incidence rates. They vary by the 85CIDA occupation class (1, 2, 3 and 4), gender, elimination period, and cause (accident vs. sickness).

Tab: 85CIDA CTRs

This tab contains all of the 85CIDA termination rates. They vary by occupation class (1, 2, 3 and 4), gender, elimination period, and cause (accident vs. sickness). The ultimate CTRs are included in this sheet, along with the select CTRs.

Tab: Mortality and Lapse Rates

This tab contains the various CSO mortality rates and policy lapse rates that can be selected in the ALR Calc sheet.

Tab: Lookups

This tab contains miscellaneous ranges required for the calculation of claim costs.