
**Indicator Construction: BCBV – Outpatient
Appointment DNA Percentage**

DOCUMENT MANAGEMENT

VERSIONS

Version	Date	Summary	Editor
1.0	31/10/2013	Baseline Version	Walt Treloar
1.1	11/11/2015	Updated Deprivation Groups after ONS IMD release 2015.	Walt Treloar
1.2	12/09/2016	Minor changes to reflect suppression of output values to aid clarity.	Walt Treloar

APPROVALS

Name	Signature	Title	Date of Issue	Version
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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
This measure allows trusts to compare their 'Did Not Attend' (DNA) rates with the national distribution. A high level of DNAs indicates a system that might be making unnecessary appointments or failing to communicate clearly with patients.

Condition	Indicator Code
All	I00614

Detailed Descriptor
<p>This indicator shows the financial productivity opportunity to be realised by reducing the excess DNA's that could have instead been spent on patient care.</p> <p>This measure allows trusts to compare their DNA rates with the national distribution. A high level of DNA's indicates a system that might be making unnecessary appointments or failing to communicate clearly with patients.</p> <p>Potential saving is defined as the excess DNA's (based on the 25th percentile for each treatment function) per quarter multiplied by the Payments by Results (PbR) tariff. The potential saving is an indicator of opportunity cost – the amount that could have instead been spent on patient care.</p>

Reporting Frequency
<p>Data supplied on a quarterly basis.</p> <p>Reporting required on a quarterly basis.</p>

2. Data

Data Source
Secondary Uses Service, Payment by Results (SUS PBR), SUS_PBR_OP_MASTER table.
ODS list of NHS organisations

Data Fields																								
<p>The source of data is the SUS PBR data set. This is supplied on a monthly basis, and loaded by the HES SUS development team. It is required for the BCBV indicators on a quarterly basis.</p> <p>The data fields required are as follows;</p> <p><u>SUS PBR Outpatient table</u></p> <table> <tr> <td>1. PROVIDER_CODE</td> <td></td> </tr> <tr> <td>2. TREATMENT_FUNCTION_CODE</td> <td>Describes the kind of treatment the patient receives.</td> </tr> <tr> <td>3. ATTENDANCE_STATUS</td> <td>Describes whether the patient attended the appointment.</td> </tr> <tr> <td>4. AGE_AT_CDS_ACTIVITY_DATE</td> <td>The submitted patient age</td> </tr> <tr> <td>5. AGE_AT_EVENT_DATE</td> <td>The age of the patient derived in SUS</td> </tr> <tr> <td>6. ATTENDANCE_DATE</td> <td></td> </tr> <tr> <td>7. SEX</td> <td></td> </tr> <tr> <td>8. TARIFF_PRE_MFF_ADJUSTED_NATIONAL</td> <td></td> </tr> <tr> <td>9. SPELL_ID</td> <td></td> </tr> <tr> <td>10. NHS_NUMBER</td> <td>The patient's NHS number</td> </tr> </table> <p><u>Organisation</u></p> <table> <tr> <td>1. Code</td> <td>The code of the organisation</td> </tr> <tr> <td>2. TypeID</td> <td>The organisation type</td> </tr> </table> <p>This table is joined to the Spells table using the PROVIDER_CODE and the CODE, records in the Spells table which are not present in the organisation table are excluded. The organisation table is populated from the ODS list of NHS organisations and is updated each quarter.</p>	1. PROVIDER_CODE		2. TREATMENT_FUNCTION_CODE	Describes the kind of treatment the patient receives.	3. ATTENDANCE_STATUS	Describes whether the patient attended the appointment.	4. AGE_AT_CDS_ACTIVITY_DATE	The submitted patient age	5. AGE_AT_EVENT_DATE	The age of the patient derived in SUS	6. ATTENDANCE_DATE		7. SEX		8. TARIFF_PRE_MFF_ADJUSTED_NATIONAL		9. SPELL_ID		10. NHS_NUMBER	The patient's NHS number	1. Code	The code of the organisation	2. TypeID	The organisation type
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3. Data Preparation

Data Filter	
The following data filters should be applied to the data.	
1.	<p>Field Name: ATTENDANCE_DATE</p> <p>Conditions: Limited to the current quarter, for the current year. Quarter 1 – 1st April to 30th June; Quarter 2 – 1st July to 30th September; Quarter 3 – 1st October to 31st December; Quarter 4 – 1st January to 31st March.</p> <p>Rationale: Data is updated quarterly using attendances with an attendance date within the quarter in question.</p>
2.	<p>Field Name: ATTENDANCE_STATUS</p> <p>Condition: in (3, 5, 6, 7)</p> <p>Rationale: Removes cancellations and not applicable.</p>
3.	<p>Field Name: SEX</p> <p>Conditions: in (1, 2)</p> <p>Rationale: Data quality - limits data to male and female patients, excluding unknown and not applicable records.</p>
4.	<p>Field Name: AGE_AT_CDS_ACTIVITY_DATE, AGE_AT_EVENT_DATE</p> <p>Condition: AGE_AT_CDS_ACTIVITY_DATE between 0 and 120 or AGE_AT_EVENT_DATE between and 120</p> <p>Rationale: Data quality – limits data to records with valid age recorded.</p>
5.	<p>Field Name: PROVIDER_CODE</p> <p>Conditions: Is not NULL and is not in '#####', '????????????', RBV</p> <p>Rationale: Data Quality, excludes records with invalid or NULL provider codes. Christie hospital is excluded due to its specialist nature.</p>
6.	<p>Field Name: TypeID</p> <p>Conditions: Is equal to 8</p> <p>Rationale: To limit data to acute trusts.</p>
7.	<p>Field Name: TREATMENT_FUNCTION_CODE</p> <p>Condition: Is not NULL and is not 999</p> <p>Rationale: Data quality, comparison is not possible where treatment function is unknown or invalid.</p>

4. Indicator Calculation

Calculation

1. Calculate the DNA rate for each provider and each treatment function:

$$DNA_{ps} = \frac{NA_{ps}}{A_{ps}}$$

where:

DNA_{ps} is the did not attend rate for each provider p and treatment function s ;

NA_{ps} is the count of did not attends (ATTENDANCE_STATUS in (3, 7)) for each provider p and treatment function s ; and

A_{ps} is the count of all attendances (ATTENDANCE_STATUS in (3, 5, 6, 7)) for each provider p and treatment function s .

2. The values for all providers are then ranked for each treatment function and the DNA rate at the 10th, 25th and 50th percentiles are determined. This is achieved in the following way.

$$REF_DNA_s = \frac{NA_{ps}}{A_{ps}}$$

- Calculate the DNA rate for each treatment function and Provider, using data from quarter 1 of the current year.
 - For each treatment function, rank the Provider results in order with the lowest DNA rate at position 1. Where values are equal, order by alphabetising the organisation code.
 - For each treatment function select the rate for the Provider with the highest DNA rate less than or equal to the Nth percentile. N will take values of 10, 25 and 50. When there are no providers with a DNA rate less than or equal to the Nth percentile select the Provider with the lowest DNA rate.
 - The selected DNA rate is the reference DNA rate for that treatment function for the Nth percentile.
 - The reference DNA rates 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 DNA rate, calculate the reference DNA rate with data from the first quarter the combination is seen.
3. Calculate the potential reduction in DNAs PR for each provider p and treatment function s , using the following method:

$$PR_{ps} = MAX(DNA_{ps} - REF_DNA_s, 0) * A_{ps}$$

4. The quarterly financial savings opportunity QFS is calculated by multiplying the potential reduction in attendances PR_{ps} by the average first attendance tariff for the provider and treatment function.

$$QFS_{ps} = PR_{ps} * AVG(TARIFF_PRE_MFF_ADJUSTED_NATIONAL)$$

5. Calculate the DNA percentage rate at all levels of provider and treatment function.

$$DNA\%_{ps} = \frac{NA_{ps}}{A_{ps}} \times 100$$

NA_{ps} is the did not attend rate for provider p and treatment function s;

$$DNA\%_{hs} = \frac{\sum_{p=GR_1}^{GR_n} NA_{ps}}{\sum_{p=GR_1}^{GR_n} A_{ps}} \times 100$$

NA_{hs} is the did not attend rate for NHS England geographical region (GR) h and treatment function s;

GR_1 to GR_n represent all of the providers in each GR;

$$DNA\%_s = \frac{\sum_{p=1}^n NA_{ps}}{\sum_{p=1}^n A_{ps}} \times 100$$

NA_s is the did not attend rate for treatment function s;

$$DNA\%_p = \frac{\sum_{s=1}^n NA_{ps}}{\sum_{s=1}^n A_{ps}} \times 100$$

NA_p is the did not attend rate for provider p;

$$DNA\%_h = \frac{\sum_{p=GR_1}^{GR_n} \sum_{s=1}^n NA_{ps}}{\sum_{p=GR_1}^{GR_n} \sum_{s=1}^n A_{ps}} \times 100$$

NA_h is the did not attend rate for GR h;

$$DNA\% = \frac{\sum_{p=1}^n \sum_{s=1}^n NA_{ps}}{\sum_{p=1}^n \sum_{s=1}^n A_{ps}} \times 100$$

NA is the national did not attend rate.

6. Aggregate the estimated potential financial savings to produce output at provider, NHS England geographical region (GR) and national levels each broken down by treatment function.

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

$FinancialOpportunity_{ps}$ is the estimated potential saving for each provider p and treatment function s;

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

FinancialOpportunity_p is the estimated potential saving for each provider p;

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

FinancialOpportunity_{hs} is the estimated potential saving for each GR h and treatment function s;

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

FinancialOpportunity_h is the estimated potential saving for each GR h;

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

FinancialOpportunity_s is the estimated national potential saving for each treatment function s;

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

FinancialOpportunity is the estimated national potential saving

7. Aggregate the estimated potential did not attend savings to produce output at provider, NHS England geographical region (GR) and national level, each broken down by treatment function.

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

VolumeOpportunity_{ps} is the estimated potential saving for each provider p and treatment function s;

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

VolumeOpportunity_p is the estimated potential saving for each provider p;

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

VolumeOpportunity_{hs} is the estimated potential saving for each GR h and treatment function s;

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

VolumeOpportunity_h is the estimated potential saving for each GR h;

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

VolumeOpportunity_s is the estimated national potential saving for each treatment function s;

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

VolumeOpportunity is the estimated national potential saving

8. *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.

$$ATTENDANCES_{ps} = A_{ps}$$

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

$$ATTENDANCES_p = \sum_{s=1}^n A_{ps}$$

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

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

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

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

$$ATTENDANCES_h = \sum_{p=GR_1}^{GR_n} ATTENDANCES_p$$

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

$$ATTENDANCES_s = \sum_{h=1}^n ATTENDANCES_{hs}$$

$ATTENDANCES_s$ is the number of attendances for the quarter in question for each treatment function s;

$$ATTENDANCES = \sum_{p=1}^n ATTENDANCES_p$$

$ATTENDANCES$ is the number of attendances for the quarter in question in total.

9. *PATIENTS* are the number of patients during the quarter in question. Count the distinct NHS_NUMBER to produce output at provider, NHS England geographical region (GR) and national levels, each broken down by treatment function.

$Patients_{ps}$ is the count of distinct count of patients for the quarter in question for provider p and treatment function s; and

$Patients_{hs}$ is the count of distinct count of patients for the quarter in question by GR h and treatment function s; and

$Patients_s$ is the count of distinct count of patients for the quarter in question by treatment function; and

$Patients_p$ is the count of distinct count of patients for the quarter in question for each provider p; and

$Patients_h$ is the count of distinct count of patients for the quarter in question for each GR h; and

$Patients$ is the count of 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	I00614
BatchID	Integer		Input file identifier.
YearQuarterID	Integer		ID of the quarter within the year
PercentileID	Integer		ID of the percentile for this calculation. See Appendix for values.
OrganisationCode	Character	15	Character code representing the organisation
ComponentID	Integer		Treatment Function (999 when calculating overall treatment functions, National when calculating overall organisations)
Value	Numeric	30,2	DNA%, percentage rate calculated in equation 5
FinancialOpportunity	Numeric	30,2	Financial opportunity calculated in equation 6
VolumeOpportunity	Numeric	30,2	Potential adjustment in attendance calculated in equation 7
Attendances ¹	Integer		Number of attendances calculated in equation 8
Patients ¹	Integer		Count of the distinct number of NHS numbers contained in equation 9
Rank	Integer		Rank calculation based on VALUE within combinations of organisation type and quarter of data.

¹ 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 th Percentile
2	25 th Percentile
3	50 th Percentile
4	Not Applicable