

BenMAP-CE Release Notes

Release Version

BenMAP-CE 1.5.8.1

Release Date

2021.02.22

Enhancements and Fixes

1. Error Logging
 - a. Changed location of BenMAP.log file from "Program Files (x86)/BenMAP-CE" to "Documents/My BenMAP-CE Files" to avoid Windows security issues that would block error logging in some configurations. (BENMAP-493)
 - b. Added additional detail to the error log when a problem is encountered while processing a ctx file in command line, batch mode. (BENMAP-504)
2. Aggregation, Incidence Pooling and Valuation Pooling
 - a. Fixed an issue causing BenMAP crash when selecting "User Defined Weight" as the pooling method and switching to a different pooling tab. (BENMAP-509)
 - b. Fixed an issue causing BenMAP not pooling valuation with Sum Dependent as the pooling method. (BENMAP-511)
3. Health Impact Functions
 - a. Improved the logic that determines which prevalence datasets are valid for a specific Health Impact Function. BenMAP now requires a dataset to match endpoints in addition to endpoint groups. Added endpoints to the "Prevalence (2008)" dataset. (BENMAP-510)
4. Validation
 - a. Fixed an issue that was causing a significant time delay when validating a dataset with a new endpoint or endpoint group. Now BenMAP only reports the first instance in which a missing endpoint or endpoint group occurs. (BENMAP-501)
 - b. Fixed a bug in the import of Health Impact Functions in which BenMAP omitted the identified seasonal metric during import if it did not exist in the pollutant definition. BenMAP now validates the presence of and relationship between pollutant, metric, and seasonal metric. An error is given during validation if the value or relationship between values is not present in the pollutant definition. (BENMAP-508)
5. Main Form
 - a. Fixed a bug in the wait dialog box that caused the main form to disappear behind other open programs when a user closed "Modify Datasets" or loaded results in the Map/Table view. (BENMAP-499)
6. Database updates (BENMAP-512)
 - a. Incidence
 - i. Updated "Other Incidence (2014)" to include new endpoints.
 - ii. Updated "Prevalence (2008)" from County level to Nation level and added Endpoint names to each prevalence rate.

- iii. Added “National Incidence & Prevalence (2021)” that includes the new misc. incidence and prevalence rates at the national level.
- b. Health Impact Functions
 - i. Removed “EPA Standard Health Functions”
 - ii. Added “EPA Standard Health Functions (2021)” to reflect recent epidemiological literature from EPA’s Integrated Science Assessments for PM2.5 and Ozone.
 - iii. Added “Additional Health Functions”, which includes older HIFs previously included in “EPA Standard Health Functions”.
- c. Valuation Functions
 - i. Removed “EPA Standard Valuation Functions”
 - ii. Added “EPA Standard Valuation Functions (2021)” to reflect updated economic values for the HIFs included in “EPA Standard Health Functions (2021)”.
 - iii. Added “Additional Valuation Functions”, which includes older functions previously included in “EPA Standard Valuation Functions”.

Release Version

BenMAP-CE 1.5.7.1

Release Date

2020.12.14

Enhancements and Fixes

1. Removed Monitor Data Conversion tool. (BENMAP-402)
2. Aggregation, Incidence Pooling and Valuation Pooling
 - a. Default currency year for inflation adjustment is changed from population dataset year to the latest available year in the database. (BENMAP-481)
3. Database
 - a. Updated Other Incidence (2014) dataset with changes to existing rates for Montana and Indiana states. (BENMAP-485)
4. Health Impact Functions
 - a. Fixed a bug in which users with daily air quality data received the warning about using annual data on a daily health impact function (BENMAP-451)
 - b. Added a check for population and incidence data to the Health Impact Function confirmation window. Users are now warned if the population data is coarser than incidence data (BENMAP-487)
 - c. Improved mapping code to ensure that health impact estimate results containing less than seven unique values will be colored properly on the map (BENMAP-459)
 - d. Adjusted the Geographic Area feature to only include an air quality cell in the geographic area if the majority of the cell's area lies within the geographic area and a portion of the cell also lies within a neighboring geographic area. If the remaining portion of a cell that intersects with a geographic area does not intersect with any other geographic area used by another function, it will be included in the geographic area regardless of how small the

intersection. This ensures that small, often coastal, cells are included in the desired geographic area. This is a slight change to BENMAP-448 that was introduced in 1.5.3.1. (BENMAP-460)

- e. Adjusted the Aggregation for Raw Data feature to clean up the health impact estimate result set when aggregating to the same grid definition that was used to assign geographic areas when running health impact functions. It is important to note that geographic areas always keep whole cells that may overlap the border of the geographic area. Because of this, previously, aggregation would include small results from the neighboring polygons. For example, when aggregating to State, a function assigned to Oregon would also include small result records for Washington, Idaho, Nevada, and California. These extra records are now removed. Similarly, if an Elsewhere region is used in the analysis, then results related to named geographic areas are removed from the Elsewhere results. (BENMAP-460)
 - f. Added additional error checking to notify the user when the aggregation area assigned to a function cannot be found in the setup. This can happen when running health impact functions and also when aggregating health impact estimates. (BENMAP-460)
5. Audit Trail (BENMAP-488)
- a. Added a "Runtime" node to the audit trail report that displays the processing time for the Health Impact Function calculation and Valuation calculation.
6. Validation (BENMAP-468)
- a. Fixed a bug in which users received a warning during validation for an entry not existing in the database that was caused by trailing white space.
7. Model Air Quality Data (BENMAP-244)
- a. Updated text and added a hover message on the Model Data window to indicate the range of valid options for "Values" when importing data.

Release Version**BenMAP-CE 1.5.6.0****Release Date****2020.11.18****Enhancements and Fixes**

1. Re-enabled the Help/Provide Feedback feature. (BENMAP-484)
2. Population
 - a. Added logic to clear respective cache entries when a population dataset is deleted through "Modify Datasets." (BENMAP-452)
 - b. Improved population caching by capturing the population dataset ID to differentiate between population datasets that use the same age range, population and air quality grids, and population year. (BENMAP-457)
 - c. Implemented change to allow column and row index values larger than 10,000 in population datasets. They must now be less than 1,000,000. (BENMAP-476)

3. Air Quality Data
 - a. When a modal data source file does not have a seasonal metric specified, BenMAP will calculate the seasonal metric defined in Pollutant Definition. (BENMAP-465)
 - b. Fixed a bug which prevented users from performing a monitor rollback on input monitor files if the setup does not have a monitor dataset uploaded. (BENMAP- 467)
4. Health Impact Functions (BENMAP-477)
 - a. Improved the load time of results in Map view.
 - b. Fixed an issue that caused the program to crash if the user had selected an aggregation level and opened the “Modify Datasets” window.
5. Modify Datasets (BENMAP-483)
 - a. Addressed issues of the program crashing when closing the “Modify Datasets” window after users had either completed analyses and loaded results or made changes to the datasets.

Release Version	BenMAP-CE 1.5.5.1
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Release Date	2020.10.09
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Enhancements and Fixes

1. Global Seasons and Seasonal Metrics (BENMAP-312, BENMAP-313, BENMAP-317)
 - a. Added a check of input model data values to conform to the guidance provided in the user manual. The number of values expected is based on the user’s designation of metric, seasonal metric, and annual statistic.
 - b. Added a check of the pollutant metric season against the seasonal metric seasons. The user will be notified if the global season is shortened such that it no longer contains the seasonal metric seasons. The user may select to reset the global season or to delete and re-enter seasonal metric seasons.
 - c. Updated the seasonal metric seasons window to notify the user when the start or end of the seasonal metric seasons do not match the start or end of the global pollutant season.
 - d. Fixed an error which caused seasonal metrics not identified in the model air quality input file to report a value in the Data tab.
2. Health Impact Functions (BENMAP-474)
 - a. Fixed an issue preventing automatically choosing incidence datasets with the year closest to the population year, when adding selected HI function.
 - b. Fixed an error which happened when users opened the “Configuration Results Report” window for HI results.
3. Aggregation, Incidence Pooling and Valuation Pooling (BENMAP-478)
 - a. Fixed an error which happened when importing a pre-1.5.4 apvrx file without aggregation scales set.
 - b. Corrected the tree view for incidence pooling so that it will not show duplicate items when

- importing pre-1.5.4 apvrx files.
- c. Improved the speed of calculating pooled population.
- d. Added "Grid Definition" column to incidence pooling CSV exports.
- 4. Audit Trail (BENMAP-479)
 - a. Updated the audit trail report for Aggregation, Pooling, and Valuation to follow the convention of using endpoint group and pooling columns
- 5. Other Changes
 - a. Corrected sporadic issue displaying "Select Result Fields" dialog when reviewing HIF results.

Release Version	BenMAP-CE 1.5.4.0
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Release Date	2020.09.03
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Enhancements and Fixes

1. Variable Dataset
 - a. Removed the requirement for a variable dataset to be selected in the Valuation step. BENMAP now allows users to choose no dataset or, if a valuation contains a variable that requires a dataset, will assist them in selecting the appropriate variable dataset (BENMAP-278)
2. Global Seasons and Seasonal Metrics (BENMAP-312, BENMAP-313, BENMAP-317)
 - a. Improved handling of the creation of Air Quality Grids from Model Data
 - i. Restricted the calculation of air quality data to the span of the global pollutant season rather than the entire year
 - ii. Required the span of seasonal metrics to fall within the bounds of the global season
 - iii. Excluded missing data within the global season from calculation of global pollutant and seasonal metrics
 - b. Improved the calculation of Health Impact Functions
 - i. Restricted the calculation of daily Health Impact Functions to the span of the global pollutant season rather than the entire year
3. Other Changes
 - a. Added Total_Pop as the default selection on the Population Map. Previously, only the individual Race, Gender, Ethnicity, and AgeRace categories were mapped. (BENMAP-288)
 - b. Allowed for the upload of population datasets that include years beyond 2099 to validate and import successfully (BENMAP-345)
 - c. Added capacity to report Geographic Area in batch mode CFGRX reports, which was previously added for APVRX reports in v 1.5.2.0 (BENMAP-446)

Release Version

BenMAP-CE 1.5.3.1

Release Date

2020.04.28

Enhancements and Fixes

1. Health Impact Functions

- a. When a function is assigned to a geographic area, an estimate will only be calculated for an air quality cell if the majority of the cell is within the geographic area. (BENMAP-448)
- b. A confirmation window has been added prior to the running of a Health Impact Function analysis. This window provides a summary of key data and raises a warning about potential issues (overlapping age ranges, no crosswalk available, etc.) that may delay or influence the analysis (BENMAP-451)

2. Aggregation, Incidence Pooling and Valuation Pooling (BENMAP-425, BENMAP-252)

a. UI changes:

i. Incidence pooling window

1. Added Pooling Level dropdown

- a. Icons are added to column headers to mark columns used in grouping.
- b. Each pooling window may have different pooling levels

2. Revised the pooling tree view to show all grouped levels even when there is only one study under a group. (No change if there is only one study for an endpoint group)

ii. Allowed children of a selected pooling group highlighted.

iii. A warning message was added to show when users use “subtraction” method on groups with discrete age ranges.

iv. Added fields: Age Range, Number of Studies and Nickname. Nickname is editable by users.

v. Revised some default group names

vi. Changed blank space “” to “pooled” for pulled groups in these fields: Dataset, Race, Ethnicity, Gender, Study Location.

vii. Removed Tile view and Condensed view

viii. Replaced Add/Delete pooling window button with “+” and “x” signs on tabs.

ix. Revised icons and colors in “Select Pooling Methods” window.

x. Moved button locations and default column orders.

b. Valuation pooling window

i. Changed the left/right layout to top/bottom layout to maximize available space and show more columns.

ii. Added instructional text and highlighting groups/studies to help users understand how to add valuation functions.

- iii. Features added to the incidence pooling window during this release were also added to the valuation pooling window.
 - c. Result window
 - i. Added “pooling window” to result column
 - d. Function changes
 - i. Fixed an issue that “Study Location” could not be used for grouping studies.
 - ii. Fixed an issue that custom weight was not correctly assigned to studies in the incidence pooling window and allowed users define custom weight in valuation pooling window.
 - iii. Fixed an issue that incidence and valuation could not be aggregated to different grid definitions.
 - iv. A preview capability has been added to the Incidence Pooling dialog. This is an additional tool to assist the user in understanding the impact of the current pooling configuration. This is an early version released with 1.5.3 for discussion. (BENMAP-252)
 - v. Updated pooled population
 - 1. Recalculate population when grouped functions have complicatedly overlapping demographic groups (e.g. one function has results for White and age 33-80 and the other function has results for Black and age 45-90).
 - 2. Added an option in the advance setting window to skip calculating population as it may take a very long time when the pooling is complicated.
 - vi. Added a feature to convert *.apvrx or *.apvx to the current structure. When users import an *.apvrx or *.apvx created in version before 1.5.3, a warning message appears to remind them to revise the converted pooling.
 - vii. Updated command line tool to process both old and updated pooling structure.
- 3. Manage Datasets
 - a. The program now notifies the user if they import a valuation function for which there is no corresponding Health Impact Function (BENMAP-215)
 - b. Fixed an issue with loading population data in which a user could not proceed to load the data if they did not require data validation but nonetheless successfully validated their data (BENMAP-449)

4. Reporting

- a. Previously, when showing analysis results, BenMAP showed values for all percentiles. Now, by default, the program only displays the 2.5th and 97.5th percentiles in the table view, with the option of including the additional percentiles, if desired. Also, when exporting results with only the 2.5th and 97.5th percentiles selected, the program now provides a formatted column commonly used in EPA reporting (BENMAP-284)
- b. Enhanced previous work on the functionality of the audit trail by allowing users to navigate through the audit trail using the Enter button and to ensure that search results are always properly displayed on screen (BENMAP-447)

5. Other Changes

- a. Improved the behavior of BenMAP when prompting users for the folder location of data inputs or report outputs. This includes: 1) remembering where users selected input Air Quality data; 2) having all dialog boxes open to the “My BenMAP-CE Files” folder or a subfolder within it (BENMAP-381)
- b. Addressed an issue in which the command line version of BenMAP was not properly reporting to the console and causing the program to crash (BENMAP-458)
- c. Merged “Open Existing Configuration Files (*.cfgx)” section and “Open Existing Configuration Result File (*.cfgrx)” section. Users will use a radio button to choose a file type to import. Similarly, merged “Open Existing APV Configuration File (*.apvx)” section and “Open Existing APV Result File (*.apvrx)” section.

Release Version**BenMAP-CE 1.5.2.0****Release Date****2020.02.28****Enhancements and Fixes**

1. Health Impact Function Calculations

- a. Population datasets were previously being cached so that subsequent analysis runs would complete more quickly. This feature was disabled in 1.3.5 due to an issue that was discovered. This issue is now resolved and population caching has been reactivated. (BENMAP-227)
- b. Health impact functions not using population data were previously calculated according to population bins without accumulating the results.. BenMAP uses average values of incidence and prevalence rates when generating point estimates. (BENMAP-410)
- c. Added notification when the air quality surface does not provide the metric specified in the health impact function and the annual metric will be used instead. (BENMAP-401)

2. Monte Carlo Iterations (BENMAP-409)

- a. In previous versions of BenMAP-CE the health impact function estimation and incidence valuation steps performed 1,000,000 Monte Carlo iterations when calculating uncertainty.

This default has been reduced to 10,000 to improve performance. And, the user may control this setting in the Advanced options for each of these steps. The number of iterations has been added to the audit trail output.

3. Batch Mode

- a. When running BenMAP in batch mode, the health impact functions are now calculated in parallel rather than sequentially. The command prompt also provides the user with additional information about the status of the run and any errors that occurred. (BENMAP-229)
- b. Corrected an issue preventing batch mode from returning to a command prompt when processing was complete. (BENMAP-342)
- c. The “Version” field is now supported as a custom field option when generating reports from batch mode for incidence and pooled incidence. (BENMAP-434)
- d. The “Geographic Area” field is now supported as a custom field option when generating reports from batch mode for incidence, pooled incidence, and pooled valuation. (BENMAP-446)

4. Audit Trail Reports (BENMAP-179, BENMAP-246)

- a. The layout of the audit trail has been modified to follow the sequence of inputs provided by the user in BenMAP (Air Quality, Health Impacts, and Aggregation, Pooling and Valuation). Improvements were made to the organization of data within each section.
- b. The previous ability to filter the audit trail is now augmented with the ability to search the audit trail. Users are now able to iterate through the audit trail to each location of the searched phrase. Expand All and Collapse All buttons were introduced to assist the user in navigating the audit trail.

5. Population Configuration

- a. Users are now able to modify or delete age ranges entered in population configurations. (BENMAP-275, BENMAP-388, BENMAP-281)
- b. BenMAP now prevents users from entering duplicate values for race, gender, and ethnicity. (BENMAP-242, BENMAP-287)
- c. Fixed issue preventing scroll bar from appearing in population configuration definition window. (BENMAP-387)

6. GIS Layer Export (BENMAP-400)

- a. Users are now able to select from among any pollutant or results layer loaded in BenMAP for export to shapefile. Previously, BenMAP provided the layer most recently loaded as the only option for export.
- b. Users are now able to select any of the variables that are generated in the “Data” tab of BenMAP for inclusion in the shapefile. Previously, BenMAP only provided point estimate data for incidence and valuation and only retrieved the data from the most recently loaded GIS layer.

7. CFG Compatibility (BENMAP-435)
 - a. CFG files created in versions of BenMAP prior to 1.5.1 were unable to load in 1.5.1 because of changes to IDs of incidence datasets in the database. BenMAP now verifies incidence datasets by name and setup, rather than ID.
8. Variable Datasets (BENMAP-436)
 - a. Previously, if users entered a dataset with a variable ("nohsdeg") that matched part of an existing variable in another dataset ("nohs"), BenMAP generated point estimate values of zero. BenMAP now retrieves values based on the name of both the variable and the dataset, instead of only the variable.
9. Corrected issues importing valuation datasets when import files contained blank rows or apostrophes. (BENMAP441, BENMAP-442)
10. Corrected issue importing incidence datasets when values contain apostrophes. (BENMAP-440)
11. Modify Datasets (BENMAP-437)
 - a. In order to prevent BenMAP from crashing, a wait screen is now included after the user selects "Modify Datasets" in the toolbar. This message allows for the necessary checks and updates to the map to occur before the user exits the program.
12. BDBX database import with health impact function dataset (BENMAP-406)
 - a. Correct an issue with incorrect value being assigned to geographic area feature in certain situations.
13. Health impact function dataset import issues (BENMAP-444)
 - a. Increased allowable field length for Name A, B, and C in health impact functions.
 - b. Adjusted several validation rules for health impact function dataset import.
14. Removed unused files from BenMAP application installer to reduce size. (BENMAP-427)

Release Version**BenMAP-CE 1.5.1.0****Release Date****2019.10.04****Enhancements and Fixes**

1. Command Line Tool (BENMAP-407)
 - a. Fixed issue causing "-TableName" parameter to be ignored when using command line to import air quality data.
2. Import from Excel (BENMAP-253)
 - a. For excel files with multiple sheets, once users select the sheet name for validation, they do not have to select again for importing.
3. Grid Definition and Crosswalk Datasets (BENMAP-421)
 - a. Updated two default crosswalks for the US setup: (1) County to State; (2) Nation to 36km.
4. Dataset Updates
 - a. For the US setup, added Global Exposure Mortality Model (GEMM) incidence data and

- into the default mortality incidence data (2015 - 2060); add GEMM health impact functions as a new function dataset. (BENMAP-414)
- b. For the US setup, replace the existing “EPA Standard Monitors Ozone” and “EPA Standard Monitors PM2.5” datasets with updated data for 2000-2018. (BENMAP-419)
- 5. Select Source of Air Quality Data
 - a. Allow users to import control AQ data without filling the Metric field (as for hourly data, it should be left blank). Before this update, users could only import baseline AQ without filling the Metric field. Fix issue causing seasonal metric not generated when Metric field is left blank. (BENMAP-375)
 - b. Fix issue causing leap year daily model data (with 366 data points) not corrected loaded (BENMAP-422).
- 6. Select Health Impact Functions (BENMAP-368)
 - a. Improved validation function for checking AQ data against selected functions. Users will receive a warning when the AQ data is annual but the function is seasonal.
- 7. Modify Datasets windows
 - a. Incidence Dataset Definition preview window. (BENMAP-223)
 - i. Updated click-to-sort to sort full list of values instead of just values on that page.
 - ii. Fixed issue causing preview window frozen when filtering by endpoint or endpoint group.
 - b. Manage Health Impact Function window, Manage Valuation Function and Manage Incidence Datasets window (BENMAP-238)
 - i. Fixed issue causing horizontal scroll bar doesn’t scroll to the end of the text.
- 8. GBD Tool
 - a. Fixed issue causing higher baseline incidence for IER function. (BENMAP-420)
- 9. GIS features
 - a. Fixed issue causing BenMAP showing the same Delta layer after a new cfgrx file is loaded. (BENMAP-417)
- 10. User Interface
 - a. Select Valuation Functions window (BENMAP-411)
 - i. When holding shift or control key, clicking does not change the status of the checkboxes any more
 - b. Fix tab order on several BenMAP-CE windows (BENMAP-273)

Release Version

BenMAP-CE 1.5.0.5

Release Date

2019.07.23

Enhancements and Fixes

1. Database Import Issues (BENMAP-416)

- a. Fixed issue causing Database Import to fail when importing version 1.3 or earlier BDBX file while reading incidence data.
- b. Fixed issue causing Database Import to fail when importing BDBX file containing valuation functions with apostrophes in the name.

Release Version

BenMAP-CE 1.5.0.4

Release Date

2019.02.20

Enhancements and Fixes

1. Geographic Areas (BENMAP-391)

- a. Added “Allow health impact functions to be assigned to features in this area” checkbox to Manage Grid Definition window. When selected, the user can choose a field from the shape file’s dataset that uniquely identifies features.
- b. Enhanced the “Apply Function To” picklist in the Health Impact Function Definition allowing the user to constrain the application of a function to a selected feature within a grid definition.
- c. Many places in the user interface will now display Geographic Area as “Area: Feature” when appropriate. For example, “State: California”.
- d. Updated import and export to support new Geographic Area Feature. Grid Definition and Health Impact Function export files can not be imported in older versions of BenMAP-CE.
- e. Added stronger validation of Health Impact Function datasets being imported from CSV. The following issues will be reported, and will block the dataset import:
 - i. Missing Geographic Area column when Geographic Area Feature column is present.
 - ii. Missing Geographic Area value when Geographic Area Feature value is present.
 - iii. Unable to find specified Geographic Area in your setup.
 - iv. Unable to find specified Geographic Area and Geographic Area Feature in your setup.
- f. Fixed an issue causing health impact functions that are tied to a geographic area, but not a geographic area feature, to display incorrectly in some windows.
- g. Previously, the “Geographic Area” column heading in the selected function list at the bottom of the Health Impact Functions selection dialog was always pink, indicating that the values were editable. In reality, the values in this column are only editable in a mixed scenario where one or more functions are constrained to a geographic area and one or more functions are not constrained. In this case, the user can select whether the unconstrained functions should run “Everywhere” or “Elsewhere.” The color of the column heading will now change dynamically to better communicate the current scenario.

2. Grid Definitions

- a. Fixed an issue preventing regular grids from working properly. (BENMAP-386)

- b. Correct issue with default values when importing grid definitions exported from previous versions of BenMAP-CE. (BENMAP-399)
- 3. Database Management Tool
 - a. Allow users to import integers with trailing zeros (e.g. 11.0) into the following fields: Column, Row, Start Age, End Age and Year. (BENMAP-245)
 - b. Allow users to enter qualifier longer than 64 characters in Valuation Function Definition Window. (BENMAP-374)
 - c. Allow users to leave un-required fields blank when importing data through Excel or CSV. (BenMAP-454)
- 4. Air Quality Rollback
 - a. Corrected issue when applying rollback to a standard with percentage interday rollbacks. (BENMAP-254)
- 5. GDB Rollback Tool
 - a. Fixed an issue with exporting GDB results into csv. (BENMAP-393)
- 6. User Interface
 - a. Fixed issues that some buttons and scrollbars disappear when resizing windows. (BENMAP-394, BENMAP-395, BENMAP-396)
 - b. Corrected issue preventing results from displaying on map when changing projection. (BENMAP-383)
 - c. Improved algorithm used to generate Jenks Natural Breaks for the map's table of contents to ensure consistent breaks when rendering large datasets. (BENMAP-382)
 - d. When displaying health impact function estimates or pooled incidence or valuation results, the Geographic Area column will be automatically displayed if one or more functions have Geographic Area assigned. (BENMAP-397)

Release Version

BenMAP-CE 1.4.14

Release Date

2018.08.22

Fixes

- 1. Database Import
 - a. Issue importing 1.4-formatted bdbx files containing Health Impact Function dataset into BenMAP-CE 1.4 for functions not assigned to a geographic area. These functions would import successfully but would not be selectable when calculating health impacts. (BENMAP-376)
- 2. GIS Interface/Functionality
 - a. Fixed an issue causing Air Quality layers with a small number of unique results not to render correctly. (BENMAP-377)

Release Version

BenMAP-CE 1.4.13

Release Date 2018.08.02

Fixes

1. Database Import
 - a. Fixed an issue importing some bdbx files containing a Population dataset into BenMAP-CE. (BENMAP-371)
 - b. Issue importing 1.4-formatted bdbx files containing Health Impact Function dataset into BenMAP-CE 1.4 when pollutant and seasonal metric exists. (BENMAP-372)

Release Version BenMAP-CE 1.4.12

Release Date 2018.07.25

Fixes

1. Database Import
 - a. Fixed an issue importing 1.3-formatted bdbx files containing a Health Impact Function dataset into BenMAP-CE 1.4. (BENMAP-366)
2. Installer
 - a. Fixed an issue where the BenMAP-CE data files were placed in the wrong location when installed by a user not having Windows administrator access. (BENMAP-367)

Release Version BenMAP-CE 1.4.11

Release Date 2018.07.12

Fixes

1. Opening Config and Pooling files
 - a. Fixed an issue opening cfgx, cfgrx, apvx, and apvrx files generated in BenMAP-CE versions earlier than 1.4. (BENMAP-365)

Release Version BenMAP-CE 1.4.10

Release Date 2018.07.11

Fixes

1. Database Import
 - a. Fixed an issue importing 1.3-formatted bdbx files containing an entire setup into BenMAP-CE 1.4. (BENMAP-364)

Release Version BenMAP-CE 1.4.9

Release Date 2018.07.02

Fixes

1. User Interface
 - a. The color of the Geographic Area column heading in the Health Impact Function dialog box has been changed to magenta to match other editable columns. (BENMAP-362)

Release Version	BenMAP-CE 1.4.8
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Release Date	2018.06.12
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Main Improvements

1. GBD Tool
 - a. Fixed a corruption issue with the GBD global shapefile. The issue didn't affect the behavior of the GBD tool, but could cause problems if the shapefile was used as a grid definition in BenMAP-CE Core. (BENMAP-357)
2. Dataset Management Tool
 - a. When importing a Health Impact Function dataset from CSV, the "Geographic Area" and "Study Location Type" columns are optional. Note that Geographic Area was added in 1.4 and Study Location Type is now obsolete and ignored. (BENMAP-356)
3. EPA Standard Variables
 - a. Added new variable (unemployment_rate_2017_18) for the average unemployment rate in each county from February 2017 to February 2018.
 - b. Added new variables representing health insurance coverage in each county. Variables are summarized for four age classifications (1-17, 18-39, 40-64, and under 65) and represent the percent of the age group in each county without health insurance.
 - c. Added new variable (pct_BlueCollar) that summarizes the percent of the labor force in each county with "blue collar" jobs, defined as occupations in natural resources, construction, maintenance, production, transportation, and material moving.
4. User Interface
 - a. Adjusted positioning and layout of Excel sheet picker dialog to avoid it being hidden behind the "please wait" message when loading air quality model data. (BENMAP-358)
5. GIS Interface/Functionality
 - a. Corrected issue that the GIS interface was unable to map negative values for delta layers. (BENMAP-354)

Release Version	BenMAP-CE 1.4.7
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Release Date	2018.05.25
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Main Improvements

1. Pooling and Aggregation
 - a. The individual default weight values were incorrectly set in certain situations with nested levels of pooling. (BENMAP-234)
2. Dataset Management Tool
 - a. An issue was resolved with incorrectly assigned metric id values when multiple health impact function datasets are imported causing the import to fail. (BENMAP-300)
 - b. Support for bdbx files containing multiple datasets was improved. (BENMAP-300)

- c. In versions previous to 1.4.7, exports containing all grid definitions for a selected setup were not properly structured if a one or more shapefiles were missing components (e.g. prj file). This could cause files to be skipped during the import phase, or could cause the import to fail. This has been resolved. (BENMAP-300)
- 3. GIS Interface/Functionality
 - a. Corrected issue with Jenks Natural Breaks categorization in DotSpatial. (BENMAP-294)
 - b. Improved error handling and reporting when a corrupt shapefile is found while generating crosswalks.
- 4. User Interface
 - a. Updated text in a few warning dialog boxes.
 - b. Added tooltips to inform users that missing values will be replaced by seasonal mean for daily calculations. (BENMAP-350)
 - c. Endpoint Group and Endpoint are now sorted in the Health Impact Function definition dialog. (BENMAP-266)
 - d. The Grid Definition will now be properly set when the Incidence Dataset Definition dialog is opened. Previously, it was set to the first option in the list which was confusing. (BENMAP-352)
- 5. Incidence Datasets
 - a. Fixed error in the imputation of unreliable county mortality estimates affecting Mortality Incidence datasets from 2015 - 2060.

Release Version

BenMAP-CE 1.4.6

Release Date

2018.05.14

Main Improvements

- 1. Calculate Health Impact
 - a. Use NaN for Mean, Standard Deviation and Variance when HI calculation is done in Point Mode. Percent baseline is also calculated using Point of Estimate instead of Mean. This now also works when users aggregate Health Impact result to a different grid definition on the fly (BENMAP-349).
- 2. Dataset Management Tool
 - a. The new, two phase import process has been implemented for imports of both 1.3 and 1.4 formatted bdbx files. Before any database changes are made, the user will see a list of all changes that will be made and given the opportunity to continue or cancel the process. (BENMAP-300)
- 3. GIS Interface
 - a. The Export Map Image tool has been significantly improved.
- 4. General
 - a. Updated the Help/About dialog box to include proper year and version in the description

Known Issues

1. With the default of Jenks Natural Breaks for the mapping, small result sets sometimes don't draw correctly. For example, with a percent rollback at the US state level, sometimes the control or delta layer won't draw. The DotSpatial team is investigating. (BENMAP-294)

Release Version

BenMAP-CE 1.4.5

Release Date

2018.05.08

Main Improvements

1. New installer structure
 - a. Rather than distributing a zip file that the user must unzip and then run the setup.exe program, we will now distribute an executable that will automatically decompress and run the install program.
2. Issues related to BENMAP-255 and BENMAP-294 (See 1.4.4 Known Issues) have been resolved.

Known Issues

1. The description in the about dialog still references version 1.3.
2. BenMAP-CE icon in Windows start menu still references version 1.4.4.0.
3. Minor typo in the message that appears when a setup doesn't have any grid definitions enabled as admin layers. "There are no Admin Layers for the current setup. Please use the 'Modify Datasets' menu and the 'Manage' button under 'Grid Definitions' to edit *it* a layer and mark it as an 'Admin Layer'."

Release Version

BenMAP-CE 1.4.4

Release Date

2018.05.04

Main Improvements

1. Command Line Tool
 - a. Fixed issue so that VNA and Fixed Radius can be selected when input monitor data is a text file. (BENMAP-337)
 - b. Fixed issue of pulling *.cfrx file when running multiple APV in one batch file. (BENMAP-337)
2. Calculate Health Impact
 - a. Fixed multiple issues which caused the incidence/prevalence data not correctly calculated when incidence/prevalence data have overlapping demographic groups (e.g. BLACK and ALL), when the incidence age range does not perfectly match population age range, and when a selected health impact function is missing corresponded incidence/prevalence data. (BENMAP-332, BENMAP-311, BENMAP-243, BENMAP-226 and BENMAP-293)
 - b. Added validation check for selected health impact functions. Warning will be issued if

selected function is missing incidence/prevalence data or if selected function is incompatible with selected pollutant dataset (e.g. daily function vs annual pollutant). (BENMAP-296)

- c. Allow the application to calculate health impact when daily baseline AQ, daily control AQ, daily delta AQ or annual delta AQ is 0. (BENMAP-270, BENMAP-314, BENMAP-324)
 - d. When point mode is selected in advanced HIF settings, use the point estimate instead of the mean (of Monte Carlo results) to calculate percent baseline because the mean is not available. The result of mean is changed to “NaN” instead of 0. (BENMAP-349)
- 3. Pollutant Concentration Data
 - a. If daily (or binned daily data from hourly data) monitor or model data have days or missing observations, these missing days will be filled with seasonal mean. (BENMAP-350)
 - b. Updated validation method for model AQ data so that it accepts both annual and daily data. (BENMAP-268)
 - c. Opening an *.AQGX file that was shared from another user could fail due to differences in folder paths between the users. This has been corrected to always use the current user’s file path for shape files. (BENMAP-343)
- 4. User Interface
 - a. Corrected url links in help menu (BENMAP-272)
 - b. Added the url link which leads to the full user manual (BENMAP-348)
- 5. Dataset Management Tool
 - a. Fixed an issue in Health Impact Function Definition window which caused an error while saving a HIF that incorporates a variable name. (BENMAP-232)
 - b. Modified import behavior to retain existing, matching datasets rather than deleting and replacing. In previous versions of BenMAP-CE, if the import contained a dataset named the same as one the user already has, the existing dataset would be deleted and replaced with the imported dataset. This could cause problems in certain situations. For example, with 1.3 imports, if the user has Monitor Dataset A tied to the PM2.5 Pollutant and then imports a bdbx file containing Monitor Dataset B, also tied to the PM2.5 Pollutant, the pollutant would be deleted and recreated in the user’s database which has the undesired side effect of deleting Monitor Dataset A’s monitor entries. Starting in 1.4, existing datasets with the same name as those in the import file are retained in order to avoid these cascading deletes. The behavior of importing *.bdbx files exported from 1.3 or previous version is unchanged. The user interface was also changed slightly to avoid confusion. After performing an import or export, the “Cancel” button changes to a “Close” button since Cancel is no longer appropriate. (BENMAP-300)
- 6. GIS Interface
 - a. The grid definition management window has been enhanced to allow the user to select

whether the grid definition should be used as a default administrative layer. If selected, the user can also choose the desired outline color and the drawing priority. This allows, for example, state borders to be drawn on top of county borders. If the outline color is modified in the map's table of contents, the new color will be stored and used for that admin layer in the future. (BENMAP-255, BENMAP-193)

- b. Resolved an issue which caused BenMAP-CE GIS Map to not always use metrics field in default symbology. (BENMAP-323)
 - c. Resolve mapping issues related to cells for which no analysis was performed. The DotSpatial GIS component was upgraded to the latest version and various issues have been resolved. (BENMAP-294)
7. Dataset Updates
- a. EPA Standard Variables:
 - i. Updated poverty status, educational attainment, and household size variables in the EPA Standard Variables dataset. Educational attainment variables have been collapsed into two groups: (1) no high school degree (or equivalent) and (2) high school degree (or equivalent) and above (including some college and college degrees).
 - ii. Added new poverty status variable in EPA Standard Variables dataset representing the fraction of each county's population living below 200% of the poverty line.
 - b. Incidence:
 - i. Added new race-stratified mortality incidence file representing county-level all-cause mortality rates from 2007-2016. Incidence rates are stratified by two categories: White and Non-White (Black, Asian and Pacific Islander, and Native American).

Known Issues (for future updates)

- 1. BENMAP-255:
 - a. If "Use this layer as a default admin layer" is selected when a grid definition is first created, the selection does not get saved. The user must reopen the grid definition and reselect the checkbox.
 - b. There is a minor typo in the tooltip for the admin layer checkbox
- 2. BENMAP-294:
 - a. Air Quality is default to Natural Breaks as desired. However, Health Impact Results, Pooled Incidence and Pooled Valuation are defaulting to Equal Intervals and need to be changed to default to Natural Breaks.
- 3. BENMAP-300:
 - a. Implement two-phase imports of 1.3 formatted bdbx files and retain existing datasets rather than deleting and renaming. Basically, import 1.3 files the same way BenMAP-CE

is now handling 1.4 files.

4. BENMAP-210:
 - a. During pooling, BenMAP-CE assumes all functions in a function dataset have the same age range. Therefore, it uses average instead of the sum of the population for pooling. This will cause issues when pooling function sets with different age ranges such as Burnett's health impact functions.
5. BENMAP-234:
 - a. Pooling User Defined Weights Error
6. Some revisions have been made to the "Export map image" capability in the GIS Map, but more work is required.

Release Version	BenMAP-CE 1.4.2
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Release Date	2017.09.29
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Main Improvements

1. Database Import has been re-enabled. (It was disabled in the 1.4.1 build due to an issue that was discovered during testing.) (BENMAP-299)
2. When an air quality surface is created from a CSV file rather than from library data, it will now be filtered consistently. Previously, CSV-based surfaces were used as-is which caused, for example, multiple POCs from the same location to be aggregated. (BENMAP-233)

Known Issues (for future updates)

7. In certain scenarios, Database Import can cause data loss. For example, importing a pollutant dataset may cause associated monitors or health impact functions to be lost since the import function deletes the matching dataset and then recreates it from the bdbx file. The import process will be modified in a future release to avoid this problem. (BENMAP-300)

Release Version	BenMAP-CE 1.4.1
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Release Date	2017.09.15
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Main Improvements

1. Health Impact Functions can now be constrained to specific Geographic Areas.
 - a. Grid Definitions can now be designated for use as Geographic Areas.
 - b. Health Impact Functions can now be constrained to selected Geographic Areas.
 - c. The Geographic Area field can be displayed in many of the data tables throughout BenMAP-CE.
 - d. Exporting from the Data tab will now include Geographic Area if the column is displayed in the user interface.
 - e. Geographic Area information is displayed in the Audit trail.
 - f. When a Health Impact Function that is constrained to a Geographic Area is selected in

the Health Impact Functions screen, any additional functions that are not constrained to an area may be run “Everywhere” or “Elsewhere” based on user selection. The application will display a popup message explaining the behavior of each option.

- g. Datasets imported through Manage Health Impact Function Dataset / Load From File should now contain a “Geographic Area” column. If the Geographic Area name is found in the user’s database, it will be assigned to the function. If the named area is not available, the function will still be imported, but will be set to run over the entire area.
2. Improvements to Tools / Database Import/Export
 - a. Health Impact Function datasets exported in CSV and BDBX format through Database Export will include Geographic Area.
 - b. Database Import will now support older (1.3.x) and new BDBX (1.4.x) format. The new format not only supports Geographic Areas, but also reduces file size in many situations.
 3. Improvements to Global Burden of Disease Tool
 - a. Replaced the Krewski et al. (2009) health impact function with the 2013 Integrated Exposure Response (IER) Function from Burnett et al. (2014) and the Shape-Constrained Health Impact Function (SCHIF) from Burnett et al. (manuscript in preparation).
 - b. Added functionality to allow users to calculate two additional health endpoints: avoided years of life lost (YLLs) and changes in life expectancy.
 - c. Added functionality to allow users to calculate the economic benefits of avoided premature mortality by applying country-specific estimates of the value per statistical life (VSL).
 - d. Improved the speed of the application by population-weighting air quality data at the country level (except for India).
 - e. Fixed errors and bugs
 4. Updated look of all “blank list” messages for improved appearance.
 5. Fixed issue when changing column headings or decimal places in Pooled Incidence Results.
 6. Corrected tab order in Health Impact Function dialog.
 7. Legend and map will now dynamically reduce the number of breaks when rendering a small number of results.
 8. The GIS interface will no longer map cells as white with a incidence of zero (0) in areas where no calculation has been performed. This significantly increases mapping speed in many cases.
 9. When grid definitions are deleted, all the dependent datasets such as incidence rates, population, etc. will also be removed. The user will be notified before the operation is executed. (BENMAP-216)
 10. Corrected an inconsistency related to filtering based on lat/long position between monitoring data read from the BenMAP database and data read directly from a CSV file. (BENMAP-233)
 11. Corrected a BenMAP-CE scripting issue that was preventing analysis from running properly when

dollar year was specified. (BENMAP-230)

Release Version	BenMAP-CE 1.3.7
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Release Date	2017.07.10
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Main Improvements

1. Several minor changes to sizing, positioning, and scaling of components on main screen to improve user experience. In particular, the map and table of contents handles screen resizing better. (BENMAP-265)
2. Columns can now be added to the pooled incidence results table. Previously, this caused an error. (BENMAP-263)
3. Pollutant seasons are now automatically created and are required when adding or editing a pollutant. (BENMAP-250)
4. The Help/Quick Start Guide menu item will now take the user to the correct page on epa.gov. (BENMAP-240)
5. When health impact functions or valuation functions are added to a newly created dataset, they will now save on the first attempt. In some scenarios, previously, newly added functions were lost. (BENMAP-221)
6. Improved performance of the GBD tool. (BENMAP-267)
 - a. Instead of four 2013 GBD Study health endpoints, this version is using non-accidental mortality.
 - b. Improved the speed of calculation by doing health impact assessment at country-age-gender level for most countries. China and India still have avoided death calculated at grid cell level.
 - c. Improved speed of exporting to Excel or CSV.

Release Version	BenMAP-CE 1.3.6
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Release Date	2017.05.08
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This release does not include any functionality changes. The following changes were made to the database that ships with BenMAP-CE.

Main Improvements

1. Removed “GBD Integrated Exposure Response” health impact function dataset.
2. Removed five health impact functions for the Acute Myocardial Infarction endpoint group in the “EPA Standard Health Functions” dataset.
3. Moved all functions in the “AMI - Age-Dependent Survival Rates” dataset into the “EPA Standard Health Functions” dataset.
4. Updated “Other Incidence (2014)” dataset to include county-level emergency department data for South Carolina.

Release Version**BenMAP-CE 1.3.5****Release Date****2017.04.18****Main Improvements**

1. Updated preloaded datasets for the United States setup as follows:
 - a. Monitor: Updated PM2.5 and Ozone monitor data for years 2000-2013.
 - b. Incidence: Updated existing death rates (2000-2050) with cause and age-specific mortality rates (2015-2060). Replaced hospitalization and ER visit dataset (Other Incidence 2007) with updated 2014 rates. Made 2007 dataset available on EPA BenMAP-CE website: <https://www.epa.gov/benmap/benmap-community-edition>
 - c. Valuation: Updated existing "EPA Standard Valuation Functions" with Willingness to Pay and Cost of Illness functions re-indexed to a 2015 baseline year.
 - d. Variable: Updated "median_income" and "natl_median_income" in "EPA Standard Variables" with new county-level median income data for the year 2015.
 - e. Income Growth Adjustments: Updated existing "EPA Standard Income Growth" (1990 to 2024) with new income growth adjustment factors (1990 to 2026).
 - f. Health Impact Functions: Replaced existing ozone functions in "EPA Standard Health Functions" with 14 new functions used by EPA for the 2013 ozone NAAQS Regulatory Impact Analysis. Merged the "PM NAAQS Final 2012 Additional Functions" into "EPA Standard Health Functions".
 - g. Inflation: Updated "EPA Standard Inflators" (1980-2010) with new sector-specific inflation data (1980-2015).
 - h. Replaced Woods and Poole population growth estimates to extend values through 2050.
2. Modified GBD Air Quality Rollback Tool. Updated underlying datasets and modified tool to evaluate the Krewski function for each air quality grid cell (0.1 degree resolution) using population and incidence data stratified by gender and age for 4 separate mortality health endpoints. Results are then summed to produce results for total mortality. Updated datasets include:
 - a. Air Quality Data: Updated PM2.5 concentrations using 2015 GBD Study. Negative concentrations were adjusted to zero.
 - b. Population Data: Updated population data using 2015 census data from the United Nations, Socioeconomic Data and Applications Center (SEDAC) Gridded Population of the World (GQW) v4. Introduced populations stratified by gender and age (replacing use of population totals). Aggregated population data for age groups 80TO84, 85TO89, 90TO94, 95TO99, and 100UP into an 80UP age group to align with incidence rates.
 - c. Incidence Rates: Replaced "all-cause mortality" rates with mortality rates from the 2013 GBD Study for 4 health endpoints: COPD, cerebrovascular disease, ischemic heart disease, and lung cancer. Incidence rates were stratified by gender and age ranges. Combined neonatal ("0 to 0") and "1 to 4" age groups into a "0 to 4" age group to align with population data.
 - d. Removed country-level GBD data from "My BenMAP-CE Files\Country Shapefiles" including shapefiles, PM2.5 concentrations, incidence rates, and population estimates. These data are now available for download at <https://www.epa.gov/benmap/benmap-community-edition>.
3. Implemented several usability improvements to the Incidence Pooling and Aggregation window.
4. Revised the Monitor Rollback dialog to improve flow. Improved performance when selecting all cells. Added ability to select multiple cells by clicking and dragging.
5. Added ability to export shape files and CSV files Tools/Database Export as an alternative to the native BenMAP-CE format.
6. Updated integrated GIS component to include new features and fixes.
7. Improved performance and reliability when generating crosswalks between grid definitions.
8. Updated BenMAP-CE User's Manual and Appendices to reflect program updates.

Known Issues (for future updates)

1. There are known issues with users' international settings causing problems with import and export of data from/to CSV and text formats. Some of these issues are inherent in text-based formats (e.g. 7/4/2015 could be either July 4 in the US or April 7 in Europe). Please refer to the

“Ben-MAP-CE Regional Formats” document for information about data conventions and computer settings.

2. There are known issues with the DotSpatial library which may cause a null reference exception or cause the program to crash when attempting to edit the legend text or color (for an individual category) on the GIS map. These issues have been reported to the DotSpatialCodePlex.
3. When BenMAP-CE is maximized the scroll bar for the legend disappears and some of the GIS layers become inaccessible.
4. Once a result has been drawn to the GIS Map the user can no longer re-organize the GIS layers.
5. There is an issue on the GIS map displayed when adding monitor data for baseline or control layers. Using the identify tool on the map causes an out of memory exception. This identify tool is currently disabled to avoid the error.
6. There is no mechanism to allow the user to modify the default administrative layer in the BenMAP-CE GIS window.
7. When importing shapefiles, users should be able to select the columns they want to designate as COL and ROW index, even if the columns of the attribute table are not labeled as such.
8. In the monitor dataset import, the import code does not allow the first value to be missing. Users have had to alter the dataset (e.g., substitute a "0" for the "." if it is the first value) to get it to import. Also, modeled data often includes "-9" as missing data code. BenMAP-CE has no way of interpreting alternate missing value codes.
9. Under “Manage Population Datasets”, there is currently no option for an “Output Sample File”.
10. An audit trail should summarize the details of the BenMAP-CE analysis at the time it was run. It should not include details from the current database.
11. Some errors have been noted in the Import/Export features (under the Tools menu). This will require additional investigation to resolve.
12. Population caching (implemented in v1.3.3) has been temporarily disabled due to some known defects.

Release Version**BenMAP-CE 1.3.4****Release Date****2016.08.03****Main Improvements**

1. Populated mean and standard deviation for GBD Integrated Exposure Response functions. These values were calculated and visible in the custom distribution subform, but were not displayed properly in the main Health Impact Function Definition form. Added beta distribution types to the database for dropdown lists (replacing hard-coded list values).
2. Corrected issue with saving Regular Grid Definitions. Additional validation checks in v1.3.0 required opening a shape file to check ROW and COL. For regular grid creation, a shapefile is not yet created when the validation routine was called. The validation routine now includes a check for grid type to differentiate.
3. Modified Pollutant Definition screen to support a more standard mechanism for selecting pollutants (created Add/Remove buttons).
4. On the Main screen, changed “Output” button to “Export” button for Data and Audit Trail Report tabs.
5. Improved Advanced Settings under “Incidence Pooling and Aggregation” and “Select Valuation Methods, Pooling and Aggregation”. Created separate dialogs for “Advanced Pooling Settings” and “Advanced Valuation Settings”. Corrected issue with redisplay of modified data.
6. Modified “Monitor Rollback Settings” to help reinforce the order of steps the user should follow.
7. Modified messages in “Setup Variable Dataset Definition” for clarity.
8. Implemented several changes to the “Incidence Pooling and Aggregation” feature to facilitate user interaction. Added checkboxes to studies, implemented list builder pattern, pre-created pooling windows, added visual indicators to pooling method, improved ability to set user-defined weights, renamed tree nodes, and added preview functionality.

Release Version**BenMAP-CE 1.3.3**

Release Date**2016.07.12****Main Improvements**

1. Fixed issue that overestimated incidence rates in cases when the incidence rate dataset had race, gender, or ethnicity information. Revised code now averages incidence rates for selected groups (previous code summed rates for all subgroups)."
2. Corrected a bug in the handling of age ranges within specific race-ethnicity-gender groups for processing Health Impact Functions. More specifically, if you ran multiple HIF's with the same race-ethnicity-gender but with the second function having both a lower start age AND a higher end age than the other, the setting of the higher end age would overwrite the setting of the lower start age. Thus, the age range across all functions would be the lower age of the first function to the higher age of the second function. This bug has been corrected; the program will now correctly use the lowest start age and highest end age across all functions to get the full age range. Note: Because the population data for the preloaded U.S. and China datasets did not have overlapping age ranges, this bug was not previously detected.
3. Added Monitor Data Conversion tool to the Tools menu. The tool converts daily monitor values (one value per row) into a format that can be used to import Monitor Datasets under the Modify Datasets menu.
4. BenMAP-CE now caches calculated population data by race-ethnicity-gender and age range. This improves efficiency of the health impact functions by avoiding population recalculation if the desired population data has already been retrieved.
5. Modified Health Impact Function Definition form to populate the mean and standard deviation into the Beta and Beta Parameter 1 fields using the imported data from "Custom" distributions.
6. Fixed issue in data import validation code. Previously, code failed to distinguish between warnings and errors (all failures were classified as errors). Code has been fixed to report warnings separately.
7. Fixed bug with "Show All" checkbox on Manage Grid Definitions screen to avoid inadvertently saving a disabled selection.
8. Modified labels in the Pollutant Definition window for clarity. Changed the button "Advanced Pollutant Options" to "Define Seasons for All Pollutant Metrics" and changed the label "Seasonal Metrics" to "Manage Seasons for Individual Pollutant Metrics".
9. Fixed minor typographical error in the monitor rollback window. The abbreviation for air quality grid should be "AQGX" and not "AGQ."
10. Updated link to EPA's BenMAP-CE website on the BenMAP-CE About page.

Release Version**BenMAP-CE 1.3.2****Release Date****2016.03.24****Main Improvements**

1. Adds PopSim under the BenMAP-CE Tools menu. PopSim is a dynamic population simulation that incorporates the cumulative effects of air pollution on different age groups over time. This is a beta version that only includes U.S. Data.
2. Updates Chart tab to remove ZedGraph utility and switch to OxyPlot. Added "Deselect All" feature (previously only had "Select All").
3. Added dynamic charts for beta distributions for Normal and Triangular distributions. These can be accessed through the Health Impact Function editor when you click on the distribution type.
4. Added Online Database Export and Online Database Import to the Tools menu. These will provide accessibility to EPRI's online database.

Release Version**BenMAP-CE 1.3.0****Release Date****2015.11.17****Main Improvements**

1. To ensure consistent GIS projections throughout BenMAP-CE, a default coordinate system will be set to World Geodetic System 1984 (WGS84). When adding shapefiles to a new setup, the

user will need to specify a local GIS projection. A shortened list of recommended projections (Albers Equal Area Conic projections) is provided to choose from. However, if the user wants to use a different projection, he/she can click "Show All" to select from all available DotSpatial projections. This local projection will be used by BenMAP-CE when performing any area-based or distance-based calculations.

2. For files that are not already in WGS84 format, software will automatically reproject on import. Imported file will be renamed to reflect reprojection. Metadata will document the reprojected file.
3. The GIS toolbar has been modified to toggle between WGS84 and the setup's local projection.
4. When importing shapefiles for air quality grids (under Manage Datasets), software will add ROW and COL fields with user confirmation if they are missing. Software will also check for duplicate ROW/COL pairs and warn the user if any are found.

Release Version	BenMAP-CE 1.1.7
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Release Date	2015.9.30
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Main Improvements

1. Added parameterized GBD Integrated Exposure Response (IER) functions. These are spline functions for PM2.5 1 to 1,000 ug/m3 range with custom beta distributions. Includes 20 segments for CEV function, and 11 segments each for COPD, IHD, and LC functions.
2. Added Country Shapefiles (from GBD Rollback Tool) and Python program to perform percentage rollback to the BenMAP-CE installer (files under 'My BenMAP-CE Files\Country Shapefiles').
3. Performed thorough review of data import forms and resolved several issues within "Modify Datasets" dialog, including: 1) resolve issues with loading and display of metadata, 2) correct minor issue with automatic load of data after validation (without user clicking "OK" to proceed), and 3) ensure that when the user clicks "Delete" the selected record is highlighted and the user receives a confirmation message prior to delete.
4. Added validation check for incidence datasets (warning will be issued if value outside of range 0 to 1).
5. Changed About page to display internal build number (4th digit in the BenMAP-CE version number (used by software developer to track internal test versions).

Release Version	BenMAP-CE 1.1.6
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Release Date	2015.8.31
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Main Improvements

1. Resolved issue with Health Impact Function Editor not importing correctly (issue identified while testing import of custom spline functions).
2. Resolved issue with BenMAP-CE throwing a database exception error when attempting to load a population dataset. The database was incorrectly trying to open a connection that was already open.
3. "Unlocked" the EPA-provided (preloaded) datasets. The locking mechanism was intended to protect preloaded datasets from being modified by the user without also modifying the associated metadata. Until development work to improve management of datasets (including a cloning feature) is complete, the preloaded datasets will remain unlocked.
4. Added metadata descriptions for preloaded datasets.

Release Version	BenMAP-CE 1.1.5
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Release Date	2015.8.10
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Main Improvements

1. Fixed an issue that prevented images for Beta Distributions to not appear within the Health Impact Function Editor (pop-up form on click of distribution type).

Release Version BenMAP-CE 1.1.4

Release Date 2015.8.7

Main Improvements

1. Fixed an issue with having to click “Run” twice to run health impact functions.
2. Fixed an issue that prevented the aggregation of Detroit data.

Release Version BenMAP-CE 1.1.3

Release Date 2015.7.30

Main Improvements

1. Added Mortality Incidence data for the Detroit setup.
2. Fixed an issue that prevented Grid Definitions from being created.

Release Version BenMAP-CE 1.1.2

Release Date 2015.7.24

Main Improvements

1. Added a setup for Detroit using the BenMAP-CE Quick Start Guide data files (dated November 2014).

Release Version BenMAP-CE 1.1.1

Release Date 2015.3.31

Main Improvements (minor bug fixes to public release version 1.1.0)

1. Fixed bug which prohibited Regular Grid creation from saving (under Modify Datasets/Grid Definitions).

Release Version BenMAP-CE 1.1.0

Release Date 2015.2.16

Main Improvements

1. Software published for public release. 64-bit and 32-bit versions available.
2. Added index to population entries table to speed up processing which use age range and race information.
3. Corrected issues related to database import tool (using .bdbx files).
4. Created default folder location for database export tool. File save location defaults to ‘My BenMAP-CE Files\Exports’.

Release Version BenMAP-CE 1.0.18.11

Release Date 2015.1.16

Main Improvements

1. To address installation issues related to UAC settings and VirtualStore (encountered on computers running Windows versions newer than XP, such as Windows Vista and Windows 7), changed installation location of software and added manifest file which requires administrative privileges to install.
2. Replaced Microsoft Interop libraries with OpenXML SDK 2.5 libraries that allow for greater support of open source office solutions and allow user to export .xlsx file while using the GBD Rollback tool.
3. BenMAP-CE now allows users to add new endpoint groups and endpoints when importing Health Impact Functions (using .csv files).
4. Modified GBD tool to clear check boxes on the 'select by country' tab if the user elects to run consecutive analyses; previously the selection list failed to clear.

Release Version BenMAP-CE 1.0.18-10

Release Date 2014.12.30

Main Improvements

1. Added the ability for the user to export a csv file from the GBD RollBack Tool.
2. Resolved an issue that prevented some of the buttons from being accessible on smaller screen resolutions. Now all large forms are resizable (i.e., GBD Rollback tool).

Release Version BenMAP-CE 1.0.18-9 (no Office Installer)

Release Date 2014.12.30

Main Improvements

1. Removed Microsoft Interop libraries that caused program instability on machines that previously had differing versions of Microsoft Office Installed.

Release Version BenMAP-CE 1.0.18-8

Release Date 2014.11.14

Known Issues (for future updates)

1. When opening a saved .projx file that has been completed through step 3 (Pooling and Aggregation) the green "stop lights" turn to red for the Health Impact Functions, Pooling, and Valuation method lights.
2. There is an issue where attempting to edit the legend on the GIS map causes a null reference exception. This has been reported as a DotSpatial bug.
3. There is an issue on the GIS map displayed when adding monitor data for baseline or control layers. Using the identify tool on the map causes an out of memory exception. This tool has currently been disabled.

Main Improvements

1. Re-enabled automated error reporting for unhandled exceptions that cause the system to crash.
2. The user is now able to deselect their current selection by right clicking on the layer that the selected item is in and choosing the "unselect all" button under "selection".
3. Included EPAStandardVariable Variable dataset into the default database.
4. Users are now allowed to import quarterly and monthly monitor datasets.
5. On Uninstall BenMAP-CE removes all application data directories from the users' machine.
6. Fixed an issue that prevented the user from manually entering Health Impact and Valuation

functions.

7. Fixed a problem that caused "Source of Air Quality Data" to disappear from workflow.
8. Fixed a multiple issues that caused BenMAP-CE to hang upon close.
9. Fixed a problem that caused Health Impact Functions input files to fail validation.
10. Replaced "new" China Health Impact Functions in the China setup. The short term functions had the multiplier "A" missing in the Baseline Function formulas.
11. Removed "Year" column from Incidence data set example file (extra column caused failure of validation checks).
12. Fixed an issue with Validation causing input files with "\$" and "%" characters to fail.
13. Fixed an issue that caused duplicate entries upon loading a valuation dataset.
14. Fixed an issue that prevented the user from importing a Variable dataset with more than 1 column.
15. Fixed multiple issues regarding Output Example Files.
16. Fixed an issue that prevented the user from selecting .aqgx files in the browse dialog for Baseline and Control under Source of Air Quality Data.
17. Fixed multiple issues related to the GDB rollback tool, specifically issues that caused scenario execution errors, unhandled exceptions, and incorrect results.
18. Fixed issue with missing health impact function configuration in reloading saved project (.projx) files. The health impact function configuration (.cfgrx) data was not being saved correctly within the project file.

Release Version	BenMAP-CE 1.0.17
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Release Date	2014.09.010
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Main Improvements

4. Fixed a problem that prevented the user from redisplaying the GIS map table of contents after being hidden.
5. Fixed an issue that prevented the user from adding a new Health Impact Function manually to the Setup.
6. Fixed a problem that prevented the drawing of the GIS map for China.
7. Fixed a data import issue for China that caused a longitude error.
8. Fixed an issue that caused duplicate Pooled Valuation Layer.

Release Version	BenMAP-CE 1.0.16
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Release Date	2014.08.19
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Main Improvements

1. Fixed issues with GIS display of air quality surfaces (Baseline/Control/Delta).
2. Added Deaths per 100,000 people, percentage of deaths attributable to pm2.5 levels, and 97.5 confidence intervals to the GDB Rollback export file.
3. Improved precision of GDB Rollback tool.

Release Version	BenMAP-CE 1.0.13-1.0.15
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Release Date 2014.08.06

Main Improvements

1. Fixed a problem that caused data validation to prevent the monitor rollback feature.
2. Resolved a database exception issue relating to the GDB Rollback tool.
3. When importing a shapefile to create a new grid, BenMAP now attempts to re-project the shapefile to GCS NAD 83 if the projection is not already this by default.

Release Version BenMAP-CE 1.0.12

Release Date 2014.08.01

Main Improvements

1. Implemented new Global Burden of Disease Rollback tool, available under the Tools menu.
2. Fixed a problem where the GIS menu bar status would not be maintained when a second pollutant was added.

Release Version BenMAP-CE 1.0.11

Release Date 2014.07.22

Main Improvements

1. Fixed bug associated with metadata save action.
2. Fixed a problem that prevented inflation datasets from importing correctly.

Release Version BenMAP-CE 1.0.10

Release Date 2014.07.07

Main Improvements

1. Automated error reporting feature was disabled due to a number of problems associated with error handling logic (to be addressed in future version). Manual "provide feedback" feature still enabled.

Release Version BenMAP-CE 1.0.9

Release Date 2014.07.03

Main Improvements

1. Fixed numerous data import issues.
2. Implemented numerous improvements to GIS map and tools.
3. Implemented new Error Reporting feature. Manual reporting of software bugs and requested improvements is available under the Help menu ("Provide Feedback"). Automated reporting feature captures error log and audit trail when the program crashes (user is prompted to submit data upon reopening BenMAP-CE).

Release Version BenMAP-CE 1.0.8

Release Date 2014.04.28

Main Improvements

1. Implemented new Data Validation features for data imports and added Metadata for user-supplied data.
2. Updated GIS DotSpatial from version 0.11.9.6 to version 1.6.
3. Fixed a problem with regular grids created by BenMAP-CE. Now these grids will begin with column and row values of 1 instead of 0.
4. When estimating health impact functions using daily modeled values, days with missing values will not be included in the results. Previously, these missing days were assigned the mean value, which led to incorrect results.
5. Fixed a problem that caused results calculated using county-level data to differ between BenMAP 4 and BenMAP-CE.

Release Version BenMAP-CE 1.0.7

Release Date 2014.04.01

Main Improvements

1. Fixed a major issue in BenMAP-CE that caused percentage crosswalks between grid definitions to be incorrect for user-added shapefiles.

Release Version BenMAP-CE 1.0.6

Release Date 2014.03.06

Main Improvements

1. Fixed a problem that prevented users from estimating health impacts in some cases.
2. Updated the Firebird database client and helper class.

Release Version BenMAP-CE 1.0.5

Release Date 2014.02.28

Main Improvements

1. Column and row variables saved as doubles in shapefile attribute tables will now be automatically converted to integers when imported into BenMAP-CE.
2. Audit trails can now be generated for files created in a BenMAP-CE setup that does not exist in a user's current list of setups.

Release Version BenMAP-CE 1.0.4

Release Date 2013.12.06

Main Improvements

1. Fixed a problem with incorrect delta maps being saved to .apvrx files generated using command line mode.

Release Version BenMAP-CE 1.0.3

Release Date 2013.12.05

Main Improvements

1. Fixed problem with command line mode that required user to confirm pooling weights for each run.

2. Fixed problem with specifying fields to be saved when generating reports in command line mode.

<i>Release Version</i>	BenMAP-CE 1.0.2
<i>Release Date</i>	2013.12.02
Initial Public Milestone Release	
