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**Indicator Construction: Managing New to  
Follow Up Outpatient Appointments**

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**DOCUMENT MANAGEMENT**

**VERSIONS**

Version	Date	Summary	Editor
1.0	31/10/2013	Baseline Version	Walt Treloar
1.1	12/09/2016	Minor changes to reflect suppression of output values to aid clarity.	Walt Treloar

**APPROVALS**

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**REVIEW DETAILS**

Review Date:	17/10/2016
Reviewer:	Walt Treloar

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## 1. Overview

Indicator Family Name
Better Care Better Value

Indicator Family Code
BCBV

Subject
Managing new to follow up outpatient appointments

Condition	Indicator Code
All	I00611

Detailed Descriptor
This indicator shows the financial opportunity for reducing the ratio of first and follow up outpatient appointments for providers. The productivity opportunity is calculated by applying the First Follow Up (FFU) of the $N^{th}$ percentile provider to the number of first attendances and applying the average follow up attendance tariff.

Reporting Frequency
Data supplied on a quarterly basis. Reporting required on a quarterly basis.

## 2. Data

Data Source
Secondary Uses Service, Payment by Results (SUS PBR), Spells table and the PBR tariffs table.

Data Fields	
The source of data is the SUS PBR data set. The out-patient table is required for this indicator.	
The data fields required are as follows;	
<u>SUS PBR Outpatient table</u>	
1. FIRST_ATTENDANCE	Indicates whether this is a first attendance appointment
2. ATTENDANCE_STATUS	The attendance status (attended, did not attend etc)
3. ATTENDANCE_DATE	The date of appointment attendance
4. PROVIDER_CODE	Code for the provider of the appointment
5. TREATMENT_FUNCTION_CODE	Code representing the clinical area of treatment
6. IMPORTFILE_ID	Identifier of the import file, for internal use
7. AGE_AT_CDS_ACTIVITY_DATE	The submitted patient age.
8. AGE_AT_EVENT_DATE	Age of the patient at the event date
9. SEX	Gender of the patient
10. POSTCODE_SECTOR_USUAL_ADDR	The postcode sector representing the patients usual address
11. TARIFF_PRE_MFF_ADJUSTED_NATIONAL	The tariff relevant to the treatment area before adjustment for market force factors
12. NHS_NUMBER	The unique patient identifier
13. IC_PBR_QUALIFIED	Describes whether the record has received a PBR tariff.
<u>Organisation</u>	
1. Code	The code of the organisation
2. TypeID	The organisation type
This table is joined to the Outpatient table using the PROVIDER_CODE and the Code fields. The organisation table is populated from the ODS list of NHS organisations and is updated each quarter.	

### 3. Data Preparation

Data Filter		
The following data filters should be applied to the data.		
1	Field Name:	ATTENDANCE_DATE
	Conditions:	Is within the quarter in question
	Rationale:	We are looking at patients who attended in the current quarter.
2	Field Name:	AGE_AT_CDS_ACTIVITY_DATE; AGE_AT_EVENT_DATE
	Conditions:	AGE_AT_CDS_ACTIVITY_DATE is between 0 and 120 or AGE_AT_EVENT_DATE is between 0 and 120.
	Rationale:	This identifies the patient's age at the date of appointment and identifies that it falls within the expected range.
3	Field Name:	SEX
	Conditions:	Is equal to 1 or 2
	Rationale:	Ensures that a valid gender has been entered for the patient.
4	Field Name:	IC_PBR_QUALIFIED
	Conditions:	Is equal to Y
	Rationale:	To find only PBR qualified records.
5	Field Name:	ATTENDANCE_STATUS
	Conditions:	Is equal to 5 or 6
	Rationale:	Filters for patients who attended on time or, if late, before the relevant care professional was ready to see the patient (5) or patients who arrived late, after the relevant care professional was ready to see the patient, but was seen (6)
6	Field Name:	TypeID
	Condition:	Is equal to 8
	Rationale:	To limit data to acute trusts
7	Field Name:	PROVIDER_CODE
	Conditions:	Is not NULL and does not equal ##### or ??????????, RBV
	Rationale:	Only valid organisations should be used in the following calculations. Christie hospital is excluded due to its specialist nature.
8	Field Name:	PROVIDER_CODE; CODE
	Conditions:	Records in the PROVIDER_CODE field in the Spells table which are not present in the CODE field in the organisation table are excluded.
	Rationale:	Only valid organisations should be used in the following calculations.
9	Field Name:	TREATMENT_FUNCTION_CODE
	Conditions:	Is not equal to 999 and is not NULL.
	Rationale:	Excludes invalid code that is used later in the indicator calculation as an aggregate code.
10	Field Name:	FIRST_ATTENDANCE
	Conditions:	Is equal to 1, 2, 3 or 4.
	Rationale:	Includes first and follow up defined appointments.

Definitions	
The following definitions are used for first attendances and follow up attendances.	
To calculate the outpatient first attendances (denominator for the ratio calculation)	
1	Field Name: FIRST_ATTENDANCE Conditions: = 1 or 3 Rationale: Filters for the outpatient first attendances
To calculate the follow up attendances (numerator for the ratio calculation)	
2	Field Name: FIRST_ATTENDANCE Conditions: = 2 or 4 Rationale: Filters for the outpatient follow up attendance
To find unique patients	
3	Field Name: NHS_NUMBER Conditions: Unique value for each patient Rationale: The NHS_NUMBER field provides a unique identifier for each individual patient.

## 4. Indicator Calculation

Calculation	
1.	Calculate the FFU ratio for each combination of provider and treatment function.
	$FFU_{ps} = \frac{FU_{ps}}{FA_{ps}}$
	<p>where:</p> <p><math>FFU_{ps}</math> is the first to follow up ratio for each provider p over each treatment function s;  <math>FA_{ps}</math> is the count of first attendance for each provider p over each treatment function s; and  <math>FU_{ps}</math> is the count of follow up attendances for each provider p over each treatment function s.</p> <p>If <math>FA_{ps}</math> is zero exclude the records for that provider for that specialty from the indicator calculations.</p>
2.	Calculate reference ratios as follows:
	<ul style="list-style-type: none"> <li>- Calculate the ratio for each treatment function and provider, using data from quarter 1 of the current year.</li> <li>- For each treatment function rank the provider results in order with the lowest ratio at position 1. Where values are equal, order by alphabetising the organisation code.</li> <li>- For each treatment function select the ratio for the provider with the highest ratio less than or equal to the N<sup>th</sup> percentile. N will take values of 10, 25 and 50. When there are no providers with a ratio less than or equal to the Nth percentile select the provider with the lowest ratio.</li> <li>- The selected ratio is the reference ratio for that treatment function for the N<sup>th</sup> percentile.</li> <li>- The reference ratios are used for calculating the savings in all four quarters of the year. If in later quarters a combination of treatment function and provider is observed that does not have a reference ratio, calculate the reference ratio with data from the first quarter the combination is seen.</li> <li>- <math>REF\_FFU_s</math> is the reference ratio.</li> </ul>

3. Calculate the Potential Reduction in attendances for each provider over each treatment function.

$$PR_{ps} = \text{MAX}(FU_{ps} - (FA_{ps} \times REF\_FFU_s), 0)$$

where:

$PR_{ps}$  is the potential reduction in attendances for each provider in each treatment function; and  
 $REF\_FFU_s$  is the relevant FFU for the treatment function and percentile in question.

4. Calculate the average tariff for follow up appointments per treatment function.

$$AT_{ps} = \frac{\sum_{n=FU_{sp}}^{n=1} \text{TARIFF\_PRE\_MFF\_ADJUSTED\_NATIONAL}_{ps}}{FU_{ps}}$$

5. Convert the potential reduction in attendances for the quarter in question into a financial value.

$$QFS_{ps} = PR_{ps} \times AT_{ps}$$

where:

$QFS_{ps}$  is the estimated potential Quarter Financial Saving;

$AT_{ps}$  is the average follow up Attendance Tariff, calculated per treatment function and provider for the quarter in question; and

6. Calculate the FFU ratio at provider, NHS England geographical region (GR), treatment function and national levels.

$$FFU_{ps} = \frac{FU_{ps}}{FA_{ps}}$$

$$FFU_{hs} = \frac{\sum_{p=GR_1}^{GR_n} FU_{ps}}{\sum_{p=GR_1}^{GR_n} FA_{ps}}$$

$FFU_{hs}$  is the first to follow up ratio for each NHS England geographical region (GR) h and treatment function s;

$$FFU_s = \frac{\sum_{p=1}^n FU_{ps}}{\sum_{p=1}^n FA_{ps}}$$

$FFU_s$  is the first to follow up ratio for each treatment function; and

$$FFU_p = \frac{\sum_{s=1}^n FU_{ps}}{\sum_{s=1}^n FA_{ps}}$$

$FFU_p$  is the first to follow up ratio for each provider p;



$$FFU_h = \frac{\sum_{p=GR_1}^{GR_n} \sum_{s=1}^n FU_{ps}}{\sum_{p=GR_1}^{GR_n} \sum_{s=1}^n FA_{ps}}$$

$FFU_h$  is the first to follow up ratio for each NHS England geographical region (GR) h;

$$FFU = \frac{\sum_{p=1}^n \sum_{s=1}^n FU_{ps}}{\sum_{p=1}^n \sum_{s=1}^n FA_{ps}}$$

$FFU$  is the national first to follow up ratio.

- Aggregate the estimated potential financial saving opportunities to produce output at provider, NHS England geographical region (GR) and national levels.

$$FinancialOpportunity_{ps} = QFS_{ps}$$

$$FinancialOpportunity_{hs} = \sum_{p=GR_1}^{GR_n} QFS_{ps}$$

$FinancialOpportunity_{hs}$  is the estimated potential saving by GR h and treatment function s;  $GR_1$  and  $GR_n$  represent all of the providers in each NHS England geographical region (GR);

$$FinancialOpportunity_s = \sum_{p=1}^n QFS_{ps}$$

$FinancialOpportunity_s$  is the estimated potential national saving by treatment function;

$$FinancialOpportunity_p = \sum_{s=1}^n QFS_{ps}$$

$FinancialOpportunity_p$  is the estimated potential saving for each provider p;

$$FinancialOpportunity_h = \sum_{p=GR_1}^{GR_n} FinancialOpportunity_p$$

$FinancialOpportunity_h$  is the estimated potential saving for each GR h; and

$$FinancialOpportunity = \sum_{p=1}^n FinancialOpportunity_p$$

$FinancialOpportunity$  is the estimated potential national saving opportunity.

- Aggregate the potential attendance adjustment to produce output at provider, NHS England geographical region (GR) and national levels.

$$VolumeOpportunity_{ps} = PR_{ps}$$

$VolumeOpportunity_{ps}$  is the quarter potential attendance adjustment for provider p and treatment function s; and

$$VolumeOpportunity_{hs} = \sum_{p=GR_1}^{GR_n} VolumeOpportunity_{ps}$$

$VolumeOpportunity_{hs}$  is the quarter potential attendance adjustment by GR h and treatment function s; and

$GR_1$  to  $GR_n$  represent all of the providers in each NHS England geographical region (GR); and

$$VolumeOpportunity_s = \sum_{p=1}^n VolumeOpportunity_{ps}$$

$VolumeOpportunity_s$  is the quarter potential attendance adjustment by treatment function; and

$$VolumeOpportunity_p = \sum_{s=1}^n VolumeOpportunity_{ps}$$

$VolumeOpportunity_p$  is the quarter potential attendance adjustment for each provider p; and

$$VolumeOpportunity_h = \sum_{p=GR_1}^{GR_n} VolumeOpportunity_p$$

$VolumeOpportunity_h$  is the quarter potential attendance adjustment for each GR h; and

$$VolumeOpportunity = \sum_{p=1}^n VolumeOpportunity_p$$

$VolumeOpportunity$  is the quarter potential national attendance adjustment.

9. **ATTENDANCES** are the number of attendances during the quarter in question. Aggregate the attendances to produce output at provider, NHS England geographical region (GR) and national levels.

$$Attendances_{ps} = FA_{sp} + FU_{sp}$$

$Attendances_{ps}$  is the number of attendances for the quarter in question for provider p and treatment function s; and

$$Attendances_{hs} = \sum_{p=GR_1}^{GR_n} Attendances_{ps}$$

$Attendances_{hs}$  is the number of attendances for the quarter in question by GR h and treatment function s; and

$AT_1$  to  $AT_n$  represent all of the providers in each NHS England geographical region (GR); and

$$Attendances_s = \sum_{p=1}^n Attendances_{ps}$$

$Attendances_s$  is the number of attendances for the quarter in question by treatment function; and

$$Attendances_p = \sum_{s=1}^n Attendances_{ps}$$

$Attendances_p$  is the number of attendances for the quarter in question for each provider p; and

$$Attendances_h = \sum_{p=GR_1}^{GR_n} Attendances_p$$

$Attendances_h$  is the number of attendances for the quarter in question for each GR h; and

$$\text{Attendances} = \sum_{p=1}^n \text{Attendances}_p$$

*Attendances* is the national number of attendances for the quarter in question.

10. *Patients<sub>ps</sub>* is the distinct count of patients, as outlined in the definitions section, for the quarter in question for provider p and treatment function s; and  
*Patients<sub>hs</sub>* is the distinct count of patients for the quarter in question by NHS England geographical region (GR) h and treatment function s; and  
*Patients<sub>s</sub>* is the distinct count of patients for the quarter in question by treatment function; and  
*Patients<sub>p</sub>* is the distinct count of patients for the quarter in question for each provider p; and  
*Patients<sub>h</sub>* is the distinct count of patients for the quarter in question for each GR h; and  
*Patients* is the distinct count of patients for the quarter in question.

## Output

The summaries produced should be in the common output format described below. One record should be present for the different geographical aggregation levels of provider, NHS England geographical region (GR) and national with breakdowns at each geographical level for different treatment functions and overall total calculations.

Field Name	Type	Length	Source
ID	integer		Primary key ID field
IndicatorID	Character	6	Indicator Code given in 'Condition' in section 1.
BatchID	integer		Input file identifier.
YearQuarterID	integer		ID of the quarter within the year
PercentileID	integer		1, 2 or 3 depending on percentile – see appendix
OrganisationCode	Character	15	Character code representing the organisation. ('National' where calculating over all organisations.)
ComponentID	integer		Treatment Function. ('999' where calculating over all Diagnosis Groups.)
Value	Numeric	30.2	Value used for ranking from equation 1 and equation 6.
FinancialOpportunity	Numeric	30.2	Financial opportunity calculated in equation 7
VolumeOpportunity	Numeric	30.2	Potential adjustment in attendance calculated in equation 8
Attendances <sup>1</sup>	integer		Number of attendances calculated in equation 9
Patients <sup>1</sup>	integer		Count of the distinct number of patient IDs contained in equation 10
Rank	integer		Rank position calculated from the value at the different levels of aggregation.

<sup>1</sup> Value output is suppressed by (a) setting values between 1 and 5 to "\*" and (b) rounding all other values to nearest 10.

## Appendices

### Appendix 1 – Groupings of data

Table A.1. Measure Types

Group Number	Description
1	10 <sup>th</sup> Percentile
2	25 <sup>th</sup> Percentile
3	50 <sup>th</sup> Percentile
4	Not Applicable