

**HOME HEALTH AGENCY QUALITY MEASURES:  
TECHNICAL DOCUMENTATION OF  
OASIS-BASED PATIENT OUTCOME MEASURES**

Department of Health and Human Services  
Centers for Medicare & Medicaid Services

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## Revision History

Original Publication: May 20, 2011

Revision 1: September, 2011

1. Section entitled “Exclusions Based on Level of Consciousness” on page 29 was eliminated and the pseudo-code for each affected measure was revised to include this logic.

Revision 2: June 2013

1. Title of document changed. Additional claims-based home health outcome measures are documented elsewhere. This document includes only OASIS-based home health outcome measures.
2. Exclusions based on level of consciousness changed to rely on the values of M1700 Cognitive Functioning in addition to M1710 When Confused and M1720 When Anxious. The change applies to the following measures:  
Improvement in Grooming, Stabilization in Grooming, Improvement in Upper Body Dressing, Improvement in Lower Body Dressing, Improvement in Bathing, Stabilization in Bathing, Improvement in Toilet Transferring, Stabilization in Toilet Transferring, Improvement in Toileting Hygiene, Stabilization in Toileting Hygiene, Improvement in Bed Transferring, Stabilization in Bed Transferring, Improvement in Ambulation-Locomotion, Improvement in Eating, Improvement in Light Meal Preparation, Stabilization in Light Meal Preparation, Improvement in Phone Use, Stabilization in Phone Use, Improvement in Management of Oral Medications, Stabilization in Management of Oral Medications, Improvement in Pain Interfering with Activity, Improvement in Speech and Language, Stabilization in Speech and Language, Improvement in Urinary Incontinence, Improvement in Bowel Incontinence, Improvement in Confusion Frequency, Stabilization in Cognitive Functioning, Improvement in Anxiety Level, Stabilization in Anxiety Level, Improvement in Behavior Problem Frequency

# HOME HEALTH AGENCY QUALITY MEASURES: TECHNICAL DOCUMENTATION OF OASIS-BASED PATIENT OUTCOME MEASURES

## Introduction

This document provides definitions of measures that appear in Home Health Agency Patient Outcome Reports, including detailed specifications for calculating these measures based on OASIS assessment data. It includes specifications for measures that appear on the "All Patients' Risk Adjusted Outcome Report" that is used for Outcome-Based Quality Improvement, A subset of which measures appear on the C M S Home Health Compare web site.

## Episodes of Care Included in Patient Outcome Quality Reports

The unit of analysis for both outcome and process quality reports is an episode of care, defined as starting with an admission to home health care (M0100 Reason for assessment = 01 or 02) or resumption of home health care after an inpatient facility stay (M0100 Reason for assessment = 03), and ending with a discharge from home health care, including discharge due to death, or admission to inpatient facility for 24 hours or more (M0100 Reason for assessment = 06, 07, 08, or 09). The data upon which these reports are based consist of OASIS assessments submitted by home health agencies to the states, which are then transmitted to a national OASIS repository residing on a secure database server maintained by C M S. Analysis records corresponding to episodes of care are constructed by matching up assessments for each individual served by a home health agency, sorting those assessments by effective date, then pairing up assessments that mark the beginning and end of an episode of care. Episodes of care for which either the beginning or end assessment is missing, or for which assessments are out of sequence, are not included in these reports.

## Creation of Episode of Care Records

The process of building episode-level records, including creating a short-term episode of care indicator, is as follows:

1. Sort assessments by home health agency ID<sup>1</sup>, patient ID and effective date, latest to earliest.

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<sup>1</sup> When working with assessment records from the OASIS National Repository, home health agency ID is actually a combination of the two position state abbreviation and Facility Internal ID, and Patient ID is a combination of the state abbreviation and Resident Internal ID.

2. For each set of assessments having the same combination of home health agency ID and patient ID, step through the assessments, latest to earliest, until an assessment with M0100\_ASSMT\_REASON = 06, 07, 08, or 09 is found. Set ST-Episode = 1.
3. Continue stepping through earlier assessments, carrying over the value of ST\_Episode from the later assessment.
4. If an assessment with M0100\_ASSMT\_REASON = 06, 07, 08, or 09 is found before an assessment with M0100\_ASSMT\_REASON = 01 or 03 is found, discard the episode being built and start over with step 2.
5. If an assessment with M0100\_ASSMT\_REASON = 04 or 05 is found before an assessment with M0100\_ASSMT\_REASON = 01 or 03 is found, set ST\_Episode to 0 and continue stepping through earlier assessments, carrying over the value of ST\_Episode from the later assessment.
6. When an assessment with M0100\_ASSMT\_REASON = 01 or 03 is found, the episode is complete. Create a completed episode record with home health agency ID, patient ID, beginning assessment ID, ending assessment ID, begin and end dates for the episode and the ST\_Episode indicator. If there are more assessments for this patient, start building a new episode beginning with step 2.
7. If no assessment with M0100\_ASSMT\_REASON = 01 or 03 is found before the assessments for this patient are exhausted, discard the pending episode being built.

## Outcome Measure Transformation Specifications

This document includes transformation specifications for outcome measures that appear on the All Patients’ Risk-Adjusted Outcome Report for Outcome-Based Quality Improvement, a subset of which appear on Home Health Compare.

### Home Health Outcome Measures

Outcome Measures are referred to as follows:

<u>Measure Domain &amp; Descriptive Measure Name</u>	<u>Short Measure Name</u>
End Result Outcomes –Functional	
Improvement in Grooming .....	Imprv_Grooming
Stabilization in Grooming .....	Stablz_Grooming
Improvement in Upper Body Dressing.....	Imprv_Upper_Dress
Improvement in Lower Body Dressing.....	Imprv_Lower_Dress
Improvement in Bathing <sup>HHC</sup> .....	Imprv_Bathing
Stabilization in Bathing.....	Stablz_Bathing
Improvement in Toilet Transferring .....	Imprv_Toilet_Transfer
Stabilization in Toilet Transferring .....	Stablz_Toilet_Transfer
Improvement in Toileting Hygiene .....	Imprv_Toilet_Hygeine
Stabilization in Toileting Hygiene.....	Stablz_Toilet_Hygeine
Improvement in Bed Transferring <sup>HHC</sup> .....	Imprv_Bed_Transfer
Stabilization in Bed Transferring.....	Stablz_Bed_Transfer
Improvement in Ambulation-Locomotion <sup>HHC</sup> .....	Imprv_Ambulation
Improvement in Eating.....	Imprv_Eating
Improvement in Light Meal Preparation .....	Imprv_Light_Meal
Stabilization in Light Meal Preparation .....	Stablz_Light_Meal
Improvement in Phone Use .....	Imprv_Phone
Stabilization in Phone Use.....	Stablz_Phone
Improvement in Management of Oral Medications <sup>HHC</sup> ....	Imprv_Oral_Meds
Stabilization in Management of Oral Medications .....	Stablz_Oral_Meds
End Result Outcomes –Health/Disease Status	
Improvement in Dyspnea <sup>HHC</sup> .....	Imprv_Dyspnea
Improvement in Pain Interfering with Activity <sup>HHC</sup> .....	Imprv_Pain
Improvement in Speech and Language.....	Imprv_Speech
Stabilization in Speech and Language.....	Stablz_Speech
Improvement in Status of Surgical Wounds <sup>HHC</sup> .....	Imprv_Status_Wounds

---

<sup>HHC</sup> Measure appears on Home Health Compare

<u>Measure Domain &amp; Descriptive Measure Name</u>	<u>Short Measure Name</u>
End Result Outcomes –Health/Disease Status (cont'd)	
Improvement in Urinary Tract Infection.....	Imprv_UTI
Improvement in Urinary Incontinence.....	Imprv_Incont
Improvement in Bowel Incontinence.....	Imprv_Bowel_Incont
Improvement in Confusion Frequency .....	Imprv_Confusion
Stabilization in Cognitive Functioning.....	Stablz_Cognitive
Improvement in Anxiety Level .....	Imprv_Anxiety
Stabilization in Anxiety Level.....	Stablz_Anxiety
Improvement in Behavior Problem Frequency .....	Imprv_Behavior
Utilization Outcomes	
Emergency Department Use without Hospitalization.....	Util_ED_Use_No_Hosp
Emergency Department Use with Hospitalization.....	Util_ED_Use_W_Hosp
Acute Care Hospitalization <sup>HHC</sup> .....	Util_Hosp
Discharged to community .....	Util_DC_Comm

---

<sup>HHC</sup> Measure appears on Home Health Compare

### Assumptions and Conventions

The following transformations result in measures with numeric values. For process and outcome measures, “1” indicates that the outcome event occurred or the process was followed, while “0” indicates the outcome event did not occur or the process was not followed. When the instructions indicate that a measure is to be set to "MISSING", the case is excluded from analysis for that particular measure, either because the measure is not applicable or because a data item on which that measure is based has been indicated as “unknown”.

OASIS data items are referred to in this documentation using field names specified in OASIS Data Submission Specifications published by C M S. “[1]” is appended to the field name if the value is taken from the beginning of episode assessment (Start or Resumption of Care), and “[2]” is appended if the value is to be taken from the assessment conducted at the end of the episode (Discharge, Transfer, or Death).



## End Result Outcome Measures Data Transformation Pseudo-Code

### Improvement/Stabilization in Functional Abilities

#### Improvement in Ambulation-Locomotion

```
IF M0100_ASSMT_REASON[2] = 09 AND M1700_COG_FUNCTION[1] <> 04
  OR M1710_WHEN_CONFUSED[1] = NA OR M1720_WHEN_ANXIOUS[1] = NA
THEN
  IF M1860_CRNT_AMBLTN[1] > 00
  THEN
    IF M1860_CRNT_AMBLTN[2] < M1860_CRNT_AMBLTN[1]
    THEN
      Imprv_Ambulation = 1
    ELSE
      Imprv_Ambulation = 0
    END IF
  ELSE
    Imprv_Ambulation = MISSING
  END IF
ELSE
  Imprv_Ambulation = MISSING
END IF
```

---

#### Improvement in Upper Body Dressing

```
IF M0100_ASSMT_REASON[2] = 09 AND M1700_COG_FUNCTION[1] <> 04
  OR M1710_WHEN_CONFUSED[1] = NA OR M1720_WHEN_ANXIOUS[1] = NA
THEN
  IF M1810_CUR_DRESS_UPPER[1] > 00
  THEN
    IF M1810_CUR_DRESS_UPPER[2] < M1810_CUR_DRESS_UPPER[1]
    THEN
      Imprv_Upper_Dress = 1
    ELSE
      Imprv_Upper_Dress = 0
    END IF
  ELSE
    Imprv_Upper_Dress = MISSING
  END IF
```

ELSE  
    Imprv\_Upper\_Dress = MISSING  
END IF

---

Improvement in Lower Body Dressing

IF M0100\_ASSMT\_REASON[2] = 09 AND M1700\_COG\_FUNCTION[1] < 04  
    OR M1710\_WHEN\_CONFUSED[1] = NA OR M1720\_WHEN\_ANXIOUS[1] = NA  
THEN  
    IF M1820\_CUR\_DRESS\_LOWER[1] > 00  
    THEN  
        IF M1820\_CUR\_DRESS\_LOWER[2] < M1820\_CUR\_DRESS\_LOWER[1]  
        THEN  
            Imprv\_Lower\_Dress = 1  
        ELSE  
            Imprv\_Lower\_Dress = 0  
        END IF  
    ELSE  
        Imprv\_Lower\_Dress = MISSING  
    END IF  
ELSE  
    Imprv\_Lower\_Dress = MISSING  
END IF

---

Improvement in Grooming / Stabilization in Grooming

IF M0100\_ASSMT\_REASON[2] = 09 AND M1700\_COG\_FUNCTION[1] < 04  
    OR M1710\_WHEN\_CONFUSED[1] = NA OR M1720\_WHEN\_ANXIOUS[1] = NA  
THEN  
    IF M1800\_CUR\_GROOMING[1] > 00  
    THEN  
        IF M1800\_CUR\_GROOMING[2] < (M1800\_CUR\_GROOMING[1]  
        THEN  
            Imprv\_GROOMING = 1  
        ELSE  
            Imprv\_GROOMING = 0  
        END IF  
    ELSE  
        Imprv\_GROOMING = MISSING  
    END IF

```

IF M1800_CUR_GROOMING[1] < 03
THEN
    IF M1800_CUR_GROOMING[2] <= M1800_CUR_GROOMING[1]
    THEN
        Stblz_GROOMING = 1
    ELSE
        Stblz_GROOMING = 0
    END IF
ELSE
    Stblz_GROOMING = MISSING
END IF
ELSE
    Imprv_GROOMING = MISSING
    Stblz_GROOMING = MISSING
END IF

```

---

*Improvement in Bathing / Stabilization in Bathing*

```

IF M0100_ASSMT_REASON[2] = 09 AND M1700_COG_FUNCTION[1] <> 04
    OR M1710_WHEN_CONFUSED[1] = NA OR M1720_WHEN_ANXIOUS[1] = NA
THEN
    IF M1830_CRNT_BATHG[1] > 00
    THEN
        IF M1830_CRNT_BATHG[2] < M1830_CRNT_BATHG[1]
        THEN
            Imprv_Bathing = 1
        ELSE
            Imprv_Bathing = 0
        END IF
    ELSE
        Imprv_Bathing = MISSING
    END IF
    IF M1830_CRNT_BATHG[1] < 06
    THEN
        IF M1830_CRNT_BATHG[2] <= M1830_CRNT_BATHG[1]
        THEN
            Stablz_Bathing = 1
        ELSE
            Stablz_Bathing = 0
        END IF
    END IF

```

```
ELSE
    Stablz_Bathing = MISSING
END IF
ELSE
    Imprv_Bathing = MISSING
    Stablz_Bathing = MISSING
END IF
```

---

Improvement in Eating

```
IF M0100_ASSMT_REASON[2] = 09 AND M1700_COG_FUNCTION[1] <> 04
    OR M1710_WHEN_CONFUSED[1] = NA OR M1720_WHEN_ANXIOUS[1] = NA
THEN
    IF M1870_CUR_FEEDING[1] > 00
    THEN
        IF M1870_CUR_FEEDING[2] < M1870_CUR_FEEDING[1]
        THEN
            Imprv_Eating = 1
        ELSE
            Imprv_Eating = 0
        END IF
    ELSE
        Imprv_Eating = MISSING
    END IF
ELSE
    Imprv_Eating = MISSING
END IF
```

---

Improvement in Toilet Transferring / Stabilization in Toilet Transferring

```
IF M0100_ASSMT_REASON[2] = 09 AND M1700_COG_FUNCTION[1] <> 04
    OR M1710_WHEN_CONFUSED[1] = NA OR M1720_WHEN_ANXIOUS[1] = NA
THEN
    IF M1840_CUR_TOILTG[1] > 00
    THEN
        IF M1840_CUR_TOILTG[2] < M1840_CUR_TOILTG[1]
        THEN
            Imprv_Toilet_Transfer = 1
        ELSE
            Imprv_Toilet_Transfer = 0
        END IF
    END IF
```

```

        END IF
    ELSE
        Imprv_Toilet_Transfer = MISSING
    END IF
    IF M1840_CUR_TOILTG[1] < 04
    THEN
        IF M1840_CUR_TOILTG[2] <= M1840_CUR_TOILTG[1]
        THEN
            Stablz_Toilet_Transfer = 1
        ELSE
            Stablz_Toilet_Transfer = 0
        END IF
    ELSE
        Stablz_Toilet_Transfer = MISSING
    END IF
ELSE
    Imprv_Toilet_Transfer = MISSING
    Stablz_Toilet_Transfer = MISSING
END IF

```

---

*Improvement in Bed Transferring / Stabilization in Bed Transferring*

```

IF M0100_ASSMT_REASON[2] = 09 AND M1700_COG_FUNCTION[1] <> 04
    OR M1710_WHEN_CONFUSED[1] = NA OR M1720_WHEN_ANXIOUS[1] = NA
THEN
    IF M1850_CUR_TRNSFRNG[1] > 00
    THEN
        IF M1850_CUR_TRNSFRNG[2] < M1850_CUR_TRNSFRNG[1]
        THEN
            Imprv_Bed_Transfer = 1
        ELSE
            Imprv_Bed_Transfer = 0
        END IF
    ELSE
        Imprv_Bed_Transfer = MISSING
    END IF
    IF M1850_CUR_TRNSFRNG[1] < 05
    THEN
        IF M1850_CUR_TRNSFRNG[2] <= M1850_CUR_TRNSFRNG[1]
        THEN

```

```

        Stablz_Bed_Transfer = 1
    ELSE
        Stablz_Bed_Transfer = 0
    END IF
ELSE
    Stablz_Bed_Transfer = MISSING
END IF
ELSE
    Imprv_Bed_Transfer = MISSING
    Stablz_Bed_Transfer = MISSING
END IF

```

---

Improvement in Management of Oral Medications / Stabilization in Management of Oral Medications

```

IF M0100_ASSMT_REASON[2] = 09 AND
    M2020_CRNT_MGMT_ORAL_MDCTN[1] IS NOT BLANK AND
    M2020_CRNT_MGMT_ORAL_MDCTN[1] <> NA AND
    M2020_CRNT_MGMT_ORAL_MDCTN[2] <> NA AND
    (M1700_COG_FUNCTION[1] <> 04 AND M1710_WHEN_CONFUSED[1] = NA
    AND M1720_WHEN_ANXIOUS[1] <> . NA)
THEN
    IF M2020_CRNT_MGMT_ORAL_MDCTN[1] > 00
    THEN
        IF M2020_CRNT_MGMT_ORAL_MDCTN[2] <
            M2020_CRNT_MGMT_ORAL_MDCTN[1]
        THEN
            Imprv_Oral_Meds = 1
        ELSE
            Imprv_Oral_Meds = 0
        END IF
    ELSE
        Imprv_Oral_Meds = MISSING
    END IF
    IF M2020_CRNT_MGMT_ORAL_MDCTN[1] < 03
    THEN
        IF M2020_CRNT_MGMT_ORAL_MDCTN[2] <=
            M2020_CRNT_MGMT_ORAL_MDCTN[1]
        THEN
            Stablz_Oral_Meds = 1
        END IF
    END IF

```

```

        ELSE
            Stablz_Oral_Meds = 0
        END IF
    ELSE
        Stablz_Oral_Meds = MISSING
    END IF
ELSE
    Imprv_Oral_Meds = MISSING
    Stablz_Oral_Meds = MISSING
END IF

```

---

*Improvement in Light Meal Preparation / Stabilization in Light Meal Preparation*

```

IF M0100_ASSMT_REASON[2] = 09 AND M1700_COG_FUNCTION[1] < 04
    OR M1710_WHEN_CONFUSED[1] = NA OR M1720_WHEN_ANXIOUS[1] = NA
THEN
    IF M1880_CUR_PREP_LT_MEALS[1] > 00
    THEN
        IF M1880_CUR_PREP_LT_MEALS[2] < M1880_CUR_PREP_LT_MEALS[1]
        THEN
            Imprv_Light_Meal = 1
        ELSE
            Imprv_Light_Meal = 0
        END IF
    ELSE
        Imprv_Light_Meal = MISSING
    END IF
    IF M1880_CUR_PREP_LT_MEALS[1] < 02
    THEN
        IF M1880_CUR_PREP_LT_MEALS[2] <= M1880_CUR_PREP_LT_MEALS[1]
        THEN
            Stablz_Light_Meal = 1
        ELSE
            Stablz_Light_Meal = 0
        END IF
    ELSE
        Stablz_Light_Meal = MISSING
    END IF
ELSE
    Imprv_Light_Meal = MISSING

```

Stablz\_Light\_Meal = MISSING  
**END IF**

---

*Improvement in Phone Use / Stabilization in Phone Use*

**IF** M0100\_ASSMT\_REASON[2] = 09 **AND** M1890\_CUR\_PHONE\_USE[1] <> NA **AND**  
M1890\_CUR\_PHONE\_USE[2] <> NA **AND** M1700\_COG\_FUNCTION[1] <> 04  
**OR** M1710\_WHEN\_CONFUSED[1] = NA **OR** M1720\_WHEN\_ANXIOUS[1] = NA  
**THEN**  
  **IF** M1890\_CUR\_PHONE\_USE[1] > 00  
  **THEN**  
    **IF** M1890\_CUR\_PHONE\_USE[2] < M1890\_CUR\_PHONE\_USE[1]  
    **THEN**  
      Imprv\_Phone = 1  
    **ELSE**  
      Imprv\_Phone = 0  
    **END IF**  
  **ELSE**  
    Imprv\_Phone = MISSING  
  **END IF**  
  **IF** M1890\_CUR\_PHONE\_USE[1] < 05  
  **THEN**  
    **IF** M1890\_CUR\_PHONE\_USE[2] <= M1890\_CUR\_PHONE\_USE[1]  
    **THEN**  
      Stablz\_Phone = 1  
    **ELSE**  
      Stablz\_Phone = 0  
    **END IF**  
  **ELSE**  
    Stablz\_Phone = MISSING  
  **END IF**  
**ELSE**  
  Imprv\_Phone = MISSING  
  Stablz\_Phone = MISSING  
**END IF**

---



## Improvement/Stabilization in Health/Disease Status

### Improvement in Dyspnea

```
IF M0100_ASSMT_REASON[2] = 09
THEN
  IF M1400_WHEN_DYSPNEIC[1] > 00
  THEN
    IF M1400_WHEN_DYSPNEIC[2] < M1400_WHEN_DYSPNEIC[1]
    THEN
      Imprv_Dyspnea = 1
    ELSE
      Imprv_Dyspnea = 0
    END IF
  ELSE
    Imprv_Dyspnea = MISSING
  END IF
ELSE
  Imprv_Dyspnea = MISSING
END IF
```

---

### Improvement in Pain Interfering with Activity

```
IF M0100_ASSMT_REASON[2] = 09 AND M1700_COG_FUNCTION[1] <> 04
  OR M1710_WHEN_CONFUSED[1] = NA OR M1720_WHEN_ANXIOUS[1] = NA
THEN
  IF M1242_PAIN_FREQ_ACTVTY_MVMT[1] > 00
  THEN
    IF M1242_PAIN_FREQ_ACTVTY_MVMT[2] <
      M1242_PAIN_FREQ_ACTVTY_MVMT[1]
    THEN
      Imprv_Pain = 1
    ELSE
      Imprv_Pain = 0
    END IF
  ELSE
    Imprv_Pain = MISSING
  END IF
```

```
ELSE
    Imprv_Pain = MISSING
END IF
```

---

Improvement in Speech and Language / Stabilization in Speech and Language

```
IF M0100_ASSMT_REASON[2] = 09 AND M1700_COG_FUNCTION[1] <> 04
    OR M1710_WHEN_CONFUSED[1] = NA OR M1720_WHEN_ANXIOUS[1] = NA
    THEN
    IF M1230_SPEECH[1] > 00
    THEN
        IF M1230_SPEECH[2] < M1230_SPEECH[1]
        THEN
            Imprv_Speech = 1
        ELSE
            Imprv_Speech = 0
        END IF
    ELSE
        Imprv_Speech = MISSING
    END IF
    IF M1230_SPEECH[1] < 05
    THEN
        IF M1230_SPEECH[2] <= M1230_SPEECH[1]
        THEN
            Stablz_Speech = 1
        ELSE
            Stablz_Speech = 0
        END IF
    ELSE
        Stablz_Speech = MISSING
    END IF
    ELSE
        Imprv_Speech = MISSING
        Stablz_Speech = MISSING
    END IF
```

---

Improvement in Status of Surgical Wounds

```
IF M0100_ASSMT_REASON[2] = 09
    THEN
```

```

IF M1340_SRGCL_WND_PRSNT[1] = 01 AND
    M1342_STUS_PRBLM_SRGCL_WND[1] > 00 AND
    M1340_SRGCL_WND_PRSNT[2] <> 02
THEN
    IF M1340_SRGCL_WND_PRSNT[2] = 00 OR
        M1342_STUS_PRBLM_SRGCL_WND[2] <
        M1342_STUS_PRBLM_SRGCL_WND[1]
    THEN
        Imprv_Status_Wounds = 1
    ELSE
        Imprv_Status_Wounds = 0
    END IF
ELSE
    Imprv_Status_Wounds = MISSING
END IF
ELSE
    Imprv_Status_Wounds = MISSING
END IF

```

---

*Improvement in Urinary Tract Infection*

```

IF M0100_ASSMT_REASON[2] = 09 AND M1600_UTI[1] <> UK AND
    M1600_UTI[1] <> NA AND M1600_UTI[2] <> NA
THEN
    IF M1600_UTI[1] > 00
    THEN
        IF M1600_UTI[2] < M1600_UTI[1]
        THEN
            Imprv_UTI = 1
        ELSE
            Imprv_UTI = 0
        END IF
    ELSE
        Imprv_UTI = MISSING
    END IF
ELSE
    Imprv_UTI = MISSING
END IF

```

---

Improvement in Urinary Incontinence

```
IF M0100_ASSMT_REASON[2] = 09 AND M1700_COG_FUNCTION[1] <> 04
  OR M1710_WHEN_CONFUSED[1] = NA OR M1720_WHEN_ANXIOUS[1] = NA
THEN
  IF M1610_UR_INCONT[1] > 00
  THEN
    IF M1610_UR_INCONT[2] < M1610_UR_INCONT[1]
      OR (M1610_UR_INCONT[2] = 01
        AND M1615_INCNTNT_TIMING[2] < M1615_INCNTNT_TIMING[1])
    THEN
      Imprv_Incont = 1
    ELSE
      Imprv_Incont = 0
    END IF
  ELSE
    Imprv_Incont = MISSING
  END IF
ELSE
  Imprv_Incont = MISSING
END IF
```

---

Improvement in Bowel Incontinence

```
IF M0100_ASSMT_REASON[2] = 09 AND M1620_BWL_INCONT[1] <> UK AND
  M1620_BWL_INCONT[1] <> NA AND M1620_BWL_INCONT[2] <> NA AND
  M1700_COG_FUNCTION[1] <> 04
THEN
  IF M1620_BWL_INCONT[1] > 00
  THEN
    IF M1620_BWL_INCONT[2] < M1620_BWL_INCONT[1]
    THEN
      Imprv_Bowel_Incont = 1
    ELSE
      Imprv_Bowel_Incont = 0
    END IF
  ELSE
    Imprv_Bowel_Incont = MISSING
  END IF
```

```
ELSE
  Imprv_Bowel_Incont = MISSING
END IF
```

---

Improvement in Confusion Frequency

```
IF M0100_ASSMT_REASON[2] = 09 AND M1710_WHEN_CONFUSED[2] <> NA AND
  M1700_COG_FUNCTION[1] <> 04
THEN
  IF M1710_WHEN_CONFUSED[1] > 00
  THEN
    IF M1710_WHEN_CONFUSED[2] < M1710_WHEN_CONFUSED[1]
    THEN
      Imprv_Confusion = 1
    ELSE
      Imprv_Confusion = 0
    END IF
  ELSE
    Imprv_Confusion = MISSING
  END IF
ELSE
  Imprv_Confusion = MISSING
END IF
```

---

Stabilization in Cognitive Functioning

```
IF M0100_ASSMT_REASON[2] = 09 AND M1710_WHEN_CONFUSED[1] = NA OR
  M1720_WHEN_ANXIOUS[1] = NA
THEN
  IF M1700_COG_FUNCTION[1] < 04
  THEN
    IF M1700_COG_FUNCTION[2] <= M1700_COG_FUNCTION[1]
    THEN
      Stablz_Cognitive = 1
    ELSE
      Stablz_Cognitive = 0
    END IF
  ELSE
    Stablz_Cognitive = MISSING
  END IF
```

```
ELSE
    Stablz_Cognitive = MISSING
END IF
```

---

Improvement in Anxiety Level / Stabilization in Anxiety Level

```
IF M0100_ASSMT_REASON[2] = 09 AND M1700_COG_FUNCTION[1] < 04
    OR M1710_WHEN_CONFUSED[1] = NA OR M1720_WHEN_ANXIOUS[1] = NA
THEN
    IF M1720_WHEN_ANXIOUS[1] > 00
    THEN
        IF M1720_WHEN_ANXIOUS[2] < M1720_WHEN_ANXIOUS[1]
        THEN
            Imprv_Anxiety = 1
        ELSE
            Imprv_Anxiety = 0
        END IF
    ELSE
        Imprv_Anxiety = MISSING
    END IF
    IF M1720_WHEN_ANXIOUS[1] < 03
    THEN
        IF M1720_WHEN_ANXIOUS[2] <= M1720_WHEN_ANXIOUS[1]
        THEN
            Stablz_Anxiety = 1
        ELSE
            Stablz_Anxiety = 0
        END IF
    ELSE
        Stablz_Anxiety = MISSING
    END IF
ELSE
    Imprv_Anxiety = MISSING
    Stablz_Anxiety = MISSING
END IF
```

---

Improvement in Behavior Problem Frequency

```
IF M0100_ASSMT_REASON[2] = 09 AND M1700_COG_FUNCTION[1] <> 04
  OR M1710_WHEN_CONFUSED[1] = NA OR M1720_WHEN_ANXIOUS[1] = NA
THEN
  IF M1745_BEH_PROB_FREQ[1] > 00
  THEN
    IF M1745_BEH_PROB_FREQ[2] < M1745_BEH_PROB_FREQ[1]
    THEN
      Imprv_Behavior = 1
    ELSE
      Imprv_Behavior = 0
    END IF
  ELSE
    Imprv_Behavior = MISSING
  END IF
ELSE
  Imprv_Behavior = MISSING
END IF
```

---

Improvement in Toileting Hygiene / Stabilization in Toileting Hygiene

```
IF M0100_ASSMT_REASON[2] = 09 AND M1700_COG_FUNCTION[1] <> 04
  OR M1710_WHEN_CONFUSED[1] = NA OR M1720_WHEN_ANXIOUS[1] = NA
THEN
  IF M1845_CUR_TOILTG_HYGN[1] > 00
  THEN
    IF M1845_CUR_TOILTG_HYGN[2] < M1845_CUR_TOILTG_HYGN[1]
    THEN
      Imprv_Toilet_Hygeine = 1
    ELSE
      Imprv_Toilet_Hygeine = 0
    END IF
  ELSE
    Imprv_Toilet_Hygeine = MISSING
  END IF
  IF M1845_CUR_TOILTG_HYGN[1] < 03
  THEN
    IF M1845_CUR_TOILTG_HYGN[2] <= M1845_CUR_TOILTG_HYGN[1]
    THEN
```

```
        Stablz_Toilet_Hygeine = 1
    ELSE
        Stablz_Toilet_Hygeine = 0
    END IF
ELSE
    Stablz_Toilet_Hygeine = MISSING
END IF
ELSE
    Imprv_Toilet_Hygeine = MISSING
    Stablz_Toilet_Hygeine = MISSING
END IF
```

---



## Utilization Outcome Measures Data Transformation Pseudo-Code

### Emergency Department Use without Hospitalization

```
IF M0100_ASSMT_REASON[2] <> 08
THEN
  IF M2300_EMER_USE_AFTR_LAST_ASMT[2] = 01
  THEN
    Util_ED_Use_No_Hosp = 1
  ELSEIF M2300_EMER_USE_AFTR_LAST_ASMT[2] = 00
    OR M2300_EMER_USE_AFTR_LAST_ASMT[2] = 02
  THEN
    Util_ED_Use_No_Hosp = 0
  ELSEIF M2300_EMER_USE_AFTR_LAST_ASMT[2] = UK
  THEN
    Util_ED_Use_No_Hosp = MISSING
  END IF
ELSE
  Util_ED_Use_No_Hosp = MISSING
END IF
```

---

### Emergency Department Use with Hospitalization

```
IF M0100_ASSMT_REASON[2] <> 08
THEN
  IF M2300_EMER_USE_AFTR_LAST_ASMT[2] = 02
  THEN
    Util_ED_Use_W_Hosp = 1
  ELSEIF M2300_EMER_USE_AFTR_LAST_ASMT[2] = 00
    OR M2300_EMER_USE_AFTR_LAST_ASMT[2] = 01
  THEN
    Util_ED_Use_W_Hosp = 0
  ELSEIF M2300_EMER_USE_AFTR_LAST_ASMT[2] = UK
  THEN
    Util_ED_Use_W_Hosp = MISSING
  END IF
ELSE
  Util_ED_Use_W_Hosp = MISSING
END IF
```

---

Discharged to Community

```
IF M0100_ASSMT_REASON[2] <> 08
THEN
  IF M0100_ASSMT_REASON[2] = 09 AND (M2420_DSCHRG_DISP[2] = 01
    OR M2420_DSCHRG_DISP[2] = 02)
  THEN
    Util_DC_Comm = 1
  ELSE IF (M0100_ASSMT_REASON[2] = 09 AND M2420_DSCHRG_DISP[2] = 03)
    OR M0100_ASSMT_REASON[2] = 06 OR M0100_ASSMT_REASON[2] = 07
  THEN
    Util_DC_Comm = 0
  ELSE IF M0100_ASSMT_REASON[2] = 09
    AND M2420_DSCHRG_DISP[2] = UK
  THEN
    Util_DC_Comm = MISSING
  END IF
ELSE
  Util_DC_Comm = MISSING
END IF
```

---

Acute Care Hospitalization

```
IF M0100_ASSMT_REASON[2] <> 08
THEN
  IF (M0100_ASSMT_REASON[2] = 06 OR M0100_ASSMT_REASON[2] = 07)
    AND M2410_INPAT_FACILITY [2]= 01
    AND M2430_HOSP_SCHLD_TRTMT[2] <> 1
  THEN
    Util_Hosp = 1
  ELSEIF M0100_ASSMT_REASON[2] = 09 OR ((M0100_ASSMT_REASON[2] = 06
    OR M0100_ASSMT_REASON[2] = 07) AND
    M2410_INPAT_FACILITY [2] <> 01 OR (M2410_INPAT_FACILITY [2]= 01
    AND M2430_HOSP_SCHLD_TRTMT[2] = 1))
  THEN
    Util_Hosp = 0
  END IF
ELSE
  Util_Hosp = MISSING
END IF
```

---