Public health grant: Exposition book for proposed formula for 2016-17 target allocations – Technical Guide

An engagement on behalf of the Advisory Committee on Resource Allocation (ACRA)

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Public health grant: Exposition book for proposed formula for 2016-17 target allocations - Technical Guide

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Executive summary

1. The Advisory Committee on Resource Allocation's (ACRA) interim recommendations for the target allocations formula for 2016-17 public health allocations are set out in the document '*Public health grant: proposed target allocation formula for 2016/17: an engagement on behalf of the Advisory Committee on Resource Allocation (ACRA)*' [1].

2. The Excel workbook *'Exposition book public health grant: proposed formula for 2016-17',* sets out the calculation of the target weighted populations for each Local Authority under ACRA's interim recommendations. These form the basis of the table in 'Annex A - Distribution of resources to LAs' based on the ACRA formula' as set out in the document '*Public health grant: proposed target allocation formula for 2016-17: an engagement on behalf of the Advisory Committee on Resource Allocation (ACRA)'*. This Technical Guide supports the Excel workbook by providing further information on the calculation of the weighted populations.

3. The Technical Guide and Excel workbook should be read in conjunction with the document '*Public health grant: proposed target allocation formula for 2016-17: an engagement on behalf of the Advisory Committee on Resource Allocation (ACRA)'*.

4. It is not possible to convert the preferred shares into cash values until the size of the national budget available for 2016-17 is known following the outcome of this year's spending review.

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1. Introduction

1.1　The Advisory Committee on Resource Allocation's (ACRA) interim recommendations for the target allocations formula for 2016-17 public health allocations are set out in the document '*Public health grant: proposed target allocation formula for 2016-17: an engagement on behalf of the Advisory Committee on Resource Allocation (ACRA)'.* The Excel workbook '*Exposition book public health grant: proposed formula for 2016-17'* sets out the calculation of the weighted populations, and hence target share, for each Local Authority under ACRA's interim recommendations. The Technical Guide supports the Excel workbook by providing further information on the calculation of the weighted populations.

1.2　The Advisory Committee on Resource Allocation (ACRA) is an independent expert body with members from the NHS, local government and Universities, including experts on public health. ACRA advises the Secretary of State for Health on the appropriate distribution of resources across Local Authorities for public health. Ministers gave ACRA the remit of developing a formula for public health based on the principle of providing equal opportunity of access for equal need and contributing to the reduction in health inequalities.

1.3　ACRA developed a new public health formula, for target allocations for 2013-14 and 2014-15 public health grants to Local Authorities. This is referred to as the current formula in this document. Both the current and proposed formulae are based on applying a weight per head to projected populations from ONS for each Local Authority.

1.4　A summary of the current formula is as follows:
- the principal indicator of need is the standardised mortality ratio (SMR) for those aged under 75 years;
- the SMR<75 is applied at MSOA level to take account of inequality within Local Authorities as well as between Local Authorities;
- the gradient of the formula across small areas is exponentially weighted at a ratio of 5 : 1 to target funding per head towards areas with the poorest health outcomes;
- the weighted population for Local Authorities is built up from the weighted populations for the MSOAs in their area;
- an age-gender adjustment per head is applied to those services with the highest proportion of public health spend which are also directed at specific age-gender groups to weight for relative needs between different age-gender groups;
- a component to support drug services funded through the pooled treatment budget up to 2012-13 which broadly follows the approach used to allocate that budget. This is based on a need component and an activity component. The need component was replaced with the SMR<75;

- an unavoidable cost adjustment is used in the formula and this is the Market Forces Factor;
- the weights per head are applied to Office for National Statistics (ONS) resident populations for Local Authorities to give weighted populations for each Local Authority. Each Local Authority's share of the total weighted population gives its target share of the national budget (once known).

1.5 The current formula has three components:
- mandated services;
- non-mandated services (excluding drugs and alcohol services);
- substance misuse services – this includes drugs services which were previously commissioned by drug action team partnerships (DATs) funded through the pooled treatment budget (PTB), all other drugs services, and alcohol services. These services are all non-mandated.

1.6 A weighted population is calculated for each of these three components. The age-gender adjustment is different for mandated and non-mandated services and so there is a need to calculate these weighted populations separately. The weighted populations for each component are combined to give a single overall weighted population.

1.7 ACRA wished to build on this current formula and develop a more evidence based formula. Their interim recommendations for the formula for 2016-17 are:
- routine data updates to the current formula;
- a change to the way the SMR<75 is applied in the current formula;
- a new formula for substance misuse services;
- a new formula for sexual health services;
- a new component for children aged under 5, following the transfer of responsibility for commissioning these services to Local Authorities from October 2015.

1.8 Section 2 of this guide discusses in more detail data updates to the current formula. The current formula has been updated for data updates for comparison purposes with the proposed formula. Not all of the data updates are used in the proposed formula as some components in the proposed formula are on a different basis. Full details of the current formula are not included in this guide, but are set out in the Exposition book Public Health Allocations 2013-14 and 2014-15 and associated Technical Guide[2]

1.9 Section 3 describes the proposed new way of applying the SMR<75, section 4 the proposed new substance misuse services component, section 5 describes the proposed new sexual health component and section 6 sets out the detail of the proposed new component for children aged under 5. Section 7 then explains how all these

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[2] Available at:
https://www.gov.uk/government/publications/ring-fenced-public-health-grants-to-local-authorities-2013-14-and-2014-15

components are brought together to calculate an overall weighted population for the proposed 2016-17 public health target allocation shares.

2. Data updates to the current formula

Population data

2.1   The primary determinant of each Local Authority's target share is the size of its population, as this is the key determinant of the need for public health services.

2.2   Two resident population estimates are used in the calculation of the weighted populations in the current public health formula. These are:
- populations for Middle Layer Super Output Area[3] (MSOA)
- populations for Local Authorities

2.3   The population data used for MSOAs have been updated to mid-2012[4] population estimates from 2010 mid-year estimates in the current formula. In order for the final populations to be closer to those for the year for which allocations are made, we have uplifted the sum of the 2012 mid-year estimates for MSOAs for each Local Authority to the 2016 population projections[5]. Both the population estimates and projections are produced by the ONS.

Standardised mortality ratio (SMR) <75

2.4   The principal indicator of need in the current formula is the SMR<75[6]. The SMR<75 is a measure of how many more or fewer deaths there are in a local area compared with the national average, having adjusted for the differences between the age profile of the local areas compared with the national average. It is available at MSOA level. A higher SMR<75 number represents a higher relative number of deaths. SMR<75 is recommended by ACRA as a good indicator of the whole population's need; it should not be interpreted that the formula does not reflect the needs of those aged over 75 years or that morbidity is unimportant[7]. The SMR<75 data have been updated from 2006-10 under the current formula to 2008-12.

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[3] An MSOA is a small (a population of approximately on average 8,000) geographical area defined by the ONS and used for statistical analysis.

[4] Mid-2012 MSOA population estimates are based on the 2011 Census to which births, deaths and migration are added or subtracted. For the Mid-2012 estimates please see:
 http://www.ons.gov.uk/ons/publications/re-reference-tables.html?edition=tcm%3A77-320861

[5] 2016 Sub National Population Projections (SNPPs) based on the 2011 Census. These are 2012-based population projections. For these projections please see:
http://www.ons.gov.uk/ons/publications/re-reference-tables.html?edition=tcm%3A77-335242

[6] The SMR<75 covers all causes for death under 75 for the time period 2008-2012. The SMR<75 for 2008-2012 is published by Public Health England and is available at:
www.localhealth.org.uk/Spreadsheets/Deaths%20under%2075,%20all%20causes_July2014.xls

[7] While alternatives such as the Disability free life expectancy (DFLE) and healthy life expectancy (HLE) capture morbidity (albeit at a basic level) as well as mortality, the SMR<75 is highly correlated with both DFLE and HLE, suggesting these have

Market Forces Factor (MFF)

2.5   The MFF index accounts for variations in unavoidable geographical costs of providing public healthcare services between Local Authorities due to location, such as due to higher premises costs. It is a component of the weighted population so that Local Authorities in higher cost areas receive additional target funding to ensure they can afford to commission the same level of services relative to need as those in other areas.

2.6   The updated MFF used in the proposed formula is derived from the MFF used in the formula for Clinical Commissioning Group (CCG) allocations for 2014-15 and 2015-16[8].

2.7   The CCG MFF is mapped to Local Authorities based on the share of each Local Authority's population in each CCG (using ONS mid-2012 populations at Lower-Layer Super Output (LSOA) area)

2.8   The resulting MFF Local Authority values are shown in the 'SMR<75 & MFF wtd pop' sheet of the Excel workbook.

Age-gender adjustments

2.9   Age-gender adjustments per head are applied in the current formula to weight for relative need between different age-gender groups. These adjustments are based on national data that reflect behavioural characteristics of different age-gender groups. In the data updates to the current formula, the same three key data sources are used. They have been updated using data for:

- The Health Survey for England (HSE) (2013)[9]
- Diagnoses rates for sexually transmitted infections (STI) from Public Health England (2013)[10]
- Drug treatment activity from Public Health England (2013-14)[11]

2.10   Annex A sets how the age-gender adjustments are calculated.

2.11   Table 1 lists the data used in this 2016-17 update of the current formula compared to the data used in the 2014-15 formula.

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little advantage in terms of capturing morbidity. The SMR<75 also has the advantage of being updated regularly at the MSOA level.
[8] Detail on the MFF used in the 2014-15 and 2015-16 CCG allocations formula can be found in the document 'Technical Guide to the formulae for 2014-15 and 2015-16 revenue allocations to Clinical Commissioning Groups and Area Teams' (2014) available at: http://www.england.nhs.uk/2014/03/27/allocations-tech-guide/
[9] HSE 2013 data can be found at: http://www.hscic.gov.uk/catalogue/PUB16077
[10] The latest Public Health England STI data are available at:
https://www.gov.uk/government/statistics/sexually-transmitted-infections-stis-annual-data-tables
[11] The latest Public Health England drug treatment activity data are available at: http://www.nta.nhs.uk/statistics.aspx

2.12   Overall weighted populations for the current formula with 2016-17 data updates can be found in the Excel spreadsheet '*Exposition book public health grant current formula with 2016-17 data updates*'.

Table 1 – Data updates to current formula

Area	2016-17 proposed formula	2014-15 current formula	Source
Population data	LA level: 2016 sub-national population projections, mid-2012 based	LA level: 2014 sub-national population projections, interim mid-2011 based	ONS
	MSOA level: mid-2012 population estimates (2011 Census based), used for aggregating the SMR<75 weights to LA level	MSOA level: mid-2010 population estimates (2001 Census based), used for aggregating the SMR<75 weights to LA level	
SMR<75 by MSOA	SMR<75 (all causes) for deaths registered in the period 2008-2012	SMR<75 (all causes) for deaths registered in the period 2006-2010	Public Health England
MFF	Derived from the MFF used in CCG allocations formula (based on 2011-12 HES and 2013-14 tariff)	Derived from the MFF used in the previous PCT weighted capitation formula (based on 2008-09 HES and 2009-10 tariff)	HES and Tariff
Age- gender adjustments	Nutrition, obesity and physical activity: % eat fewer than 5 portions of fruit and vegetables per day (HSE 2013)	Nutrition, obesity and physical activity: % eat fewer than 5 portions of fruit and vegetables per day (HSE 2010)	Health Survey for England (HSE)
	Alcohol misuse: % who drank more than recommended daily units on heaviest drinking day in past week (HSE 2013)	Alcohol misuse: % who drank more than recommended daily units on heaviest drinking day in past week (HSE 2010)	
	Smoking: % who are current smokers (HSE 2013)	Smoking: % who are current smokers (HSE 2010)	
	Sexual health: Diagnosis rates of sexually transmitted infections, 2013	Sexual health: Diagnosis rates of sexually transmitted infections, 2010	Public Health England
	Drugs misuse: Drug treatment activity, 2013-14 This is not an age-gender adjustment	Drugs misuse: Drug treatment activity, 2010-11	Public Health England

3. SMR Groups

3.1   The current public health formula is largely based on the standardised mortality ratio for those aged under 75 (SMR<75). The SMR<75 is applied at MSOA level to take account of inequality within, as well as between, Local Authorities.

3.2   In the current formula each MSOA is assigned to one of ten groups based on the value of their SMR<75. The current groups are based on:

- each group having at least 5% of MSOAs, to reduce the impact of random fluctuations in the SMR<75 over time and remove the impact of outliers which may be due to data issues;
- the other groups each cover the same span of SMR<75 values, called 'equal width' groups;
- MSOAs in the same group are given the same weight per head. MSOAs in the group with the highest SMR<75 are given a weight per head 5 times higher than the MSOAs in the group with the lowest SMR<75s. The weight per head for the intermediate groups increases exponentially. This means the differences in the weights between each group increases as the SMR<75 rises.

3.3   Under the proposed formula, ACRA is recommending that there should instead be 16 groups with each group having no fewer than 30 MSOAs to guard against volatility. Extrapolating across 16 groups now gives a ratio of 10 : 1 between the group with the highest SMR<75 and the group with the lowest SMR<75 (compared to a 5 : 1 ratio for the previous 10 groups).

3.4   Table 2 gives the original 10 SMR<75 groups that are used in the current formula and ACRA's proposed 16 SMR<75 groups for the 2016-17 formula.

3.5   The MSOA level populations are weighted using the values in the 'Weight per head' column of Table 2. The first step is to assign each MSOA into one of the sixteen groups on the basis of its SMR<75 score. For example, MSOA X with a SMR<75 of 90.00 is assigned to group 5 (as 90.00 is within 85.0 and 97.1). Each MSOA is then assigned a corresponding SMR<75 weight. So for MSOA X, the SMR<75 weight per head is 1.85. The population in each MSOA is then multiplied by the SMR<75 weight per head. If the MSOA X population is 10,000, then the weighted population will be 18,500. The weighted populations by MSOA are then normalised, i.e. the figure for each MSOA is scaled by the same proportion, so that the total weighted population for all MSOAs together equals the 2012 mid-year population estimate for England.

3.6   This provides MSOA need weighted populations based on 2012 population estimates. This calculation is set out in the 'SMR<75 by MSOA 16grps 10-1wt' sheet in the Excel workbook.

3.7   The MSOA level need weighted populations are aggregated to Local Authority level by summing the MSOA weighted populations in each Local Authority[12]. For the 2016-17 formula, these Local Authority figures are then uplifted to 2016 population projections. The Local Authority weighted populations are then normalised so that the total weighted population for all Local Authorities together equals the 2016 population projections for England.

3.8   The MFF is applied to the Local Authority need weighted populations and normalised to the 2016 population projections for England. This provides Local Authority level need and MFF weighted populations for 2016 population estimates.

3.9   The calculation of Local Authority need and MFF weighted populations is set out in the 'SMR<75 & MFF wtd pop' sheet in the Excel workbook.

Table 2: SMR<75 weights for MSOAs

	Original 10 groups					ACRA's proposed 16 groups				
Group	% of MSOAs	SMR<75 width		SMR<75 span	Weight per head	Group	% of MSOAs	SMR<75 width		SMR<75 span	Weight per head
1	5%	36.8	61.9	25.1	1.00	1	0.4%	36.8	48.9	12.1	1.00
2	14%	61.9	74.3	12.4	1.20	2	3.8%	48.9	60.9	12.1	1.17
3	19%	74.3	86.6	12.4	1.43	3	13.0%	60.9	73.0	12.1	1.36
4	17%	86.6	99.0	12.4	1.71	4	17.8%	73.0	85.0	12.1	1.59
5	12%	99.0	111.4	12.4	2.04	5	16.4%	85.0	97.1	12.1	1.85
6	10%	111.4	123.8	12.4	2.45	6	12.6%	97.1	109.1	12.1	2.15
7	8%	123.8	136.1	12.4	2.92	7	10.4%	109.1	121.2	12.1	2.51
8	6%	136.1	148.5	12.4	3.50	8	8.0%	121.2	133.2	12.1	2.93
9	5%	148.5	165.6	17.1	4.18	9	5.9%	133.2	145.3	12.1	3.42
10	5%	165.6	277.8	112.3	5.00	10	4.6%	145.3	157.3	12.1	3.98
						11	2.8%	157.3	169.4	12.1	4.64
						12	1.5%	169.4	181.4	12.1	5.41
						13	1.0%	181.4	193.5	12.1	6.31
						14	0.7%	193.5	207.9	14.4	7.36
						15	0.5%	207.9	222.3	14.5	8.58
						16	0.4%	222.3	277.8	55.5	10.00

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[12] Data mapping of MSOAs to Local Authorities is available at:
https://geoportal.statistics.gov.uk/geoportal/catalog/search/browse/browse.page

4. New formula for substance misuse services component

4.1   The current substance misuse formula is based on a mixture of the SMR<75 (reflecting underlying need), recent activity and (for 2013-14) recent success rates. This methodology provided consistency with the approach previously used for Pooled Treatment Budgets (PTB). The used of SMR<75 for underlying need was also consistent with the wider public health formula. The PTB approach was designed to provide a mixture of allocation based on need and incentive to improve performance. The relative weightings of the components (which ACRA adopted) were largely based on judgement.

4.2   Since ACRA proposed this approach the University of Manchester have developed an utilisation base formula for individual treatment services for drugs and alcohol misuse. This involved modelling the use of these treatment services using data on the characteristics of clients, their place of residence and supply variables. Supply variables are included in the model to account for the possibility of supply induced demand, but are not included in the formula for target allocations.

4.3   ACRA is proposing a new component for substance misuse for the 2016-17 formula using the model developed by Manchester University. A description of the models developed by the University of Manchester is in the document '*Public health grant: proposed target allocation formula for 2016-17: an engagement on behalf of the Advisory Committee on Resource Allocation (ACRA)'* and full details are in the research report from the University of Manchester[13] .

Calculating Local Authority level weighted populations

4.4   The researchers supplied modelled costs (based on the need variables from the person-based model with supply variables sterilised) for each of the eight age groups (under 15, 15 to 19, 20 to 24, 25 to 29, 30 to 44, 45 to 59, 60 to 64, 65 and above) at postcode sector level. These are multiplied by 2011 populations for each age group and normalised i.e. so that the sum of all the postcode sector weighted populations equals the 2011 population for England. The postcode sector weighted populations are then aggregated to Local Authority level.

4.5   The MFF and population growth from 2011 to 2016 are then applied and re-normalised to 2016 populations. This provides Local Authority need based weighted populations for substance misuse services. The modelled costs for each age group and the 2011

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[13] 'Resource Allocation for Local Public Health (Final report)', University of Manchester, July 2015

population weights at postcode sector level are provided in the 'Sub misuse services – new (b)' sheet of the Excel workbook. Aggregation to Local Authority and calculation of the weighted populations are shown in the 'Sub misuse services – new (a)' sheet of the Excel workbook.

5. New formula for sexual health services component

5.1   In the current formula the SMR<75 is used as an indicator for need for public health services, including sexual health services. However, the responses to the engagement exercise undertaken in 2012 on the current formula included a strong view from some areas that the SMR<75 was not correlated with the need for sexual health services.

5.2   The University of Manchester were commissioned to develop an utilisation based formula for sexual health services. This involved modelling the use of these treatment services using data on the characteristics of clients, their place of residence and supply variables. Supply variables are included in the model to account for the possibility of supply induced demand, but are not included in the formula for target allocations.

5.3   ACRA recommended that the new models of activity are an improvement on using the SMR<75 plus an age-gender adjustment (as is used in the current formula) and propose using the model from the University of Manchester for sexual health treatment services in the formula for 2016-17. A description of the models developed by the University of Manchester is in the document '*Public health grant: proposed target allocation formula for 2016-17: an engagement on behalf of the Advisory Committee on Resource Allocation (ACRA)'* and full details are in research report from the University of Manchester[14]

5.4   The University of Manchester were not able to include the Isles of Scilly and the City of London in their models due to their small population sizes. They were instead merged with Cornwall and Hackney respectively.

5.5   Local Authorities report expenditure in three categories for sexual health services: 1) STI testing and treatment (mandated service); 2) contraception (mandated services); and 3) advice, prevention and promotion (non-mandated service). ACRA recommended that there are two components in the overall formula for the sexual health services in 2016-17.

- a component covering STI testing and treatment, and contraception, based on the new formula developed by the University of Manchester; and
- a component for advice, prevention and promotion. ACRA felt that the utilisation formula for treatment services would not be an appropriate base for advisory, prevention and promotion services. These services are captured within the non-mandated services component of the current formula based on the SMR<75.

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[14] 'Resource Allocation for Local Public Health (Final report)', University of Manchester, July 2015

Calculating Local Authority level weighted populations

5.6   The researchers supplied predicted costs for each of the seven age-gender groups (0-14, 15-19, 20-24, 25-34, 35-44, 45-64, 65-99) aggregated to Local Authority level. These are multiplied by the 2016 population projection for each age-gender group and normalised i.e. so that the sum of all the Local Authority weighted populations equals the 2016 population for England. The MFF is then applied. This is shown in the sheet 'Sexual health services – new' of the Excel workbook

5.7   This provides Local Authority need based weighted populations for sexual health treatment services. The Isles of Scilly / Cornwall, and the City of London / Hackney have combined weighted populations. These are split into separate Local Authority weighted populations using the proportion of their 2016 population.

6. New component for children aged under 5

6.1   The responsibility for commissioning public health services for children aged under 5 years (commonly referred to as '0-5 children's services') transfers from NHS England to Local Authorities from October 2015. A component for 0-5 children's services to the overall public health formula will first be introduced in 2016-17.

6.2   The document '*Public health grant: proposed target allocation formula for 2016-17: an engagement on behalf of the Advisory Committee on Resource Allocation (ACRA)'* sets out the ACRA's interim recommendations for each of these and the rationale for their recommendations. These are:

- the number of children aged under 5 in each Local Authority, as projected by ONS for 2016-17 (the population base);
- an adjustment for relative need per head of the population base; and
- sparsity - subject to materiality.

6.3   Relative need per head uses the Children in Low Income Families measure at Local Authority level[15], defined as the proportion of under 16-year olds living in families in receipt of out-of-work benefits or tax credits where their income is less than 60% of median UK income. The latest data are currently for 2012, and data for 2013 will be published in September 2015. Children in Low Income Families receive a weight per head 4 times that for children not in Low Income Families.

6.4   There is an adjustment for sparsity for travel time for home visits, estimated from the travelling salesman methodology which has been used to estimate the minimum travel time within small areas (MSOAs) based on the road network rather than distance as the crow flies.

6.5   There are a number of available software packages which include 'travelling salesman' algorithms. Combined with data on the number of children by age in each very small area (ONS Output Areas), a number of assumptions are required to run the 'travelling salesman' model. These include the proportion of time spent in clinics versus home visits, duration of contact time with families, and average speeds for different types of roads.

6.6   Advice from Public Health England on the estimated proportion of home visits to clinic appointments is as set out in Table 3. The average percentage of home visits is 52% and this has been used in the model.

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[15] https://www.gov.uk/government/statistics/personal-tax-credits-children-in-low-income-families-local-measure

Table 3: Health visitors home visits to clinic appointments

	Estimated % at clinic	Estimated % home visits
Ante-natal	50%	50%
New birth visit	0%	100%
6-8 weeks	30%	70%
9 to 15 months	80%	20%
2 - 2.5 years	80%	20%
Average	**48.0%**	**52.0%**

6.7   In the model the contact time with families was set at an average of 60 minutes.

Calculating Local Authority level weighted populations

6.8   The 4 : 1 weights are applied to the Children in Low Income Families measure to create a relative index. The index for each Local Authority is multiplied by their 2016 under 5 population and normalised to the 2016 all age population for England.

6.9   The MFF is then applied to the Local Authority weighted populations and re-normalised to the 2016 population. The health visitor sparsity index (the Local Authority's total time divided by the weighted average total time for England) is then applied and re-normalised.

6.10   These calculations are set out in sheet 'Children under 5 – new' of the Excel workbook and give Local Authority need based weighted populations for children aged under 5 services.

7. Calculating overall weighted populations for proposed 2016-17 formula

7.1   The introduction of the proposed new formula for sexual health treatment services (that are mandated) means that these services have to be removed from the mandated services component of the current formula. The remaining services in the new mandated component of the 2016-17 formula are NHS health check, Child measurement, health protection and public health advice programmes for which the SMR<75, without an age-gender adjustment, is used.

7.2   The proposed public health formula has five separate components:
- new mandated services (see above);
- non-mandated services (the same weighted population as in the updated current formula – see Annex A for details);
- a new substance misuse services formula (see section 4);
- a new sexual health services formula (see section 5);
- new children under 5 services component (see section 6).

7.3   Each of the weighted populations for these five components are combined using relative 2013-14 spend to give an overall weighted population for each Local Authority. These are given in the 'Final 2016-17 wtd pops' sheet of the Excel workbook.

Annex A: Calculating age-gender adjustments in the current formula

A1   In the current formula, there are age-gender adjustments applied to those services with the highest proportion of public health spend which are also directed at specific age-gender groups to weight for relative needs between different age-gender groups

Calculating national age-gender indices

A2   There are six public health service areas in the current formula that have an age-gender adjustment. These are listed in Table A1, alongside the relevant updated sources of data. The table is split by age group as there is limited data available for under 16's.

A3   For four service areas (Nutrition, obesity and physical activity, Alcohol misuse, Smoking, and Drugs misuse) the average weights for the parental age groups for children aged under 5 years are used. Although ACRA recognised that Local Authorities were not formally responsible for this age group in 2013-14 and 2014-15, they fell in line with Marmot's recommendations that account should be taken in the current formula of the very early development years for their future health, influenced by their parents.

A4   Data collected from the evidence base in Table A1 was used to construct national age-gender indices for all six service areas to show how behavioural characteristics vary by age-gender groups. These indices are in Annex B.

Calculating Local Authority level age-gender indices

A5   For each of the six service areas, the relevant national age-gender index is applied to the ONS unweighted population projections by Local Authority, age and gender. This generates six service specific age-gender weighted populations. In updating the current formula, the population projections for 2016 are used[16]

A6   These weighted populations are combined using relative baseline spend estimates as weights, and this is done separately for mandated, non-mandated, drugs misuse and alcohol misuse functions. The current formula with data updates uses spend in 2013-14 for the weights.

A7   The resulting weighted populations for each of the four functions in the current formula are converted into age-gender indices and applied to the relevant weighted populations.

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[16] 2016 Sub National Population Projections (SNPPs) based on the 2011 Census available at: http://www.ons.gov.uk/ons/publications/re-reference-tables.html?edition=tcm%3A77-335242

A8 The mandated and non-mandated age-gender indices and weighted populations are in the sheet 'Age gender adjustments' in the Excel workbook.

Table A1: Service areas for which age-gender adjustments are calculated

Service area	Mandated or non-mandated service areas?	Indicator for those aged 16 and over	Indicator for 5 to 15 year olds (if different)	Indicator for children aged under 5 years
Nutrition, obesity and physical activity	Both	Health Survey for England (HSE) 2013[17] Percentage in each age-gender group who eat fewer than 5 portions of fruit and vegetables per day		Average of the weights for parental age groups (where parental age is taken to be between 16 and 54).
Alcohol misuse	Non-mandated	Health Survey for England (HSE) 2013 Percentage of each age-gender group who engage in binge drinking. Binge drinking is defined as more than 8 units for men and more than 6 units for women in the heaviest drinking day last week.	Percentage of 14-15 year olds who reported they had an alcoholic drink or alcopop in the last 4 weeks. This data is used to calculate a weight for all 5-15 year olds. Note: HSE 2010 data are used for the 5-15 weight. The HSE 2013 child sample size is much lower than in 2010 thereby making the estimate unreliable.	Average of the weights for parental age groups (where parental age is taken to be between 16 and 54)
Smoking	Non-mandated	Health Survey for England (HSE) 2013 The percentage in each age-gender group who are current smokers	Percentage of 14-15 year olds who reported they had either a) smoked in the last week or b) smoked sometimes or c) are often near people who smoke at home. This data is used to calculate a weight for all 5-15 year olds. Note: HSE 2010 data are used for the 5-15 weight. The HSE 2013 child sample size is much lower than in 2010 thereby making the estimate unreliable.	Average of the weights for parental age groups (where parental age is taken to be between 16 and 54)

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[17] http://www.hscic.gov.uk/catalogue/PUB16077

Sexual health	Both	Public Health England (PHE) 2013 rates of diagnoses at Genitourinary Medicine (GUM) clinics for gonorrhoea, syphilis, herpes (first episode only) and warts (first episode only) per 100,000 population for those aged 15 and over, and rates of diagnoses at GUM clinics and in the community for chlamydia per 100,000 population for those aged 15 and over [18] [19]	No weight for age 5-14	No weight for under 5's
Children's 5-19 services	Non-mandated	A weight of one for each member of the population aged 5-19, and zero for all other population age groups. No gender adjustment is applied		No weight for under 5's
Drug misuse[20]	Non-mandated	Public Health England (PHE) – activity data of all treatment activity for drug misuse (2013-14)[21] that was previously funded through the PTB, as a proportion of the age-gender group population[22] This covers ages 12+	Under 12's get the average of the weights for parental age groups (where parental age is assumed between 18 and 54).	

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[18] The STI data used to calculate the sexual health age-gender index are published by Public Health England (PHE) and are available at: https://www.gov.uk/government/statistics/sexually-transmitted-infections-stis-annual-data-tables

[19] The STI rates have been combined, with equal weights, to calculate an overall sexual health age-gender index

[20] Drug misuse here covers all drug misuse services i.e. drug misuse services previously funded through the Pooled Treatment Budget (PTB) and all other drug misuse services.

[21] Drug treatment activity data, used to calculate the drug misuse age-gender index are published by Public Health England and are available at: http://www.nta.nhs.uk/statistics.aspx

[22] Where the population used is ONS 2012 SNPPs available at: http://www.ons.gov.uk/ons/rel/snpp/sub-national-population-projections/2012-based-projections/index.html

Annex B: National age-gender indices

Table B1: Age-gender index for Nutrition, Obesity and Physical Activity services

Fruit and vegetable consumption: proportion of the national population consuming less than 5 portions of fruit and vegetables per day (2013)		
	Male	**Female**
0-4	76.0	73.4
5-15	84.3	82.8
16-24	82.8	81.0
25-34	75.9	74.1
35-44	71.0	67.1
45-54	74.3	71.4
55-64	74.3	70.2
65-74	70.0	68.0
75+	76.3	75.4

Table B2: Age-gender index for Alcohol services

Alcohol consumption: proportion of the national population who engaged in binge drinking on their heaviest drinking day in the last week (2013)		
	> 8 units	**> 6 units**
	Male	**Female**
0-4	24.8	16.4
5-15	31.1	30.5
16-24	27.8	15.9
25-34	25.9	16.3
35-44	22.1	17.2
45-54	23.6	16.1
55-64	19.7	9.8
65-74	11.4	4.7
75+	2.6	1.9

Table B3: Age gender index for Tobacco services

Smoking: % of population who are current smokers (2013)		
	Male	**Female**
0-4	28.7	20.3
5-15	25.2	29.6
16-24	27.5	18.9
25-34	37.4	24.5
35-44	25.1	18.6
45-54	24.6	19.2
55-64	21.4	17.2
65-74	11.7	11.6
75+	7.0	4.9

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Table B4: Age-gender index for Sexual Health services

Sexual Health: Rates of new episodes of selected diagnoses (Gonorrhoea, Syphilis, Anogenital Herpes, Anogenital Warts) per 100,000 of the national population (2013)		
	Male	**Female**
0-4	0	0
5-14	0	0
15-19	1,312	3,588
20-24	3,121	3,810
25-34	1,485	1,055
35-44	512	267
45-54	170	79
55-64	22	5
65+	1,312	3,588

Table B5: Age-gender index for Children aged 5-19 services

Children 5-19		
	Male	**Female**
0-4	0	0
5-19	1	1
20-24	0	0
25-34	0	0
35-44	0	0
45-54	0	0
55-64	0	0
65-74	0	0
75+	0	0

Table B6: Age-gender index for Drugs services

Drugs services: activity as a percentage of the national population (2013-14)		
	Male	**Female**
0-11	0.011	0.004
12-17	0.005	0.003
18-24	0.005	0.002
25-29	0.009	0.004
30-34	0.016	0.006
35-39	0.017	0.006
40-44	0.013	0.004
45-49	0.008	0.002
50-54	0.004	0.001
55-59	0.002	0.001
60+	0.000	0.000