

# **Case Mix Analysis Tool**

## **Introduction, Instructions, and FAQs**

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## Contents

1	Introduction.....	3
2	Instructions.....	4
3	Sample Case Mix Analysis Report.....	8
4	FAQs.....	11

# 1 Introduction

## **Purpose**

When first trying to understand the major contributing factors that affect the acute care hospitalization rates in your agency, it is beneficial to understand the case mix of your patient population. The purpose of the Case Mix Analysis Tool (CMAT) is to support this information-gathering effort, which in turn supports the Process of Care Investigation phase of the OBQI process. The CMAT utilizes the data from your Case Mix and Outcome Tally Reports to create the Mix Analysis Report (CMAR). This report identifies differences between patients whose care episode ended in hospitalization compared to those whose care episode did not end in hospitalization. An example of the CMAR is provided in Section 3 of this document. Comparing the differences in case mix values between these two groups of patients may help you to identify risk factors associated with acute care hospitalization in your agency. Early identification and classification of these risk factors should enable you to be more proactive in establishing interventions that will reduce the number of avoidable hospitalizations.

## **Obtaining and interpreting your CMAR**

Your QIO may provide you with the CMAT itself (i.e., your staff would enter your Tally Report data into the CMAT and create your own report); alternatively, they may provide the report generated from the CMAT (i.e., QIO staff would enter your Tally Report data into the CMAT and create the report for you). Factors influencing this QIO decision may include the level of experience you have in retrieving your Tally Report data and using the CMS Tally Template Tool, as well as your comfort level in using Excel-based applications. If you prefer to use the CMAT yourself, be sure to inform your QIO of your preference. Detailed instructions on how to use the CMAT are provided in Section 2 of this document.

Regardless of whether your or your QIO generates your CMAR, you should review it with your QIO to ensure that you understand how to interpret it and to identify those factors that represent a clinically meaningful difference between the patient groups. Section 4 of this document addresses some common questions that you may have about the CMAR.

## **Using the CMAT/CMAR**

Once you have identified risk factors that are clinically relevant to acute care hospitalization in your patient population, you can incorporate this information into the design and development of your Plan of Action. Furthermore, you can use the results of the CMAR to inform your selection of intervention strategies and actions from the ACH Change Binder. Finally, you can use the CMAT and CMAR for ongoing monitoring of the risk factors associated with acute care hospitalization in your agency.

## 2 Instructions

DISCLAIMER: The Case Mix Analysis Tool was developed in Excel 2000 (9.0.6926 SR-3) under a Windows 2000 operating system. This tool may not work correctly if used under a different operating system or with an earlier version of Excel. For agencies with more than 5,000 episodes, the tool may not work in Excel 2000; however, it will work as described in Excel 2003.

These instructions assume user knows how to retrieve their Case Mix and Outcome Tally Reports and has a basic familiarity with the CMS Tally Template Tool. ***Always use a new copy of the tool whenever you want to generate reports for your agencies.***

1. Retrieve a Case Mix Tally Report for a recent 12-month period
2. Retrieve an Outcome Tally Report for a recent 12-month period
  - (NOTE: Be sure you use the same data period for both Tally Reports.)
3. Enter your Tally Report data into the CMS Tally Template Tool.
  - A. Open the CMS Tally Template Tool
  - B. Click ***Import New Data*** and then click the ***Go...*** button
  - C. Click the ***Browse*** button and choose file that contains your Case Mix Tally Report data
  - D. Click the ***Browse*** button and choose file that contains your Outcome Tally Report data
  - E. Click on the ***Finished*** button
  - F. You should get a message saying your data were imported successfully. Click the ***OK*** button
4. Create reports for your hospitalized and non-hospitalized patients
  - A. For **hospitalized** patients:
    1. Click the ***Click Here to Activate Tally Report Menu*** button
    2. Click the ***Create New Query on Existing Spreadsheet Data*** button
    3. Click the ***Go...*** button
    4. On the Criteria Selection window, scroll to the bottom and click the ***Acute Care Hospitalization*** box. Make sure the Outcome Result is "Achieved".
    5. Click the ***Run Query*** button
  - B. For **non-hospitalized** patients:
    1. Click the ***Click Here to Activate Tally Report Menu*** button
    2. Click the ***Create New Query on Existing Spreadsheet Data*** button
    3. Click the ***Go...*** button
    4. On the Criteria Selection window, scroll to the bottom and click the ***Acute Care Hospitalization*** box. Make sure the Outcome Result is "Not Achieved".
    5. Click the ***Run Query*** button

## 5. Open the Case Mix Analysis Tool

- A. From the toolbar, select **File**
  - B. Select **Save As**
  - C. Choose the directory and name the file in which you will enter your data.
- (NOTE: Do **NOT** click on the **Save** icon as this will overwrite your Case Mix Analysis Tool template.)

## 6. Paste data for hospitalized patients into the Case Mix Analysis Tool

- A. Go to the worksheet in the CMS Tally Template Tool that contains your Case Mix data for your hospitalized patients (if you used the CMS tool in the order above, this data will be in tab “Query 1 Case Mix”).
  - B. Click on cell A1, then holding down the Shift key, press the right arrow over to cell EF1.
  - C. While still holding down the Shift key, press the down arrow until you have highlighted all your data.
  - D. Copy the highlighted data (hold down the Cntl-C keys or click the Copy icon)
  - E. Go to the Case Mix Analysis Tool, and click on the “Hospitalized” worksheet.
  - F. Place your cursor in cell A1 (the yellow cell) and paste your data (hold down the Cntl-V keys or click the Paste icon).
- (NOTE: The button from the CMS Tally Template Tool will also be pasted in: just ignore it!)

## 7. Paste data for non-hospitalized patients into the Case Mix Analysis Tool

- A. Go to the worksheet in the CMS Tally Template Tool that contains your Case Mix data for your non-hospitalized patients (if you used the CMS tool in the order above, this data will be in tab “Query 2 Case Mix”).
  - B. Click on cell A1, then holding down the Shift key, press the right arrow over to cell EG1.
  - C. While still holding down the Shift key, press the down arrow until you have highlighted all your data.
  - D. Copy the highlighted data (hold down the Cntl-C keys or click the Copy icon)
  - E. Go to the Case Mix Analysis Tool, and click on the “Not hospitalized” worksheet.
  - F. Place your cursor in cell A1 (the yellow cell) and paste your data (hold down the Cntl-V keys or click the Paste icon).
- (NOTE: The button from the CMS Tally Template Tool will also be pasted in: just ignore it!)

## 8. Generate your Case Mix Differences Report and Observed Hospitalization Rate Report

- A. Go to the “Generate Reports” worksheet.
- B. In cell B1, enter the name of your agency, then press the Enter key
- C. In cell B2, enter the data period for your reports, then press the Enter key
- D. Click on the ***Click to create Case Mix Differences Report*** button. The report will be automatically generated.
- E. Click on the ***Click to create Observed Hospitalization Rate Report*** button. The report will be automatically generated.

## 9. Clicking the buttons to create the reports will generate 2 reports. These reports are:

- A. **REPORT-observed rate**— Shows the number of episodes that ended in a hospitalization, the total number of episodes, and the observed hospitalization rate
- B. **REPORT-Case mix differences** — Shows aggregate percentages and averages of case mix variables for episodes that ended in a hospitalization and for episodes that did not end in a hospitalization; also shows the differences in case mix value between these two groups
  - (NOTE: You can navigate between these reports by clicking on the appropriate worksheet tabs at the bottom of your workbook.)

## 10. Check your reports

- A. You must check your Observed Hospitalization Rate Report against your OBQI Outcome Report for the same data period.
- B. If the number of hospitalized episodes and the number of total episodes on your Observed Hospitalization Rate Report **does not match** the values on the OBQI Outcome Report (for the Acute Care Hospitalization measure), **then you must re-paste your data and re-generate your reports.**
  - (NOTE: You should open a “fresh” copy of the Case Mix Analysis Tool before re-pasting your data.)

## 11. Interpret your Case Mix Differences Report

The Case Mix Differences Report shows the differences in case mix values between episodes that ended in a hospitalization and those that did not.

- A. If the difference shown is **positive** (i.e., greater than zero) then the value is higher for episodes that ended hospitalized episodes.
- B. If the difference shown is **negative** (i.e., less than zero), then the value is higher among the non-hospitalized episodes.
- C. Whether or not a difference should be interpreted as **meaningful** depends on the magnitude of the difference in relation to the scale of the measure (for example, the scale for percentages is 0 to 100; for bathing, the scale is 0 to 5).
- D. The difference should also represent a **clinically meaningful** difference.

### 3 Sample Case Mix Analysis Report

Differences in case mix averages/percentages, hospitalized vs. non-hospitalized patients  
 ABC Home Care  
 CY2004

Case mix category	Case mix measure	Average/percentage Hospitalized	Not hospitalized	Difference (Hospitalized - Not hospitalized)
<b>Demographics</b>	Age	66.38	66.96	-0.58
	Gender: Female	65.38%	64.78%	0.60%
	Race: Black	40.14%	33.49%	6.64%
	Race: White	5.14%	9.96%	-4.82%
	Race: Other	53.89%	54.44%	-0.55%
<b>Payment Source</b>	Any Medicare	58.28%	62.36%	-4.08%
	Any Medicaid	52.76%	45.45%	7.31%
	Any HMO	5.14%	10.39%	-5.25%
	Medicare HMO	0.83%	1.78%	-0.95%
	Private third party	0.00%	0.00%	0.00%
<b>Residence</b>	Own home	81.56%	79.43%	2.13%
	Family member home	15.27%	16.16%	-0.89%
<b>Current Living Situation</b>	Lives alone	35.60%	33.55%	2.05%
	With other family member	60.09%	60.31%	-0.22%
	With friend	1.81%	3.23%	-1.42%
	With paid help	2.65%	3.23%	-0.59%
<b>Assisting Persons</b>	Person residing in home	51.93%	52.72%	-0.79%
	Relative/friend/neighbor	36.13%	38.88%	-2.75%
	Paid help	12.70%	12.12%	0.58%
<b>Primary Caregiver</b>	Spouse/significant other	14.97%	15.83%	-0.87%
	Daughter/son	28.65%	29.94%	-1.29%
	Other paid help	8.01%	7.05%	0.96%
	No one person	29.25%	27.14%	2.11%
	Freq. of assistance (0-6)	3.31	3.43	-0.12
<b>Inpt DC</b>	From hospital	91.16%	85.84%	5.32%
	From rehab facility	0.38%	1.29%	-0.91%
	From nursing home	0.23%	0.11%	0.12%
<b>Med Reg</b>	Medical regimen change	85.49%	86.05%	-0.57%
<b>Prognoses</b>	Moderate recovery prognosis	80.57%	92.89%	-12.32%
	Good rehab prognosis	67.80%	82.50%	-14.70%
<b>ADL Disabilities at SOC</b>	Grooming (0-3)	1.06	0.75	0.31
	Dress upper body (0-3)	1.17	0.80	0.36
	Dress lower body (0-3)	1.48	1.10	0.38
	Bathing (0-5)	2.29	1.78	0.51
	Toileting (0-4)	0.67	0.43	0.24
	Transferring (0-5)	0.89	0.67	0.22
	Ambulation (0-5)	1.19	0.94	0.26
	Eating (0-5)	0.49	0.34	0.15
<b>ADL Status Prior to SOC</b>	Grooming (0-3)	0.83	0.54	0.29
	Dress upper body (0-3)	0.92	0.59	0.33
	Dress lower body (0-3)	1.15	0.76	0.39
	Bathing (0-5)	1.82	1.27	0.54
	Toileting (0-4)	0.54	0.36	0.18
	Transferring (0-5)	0.72	0.54	0.18
	Ambulation (0-5)	0.99	0.75	0.23

Case mix category	Case mix measure	Average/percentage Hospitalized	Not hospitalized	Difference (Hospitalized - Not hospitalized)
	Eating (0-5 )	0.40	0.28	0.12
<b>IADL Disabilities at SOC</b>	Light meal prep (0-2 )	1.23	1.02	0.21
	Transportation (0-2 )	1.03	0.95	0.08
	Laundry (0-2 )	1.78	1.57	0.20
	Housekeeping (0-4 )	3.22	2.81	0.41
	Shopping (0-3 )	2.22	2.00	0.22
	Phone use (0-5 )	0.67	0.46	0.21
	Mgmt. oral meds (0-2 )	0.61	0.44	0.16
<b>IADL Status Prior to SOC</b>	Light meal prep (0-2 )	0.99	0.78	0.21
	Transportation (0-2 )	0.98	0.88	0.10
	Laundry (0-2 )	1.51	1.22	0.29
	Housekeeping (0-4 )	2.69	2.17	0.52
	Shopping (0-3 )	1.85	1.55	0.30
	Phone use (0-5 )	0.58	0.43	0.16
	Mgmt. oral meds (0-2 )	0.53	0.40	0.13
<b>Resp status</b>	Dyspnea (0-4 )	1.06	0.78	0.28
<b>Therapies</b>	IV/infusion therapy	0.83%	1.72%	-0.89%
	Parenteral nutrition	0.08%	0.05%	0.02%
	Enteral nutrition	0.68%	0.48%	0.20%
<b>Sensory Status</b>	Vision impairment (0-2 )	0.21	0.16	0.05
	Hearing impair. (0-4 )	0.21	0.18	0.02
	Speech/language (0-5 )	0.36	0.29	0.08
<b>Pain</b>	Pain interfer. w/activity (0-3)	0.66	0.66	0.00
	Intractable pain	6.05%	5.22%	0.82%
<b>Neuro/Emotional/Behavioral</b>	Moderate cognitive disability	9.15%	7.00%	2.15%
	Severe confusion disability	5.37%	4.36%	1.00%
	Severe anxiety level	13.83%	8.99%	4.84%
	Behav probs > twice a week	2.72%	2.32%	0.41%
<b>Integumentary Status</b>	Presence of wound/lesion	38.70%	41.14%	-2.44%
	Stasis ulcer(s) present	4.23%	1.18%	3.05%
	Surgical wound(s) present	12.40%	17.99%	-5.59%
	Pressure ulcer(s) present	5.59%	2.58%	3.01%
	Stage 2-4 ulcer(s) present	5.22%	2.21%	3.01%
	Stage 3-4 ulcer(s) present	2.95%	0.92%	2.03%
<b>Elimination Status</b>	UTI within past 14 days	4.76%	3.28%	1.48%
	Urinary incont./catheter present	17.46%	12.01%	5.45%
	Incontinent day and night	10.43%	7.54%	2.89%
	Urinary catheter	3.10%	2.42%	0.68%
	Bowel incont. (0-5 )	0.29	0.15	0.14
<b>Acute Conditions(QUIGs)</b>	Orthopedic	13.15%	21.32%	-8.17%
	Neurologic	6.05%	9.48%	-3.43%
	Open wounds/lesions	38.93%	41.41%	-2.48%
	Terminal condition	9.83%	4.20%	5.63%
	Cardiac/peripheral vascular	51.25%	51.00%	0.25%
	Pulmonary	21.39%	14.38%	7.01%
	Diabetes mellitus	30.23%	27.46%	2.77%
	Gastrointestinal disorder	9.52%	7.81%	1.72%
	Contagious/communicable	11.11%	3.55%	7.56%
	Urinary incont./catheter	8.16%	5.82%	2.35%

Case mix category	Case mix measure	Average/percentage Hospitalized	Not hospitalized	Difference (Hospitalized - Not hospitalized)
	Mental/emotional	5.29%	4.36%	0.93%
	Oxygen therapy	7.11%	3.45%	3.66%
	IV/infusion therapy	0.83%	1.72%	-0.89%
	Enteral/parenteral nutrition	0.76%	0.54%	0.22%
	Ventilator	0.00%	0.05%	-0.05%
<b>Chronic Conditions (QUIGs)</b>	Dependence in living skills	64.47%	50.67%	13.80%
	Dependence in personal care	37.94%	24.61%	13.33%
	Impaired ambulation/mobility	16.63%	11.04%	5.59%
	Eating disability	4.76%	2.69%	2.07%
	Urinary incontinence/catheter	8.99%	6.14%	2.86%
	Dependence in med. admin.	51.85%	35.92%	15.93%
	Chronic pain	1.97%	1.88%	0.08%
	Cognitive/mental/behavioral	15.34%	11.36%	3.98%
	Chronic pt. with caregiver	42.40%	35.33%	7.08%
<b>Diagnoses For Which Patient is Receiving Home Care</b>	Infections/parasitic diseases	14.59%	5.49%	9.10%
	Neoplasms	14.29%	11.74%	2.55%
	Endocrine/nutrit./metabolic	52.15%	48.25%	3.90%
	Blood diseases	10.36%	6.35%	4.00%
	Mental diseases	14.81%	14.43%	0.38%
	Nervous system diseases	8.62%	10.61%	-1.99%
	Circulatory system diseases	71.88%	70.92%	0.96%
	Respiratory system diseases	24.04%	17.82%	6.21%
	Digestive system diseases	9.52%	7.11%	2.42%
	Genitourinary sys. diseases	12.02%	9.37%	2.65%
	Pregnancy problems	0.00%	0.32%	-0.32%
	Skin/subcutaneous diseases	11.87%	7.92%	3.95%
	Musculoskeletal sys. diseases	11.94%	17.45%	-5.50%
	Congenital anomalies	0.08%	0.11%	-0.03%
	Ill-defined conditions	21.62%	24.99%	-3.37%
	Fractures	1.13%	1.18%	-0.05%
	Intracranial injury	0.08%	0.22%	-0.14%
	Other injury	1.13%	2.26%	-1.13%
	Iatrogenic conditions	2.04%	2.69%	-0.65%
<b>Length of Stay</b>	LOS until discharge ( in days)	37.11	45.56	-8.45
	LOS from 1 to 31 days	64.55%	39.20%	25.35%
	LOS from 32 to 62 days	19.12%	46.96%	-27.83%
	LOS from 63 to 124 days	10.28%	9.80%	0.48%
	LOS more than 124 days	6.05%	4.04%	2.01%

## 4 Frequently Asked Questions (FAQs)

This section gives answers to several frequently asked questions about the Case Mix Analysis Report.

### 1. What does the Case Mix Analysis Report show?

This report shows the differences in case mix values between two groups: home health episodes that ended in a hospitalization versus those that did not.

### 2. Why do some of the case mix measures have a shaded (green) background?

The case mix measures with the green background shading are those that are associated with risk factors for hospitalization that have been reported in the scientific literature. These measures may or may not be risk factors for your particular patient population.

### 3. What data period is represented in the Case Mix Analysis Report?

The data period reflected in the report is noted at the top of the report (under the agency name).

### 4. Why do some numbers have percent signs and some do not?

Some case mix values are reported as percentages and some are reported as averages. Values measured by presence or absence have a percent sign (e.g., female gender, Medicaid as a payment source, etc.). Values that do not have a percent sign are averages (e.g., age); many are from OASIS items that are measured using a scale (e.g., bathing is measured on a scale from 0 to 5).

### 5. What does it mean if the difference is positive?

When the difference is positive (i.e., greater than zero), then the case mix value is higher among hospitalized episodes.

### 6. What does it mean if the difference is negative?

When the difference is negative (i.e., less than zero), then the case mix value is higher among the non-hospitalized episodes.

### 7. Why don't the percentages add up to 100% (across the rows)?

They are not supposed to. The percentages are calculated from within each group separately (hospitalized vs. not hospitalized).

**8. Why don't the percentages in a given section add up to 100% (in a column)?**

Many of the case mix values are based on OASIS items for which multiple items can be marked (e.g., Assisting persons, based on M0350). The sum for groups of case mix values such as these will likely be greater than 100%.

Furthermore, there are not always case mix values for all the available choices for a particular OASIS item (e.g., Residence, based on M0300). The sum for groups of case mix values such as these will likely be less than 100%.

**9. When should a difference be interpreted as meaningful?**

This depends on the magnitude of the difference in relation to the scale of the measure (for example, the scale for percentages is 0 to 100; for bathing, the scale is 0 to 5). The difference should also represent a clinically meaningful difference.