

# **MINI-SENTINEL MODULAR PROGRAMS**

## **MODULAR PROGRAM 8: UPTAKE, USE, AND PERSISTENCE OF NEW MOLECULAR ENTITIES (NMEs)**

**Documentation version: 1.1**

**Prepared by the Mini-Sentinel Operations Center  
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Mini-Sentinel is a pilot project sponsored by the [U.S. Food and Drug Administration \(FDA\)](#) to inform and facilitate development of a fully operational active surveillance system, the Sentinel System, for monitoring the safety of FDA-regulated medical products. Mini-Sentinel is one piece of the [Sentinel Initiative](#), a multi-faceted effort by the FDA to develop a national electronic system that will complement existing methods of safety surveillance. Mini-Sentinel Collaborators include Data and Academic Partners that provide access to health care data and ongoing scientific, technical, methodological, and organizational expertise. The Mini-Sentinel Coordinating Center is funded by the FDA through the Department of Health and Human Services (HHS) Contract number HHSF223200910006I.

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## Modification History

Version	Date	Modification	By
1.1	09/30/2014	<ul style="list-style-type: none"><li>Updated due to minor changes to MSOC tracking macro parameters</li></ul>	Mini-Sentinel Operations Center
1.0	04/14/2014	<ul style="list-style-type: none"><li>Original published version</li></ul>	Mini-Sentinel Operations Center

## I. OVERVIEW

Mini-Sentinel modular programs (MPs) allow rapid implementation of standard queries across the Mini-Sentinel Distributed Database (MSDD). MPs are designed to run against the Mini-Sentinel Common Data Model (MSCDM).<sup>1</sup> They are written in SAS and can be customized using various parameter settings that define exposures, outcomes, date ranges, age ranges, and other implementation details. This document describes the key program specifications and main assumptions underlying each of the query parameters for Modular Program 8 version 1.1. Program specification requirements, formats, and default values of all parameters are defined. A sample program specification is provided along with output from a sample scenario.

## II. TERMINOLOGY

For simplicity, the term “scenario” is used throughout this document to refer to a set of parameters and criteria used to define an execution of the MP. The “requester” refers to an individual (or group of individuals) who initiates the MP request and defines scenarios. The term “request programmer” refers to an individual who creates request Input Files and distributes the MP to the Data Partners.

The terms “exposure” and “exposure of interest” are used to represent exposure to a medical product as defined by the MP requester. In MP8, an exposure can be defined using any set of National Drug Codes (NDCs) found in the MSCDM. For example, exposure to a drug product dispensed in the outpatient setting can be defined as observation of one or more NDCs in the pharmacy dispensing file. MP8 does not support the use of diagnosis and procedure codes.

The term “claim” is used to represent an outpatient pharmacy dispensing with any of the codes for the exposure(s) of interest.

A “treatment episode” or “episode” is a period of continuous treatment defined using outpatient pharmacy dispensings. A treatment episode is a dispensing sequence that has no interruption in days supplied greater than an allowable “gap”. The allowable gap is the number of days used to bridge dispensings to create a continuous treatment episode.

The term “member” is used to represent an individual with relevant criteria for enrollment and exposure(s) (as specified by the MP parameters). A member can be further defined as a “user” if evidence of use of exposure(s) of interest is observed. Whenever a user is identified, the service date on the claim of the first exposure of interest observed during the relevant period of interest is labeled the “index date”.

The execution of MP8 allows information for multiple scenarios to be generated at the same time. Results from all scenarios are included in the MP output tables and can be differentiated using “group names” defined by the requester. This document describes the process for one scenario to be tested.

<sup>1</sup> See [http://www.mini-sentinel.org/data\\_activities/](http://www.mini-sentinel.org/data_activities/) for more information about the MSCDM.

### III. PROGRAM SUMMARY

MP8 is used to describe the uptake, persistence, and patterns of drug use during a period defined by a start and an end date (*i.e.*, the query period).

MP8 evaluation focuses on medication persistence, including measures of treatment episode length, gaps between treatment episodes, a survival curve examining time that initiators remain exposed to the drug, and the number of episodes per user. The primary objective of MP8 is to assess drug use patterns for new molecular entities (NMEs) from their approval or launch date to a user specified end date. The uptake assessment describes the initial adoption and diffusion of the NMEs with respect to the number of new users in each month following approval. The number of new users is stratified by age group and sex.

MP8 creates continuous treatment episodes using various parameters in the treatment episode algorithm (*e.g.*, pre-initiation enrollment and washout period, minimum episode duration, minimum allowable gap in days supply to be bridged between two dispensings, episode extension days). The dispensings used to create the treatment episodes must have a supply within a user-defined allowable range to be considered valid.

MP8 has two optional modules available. One can be used to restrict the MSCDM data extraction to a minimum (“floor”) and maximum (“cap”) date, to require data partner site databases to be “complete” during the time period. This is done by truncating member enrollment based on floor and cap dates. The other module allows MP8 to output a subset of result tables generated, reducing workload to compile and review results that are not relevant to a specific request.

One run of MP8 generates a total of twelve result tables. The first table is a copy of the QUERYFILE input file and it contains the information about the exposures of interest. The second table contains information about members excluded along with the reasons for exclusion. Four additional tables contain metrics about individual dispensings: number of dispensings, distribution of days of supply, gap between the first two dispensings, and new users and dispensings stratified by month, age group, sex and coverage type. Three more tables contain metrics on valid episodes: number of episodes and episode duration stratified by censoring criteria and gap between episodes. The last three tables describe the distribution of members by number of episodes and first episode initiation month, the distribution of days of supply by user-defined thresholds and the distribution of members by length of the first episode.

MP8 requires the specification of several parameters to define a scenario. These include program parameters to specify a request identifier, age range(s), dispensings day of supply ranges, total days of supply thresholds and enrollment criteria. The names of up to three input files (built as SAS datasets) containing several parameters must also be specified.

The first input file is the [Query File](#) that defines exposures of interest. The second file is the [Floor and Cap Dates File](#) it is optional and is used to limit the MSCDM data extraction period and member enrollment. The third file, the [Output Table Selection File](#), defines the subset of MP8 output files to generate.

All parameters and input file specifications are described in [Section IV](#).

## IV. PROGRAM PARAMETER AND INPUT FILE SPECIFICATIONS

### A. PROGRAM PARAMETER SPECIFICATIONS

There are several main program parameters that must be specified. These include a several identifiers for MSOC tracking purposes, age stratifications, dispensing days of supply stratifications, total days of supply thresholds, an allowed enrollment gap used to create continuous enrollment periods, and the names of up to three input files (the [Query File](#), [Data Floor and Cap Dates File](#), and [Output Table Selection File](#)).

Table 1 contains detailed specifications for each of these required parameters.

**Table 1: Main Program Parameter Specification**

Parameter	Field Name	Description
Project Identifier	MSPROJID	<p><b>Details:</b> project identifier for internal MSOC identification and tracking.</p> <p><b>Defined by:</b> Request programmer  <b>Input type:</b> Required  <b>Format:</b> Alphanumeric  <b>Example:</b> MSPROJID=to09y05</p>
Work Plan Type	MSWPTYPE	<p><b>Details:</b> work plan type for internal MSOC identification and tracking.</p> <p><b>Note 1:</b> should always be mpr for modular program requests.</p> <p><b>Defined by:</b> Request programmer  <b>Input type:</b> Required  <b>Format:</b> Alphanumeric  <b>Example:</b> MSWPTYPE=mpr</p>
Work Plan Identifier	MSWPID	<p><b>Details:</b> work plan identifier for internal MSOC identification and tracking.</p> <p><b>Note 1:</b> should follow the format [wp##].</p> <p><b>Note 2:</b> should be used to uniquely identify a modular program request.</p> <p><b>Defined by:</b> Request programmer  <b>Input type:</b> Required  <b>Format:</b> Alphanumeric  <b>Example:</b> MSWPID= wp01</p>
Data Partner Identifier	MSDPID	<p><b>Details:</b> Data Partner identifier for internal MSOC identification and tracking.</p> <p><b>Note 1:</b> should adhere to the MSDPID assigned acronym</p>

Parameter	Field Name	Description
		list.  <b>Defined by:</b> Request programmer <b>Input type:</b> Required <b>Format:</b> Alphanumeric <b>Example:</b> MSDPID= MSOC
Version Identifier	MSVERID	<b>Details:</b> version identifier for internal MSOC identification and tracking. Should track each re-distribution of the package (if multiple distributions are required).  <b>Note 1:</b> should follow the format [v##].  <b>Defined by:</b> Request programmer <b>Input type:</b> Required <b>Format:</b> Alphanumeric <b>Example:</b> MSVERID =v01
Run Identifier	RUNID	<b>Details:</b> run identifier for internal MSOC identification and tracking. Should uniquely identify each execution of a modular program within the same work plan.  <b>Note 1:</b> should follow the format [r##].  <b>Defined by:</b> Request programmer <b>Input type:</b> Required <b>Format:</b> Alphanumeric <b>Example:</b> RUNID =r01
Enrollment Gap	ENROLGAP	<b>Details:</b> sets the number of days that will be bridged between two consecutive enrollment periods to create a “continuously enrolled” period. For example, if ENROLGAP=30 and a member is eligible for medical and drug coverage in periods 1/1/2007-3/27/2007 and 4/1/2007-12/21/2007 ( <i>i.e.</i> , a 4-day gap between two consecutive enrollment episodes), the member will be considered continuously enrolled from 1/1/2007 to 12/21/2007. Any gaps in enrollment greater than 30 days will result in a new enrollment period, and all the days in the gap will be considered un-enrolled.  <b>Note 1:</b> a gap of 45-days is recommended for most uses.  <b>Note 2:</b> multiple continuous enrollment periods per member may be assessed.  <b>Defined by:</b> Requester <b>Input type:</b> Required <b>Format:</b> Numeric <b>Example:</b> ENROLGAP=45 (gaps less than or equal to 45)

Parameter	Field Name	Description
		days will be “bridged” to form one “continuously enrolled” sequence)
<a href="#">Query File</a>	QUERYFILE	<p><b>Details:</b> name of the SAS dataset defining the query exposure(s) of interest. It lists the codes of interest and various parameters to specify how each code must be queried by MP8. The file name, including its extension, must be entered. For specific details on the content of this file, please see <a href="#">Section IV.B.1</a>.</p> <p><b>Defined by:</b> Request programmer  <b>Input type:</b> Required  <b>Format:</b> .sas7bdat or .cport file format  <b>Example:</b> QUERYFILE=query.sas7bdat or query.cport</p>
<a href="#">Data Floor and Cap Dates File</a>	FLOORCAPFILE	<p><b>Details:</b> name of the SAS dataset used to limit the period for which the MSCDM data is extracted. The file contains dates defining a period for MSCDM data extraction and member enrollment truncation. The file name, including its extension, must be entered. For specific details on the content of this file, see <a href="#">Section IV.B.2</a>.</p> <p><b>Defined by:</b> Request programmer  <b>Input type:</b> Required  <b>Format:</b> .sas7bdat or .cport file format  <b>Example:</b> FLOORCAPFILE=floorandcap.sas7bdat or floorandcap.cport</p>
<a href="#">Output Table Selection File</a>	OUTTABLESFILE	<p><b>Details:</b> name of the SAS dataset defining the output table(s) to be preserved in the output folder. The file name, including its extension, must be entered. For specific details on the content of this file, see <a href="#">Section IV.B.3</a>.</p> <p><b>Defined by:</b> Request programmer  <b>Input type:</b> Optional  <b>Format:</b> .sas7bdat or .cport file format  <b>Example:</b> OUTTABLESFILE = output.sas7bdat or output.cport</p>
Age Groups	AGESTRAT	<p><b>Details:</b> age group categories for reporting. Specifying this parameter will (1) restrict to certain age groups and (2) specify how age groups will be stratified in the result tables. For example, to have results stratified by 20 year increments for members 40-99 years of age, AGESTRAT=40-59 60-79 80-99 would be entered.</p> <p><b>Note 1:</b> age is determined at the index date.</p> <p><b>Note 2:</b> various units of time can be used. Valid values are:</p>



Parameter	Field Name	Description
		<ul style="list-style-type: none"> <li>• <b>D:</b> days</li> <li>• <b>W:</b> weeks</li> <li>• <b>Q:</b> quarters</li> <li>• <b>M:</b> months</li> <li>• <b>Y:</b> years (default value)</li> </ul> <p><b>Note 3:</b> lower value is binding. If AGESTRAT=0-5 5-10, then all 5 year olds will be placed in the second age group. If AGESTRAT=0-5 6-10, then all 5 year olds will be placed in the first age group.</p> <p>For example, to have results stratified by 6 month increments for the first two years of life and then by 2 year increments until the age of 6, AGESTRAT = 00M-05M 06M-11M 12M-17M 18M-23M 02Y-03Y 04Y-05Y needs to be entered.</p> <p><b>Defined by:</b> Requester  <b>Input type:</b> Optional (default value is <b>00-19 20-49 50-64 65-74 75+ in years</b>)  <b>Format:</b> AA-AA BB-BB ZZ-ZZ  <b>Example:</b> AGESTRAT=<b>40-59 60-79 80-99</b></p>
Days of Supply Groups	DISPDAYSSUPSTRAT	<p><b>Details:</b> days of supply categories for reporting. This parameter will specify how claim days of supply will be stratified in result tables examining distribution of days supplied. For example, to have results stratified by 15 days increments for claims with 15-60 days of supply, DISPDAYSSUPSTRAT=15-29 30-44 45-60 would be entered.</p> <p><b>Note 1:</b> lower value is binding. If DISPDAYSSUPSTRAT=0-30 30-60, then all 30 days of supply will be placed in the second stratum. If DISPDAYSSUPSTRAT =0-30 31-60, then all 30 days of supply will be placed in the first stratum.</p> <p><b>Note 2:</b> last upper value is inclusive. If DISPDAYSSUPSTRAT =0-30 30-60, then all 60 days of supply will be included in the last stratum.</p> <p><b>Note 3:</b> the lower bound should be at least equal to the lowest MINDAYSUPP and the upper bound should be at least equal to the highest MAXDAYSUPP in the <a href="#">Query File</a>.</p> <p><b>Defined by:</b> Requester  <b>Input type:</b> Optional (default value is <b>0-14 15-29 30-59 60-89 90+</b>)</p>

Parameter	Field Name	Description
		<b>Format:</b> AA-AA BB-BB ZZ-ZZ <b>Example:</b> DISPDAYSSUPSTRAT= <b>15-30 30-45 45-60</b>
Total Days of Supply Threshold(s)	TOTALDAYSSUPTHRESH	<b>Details:</b> total days of supply threshold(s) for reporting. This parameter will specify how members' total days of supply (for all observed dispensings) will be stratified in the result tables examining distribution of members by number of total days supplied. For example, to have results stratified by 60 total days of supply, TOTALDAYSSUPTHRESH=060 120 180 240 300 would be entered.  <b>Note 1:</b> each threshold value must be specified with three digits. If a threshold is lower than 100, leading zeros should be specified to the left of the threshold value.  <b>Note 2:</b> each threshold value represents the lower bound of a stratum. There is no upper bound for a stratum. If TOTALDAYSSUPTHRESH=060 120, then all members with 60+ total days of supply will be placed in the first stratum (including those with 120+ total days of supply) and all members with 120+ total days of supply will be placed in the last stratum.  <b>Defined by:</b> Requester <b>Input type:</b> Optional (default value is <b>030 090 180 270 360</b> ) <b>Format:</b> AAA BBB ZZZ <b>Example:</b> TOTALDAYSSUPTHRESH= <b>060 120 180 240 300</b>

## B. INPUT FILE SPECIFICATIONS

In addition to the main program parameters, several required and optional parameters must be specified in the Query, Data Floor and Cap Dates, and the Output Table Selection files.

### 1. Query File

The [Query File](#) is required. It contains the comprehensive set of NDCs used to define the exposure(s) of interest used to create treatment episodes.

The structure of the [Query File](#) must reflect how codes should be queried to define a unique exposure. The GROUP field is used by the request programmer to group all codes pertaining to a given exposure of interest. For example, a group for "Exposure1" could be defined by all NDCs for any oral forms of anti-diabetic medications and a group for "Exposure2" could be defined by only those NDCs for a recently approved oral form of anti-diabetic medication.

The GROUP field is also used by the request programmer to define a unique scenario (*i.e.*, a unique combination of parameters across all input files). For example, if a requester wants to examine exposure to “Exposure1” with a washout period of 60 *and* 90 days (two scenarios), the two “Exposure1” requests would each need a unique GROUP name (*e.g.*, “Exposure 1\_W60” and Exposure 1\_W90”). Request programmers must ensure that when choosing GROUP names they represent both a unique exposure *and* a unique scenario. Table 2 describes specifications for the [Query File](#).

**Table 2: Query File Specification**

Parameter	Field Name	Description
Name of Query Group	GROUP	<p><b>Details:</b> standardized name used to refer to a query GROUP for exposure(s) of interest to be queried.</p> <p><b>Note 1:</b> multiple exposures/query groups can be defined within the same <a href="#">Query File</a>. In this case all exposures are queried independently and results are reported separately and labeled using each query GROUP name specified.</p> <p><b>Note 2:</b> the GROUP field is used by the stockpiling algorithm as group categories to adjust claim service dates. See <a href="#">Section V.B.1</a> for more details.</p> <p><b>Defined by:</b> Request programmer  <b>Input type:</b> Required  <b>Format:</b> Alphanumeric; SAS character \$30; no special characters (<i>e.g.</i>, commas, periods, hyphens, etc.) allowed, and underscores must be used to mark spaces.  <b>Example:</b> NME1</p>
Query Code Type	CODETYPE	<p><b>Details:</b> type of each code value included in the CODE field (below) of this file. Valid values are:</p> <ul style="list-style-type: none"> <li>• <b>RX11:</b> 11-digit NDC</li> <li>• <b>RX09:</b> 9-digit NDC</li> </ul> <p><b>Note 1:</b> for CODETYPE=RX09, a nine-digit NDC value must be included in the CODE field (below).</p> <p><b>Defined by:</b> Request programmer  <b>Input type:</b> Required  <b>Format:</b> Alphanumeric; SAS character \$4.  <b>Example:</b> RX11</p>
Query Codes of Interest	CODE	<p><b>Details:</b> NDC values for the exposure(s) of interest.</p> <p><b>Note 1:</b> for NDCs, either 9 or 11 digit codes can be entered.</p> <p><b>Note 2:</b> remove decimal points in the code value.</p>

Parameter	Field Name	Description
		<p><b>Note 3:</b> CODETYPE must be consistent with the expected format of the CODE value (<i>e.g.</i>, MP will not find any valid matches in the data for CODETYPE=RX11 and a 9-digit NDC value).</p> <p><b>Note 4:</b> duplicate CODETYPE-CODE combinations in a given query GROUP are removed by the MP8 algorithm.</p> <p><b>Defined by:</b> Requester  <b>Input type:</b> Required  <b>Format:</b> Alphanumeric; SAS character \$11.  <b>Example:</b> 12345678910</p>
Query Code Description	DESCR	<p><b>Details:</b> description of the NDC listed in the CODE field. Used primarily by request programmers to include meaningful code definitions in input files.</p> <p><b>Defined by:</b> Request Programmer  <b>Input type:</b> Required  <b>Format:</b> SAS character \$30.  <b>Example:</b> NME1_Details</p>
New Molecular Entity Indicator	NME	<p><b>Details:</b> specifies whether exposures should be treated as a NME; that is, the MP algorithm will not look prior to the query period start date (either approval or launch date) when applying the washout (WASHPER) condition. This parameter has no impact on how ENRDAYS is processed, <i>i.e.</i>, when ENRDAYS is specified the program will always look for enrollment prior to the query period start date if necessary.</p> <p>Valid values are:</p> <ul style="list-style-type: none"> <li>• <b>0:</b> The group should not be treated as a NME.</li> <li>• <b>1:</b> The group should be treated as a NME.</li> </ul> <p><b>Note 1:</b> this value must be the same within a given query GROUP.</p> <p><b>Defined by:</b> Requester  <b>Input type:</b> Required  <b>Format:</b> Numeric  <b>Example:</b> 1</p>
Drug Approval Date	APPDATE	<p><b>Details:</b> the NME approval date.</p> <p><b>Note 1:</b> either this parameter or the LAUNCHDATE parameter is required.</p>

Parameter	Field Name	Description
		<p><b>Note 2:</b> if using MP8 to investigate non NMEs, APPDATE must be set to the desired query period start date.</p> <p><b>Note 3:</b> this date must be the same within a given query GROUP.</p> <p><b>Defined by:</b> Request Programmer  <b>Input type:</b> Optional if LAUNCHDATE is specified  <b>Format:</b> SAS date MMDDYY10.  <b>Example:</b> 11/04/2006</p>
Drug Launch Date	LAUNCHDATE	<p><b>Details:</b> the NME launch date.</p> <p><b>Note 1:</b> either this parameter or the APPDATE is required.</p> <p><b>Note 2:</b> if using MP8 to investigate non NMEs, LAUNCHDATE must be set to the desired query period start date.</p> <p><b>Note 3:</b> this date must be the same within a given query GROUP.</p> <p><b>Defined by:</b> Request Programmer  <b>Input type:</b> Optional if APPDATE is specified  <b>Format:</b> SAS date MMDDYY10.  <b>Example:</b> 12/06/2008</p>
Query Period Start Date Type	STARTDATETYPE	<p><b>Details:</b> specifies which of the APPDATE or LAUNCHDATE values should be used to define the query period start date.</p> <p>Valid values are:</p> <ul style="list-style-type: none"> <li>• <b>A:</b> approval date (APPDATE) will be used as the query period start date</li> <li>• <b>L:</b> launch date (LAUNCHDATE) will be used as the query period start date</li> </ul> <p><b>Defined by:</b> Request Programmer  <b>Input type:</b> Required (default value is L)  <b>Format:</b> Alphanumeric; SAS character \$1.  <b>Example:</b> A</p>
Query Period End Date	STUDYENDDATE	<p><b>Details:</b> specifies the query period end date.</p> <p><b>Note 1:</b> this date must be the same within a given query GROUP.</p> <p><b>Defined by:</b> Request Programmer</p>

Parameter	Field Name	Description
		<p><b>Input type:</b> Required  <b>Format:</b> SAS date MMDDYY10.  <b>Example:</b> 10/08/2012</p>
Query Washout Period	WASHPER	<p><b>Details:</b> length of washout period in days. The washout period is a period of time before the <u>first</u> treatment episode index date during which a member cannot have any evidence of the exposure(s) of interest.</p> <p><b>Note 1:</b> length of washout period in days must be the same within a given query GROUP.</p> <p><b>Note 2:</b> this parameter is applied to the first treatment episode only.</p> <p><b>Note 3:</b> for non NMEs (NME=0), the MP algorithm may use days before the query period start date to determine if incidence criteria are met. For NMEs (NME=1), the MP algorithm will not use days before the query period start date to ensure WASHPER requirements are met. Should the WASHPER days extend before the query period start date for NMEs, the WASHPER value will be truncated and only assessed for the days between the index date and the query period start date.</p> <p><b>Note 4:</b> in conjunction with the ENROLGAP and minimum pre-index enrollment days (ENRDAYS) parameters, the washout period parameter (WASHPER) is used to ensure that appropriate enrollment requirements are met. (See <a href="#">Section V.A</a>).</p> <p><b>Defined by:</b> Requester  <b>Input type:</b> Required (0 must be entered if no WASHPER is required)  <b>Format:</b> Numeric  <b>Example:</b> 183</p>
Minimum Pre-Index Enrollment Days	ENRDAYS	<p><b>Details:</b> optional parameter to ensure a minimum number of days of continuous enrollment prior to the start of the <u>first</u> treatment episode.</p> <p><b>Note 1:</b> if not specified by the requester a default value of WASHPER days is used by the MP algorithm.</p> <p><b>Note 2:</b> if specified must be the same within a given query GROUP.</p> <p><b>Note 3:</b> this parameter is applied to the first episode only.</p>

Parameter	Field Name	Description
		<p><b>Note 4:</b> for NMEs as well as non NMEs, the MP algorithm may use days before the query period start date to determine if continuous enrollment and incidence criteria are met.</p> <p><b>Note 5:</b> in conjunction with the ENROLGAP and WASHPER parameters, the ENRDAYS parameter is used to ensure that appropriate enrollment requirements are met. If enrollment requirements prior to the first episode index date are not met, the member is <u>discarded from the study</u>. (See <a href="#">Section V.A</a>).</p> <p><b>Defined by:</b> Requester  <b>Input type:</b> Optional (default value is the same as WASHPER)  <b>Format:</b> Numeric  <b>Example:</b> 365</p>
Minimum Days of Supply	MINDAYSUPP	<p><b>Details:</b> minimum days of supply for a dispensing to be valid.</p> <p><b>Note 1:</b> this value must be the same within a given query GROUP.</p> <p><b>Note 2:</b> if a member has a claim with a supply lower than the minimum days of supply required, the <i>member</i> is <u>discarded from the study</u>.</p> <p><b>Note 3:</b> default value is 1.</p> <p><b>Defined by:</b> Request Programmer  <b>Input type:</b> Required  <b>Format:</b> Numeric.  <b>Example:</b> 15</p>
Maximum Days of Supply	MAXDAYSUPP	<p><b>Details:</b> maximum days of supply for a claim to be valid.</p> <p><b>Note 1:</b> this value must be the same within a given query GROUP.</p> <p><b>Note 2:</b> if a member has a claim with a supply higher than the maximum days of supply allowed, the <i>member</i> is <u>discarded from the study</u>.</p> <p><b>Note 3:</b> default value is 90.</p> <p><b>Defined by:</b> Request Programmer  <b>Input type:</b> Required  <b>Format:</b> Numeric.</p>

Parameter	Field Name	Description
		<b>Example:</b> 90
Treatment Episode Gap Type	EPISODEGAPTYPE	<p><b>Details:</b> specifies the type of algorithm to use for the calculation of episode gaps.</p> <p>Valid values are:</p> <ul style="list-style-type: none"> <li>• <b>F:</b> Fixed episode gap. The value specified in EPISODEGAP will be used to determine if two consecutive claims are in the same episode.</li> <li>• <b>P:</b> Percentage episode gap. The value specified in EPISODEGAP will represent a percentage of the previous dispensing's days of supply to determine if two consecutive claims are in the same episode.</li> </ul> <p><b>Note 1:</b> this value must be the same within a given query GROUP.</p> <p><b>Note 2:</b> default value is "P."</p> <p><b>Defined by:</b> Request Programmer  <b>Input type:</b> Required (default value is P)  <b>Format:</b> Alphanumeric; SAS character \$1.  <b>Example:</b> P</p>
Treatment Episode Gap	EPISODEGAP	<p><b>Details:</b> used in conjunction with EPISODEGAPTYPE; sets the number of days allowed between two consecutive claims to consider them as part of the same treatment episode. For a given claim, if EPISODEGAPTYPE is Fixed (F), a gap of more than EPISODEGAP days between the claim date and the date of the last day of supply of the previous claim triggers a new treatment episode. If EPISODEGAPTYPE is Percentage (P), a gap of more than EPISODEGAP percent of the previous claim days of supply between the claim date and the date of the last day of supply of the previous claim triggers a new treatment episode.</p> <p>For example, if EPISODEGAP=10 and EPISODEGAPTYPE=F, claim1's last day of supply is on 1/31/2012 and claim2's start date is 2/12/2012, the MP algorithm starts a new treatment episode on 2/12/2012 because there are more than 10 days between the two claims.</p> <p><b>Note 1:</b> this value must be the same within a given query GROUP.</p> <p><b>Defined by:</b> Requester</p>



Parameter	Field Name	Description
		<p><b>Input type:</b> Required (0 must be entered if no EPISODEGAP is required; default value is 0 for Fixed EPISODEGAPTYPE and 30 for Percentage EPISODEGAPTYPE)</p> <p><b>Format:</b> Numeric</p> <p><b>Example:</b> 10</p>
Episode Extension Period	EXEPTPER	<p><b>Details:</b> extends the length of the treatment episode by a specified number of days. A treatment episode can be extended EXEPTPER days after the last day of supply of the treatment episode's last claim.</p> <p><b>Note 1:</b> extension days are added after the stockpiling algorithm has been applied and treatment episodes are created. See <a href="#">Section V.B.1</a> and <a href="#">Section V.B.3</a> for details.</p> <p><b>Note 2:</b> this value must be the same within a given query GROUP.</p> <p><b>Note 3:</b> if EXEPTPER is left blank, this parameter will take the value of the last gap in dispensing's days supplied for a treatment episode. For example, if EXEPTPER is missing and a treatment episode has two allowed gaps, 3 days between the first and second dispensing and 6 days between the second and third dispensing, the treatment episode will have an extension of 6 days (the last gap in the episode). Note that the maximum allowable gap between dispensings to be included in the same treatment episode is determined by the EPISODEGAPTYPE-EPISODEGAP combination allowed for these values.</p> <p><b>Defined by:</b> Requester</p> <p><b>Input type:</b> Optional (0 must be entered if no EXEPTPER is required; default value is last episode gap)</p> <p><b>Format:</b> Numeric</p> <p><b>Example:</b> 15</p>
Minimum Episode Duration	MINEPISDUR	<p><b>Details:</b> used to reject <i>members</i> with <u>first</u> treatment episode of fewer than MINEPISDUR days.</p> <p><b>Note 1:</b> criterion applied after any gaps are bridged and extension days added to the length of the treatment episode.</p> <p><b>Note 2:</b> this value must be the same within a given query GROUP.</p> <p><b>Defined by:</b> Requester</p> <p><b>Input type:</b> Required (0 must be entered if no</p>

Parameter	Field Name	Description
		<p>MINEPISDUR is required; default value is 1)</p> <p><b>Format:</b> Numeric</p> <p><b>Example:</b> 10</p>
Stockpiling Algorithm Type	STOCKPILTYPE	<p><b>Details:</b> specifies the type of stockpiling algorithm to use.</p> <p>Valid values are:</p> <ul style="list-style-type: none"> <li>• <b>S:</b> Standard algorithm. Slides overlapping dispensings to create a continuous sequence of non-overlapping dispensings.</li> <li>• <b>R:</b> Revised algorithm. If a second dispensing occurs at least XX% (i.e., XX% or more) of the time through the previous dispensing, the length of the second dispensing is added to the end of the first dispensing; if the second dispensing occurs less than XX% of the time through the first dispensing then the second dispensing time is begun at the time it is dispensed and the first one is truncated.</li> </ul> <p><b>Note 1:</b> this value must be the same within a given query GROUP.</p> <p><b>Note 2:</b> unlike other MPs, MP8 stockpiles at the GROUP level and not the SUBGROUP level (the parameter SUBGROUP is not included in MP8)</p> <p><b>Note 3:</b> in the event of same day dispensings within a GROUP, MP8 will sum RxSup and RxAmt values</p> <p><b>Note 4:</b> only claims with RxSup &gt;0 are considered (claims not meeting this criteria are discarded from analysis)</p> <p><b>Defined by:</b> Requester</p> <p><b>Input type:</b> Required</p> <p><b>Format:</b> Alphanumeric; SAS character \$1.</p> <p><b>Example:</b> R</p>
Revised Stockpiling Percentage	STOCKPILPERCENT	<p><b>Details:</b> used in conjunction with STOCKPILTYPE; specify the percentage to be applied when STOCKPILETYPE=R.</p> <p><b>Note 1:</b> this value must be the same within a given query GROUP.</p> <p><b>Note 2:</b> valid values are between 1 and 100.</p> <p><b>Note3:</b> leave blank when STOCKPILTYPE=S.</p>

Parameter	Field Name	Description
		<b>Defined by:</b> Requester <b>Input type:</b> Required when STOCKPILTYPE=R. <b>Format:</b> Numeric. <b>Example:</b> 50

## 2. Data Floor and Cap Dates File

The [Data Floor and Cap Dates File](#) is required. The file is used to limit the period for MSCDM data extraction and truncate member enrollment. The file contains dates that will define the period for MSCDM data extraction.

The dates contained in the file can be constrained to be identical across Data Partners. In this case, since the only MSCDM tables used by the program are Enrollment, Demographic and Dispensing, the floor date cannot be lower than the maximum data completeness date for these tables across Data Partners. In the same way, the cap date cannot be higher than the minimum data completeness date for the same tables.

The dates contained in the file can also be different across Data Partners. In this case, for each Data Partner, the floor cannot be lower than the maximum data completeness date for the enrollment, demographic and dispensing tables and the cap date cannot be higher than the minimum data completeness date for the same tables. Table 3 contains detailed specifications for the [Data Floor and Cap Dates File](#).

**Table 3: Data Floor and Cap Dates File Specification**

Parameter	Field Name	Description
MSCDM Data Floor Date	DATAFLOORDATE	<b>Details:</b> the lower bound date for data extraction across MSCDM tables. Claims prior to this date will not be extracted and processed by the program and member enrollment start dates will be floored at this date.  <b>Defined by:</b> Request programmer <b>Input type:</b> Required <b>Format:</b> SAS date MMDDYY10. <b>Example:</b> 01/01/2001
MSCDM Data Cap Date	DATACAPDATE	<b>Details:</b> the upper bound date for data extraction across MSCDM tables. Claims after this date will not be extracted and processed by the program and member enrollment end dates will be capped at this date.  <b>Defined by:</b> Request programmer <b>Input type:</b> Required <b>Format:</b> SAS date MMDDYY10. <b>Example:</b> 12/31/2012

### 3. Output Table Selection File

The [Output Table Selection File](#) is optional. It is used to instruct the MP algorithm to preserve only a subset of all output tables generated by one run of the MP. If defined, it contains parameters used to specify which output tables generated by the MP should be kept in the MSOC output folder of the MP run.

Unlike other MP input files, the GROUP field is not part of the set of required parameters. One version of the OUTTABLESFILE input file can be used for multiples runs of the MP no matter what GROUP values are used.

There are four required parameters that must be specified, all by the request programmer. Moreover, the input file must contain one line for each of the output files generated by each run of MP8. Table 4 contains detailed specifications for the [Output Table Selection File](#), and a template is provided in [Section IX](#).

**Table4: Output Table Selection File Specification**

Parameter	Variable Name	Description
Name of Table in MP Documentation	DOCTABNAME	<p><b>Details:</b> contains the name of the table as specified in the MP documentation.</p> <p><b>Note 1:</b> this is not the actual name used inside the program but the name as listed in the documentation.</p> <p><b>Defined by:</b> Request programmer</p> <p><b>Input type:</b> Optional, for reference only, dropped at the start of the MP execution.</p> <p><b>Format:</b> Alphanumeric; SAS character \$30.</p> <p><b>Example:</b> Table1</p>
Description of Table in MP Documentation	DOCTABDESCR	<p><b>Details:</b> contains the description of the table as specified in the table titles of the modular program documentation.</p> <p><b>Defined by:</b> Request programmer</p> <p><b>Input type:</b> Optional, for reference only, dropped at the start of the MP execution.</p> <p><b>Format:</b> Alphanumeric; SAS character \$150.</p> <p><b>Example:</b> Counts of Members, Incident Treatment Episodes, Total Dispensings and Days of Supply</p>

Parameter	Variable Name	Description
Name of Table Generated by MP	TABNAME	<p><b>Details:</b> contains the name of the table generated by the modular program.</p> <p><b>Note 1:</b> must be entered in lower case.</p> <p><b>Note 2:</b> this is the actual table name used inside the program.</p> <p><b>Defined by:</b> Request programmer  <b>Input type:</b> Required  <b>Format:</b> Alphanumeric; SAS character \$10.  <b>Examples:</b> table1, table11</p>
Table Inclusion Indicator	TABREQUIRED	<p><b>Details:</b> indicates whether TABNAME must be preserved. Valid values are:</p> <ul style="list-style-type: none"> <li>• <b>Y:</b> preserve table in output</li> <li>• <b>N:</b> remove table from output</li> </ul> <p><b>Defined by:</b> Request programmer  <b>Input type:</b> Required  <b>Format:</b> Alphanumeric; SAS character \$1.  <b>Example:</b> Y</p>

## V. KEY DEFINITIONS

### A. ENROLLMENT REQUIREMENTS

All claims used by the MP algorithm to select members of interest and build treatment episodes must occur during valid enrollment periods. Requirements used to build valid enrollment periods are customizable using a set of requester-defined input parameters. Unlike other MPs that require requesters to select medical and drug coverage requirements for each execution of the MP, MP8 by default outputs results for the following coverage strata:

1. Members with both drug and medical coverage
2. Members with drug coverage only
3. Members with drug coverage regardless of medical coverage

Within each coverage stratum, continuous enrollment periods are constructed by bridging all enrollment records of the corresponding coverage type. That is, using the main ENROLGAP parameter, two (or more) consecutive enrollment periods separated by (no more) than ENROLGAP days are bridged together to form a longer, continuous enrollment episode of the relevant coverage type. Such continuous enrollment episodes are then used to confirm whether claims with query codes of interest and other characteristics can be used toward creation of treatment episodes.

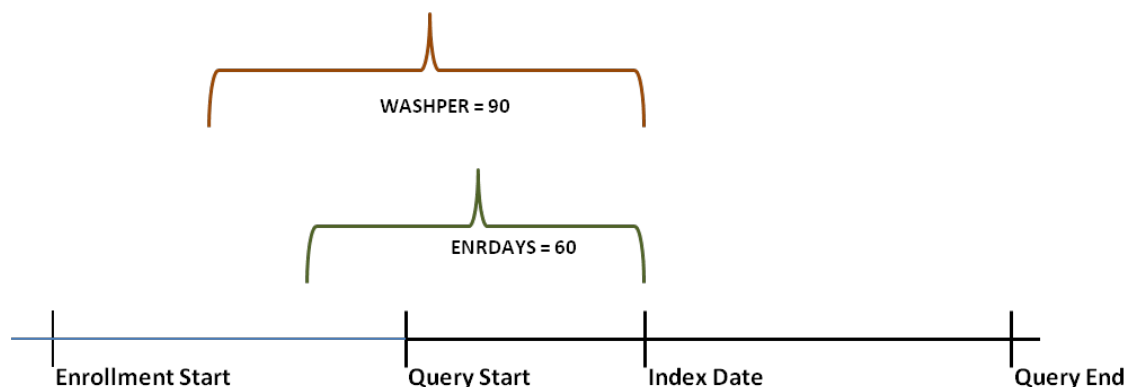
For non NMEs, since the first treatment episode can only be considered valid with at least WASHPER days free of the exposure(s) of interest, the MP algorithm by default ensures that *at least* WASHPER days of continuous enrollment with the relevant coverage type are found before the index date no

matter how many minimum pre-index enrollment days are requested (as specified by the ENRDAYS parameter of the [Query File](#)). Therefore the minimum pre-index enrollment days requirement can only be binding if it requires more days than those already requested by the required WASHPER parameter (i.e., if ENRDAYS > WASHPER). For example, if the required WASHPER is set to 183 days, a minimum number of pre-index enrollment days of ENRDAYS=183 (or less) does not impact what records are used to select the desired cohort of members.

For NME's, the interaction between ENRDAYS and WASHPER differs, as WASHPER may be truncated when the user-defined value extends beyond the query period start date. If WASHPER is not truncated, the interaction between ENRDAYS and WASHPER is identical for NMEs and non NMEs. However, should WASHPER be truncated, it may not be true that the minimum pre-index enrollment days requirement is only be binding if it requires more days than those already requested by the required WASHPER parameter (i.e., if ENRDAYS > WASHPER).

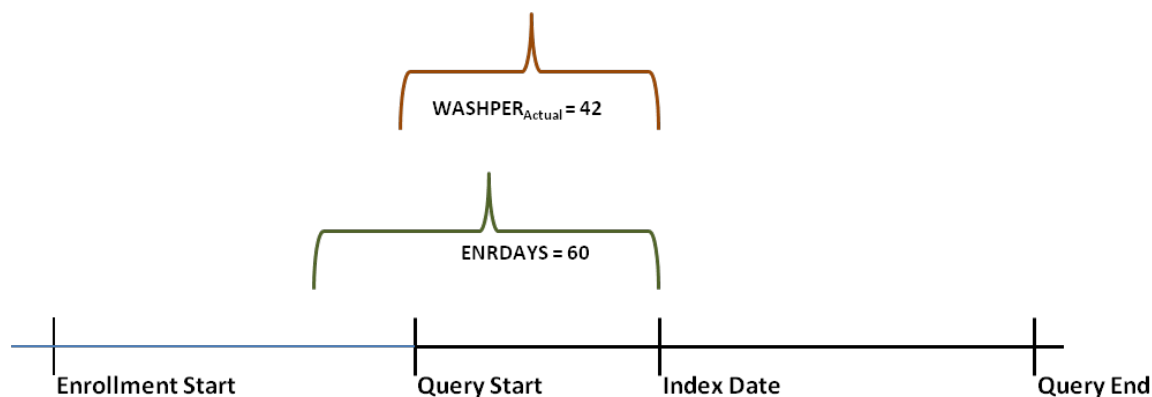
Take the following example where the user defines ENRDAYS=60 and WASHPER= 90, and the index date occurs 42 days after the query period start date (Figure 1).

**Figure 1: Enrollment and Washout Requirement Assessment in MP8**



For non NME's, the MP algorithm will require 90 days of continuous enrollment (since WASHPER > ENRDAYS) and 90 days free of the exposure of interest prior to index date. For NMEs, however, the WASHPER value will be truncated because it extends beyond the query period start date (Figure 2).

**Figure 2: Enrollment and Washout Requirement Assessment in MP8 – Truncated Washout Period**



For NME's, then, the MP algorithm will require 60 days of continuous enrollment and 42 days free of the exposure of interest prior to index date.

## B. TREATMENT EPISODES

A treatment episode is defined as an uninterrupted sequence of treatment with claims of the same query group; a treatment episode ends when this sequence is interrupted by a gap in days supply that is greater than the allowable gap ([Section V.B.2](#)) defined by the requester. The length of a treatment episode is defined as the difference between the episode end date and the episode start date plus one.

In MP8, incidence and pre-index enrollment requirements are only assessed for the first treatment episode during the query period. If the first episode does not meet requirements, it is discarded along with all subsequent episodes for the member. Episodes other than the initial episode are not constrained to washout requirements.

### 1. Stockpiling Algorithm

Because members may refill their drug prescriptions before the end of days supply of the prior prescription, a stockpiling algorithm is used to account for claims with overlapping days of supply of the same query GROUP. Since this early-refill pattern may artificially reduce the length of the treatment episode ([Section V.B.3](#)), the dispensing date of the subsequent overlapping dispensing is adjusted. For example, all codes contained in exposure GROUP "Exposure1" will be input together in the stockpiling algorithm to adjust claim service dates. Claims in exposure GROUP "Exposure2" will be adjusted separately from "Exposure1" claims. Once service dates have been adjusted, treatment episodes are created at the GROUP level using all claims with adjusted dates.

Figure 3 illustrates the standard stockpiling algorithm and how the service dates of various claims of the same GROUP are adjusted. Note that this stockpiling process occurs before the identification of continuous treatment episodes.

**Figure 3: Standard Stockpiling Algorithm of MP8**

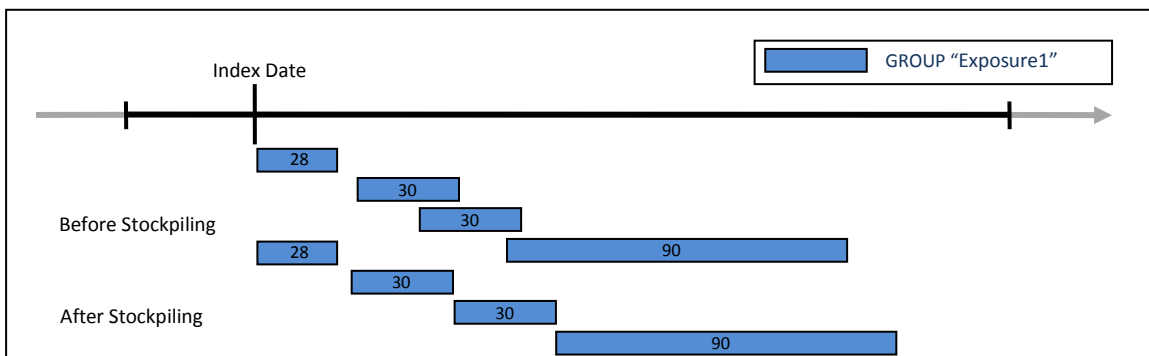
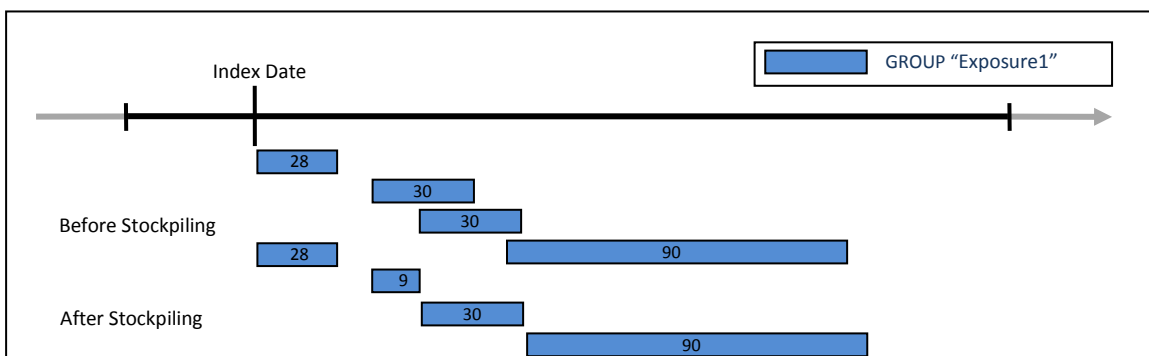


Figure 4 illustrates the revised stockpiling algorithm with a 50% percent value.

**Figure 4: Revised Stockpiling Algorithm of MP8**



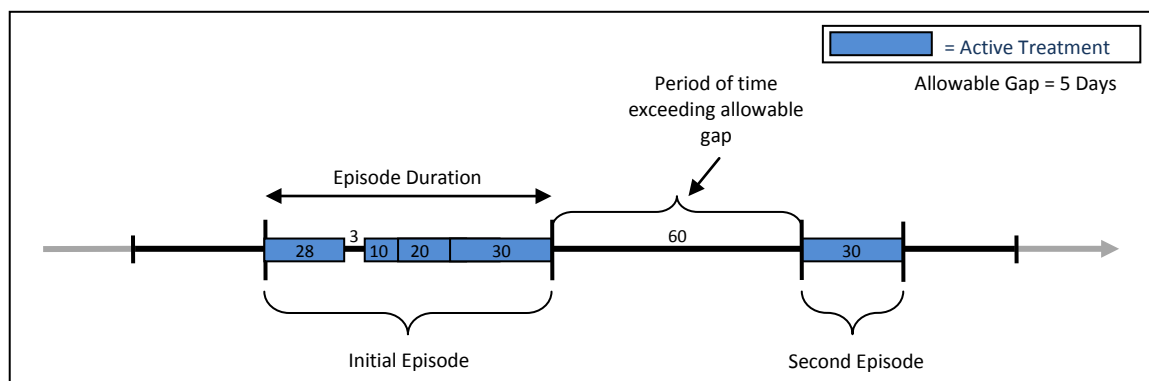
In Figure 4, the second claim is truncated because the third one occurs less than 50% of the time through the second dispensing.

## 2. Allowable Gap and Length of Treatment Episodes

The allowable gap (defined by the EPISODEGAPTYPE and EPISODEGAP parameters in the [Query File](#)) is the maximum number of days of interrupted days of supply that can be found between two claims of the same query group to be considered part of the same treatment episode. The EPISODEGAP can be a fixed value or a percentage of the previous claim's days of supply. If a gap of treatment between two claims of the same query group is smaller than or equal to the allowable gap, the MP8 algorithm "bridges" these two claims to build a continuous treatment episode. If, however, the allowable gap is exceeded between the same two claims, the treatment episode ends at the end of first claim and a new treatment episode starts at the beginning of the second claim. The allowable gap is assessed after claim service dates are adjusted by the stockpiling algorithm. Figure 3 summarizes the treatment episode and allowable gap concepts.



**Figure 5: Illustration of Treatment Episode and Allowable Gap of MP8**



In Figure 3, a fixed allowable gap of treatment of five days is used. The “active treatment” (in blue) corresponds to the days supply for claims of a given query group. Four claims make up the first treatment episode since there is only a 3-day interruption in treatment between the first and second dispensing; that gap is “bridged” by the MP8 algorithm to create a single episode.

The treatment episode start date (or index date) is the service date on the first claim of the treatment episode. The treatment episode end date corresponds to the earliest of 1) date of the last day of supply preceding a treatment gap that is greater or equal to the “allowable gap” (as in Figure 3); 2) interruption in the member’s enrollment; or 3) query period end date.

In MP8, if a treatment episode ends with remaining days of supply, it will be identified as censored. A censoring flag is assigned to each treatment episode, indicating whether the treatment episode was:

1. not censored
2. censored due to disenrollment (i.e., interruption in the member’s enrollment)
3. censored due to end of the query period

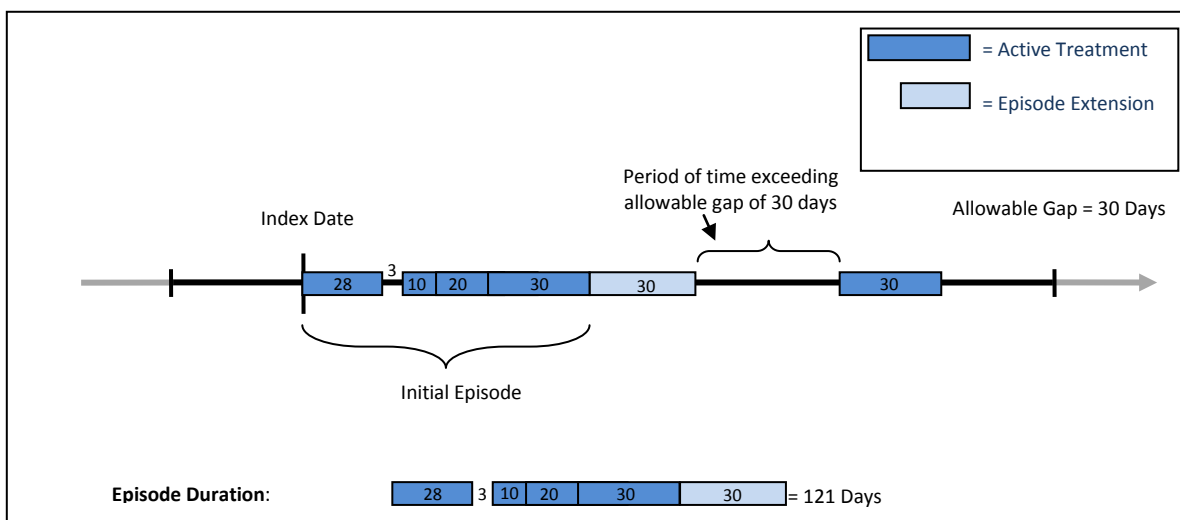
If a member’s episode is censored for disenrollment and the end of the query period, censoring will be attributed to the event that occurs first. If disenrollment and the query period end date occur on the same day, censoring is attributed to the query period end date.

### 3. Episode Extension

MP8 allows the requester to extend the treatment episode using the episode extension parameter. For example, if a treatment episode ends on December 31<sup>st</sup>, 2010 and an episode extension of 5 days is allowed, the episode will be extended to January 5<sup>th</sup>, 2011.

Figure 4 illustrates the case where the allowable treatment gap and the episode extension are both set to 30 days.

**Figure 6: Treatment Episode with an Episode Extension**



In Figure 6, the active treatment ends on the last treatment day of the fourth dispensing because a gap of more than 30 days separates this date from the fifth dispensing. At this point the initial episode duration is 91 days. Since the episode extension is set to 30 days, the episode duration is adjusted to 121 days.

When an episode extension is used, the end date of the episode (and thus the episode length) is adjusted to reflect the additional days of extension.

If an episode extension extends into another treatment episode (*i.e.*, episode extension > allowable gap), the episode extension is truncated and no “bridging” of treatment episodes occurs.

## C. VALID TREATMENT EPISODES

In MP8, the first treatment episode during the query period is subject to different requirements than subsequent episodes. Valid first treatment episodes for members must meet all user-defined incidence and enrollment criteria. If a member’s first treatment episode meets all requirements, then all subsequent episodes are included in analyses.

### 1. First Episode Incidence

In order for a first treatment episode to be considered incident, it must meet the following criteria:

1. Member is continuously enrolled at least ENRDAYS (if specified by the Minimum Pre-Index Enrollment Days parameter in the [Query File](#)) and WASHPER days before the treatment episode index date.
2. Member has no evidence of exposure during the WASHPER days before the treatment episode index date.
3. Claim is the first claim meeting conditions 1 and 2 during the query period.

Note that for NMEs, the washout period requirement is never verified prior to the query period start date, since logically this date corresponds to the approval or the launch date. Therefore, the WASHPER

parameter in the [Query File](#) may be truncated if the number of days specified by WASHPER would require assessment prior to query period start. For non NMEs, days before the query period start may be used to assess incidence requirements.

## VI. PROGRAM STEPS

The general program steps are:

1. Process the modular program parameters and attribute default values to the optional parameters if needed
2. Process the required input file (and all other optional ones if specified)
3. Extract drug claims from the outpatient pharmacy file
4. Identify invalid claims, i.e., those with days of supply outside the allowable range (determined by user-defined MINDAYSUPP and MAXDAYSUPP parameters; reported in output Table 2)
5. Apply stockpiling algorithm to valid claims (by query GROUP) according to the specified STOCKPILTYPE
6. Identify index dates for exposed members
7. Extract enrollment and demographic data
8. Reconcile enrollment spans (gaps in enrollment less than ENROLGAP) stratified by coverage type
9. Exclude members who do not meet demographic, enrollment, claims supply requirements within allowable range and minimum pre-index enrollment days requirements (reported in exclusions output table)
10. Create query group treatment episodes according to the specified episode gap type and episode gap, and apply extension, duration and censoring rules
11. Remove all episodes where the member's age is outside the valid range and retain only the first treatment episodes satisfying the minimum duration condition
12. Drop all episodes and claims of members with invalid first treatment episodes
13. Create output tables

## VII. PROGRAM EXECUTION

When implementing modular programs within the MSDD, the Mini-Sentinel Operations Center (MSOC) uses a uniform folder structure across Data Partners to facilitate communications between MSOC and Data Partners and to streamline file management. Each request distributed by MSOC is assigned a unique Request ID. Upon receipt of the request, Data Partners create a folder named after the Request ID and several subfolders to organize program inputs and outputs. One of the folders contains output to be sent to MSOC and another contains intermediate files that remain with the Data Partner, but could be used to facilitate follow-up queries if necessary. Appropriate retention policies apply.

Table 4 defines the local environment variables that must be initialized by the user to execute the program (*i.e.*, defined by the Data Partner before execution of the program). Please note that these values cannot be left blank. Each Data Partner is required to enter user inputs at the beginning of the SAS Program sent with each request. These inputs are unique to each Data Partner.

**Table 4: Environment Variable Definitions**

Label	Field Name	Description
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Label	Field Name	Description
Data Partner ID	DPID	Enter the two character partner ID.
Site ID of Data Partner	SITEID	Enter the two character Site ID.
Enrollment Table Name	ENRTABLE	Enter the name of the MSCDM Enrollment table.
Demographics Table Name	DEMTABLE	Enter the name of the MSCDM Demographics table.
Dispensing Table Name	DISTABLE	Enter the name of the MSCDM Dispensing table.
Input file folder	INFOLDER	Enter the path where the input files will be saved.
Output file folder	MSOC	Enter the path where the shared output tables will be saved.
Dataset file folder	DPLOCAL	Enter the path where the local SAS datasets will be saved.
Libname of the MSCDM	INDATA	Enter the path where the MSCDM data is saved.

## VIII. OUTPUT TABLES AND ANALYSIS TOOLS

### A. OUTPUT TABLES

Twelve output tables are created by the modular program. Output tables are analytic datasets that must be further processed to create summary statistics of interest. Below are examples of all output tables.

**Output TABLE1: Summary of Query Group Creation**

Group	CodeType	Code	StartDateType	AppDate	LaunchDate	StudyEndDate	WashPer	EnrDays
QGRP1	RX11	00078041915	A	12/22/2004	.	12/31/2010	183	365
QGRP1	RX11	00078041934	A	12/22/2004	.	12/31/2010	183	365

MinDay Supp	MaxDay Supp	MinEpisDur	EpisodeGap Type	Episodegap	ExpExtPer	StockPil Type	StockPil Percent	NME	Descr
1	90	1	P	30	.	R	50	1	
1	90	1	P	30	.	R	50	1	

Interpretation of Output TABLE 1: This table summarizes the executed queries. For group QGRP1 NMEs, the query period start date was equal to the approval date. The query period spanned 12/22/2004-12/31/2010, and the program required a 183-day washout period and 365 days of continuous enrollment before the first treatment episode. To be valid, claims had to have a supply between 1 and 90 days. Episode gaps were calculated using 30% of the previous dispensing's supply and the revised stockpiling algorithm with 50% threshold was used.

**Output TABLE2: Distribution of Number of Dispensings by Days Supplied**

Group	CovType	SupGroup	MinDaySupp	MaxDaySupp	Disp	TotDisp
QGRP1	0	1	1	90	112	4607
QGRP1	0	2	1	90	99	4607
QGRP1	0	3	1	90	4375	4607
QGRP1	0	4	1	90	1	4607
QGRP1	0	5	1	90	4587	4607
QGRP1	0	6	1	90	20	4607
QGRP1	0	7	1	90	4607	4607

**Interpretation of Output TABLE2:** This table summarizes the number of dispensings by GROUP, coverage type (CovType), and user-defined days supplied categories (SupGroup; defined using the DISPDAYSSUPSTRAT macro parameter).

Coverage types are coded as follows:

- 0: medical and drug coverage
- 1: drug coverage only
- 2: drug coverage regardless of medical coverage

SupGroups are coded as a numeric indicator of the groups defined in the DISPDAYSSUPSTRAT macro parameter. For example, if DISPDAYSSUPSTRAT = “15-30 31-45 45-60 61-90” SupGroup values would be as follows:

- 1: 15-30
- 2: 31-45
- 3: 45-60
- 4: 61-90

In addition, the last three SupGroup values always correspond to the number of valid dispensings, number of invalid first dispensings, and total number of dispensings, respectively. In the example above, SupGroup would also take the following 3 values:

- 5: number of valid dispensings
- 6: number of invalid dispensings
- 7: total number of dispensings

Therefore, the TABLE2 example above can be interpreted as: for GROUP QGRP1 NMEs in the medical and drug coverage stratum, 112 dispensings identified had 15-30 days supplied, 99 dispensings had 31-45 days supplied, 4,375 dispensings had 45-60 days supplied, and 1 had 61-90 days supplied. There were a total of 4,587 valid dispensings. In this example, 20 dispensings were excluded because they had invalid days supply for a total of 4,607 dispensings.

**Output TABLE3: Counts of Dispensings per Number of Days of Supply**

Group	CovType	RxSup	Count
QGRP1	0	15	5,703
QGRP1	0	30	2,604
QGRP1	0	45	116
QGRP1	0	60	97

**Interpretation of Output TABLE 3:** This table summarizes all dispensings identified by their days supplied (RxSup). Unlike TABLE2, TABLE3 lists all identified values of RxSup, and not user-defined categories. For GROUP QGRP1 NMEs in the medical and drug coverage stratum, 5,703 dispensings had 15 days of supply and 97 dispensings had 60 days of supply. This table is used to generate descriptive statistics for the number of days supplied per valid dispensing.

**Output TABLE4: Episodes by Episode Number, Episode Length and Censoring Type**

Group	CovType	episode	CensNone	CensEnd	CensEnrol	EpisodeLength	Count
QGRP1	0	1	1	0	0	30	933
QGRP1	0	1	1	0	0	41	201
QGRP1	0	1	1	0	0	57	123
QGRP1	0	2	0	0	1	62	96

Interpretation of Output TABLE 4: This table summarizes episode length by episode number (i.e., first episode =1, second episode=2, etc.), highlighting which episodes were censored and why. The censoring indicator variables are defined as follows:

CensNone:

- 0: censored
- 1: not censored

CensEnd:

- 0: not censored
- 1: censored due to end of the query period

CensEnrol:

- 0: not censored
- 1: censored due to disenrollment (i.e., interruption in the member’s enrollment)

For GROUP QGRP1 NMEs in the medical and drug coverage stratum, there were 933 uncensored first episodes with a length of 30 days, and 96 second episodes with a length of 62 days censored due to disenrollment. This table is used to generate descriptive statistics for the length of treatment episodes.

**Output TABLE 5: Time to Second Dispensing Characterization**

Group	CovType	DInterval	Count
QGRP1	0	0.9	3
QGRP1	0	0.9333	1
QGRP1	0	1.03	2
QGRP1	0	1.09	5

Interpretation of Output TABLE 5: this table characterizes the time to second dispensing for all members with more than one dispensing of interest during the query period. The table defines the timing of the second dispensing (DInterval) as:

$$\frac{\text{Date of second dispensing} - \text{Date of first dispensing} + 1}{\text{First dispensing days supply}}$$

For example, if the first dispensing occurs on 6/1/2012 with a days supply = 30 and the second dispensing occurs 6/28/2012, the DInterval value will be  $28/30 = 0.93$ .

For GROUP QGRP1 NMEs in the medical and drug coverage stratum, 3 claims were dispensed after 90% of the first’s claims days of supply and 5 claims were dispensed after 109% of the first’s claims days of

supply (indicating a small gap between the first and second dispensing). This table is used to generate the length of the interval (as a percentage of the first dispensing's days of supply) between the first and the second dispensings.

**Output TABLE6: Users and Total Dispensings by Sex, Age Group and Months Post-Approval**

Group	CovType	Sex	AgeGroup	MntsFromApp	_TYPE_	NUsers	TotDisp
DARIFENACIN_HYDROBROMIDE	0	F	20-49	1	27	2	2
DARIFENACIN_HYDROBROMIDE	0	F	20-49	2	27	1	1
DARIFENACIN_HYDROBROMIDE	0	F	20-49	3	27	8	9
DARIFENACIN_HYDROBROMIDE	0	F	20-49	4	27	6	14

Interpretation of Output TABLE 6: this table summarizes the number of users and number of total dispensings stratified by user demographics, months since approval/launch, and coverage type. For GROUP QGRP1 NMEs in the medical and drug coverage stratum, there were 2 new female users aged between 20 and 49 years for a total of 2 dispensings in the first month post-approval, and 6 new female users aged between 20 and 49 years with a total of 14 dispensings in the fourth month post-approval. This table is used to generate new users, cumulative new users, dispensings and cumulative dispensings per month post-approval, age group, sex and coverage type.

Note that \_TYPE\_ is an indicator of each stratum combination of CovType\*Sex\*AgeGroup and can be used to facilitate analyses, but it is not relevant to cohort characteristics.

**Output TABLE7: Episodes by Episode Number, Episode Length and Censoring Type**

Group	CovType	episode	CensNone	CensEnd	CensEnrol	EpisodeLength	Count
QGRP1	0	1	1	0	0	30	933
QGRP1	0	1	1	0	0	41	201
QGRP1	0	1	1	0	0	57	123
QGRP1	0	2	0	0	1	62	96

Interpretation of Output TABLE7: This table summarizes episode length by episode number (i.e., first episode =1, second episode=2, etc.), highlighting which episodes were censored and why.

For GROUP QGRP1 NMEs in the medical and drug coverage stratum, there were 933 uncensored first episodes with a length of 30 days, and 96 second episodes with a length of 62 days censored due to disenrollment. This table is used to generate descriptive statistics for the length of treatment episodes.

**Output TABLE 8: Episode Gaps by Gap Number, Gap Length and Censoring Type**

Group	CovType	CensNone	CensEnd	CensEnrol	GapNo	Gap	Count
QGRP1	0	1	0	0	1	2	6
QGRP1	0	1	0	0	1	7	1
QGRP1	0	1	0	0	1	13	5
QGRP1	0	1	0	0	2	17	2

Interpretation of Output TABLE8: This table characterizes the duration of gaps between treatment episodes. "GapNo" indicates when the gap occurred relative to two treatment episodes, e.g., GapNo=1

indicates that the gap occurred between the first and second episode; GapNo=2 indicates that the gap occurred between the second and third episode.

For GROUP QGRP1 NMEs in the medical and drug coverage stratum, there were 6 gaps with a length of 2 days between the first and the second uncensored episode; there were 2 gaps with a length of 17 days between the second and the third uncensored episode. This table is used to generate descriptive statistics for gaps between valid treatment episodes.

**Output FIG4: Users by Total Number of Episodes and Time to First Treatment Episode Initiation**

Group	CovType	MntsFromApp	TotalEpisodes	Count
QGRP1	0	1	1	2
QGRP1	0	1	3	1
QGRP1	0	2	1	11
QGRP1	0	2	2	5

Interpretation of Output FIG4: This table characterizes the total number of users by number of treatment episodes and first treatment episode initiation (defined as months since approval/launch).

For GROUP QGRP1 NMEs in the medical and drug coverage stratum, there were 2 members with one episode during the query period that occurred during the first month post-approval. There were 5 members with two episodes during the query period; the first episode occurred during the second month post-approval. This table is used to generate a distribution of members by number of episodes within the 12 first months of use.

**Output FIG5: Users by Total Days Supply for All Dispensings**

Group	CovType	_030Days	_090Days	_180Days	_270Days	_360Days	TotUsers
QGRP1	0	879	439	203	126	93	894

Interpretation of Output FIG5: This table summarizes the total days supply for all dispensings during the query period by the number of users. Each column value represents a threshold value, e.g., users in the \_030Days column are users that had at least 30 days of total supply during the query period. Any users with fewer days supply than the first threshold column value will only appear in the TotUsers column.

For GROUP QGRP1 NMEs in the medical and drug coverage stratum, there were a total of 894 users. Among these users, 879 had at least 30 total days of supply and 93 had at least 360 total days of supply. The macro parameter TOTALDAYSSUPHRESH is used to determine the strata values. This table is used to generate a distribution of members by number of total days supplied.

**Output FIG6 First Episode Length by Censoring Type**

Group	CovType	CensNone	CensEnd	CensEnrol	EpisodeLength	NPts
QGRP1	0	1	0	0	30	205
QGRP1	0	1	0	0	38	1
QGRP1	0	1	0	0	44	2
QGRP1	0	1	0	0	60	23



Interpretation of Output FIG6: For group QGRP1 in the coverage stratum 0 (0 corresponding to medical and drug coverage) there were 205 members with uncensored first episodes having a length of 30 days and 23 members with uncensored first episodes having a length of 60 days. This table is used by the summary program to generate the survival curve for the length of the first treatment episode.

## B. ANALYSIS TOOLS

### 1. Exclusion Table

A standalone analysis tool that is executed by default for each run of MP8 is the Exclusion Table. This tool outputs a table containing the count of excluded members following application of inclusion and exclusion criteria. It allows the requester to see how the cohort of interest evolves after successively applying these criteria. The exclusion table tool will enable the requester to summarize this information in a single output table; Table 5 displays example output.

**Table 5: Example of Exclusion Table**

Group	CovType	ExclNumber	Exclusions	Counts
QGRP1	0	1	Members Exposed To Drug Of Interest	2345
QGRP1	0	2	Members Without Birth Date	4
QGRP1	0	3	Members Without Known Sex	1
QGRP1	0	4	Members Outside Age Range During Entire Study Period	3
QGRP1	0	5	Members Without Drug Coverage	2
QGRP1	0	6	Members Without Medical Coverage	68
QGRP1	0	7	Members Without Sufficient Coverage Prior To Index Date	44
QGRP1	0	8	Members With Claims Prior To Index Date	0
QGRP1	0	9	Members With Dispensing Supply Outside Allowable Range	33
QGRP1	0	10	Members With Episode Outside Age Range	6
QGRP1	0	11	Members Without Sufficient First Episode Duration	0
QGRP1	0	12	Members Kept in Study	2184

## IX. EXAMPLE

Tables 6-8 show partially-populated examples of the Query, Data Floor and Cap, and Output Table Selection Files used to create the output for QGRP1 described in [Section VIII](#):

**Table 6: Example of [Query File](#)**

Group	CodeType	Code	StartDateType	AppDate	LaunchDate	StudyEndDate	WashPer	EnrDays
QGRP1	RX11	00078041915	A	12/22/2004	.	12/31/2010	183	365
QGRP1	RX11	00078041934	A	12/22/2004	.	12/31/2010	183	365

MinDay Supp	MaxDay Supp	MinEpisDur	EpisodeGap Type	Episodegap	ExpExtPer	StockPil Type	StockPil Percent	NME	Descr
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MinDay Supp	MaxDay Supp	MinEpisDur	EpisodeGap Type	Episodegap	ExpExtPer	StockPil Type	StockPil Percent	NME	Descr
1	90	1	P	30	.	R	50	1	
1	90	1	P	30	.	R	50	1	

**Table 7: Example of [Data Floor and Cap Dates File](#)**

DataFloorDate	DataCapDate
01/01/2000	12/31/2013

**Table 8: Example of [Output Table Selection File](#)**

DOCTABNAME	DOCTABDESCR	TABNAME	TABREQUIRED
Table1	Drugs of Interest	table1	Y
	Members Excluded with Reason for Exclusion	exclusions	Y
Table2	Distribution of Days Supplied (%) per Dispensing	table2	Y
Table3	Descriptive Statistics for Number of Days Supplied per Valid Dispensing (all dispensings)	table3	Y
Table4	Descriptive Statistics for Length of Treatment Episode (in Days)	table4	N
Table5	Descriptive Statistics for Length of Interval (in %) between the First and Second Dispensings	table5	Y
Table6	Number of New Users and Dispensings by Month Post-Approval, Age Group, Sex and Coverage Type	table6	Y
Table7	Descriptive Statistics on Length (in days) of Valid Treatment Episodes	table7	Y
Table8	Descriptive Statistics for Gaps (in days) between Valid Treatment Episodes	table8	N
Fig4	Distribution of Members (in %) by Number of Episodes Within 12 First Months of Use	fig4	Y
Fig5	Distribution of Members (in %) by Number of Total Days Supplied	fig5	Y
Fig6	Survival Curve for Length of First Treatment Episode	fig6	Y
	Information About The Program Execution	signature	Y

In the example above, the requester additionally instructed the request programmer to use the following SAS macro parameters:

- Any enrollment gap of less than 45 days is considered administrative and is ignored
- Results should be stratified according to the following age groups: 18-44 45-54 55-64 65+
- Dispensings should be stratified according to the following supply groups: 15-29 30-59 60-89 90+
- Thresholds for total days of supply should be 90, 180 and 360

For this request, the program could be executed using the following SAS macro call:

```
%MODULARPROGRAM8 (
MSPROJID=to09msy5
MSWPTYPE=mpr,
MSWPID=wp01,
```

```
MSVERID=v01,  
RUNID=01,  
ENROLGAP=45,  
QUERYFILE=QueryMP8.sas7bdat,  
FLOORCAPFILE=FloorAndCap.sas7bdat,  
OUTTABLESFILE=mp_output_select.sas7bdat,  
AGESTRAT=18-44 45-54 55-64 65,  
DISPDAYSSUPSTRAT=15-29 30-59 60-89 90+  
TOTALDAYSSUPTHRESH=090 180 360  
);
```