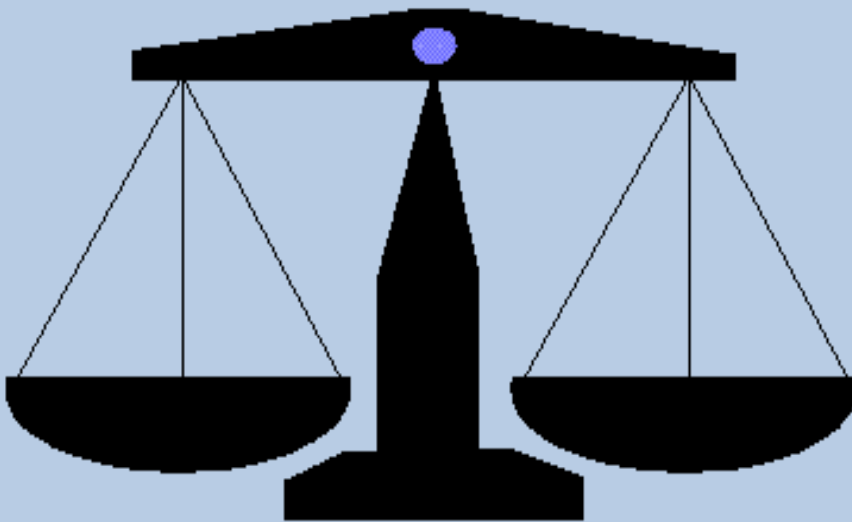




Health and Social  
Care Board

***PROPOSED CHANGES TO THE  
NORTHERN IRELAND WEIGHTED  
CAPITATION FORMULA***

**SIXTH REVIEW**



DECEMBER 2015

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# Chapter 1

## Capitation Formula Overview

### Introduction

- 1.1. The Health & Social Care Board (HSCB) is responsible for the commissioning of Health and Social Care services for the population of Northern Ireland. The HSCB must ensure its funding is targeted on health needs. A complex statistical tool known as the Capitation Formula has been used to assist them in this process since 1994.
- 1.2. Health and Social Care services are commissioned across five Local Commissioning Group (LCG) areas. Each Local Commissioning Groups' fair share of available resources is determined by the formula, based on its population size, age/gender mix and the additional needs profile of the population.
- 1.3. The demands for Health and Social Care are be greater than the resources available. Therefore, the formula cannot guarantee that all Health and Social care needs are met but helps to ensure that all populations have fair access to the resources that exist. The Capitation Formula does not determine the level of investment required at Programme of Care level; rather it provides the equitable distribution of that Programmes' funding by LCG.
- 1.4. Responsibility for the Capitation Formula was delegated to the HSCB by the DHSSPS following the Review of Public Administration (RPA). The formula is maintained and updated by the Capitation Formula Review Group (CFRG). CFRG is a multidisciplinary group with representatives from the Department of Health, Social Services and Public Safety (DHSSPS), the Health and Social Care Board (HSCB) and the Public Health Agency (PHA).

### The Current Formula

- 1.5. The primary purpose of the Capitation Formula is identifying fair shares to inform resource allocation by locality. Each year, additional commissioning investment is identified to LCG through the use of Capitation shares. An equity review is carried out on an annual basis comparing planned and actual expenditure on baseline investments with fair shares, together with an assessment of variances in quality and performance. The formula provides a direction of travel for strategic investment decisions. An overview of the formula is in Appendix 2.

**1.6.** The formula is based on a Programme of Care (PoC) approach. There are nine Programmes of Care as listed below:

- PoC 1 – Acute Services
- PoC 2 – Maternity & Child Health
- PoC 3 – Family & Childcare
- PoC 4 – Older People
- PoC 5 – Mental Health
- PoC 6 – Learning disability
- PoC 7 – Physical & sensory disability
- PoC 8 – Health promotion
- PoC 9 – Primary Health & adult community

Each Programme of Care has an associated formula, most of which comprises of 3 elements:

- Relevant Population - The client group on which PoC is based;
- Age / Gender weighting - Age/gender structure of a population affects its need for Health and Social Care, this is thus compensated for;
- Additional needs weighting - Differential needs for services are likely to be due to socio economic factors e.g. deprivation – The relevant factors are chosen for each PoC.

**1.7.** The Programme of Care formulae are consolidated to produce LCG fair shares. Two cost adjustments are then made to compensate the LCGs for the differing cost of provision of service to their populations.

- Rurality – The additional cost of providing services in rural/urban areas
- Economies of Scale adjustment – The effect of hospital and community infrastructure size has on costs

**1.8.** The result is a formula which establishes the fair share of available resources that each LCG should receive based on relative, not absolute, need. The current population and needs index information for each PoC is attached in Appendix 3.

### **Work Programme**

**1.9.** Since its inception in 1994, in addition to the annual updates of demographic and financial information, CFRG has carried out periodic reviews of the individual elements of the formula. Typically this involves detailed review and update of the underlying utilisation and cost data on which the original model was based or, introducing new modelling approaches to take account of developments in the resource allocation modelling field. Each such review involves significant resource and time input from staff across the HSC. Due to

this, it is only feasible to review a limited number of elements of the formula in any one review. Appendix 2 summarises areas covered in previous reviews.

- 1.10** A work programme was established to update areas of the formula along with a number of other issues to be explored. The following areas were identified for review or investigation:
- Mental Health
  - Rurality
  - Alternative Resource Allocation methodologies
  - Family & Childcare
- 1.11** The Mental Health and Rurality formula were both revised. In addition, a separate review of Alternative Resource Allocation Methodologies in GB was completed and compared to the NI approach.
- 1.12** Initial scoping work identified that there was insufficient data to undertake a detailed update of the Family & Childcare formula in this review. However, in order to prepare for the future update of the Family & Childcare formula, extensive engagement, led by Social Services directorate in the HSCB, took place with Trusts. This process examined the data currently collected and proposed new measures which would facilitate the collection of the data required to allow the update of the formula. Appendix 4 sets out the findings of the Family & Childcare capitation advisory group. This is being taken forward as the next phase of the Capitation Formula review.
- 1.13** The findings of the investigation into Rurality, Mental Health and Alternative Resource Allocation Methodologies are included in the following chapters.
- 1.14** In conjunction with the review of the formula itself, work has been carried out using the formula on a detailed equity analysis. This compares the formula with actual spend and considers issues around quality and access to services across local populations. This is part of a separate process.
- 1.15** In order to progress the work, the Capitation Formula Review Group has been supported by a Technical group providing statistical and financial expertise in the development of the formula. A wide range of contributors from across the Health & Social Care including professional expertise in the development of the Mental Health formula was provided by:
- Bamford Group
  - Performance Management and Service Improvement Directorate (PMSI)
  - Professional leads from Mental Health, HSCB
  - Information & Finance, Trusts

Further assurance has been provided by a collaborative peer reviewer from University of Manchester. The HSCB Senior Management Team reviewed and approved the report.

**1.16** Chapters 5 and 6 provide overall conclusions and summarises areas for consideration in a future work programme.

# Chapter 2

## Review of Rurality Adjustment

### Rurality Overview

- 2.1** The rurality adjustment was introduced to the Capitation Formula as part of the third review, published in 2001. The model is designed to compensate areas for unavoidable costs associated with the unproductive time spent by staff when travelling to clients' homes and the cost of this excess travel. In each area, these costs will depend on the geographical spread of the population, the amount of travel required (both time and distance) and the grades of staff involved in the travel.
- 2.2** The current rurality adjustment redistributes £104m of resources between the five LCGs. CFRG requested that in light of the changing pattern of service delivery, the change in structures since the Review of Public Administration (RPA) and the age of the data on which is the formula is modelled, that the rurality formula would be reviewed.

### Review Methodology

- 2.3** The review of the rurality adjustment took place in a number of stages:
- Review of the existing service types contained in the formula
  - Detailed data collection exercise of services identified as applicable
  - Modelling of data collected
  - Review of the method used to carry forward and uplift the adjustment.

### Review of Existing Services Contained in Formula

- 2.4** Initially the CFRG technical group, in conjunction with the five Health and Social Care Trusts (HSCTs), reviewed the services currently included in the rurality adjustment to establish whether they are still relevant and to identify additional services considered necessary/suitable for inclusion. Based on this review, no additional services are proposed, however a number of services such as those now provided on a regional basis e.g. the Northern Ireland Ambulance Service (NIAS), are no longer included. Removing these services from the adjustment reduces the amount redistributed through rurality to approximately £87m).

### Data Collection Exercise

- 2.5** An extensive data collection exercise was carried out by PMSI in collaboration with the HSCTs, HSCB Finance and Information and Analysis Directorate (IAD) within DHSSPS for the rurality services. The data collected included the age-gender profile of service users and service delivery location information. After a significant quality assurance exercise the final activity datasets were

received by CFRG in June 2014. This dataset contained a significant amount of service delivery information, for example, over 1.1 million district nursing client contacts are included.

- 2.6** For the vast majority of services the HSCTs were able to provide the required data on service users and delivery locations. Where this was not possible, a Northern Ireland average position was used. Information on the staff grade, cost and health service location of those who provided the community services under analysis, was collected by IAD. Based upon the collected activity data and following discussion with the HSCB and HSCTs, it was decided that the Family & Childcare Day Centre service was no longer consistent across NI and that it was no longer suitable for inclusion in this cost adjustment. The exclusion of the Family & Childcare Day Centre service reduced the size of the rurality adjustment from £87m to £82m.

### **Modelling of Data Collected**

- 2.7** The activity information outlined above was used to remodel the visiting professional elements of the rurality adjustment (see below). This remodel followed the methodology of the previous adjustment as closely as possible, with only minor changes made to accommodate updates to the geographies used. It incorporated moving from the legacy four Health and Social Services Board configuration to the current five Local Commissioning Group (LCG) structure and moving from the Census Enumeration District geography to Census Output Area geography. Changes were also made to include an updated population estimate.

- 2.8** The rurality modelling was implemented in a number of stages as outlined below.

1. The model takes the reported levels of service provision to produce average demands per head for each age and gender grouping.
2. The average levels of demand are used along with the census population, to calculate the average expected levels of demand occurring in each of the 5,022 Census Output Areas (COAs) in Northern Ireland.
3. Information on the relevant professionals who can provide this service is used to construct service depots. The information used is the office location and the whole time equivalent number of professionals at each location.
4. The model then evaluates which depots would, in theory, best service each COA.
5. The estimated levels of demand are filled using the nearest depot within the limits of the size of the depot and time constraints of the staff.
6. The model then calculates the travel needed from each depot to service the estimated demand.



7. Both the time spent travelling and the distance travelled are then converted to travel costs using the mileage rates, as well as the average hourly pay rate for the professionals in each area.
8. These travel costs are then summed up across the LCG area and reported as a proportion of the total travel costs for that particular service.
9. These steps are then repeated for each service in turn.

## Review of Method

### Alternative Visiting Professional Method

**2.9** During the process of this review it was determined that the domiciliary care services and community social work services were no longer configured to match this approach, for example in community social work the visiting professionals no longer just visit clients homes they also spend a large amount of their time travelling to other venues such as the courts or family centres to supervise visits. As such it was determined that the above method was not able to suitably reflect the required travel in these services. Consequently it was proposed to examine these services based upon Trust reported travel and subsistence receipts for these services.

**2.10** For this alternative method the following steps were carried out.

1. Collect Trust level travel and Subsistence (T&S) spend service
2. Establish Trust level average travel speeds – to be determined from services already modelled via original method
3. Convert T&S spend into miles travelled
4. Using average speeds developed in stage 2 with miles from stage 3 calculate time spent travelling for each Trust
5. Using staffing information convert time from stage 4 to a staff cost
6. Combine 1 and 5 to produce a rurality cost for each service line for each Trust.

### Result of Remodel

**2.11** The result of this update of the rurality pot and the services now covered is shown in Table 1. The overall pot now reflects the investment in community and PSS services since 2001 and the updated modelled travel cost and travel time of these services. This is based on the activity data provided by individual Trusts and staffing information provided by DHSSPS.

Table 1: Revised rurality pot (excludes Ambulance)

Service	Rurality Pot £
District Nursing	5,115,797
Community Psychiatric Nursing	1,160,376
Health Visiting	2,670,941
Podiatry	558,769
Occupational Therapy	1,581,277
Community Midwifery	2,091,365
Community Social Work <sup>1</sup>	9,271,410
Physiotherapy	664,693
Speech Therapy	467,935
Learning Disability Nursing	509,650
Community Dentistry, Med. Services & Specialist Nurs	2,328,842
Domiciliary Services <sup>1</sup>	17,320,870
Mental Health Day Centres	1,890,914
Learning Disability Day Centres	2,971,436
<b>Total Rurality Pot</b>	<b>48,604,275</b>

\*Figures may not sum due to rounding<sup>1</sup>

**2.12** The reduction from the total rurality pot identified in the previous review is a combination of:

- Changes to the provision of services e.g. the regionalisation of ambulance services
- Changes in the pattern of service provision and staff base locations since the prior review
- The actual travel costs as identified in the updated model being less than projected in the existing model method of annual uplift

## Rurality Shares

**2.13** The Rurality shares for each LCG are shown in Table 2.

Table 2: Shares resulting from remodelled services

	Local Commissioning Group					
	Belfast	Northem	South Eastern	Southern	Western	Total
<b>Rurality Shares</b>	12.07%	26.14%	14.90%	26.79%	20.09%	100.00%

<sup>1</sup> Domiciliary Services and Community Social Work are now modelled directly, based upon reported levels of travel and subsistence by the HSC Trusts.

## Method for Annual Uplift of Formula

- 2.14** How the quantum of resources redistributed by the rurality adjustment is updated each year has also been considered in this review.
- 2.15** The approach to the annual lift was to increase the total rurality pot in line with the annual increase in investment of the services with a rurality component.
- 2.16** This method of uplift was originally established based upon recommendations of the external researchers<sup>2</sup> who produced the original model. However, it is has been determined that this approach is no longer appropriate in the current economic climate with a change in the pattern of travel.
- 2.17** The detailed analysis of the current position shows that all elements of the rurality costs are not increasing at the same rate. The staff travel cost component of the total rurality pot has increased at a lower rate than the overall investment in the services.
- 2.18** More regular update of the rurality formula in future CFRG work programme could help address material variations between projected and actual rurality costs in the future.
- 2.19** Rurality shares reflect population density as expected. The revised shares vary only from an increase of 4.4% to a reduction of 2.45%. The method of uplifting the formula in the past artificially inflated the overall pot for rurality as travel element of professional time has not increased in line with the overall investment in the service. Therefore it is crucial that the rurality formula is regularly updated with a maximum of a five year period between reviews.
- 2.20** Investment in the community based services contained in the rurality formula has increased since the last review as expected. At the same time, the travel cost element has not increased at the same rate. This is due to a combination of greater use of clinics, reorganisation of staff bases following RPA and a constrained travel reimbursement policy.

## Conclusion

- 2.21** The proposed new formula offers an improved rurality adjustment to the Capitation Formula. The updated activity data is a more accurate reflection of current community service delivery across LCGs, reflecting service

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<sup>2</sup> Research into the effect of rurality on the Capitation Formula for health and social services in Northern Ireland - PricewaterhouseCoopers - September 1998

investments since the current formula was developed and changes to travel patterns.

- 2.22** Overall results are still in line with population density and reflect detailed analysis of cost and activity provided by both the Trusts and DHSSPS for each of the relevant community and personal social service areas.
- 2.23** It is recommended that the new shares are incorporated in the Capitation Formula from 2016/17 and used in future equity reviews.
- 2.24** It is also recommended that going forward the time between the reviews of this adjustment should be reduced in light of, both the current Transforming Your Care agenda, and the potential for changes in distributions of resources as these services are changed, no more than five years between any future reviews.

# Chapter 3

## Review of Mental Health Formula

### Mental Health Overview

- 3.1** The Mental Health formula comprises all personal social and community services where the primary reason for the service is due to Mental illness as well as activity relating to a hospital inpatient episode where the consultant is a specialist in one of the following areas:
- Mental Illness
  - Child & Adolescent psychiatry
  - Forensic psychiatry
  - Psychotherapy
- 3.2** The current formula was produced for the Fourth Report which had needs drivers taken from 1991 population census. The utilisation data dates back to 1997/98 and was provided by Trusts in the former Eastern, Northern and Western Board areas, with none available from the Southern area.
- 3.3** The current planned expenditure on the Mental Health PoC is circa 7.6% of the total Health and Social Care Board (HSCB) expenditure (excluding expenditure on capital charges and medical negligence).

### Review of the Formula

- 3.4** The following section discusses this current review of the formula, the approach taken and the information used. This extensive exercise has been carried out to consider the form of a new model for the allocation of Mental Health resources and has included a number of approaches.
- Informed Model Approach.  
*The opinion of a relevant group of professionals was sought to identify what variables they felt explained the need for Mental Health services. Statistical modelling, based upon their suggested variables, was carried out.*
  - Full set of needs variables.  
*The Statistical modelling approach was based on modelling a large selection of all available variables from sources such as the 2011 Census.*
  - Needs variables with Outliers removed.  
*Investigation around the activity data to include as the basis of this modelling exercise has also been performed.*

The models resulting from these investigations will be discussed in the remainder of this chapter.

### Activity Data Collection

**3.5** The activity data which was collected relates to the 2012/2013 financial year and comprises both hospital and community based Mental Health activity. Separate data collections were carried out with a view to producing two distinct models, one for each activity setting i.e. hospital and community. However, initial investigations ruled out the development of distinct hospital and community models as the five Health and Social Care Trusts (HSCTs) were at differing stages of resettling patients between long stay hospital and community settings.

**3.6** Community data was collected via Performance Management and Service Improvement Directorate (PMSID) from each HSCT and the majority of acute data was collected directly from the BSO Data Warehouse. Activity for the Beechcroft facility was provided directly from the Belfast HSCT.

### Costing Approach

**3.7** Mental Health activity data was costed by the Financial Planning and Performance section within the HSCB Finance Directorate. The Northern Ireland average direct costs from both hospital specialty and community indicators were applied to the reported activity at patient level for the 2012/13 year. The direct cost only was chosen to ensure that the costed activity solely reflected the use of Mental Health services, not differing infrastructure or overheads across HSCTs. The costed data also allowed estimates of how much of the Trust Financial Return (TFR) recorded spend was actually collected via activity data in this exercise.

### Hospital Data - Activity Profile

**3.8** Information was collected on a total of 243,855 bed days during 2012/13 as presented in the charts below, illustrating the distribution of activity by age and Trust area of residence. (Within this data 3.6% of the records did not have accurate post code information). Figure 2 shows the bed days by age band and Trust of residence. This shows the lower levels of hospital activity in the younger age bands i.e. there is no hospital activity recorded for any individual under 15. This pattern was verified (and expected) by the Mental Health professionals on the working group. The chart also shows a peak in activity as measured by bed days in the 50-54 age band, indicating a likely higher prevalence of Mental Health conditions in this age band.

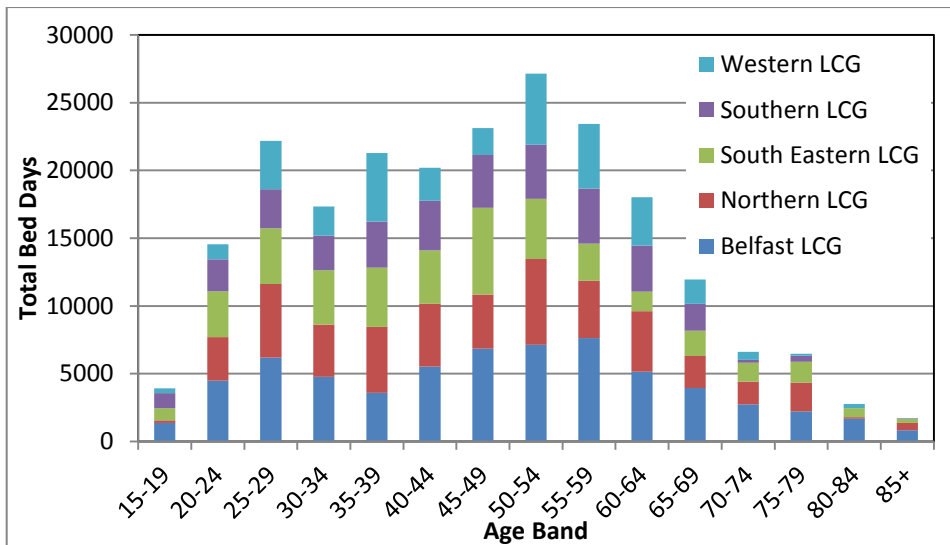


Figure 2 Bed days by Trust of Residence

### Community Data – Activity Profile

**3.9** Community information, covering over 360,000 incidences of contact with a Mental Health professional, was collected as a combination of contacts and hours delivered. These were costed to combine these different currencies of activity. The costs distributed by age and Trust are shown in the Figure 3 below, again reported by Trust of residence. For this community data 1.1% of the recorded costs had no associated postcode information.

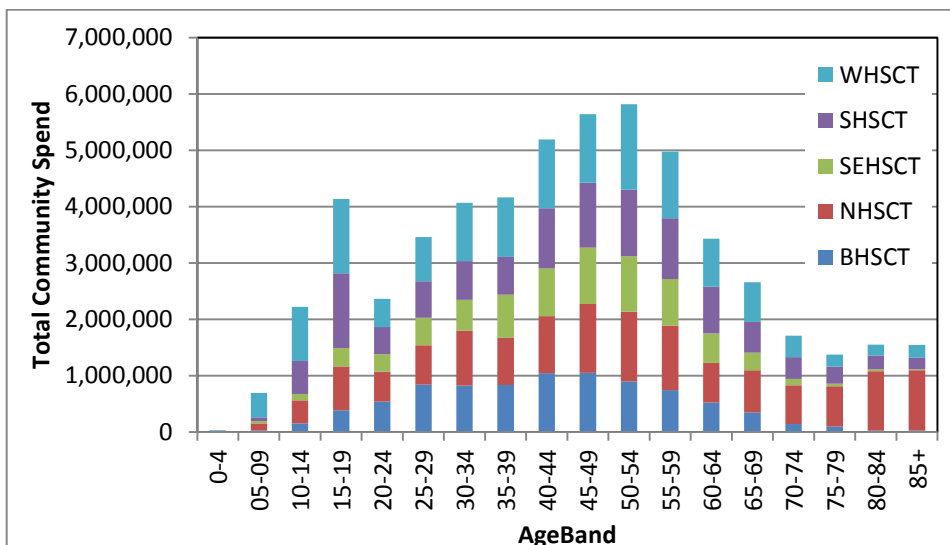


Figure 3 Cost of community services by age band and Trust of residence

**3.10** A peak in activity in the 50-54 age band is apparent, while the Northern Trust area is expending significantly more resources than any other Trust in the elderly age bands. Upon investigation this additional spend is due to the supported accommodation costs of a small number of high cost individuals.

### Costed Activity Data – Hospital and Community

**3.11** The purpose of collecting the hospital and community activity data separately was with a view to producing two separate models of the services. However

upon initial investigation and consideration of the activity data it was clear that there are very different patterns of utilisation within the hospital and community services in the different HSCT areas, as shown in Table 3 below. This did not allow the development of 2 separate models.

**Table 3 Total cost by HSCT of residence**

Trust of residence	Hospital Activity Costs(direct)		Community Activity Costs(direct)	
	£	%	£	%
Belfast	£13,443,091	26.9%	£8,537,512	15.3%
Northern	£10,660,284	21.4%	£13,958,117	25.0%
South Eastern	£9,204,089	18.4%	£7,315,139	13.1%
Southern	£7,165,042	14.4%	£11,463,649	20.5%
Western	£6,520,808	13.1%	£13,814,585	24.7%
Unknown	£2,923,506	5.9%	£776,417	1.4%
Northern Ireland	£49,916,821	100%	£55,865,420	100%

**3.12** The Belfast and Western HSCTs are a clear example of this, where instead of having comparable levels of use within the hospital and community settings each are at opposite extremes of percentage of use for each area. Belfast is the highest user of hospital services and the lowest user of community services. Conversely, the Western is the lowest user of hospital and almost the highest user of community services. This suggests it is likely that the different Trusts are at different stages of development of their Mental Health services with some clearly further down the road of developing their community services<sup>3</sup>. Thus in the context of developing separate community and hospital models it would seem unlikely that this data would be adequate to explain differences in activity as to exclude hospital or community services from one Trust or the other would have differing consequences for each.

**3.13** When discussed with the advisory group it was confirmed that, in the time frame for which the activity data was collected, there were likely to be Trusts at different stages of their progression towards the current Bamford and Transforming Your Care<sup>4</sup> (TYC) recommended configurations. Additionally, it was also discussed that there is also likely to be an element of service substitution between hospital and community services in the different Trusts, where there are greater or lesser distances to regional specialist services.

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<sup>3</sup> There has been a historical preference for Mental Health services to be delivered via acute care; however, the Bamford review and the TYC programme have actively encouraged the trusts to move these services to a community setting.

<sup>4</sup> For more information on TYC see: <http://www.dhsspsni.gov.uk/index/tyc.htm>



- 3.14 As a consequence of the differing Trust services delivery configurations and the observed differences in the utilisation data it was decided to develop a single Mental Health model based upon the combined hospital and community activity data.
- 3.15 The costed activity can be used along with the resident population of Northern Ireland (as estimated by the 2011 census) to calculate relative population weighted average costs for each gender and age band, which is shown for the combined hospital and community activity in Figure 4 below.

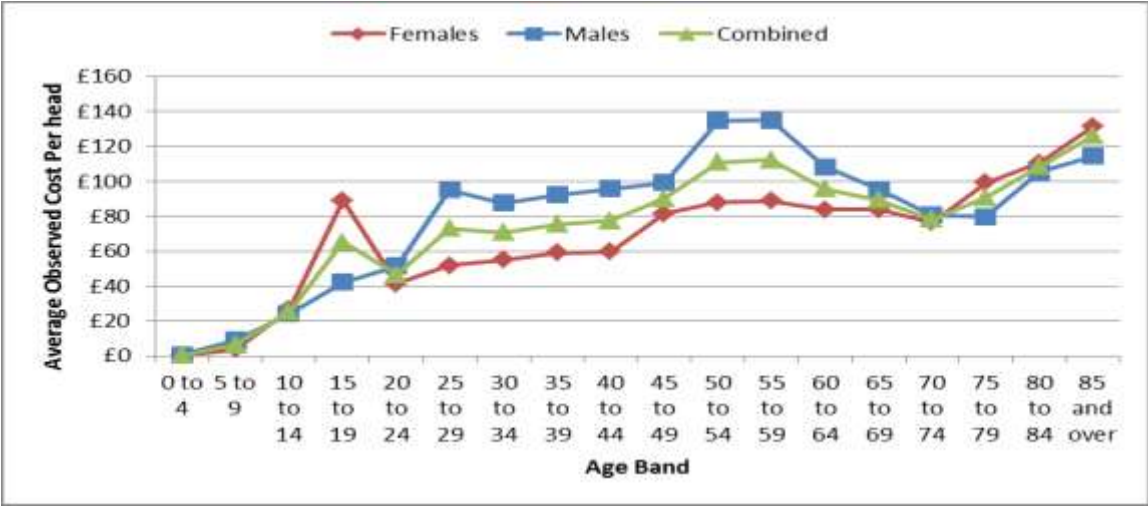


Figure 4 Age cost curve for Mental Health activity in Northern Ireland

- 3.16 On average the male population appears to be using more services compared to the female population. In fact on only four occasions within the 18 age bands (15-19, 75-79, 80-84 and 85+) are females using more resources on average. Male activity per head peaks in the 50-59 age range while amongst females the maximum cost per head occurs in the 85+ age range.

**Modelling Approach**

**Methodology**

- 3.17 Initial work determined that the most appropriate model form was a two-stage additive model, thus this results section only discusses the models developed using this approach. The two-stage approach uses age-sex weights to compute a standardised dependent variable, and then computes an additional needs index. For the first stage, the dependent variable will be computed as an indirectly standardised ratio of the actual to expected costs of all the relevant types of activity in each Super Output Area (SOA).
- 3.18 The expected values are based on national age/sex curves and the SOA population breakdowns taken from the 2011 Census. The additional needs

indices are then derived from the results of regression analysis, based on these dependents after allowing for the effects of policy and supply.

**3.19** The technical group and the peer reviewer considered the statistical results against a number of statistical criteria e.g. Adjusted R<sup>2</sup> score. The professional advisers also considered whether the results reflected professional expectations on the patterns and drivers for need of Mental Health services.

### **Informed Model Development**

**3.20** The peer reviewer recommended that a model informed by practitioners should be considered as a starting point for model development – based upon what they see as drivers for Mental Health need. Consequently the views of the HSC Bamford group were sought concerning the likely drivers of Mental Health needs in Northern Ireland. The initial suggestions from this survey of the group are included in the next section of this report.

### **Full Models**

**3.21** Development of the initial informed model is followed up with model development using the full range of collected potential needs variables, as described below.

### **Modelling Variables**

**3.22** This section discusses the socio-economic variables used to attempt to explain the variation of additional need as well as those chosen to explain the variation in utilisation due to supply.

### **Socio Economic Variables – Needs**

**3.23** The variables considered as potential needs variables were chosen based upon them being readily available, up to date and available at Super Output Area (SOA) level. They and their sources are collected under the following headings:

- Geographical information;
- Vital Statistics;
- 2011 Census Outputs;
- Northern Ireland Index of Deprivation;
- Administrative data – e.g. Benefits Data.

### **Supply Variables**

**3.24** It is known that for some services good accessibility can create higher levels of demand for the same level of need, and likewise, poorly supplied areas may have lower than expected utilisation. Therefore, it is important to consider the effect of differential historic levels of supply and to neutralise this effect as far

as possible so that resources are allocated equitably on the basis of need alone.

**3.25** The variables considered here were constructed using:

$(\text{Capacity of the facility}) / (\text{distance to the facility})^2$ , for all service providers.

Supply variables were created using the distance from each SOA centroid to the service, and those considered were:

- Distance to nearest Mental Health day care facility;
- Distance to nearest acute Mental Health facility;
- Distance to nearest GP.

Two further variables indicating whether or not there was either Supported living, or a Mental Inpatient health facility within the SOA were also included.

### **Policy - Geography Dummy Variables**

**3.26** Dummy variables are used in the modelling as a way of controlling for supply effects that will not be corrected by the supply variables, such as differences between LCGs or Trusts in their policies or in their implementation of specific initiatives. For acute activity, such area-effects exist at LCG level and may interact with hospital-provider effects. We try to control for high level commissioning effects by using LCG dummies in this analysis. There is of course always the possibility that the variations between LCGs or Trusts in policies or in implementation are associated with one or more needs variables and it is therefore seen as important to check the possible extent of this dilution of the effects of the needs variables.

## **Results of Modelling**

### **Informed Model Approach**

**3.27** This model was constructed with a set of needs variables as suggested by the Bamford group. The resultant model from this exercise has an Adjusted R<sup>2</sup> of 0.455. Adjusted R<sup>2</sup> is the measure of the statistical fit used in modelling. An Adjusted R<sup>2</sup> of 0.455 means that 45.5% of the need is explained by the model. It was constructed using all of the activity data, and the model development is shown below with each step representing the inclusion of an additional set of variables which are numbered as:

Model 1. Includes only policy effects.

Model 2. Includes policy and supply effects.

Model 3. Includes policy, supply and needs effects.

**Table 4: Informed Model Development Summary**

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.115	.013	.009	1.16130
2	.646	.418	.412	.89472
3	.680	.463	.455	.86076

**3.28** From table 4, it is clear that the supply variables are providing a significant amount of the explanatory power. As shown in Table 5 there are only three needs variables entering the model, while there are five supply variables included. The considerable influence of the supply variables is potentially an issue within this model. However, if chosen, when it is applied the effect of the policy and supply variables are sterilised out with only the needs variables left in for the allocation of resources.

**Table 5: Informed Model - Variables and Coefficients**

	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	-.056	.172		-.327	.744
Belfast	-.094	.096	-.032	-.985	.325
South Eastern	-.206	.089	-.070	-2.315	.021
Southern	-.241	.092	-.082	-2.632	.009
Western	.039	.096	.012	.404	.686
Supported Living present in area	1.852	.123	.397	15.118	.000
MH hospital present in area	2.856	.222	.325	12.844	.000
supported supply (dist)	.020	.005	.111	3.795	.000
GP Supply 2	.001	.002	.018	.549	.583
GP Supply 1	.014	.017	.022	.831	.406
Highest level of qualification: Other qualifications: Aged 16+ years (%)	.071	.020	.106	3.502	.000
proportion 16+ claiming IS	.048	.007	.201	7.023	.000
Rented from: Private landlord or letting agency (%)	.011	.004	.079	2.621	.009

**Approach Using Full Set of Needs Variables**

**3.29** This model has been developed with the same activity dataset as the Informed model above. However, this model was developed with a much larger set of potential needs variables. The development of this model is again presented in steps showing the influence of the different sets of variables.

**Table 6 : Full Model Development Summary**

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.115	.013	.009	1.16130
2	.646	.418	.412	.89472
3	.702	.492	.482	.83933

**3.30** As with the informed model, Table 6 shows the supply variables appear to have the most influence on the explanatory power of the model. In this case,

the needs variables appear to be adding only a little extra to the adjusted R<sup>2</sup> of the model, contributing 0.07. The variables and coefficients of the Full model are set out in Table 7.

**Table 7: Full Model - Variables and Coefficients**

	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	-.333	.302		-1.100	.271
Belfast	-.103	.105	-.035	-.981	.327
South Eastern	-.176	.089	-.059	-1.977	.048
Southern	-.241	.092	-.082	-2.628	.009
Western	-.040	.095	-.013	-.422	.673
Supported Living present in area	1.786	.120	.383	14.821	.000
MH hospital present in area	2.839	.219	.323	12.975	.000
supported supply (dist)	.016	.005	.090	3.145	.002
GP Supply 2	.001	.002	.025	.789	.430
GP Supply 1	.013	.017	.020	.778	.437
Economically inactive: Long-term sick or disabled: Aged 16-74 years (%)	.098	.014	.331	6.905	.000
Highest level of qualification: Other qualifications: Aged 16+ years (%)	.087	.019	.130	4.569	.000
Births 2009-2012	-.001	.000	-.075	-2.877	.004
Provides 20+ hours unpaid care per week	-.095	.037	-.101	-2.585	.010
Living rent free: HRP aged 65+ years	.031	.013	.067	2.357	.019
Full-time students: Aged 18-74 years:	.021	.007	.080	3.024	.003
Economically active: Unemployed (%)					
NS-SeC: 1.2 Higher professional occupations: Aged 16-74 years (%)	.030	.012	.100	2.580	.010
Private rented: HRP aged 65+ years	.018	.007	.069	2.659	.008

**3.31** At this stage both models developed have an adjusted R<sup>2</sup> approaching 0.50 which is at a comparable level to the current Mental Health model. However, these models appear to be strongly driven by the supply variables within them. In an effort to reduce the influence of these supply variables two approaches were considered.

1. Top slice the activity attributed to selected individuals in acute care along with those who appear to have been resettled into supported living/residential care.
2. Consider outliers within the activity data i.e. remove activity for selected SOAs where it appears to be extreme and unusual.

### Top Slice Approach

**3.32** The developed top slice models are not discussed here as the technical group felt that the implementation and maintenance of this approach posed more long term issues when compared to the outlier removal approach. After initial modelling and investigations the approach using the removal of outliers was adopted.

## Outliers Removal

**3.33** The extreme high outlying SOAs were removed from the model in order to consider the supply effect and to improve the contribution of the needs variables. To do this, the effect on the model fit (Adj R<sup>2</sup>) of removing outliers was considered. The initial two stage additive model was re-estimated with a varying number of the high outlying SOAs removed from the dataset. These investigations showed that, the initial effect of removing SOAs was to increase the Adj R<sup>2</sup> of the model. This effect peaked when four SOAs were removed (0.45% of all SOAs). As further SOAs were removed, the Adj R<sup>2</sup> of the model fell. However, it was observed that as the Adj R<sup>2</sup> of the model fell, the Adj R<sup>2</sup> of models based only on needs variables increased, peaking when 35 outlier SOAs were removed. This can be seen in table 8.

**Table 8: Outlier Model Development Summary**

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.607 <sup>a</sup>	.368	.364	.45183
2	.611 <sup>b</sup>	.373	.366	.45104
3	.660 <sup>c</sup>	.435	.425	.42942

**3.34** Considering these options and the relative contributions of needs and supply variables in the different scenarios, it was recommended that most could be potentially gained by removing 35 SOAs from the dataset.

## Remodelling Selected Data with 35 SOA Outliers Removed

**3.35** When this reduced dataset was considered, the model shown in Table 9 was produced. This model has a slightly reduced Adj R<sup>2</sup> compared to the informed model. However, this model is much less dependent upon the supply variables.

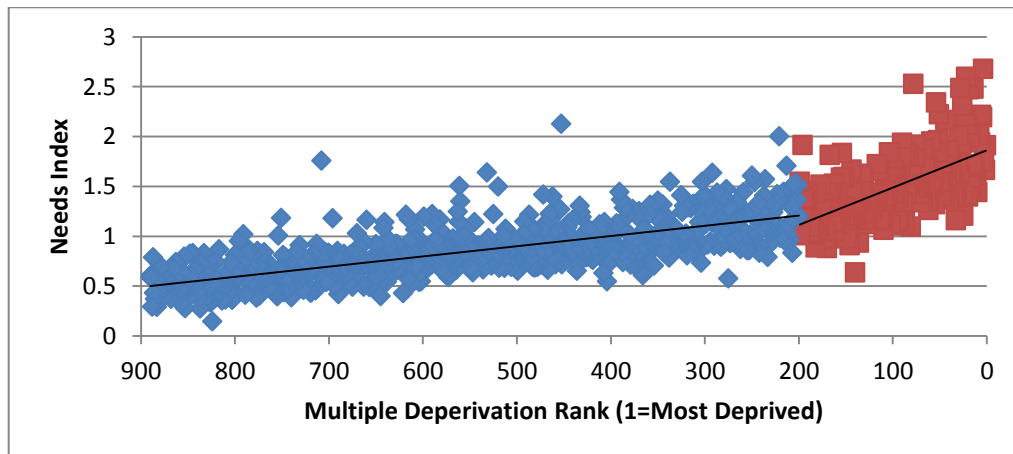
**3.36** To quantify the needs/supply effect within the model, the sum of the absolute standardised coefficients (Beta) of the groups of variables was compared. The needs variables displayed an absolute Beta of 0.831 (58% of total model Beta). The supply and policy variables had a combined absolute Beta of 0.600 (42%), indicating that the needs variables contributed more than the policy and supply variables in regards explaining the observed variation of the dataset. For the total model, these values were 0.954 (48%) for needs and 1.030 (52%) for supply and policy, this indicates that when the 35 SOAs are removed the needs variables have a much stronger influence on the model compared to the policy and supply variables as shown in Table 9.

**Table 9 Model Needs Variables with Outliers Removed - 35 SOAs removed**

	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	.024	.096		.245	.807
Belfast	-.127	.053	-.088	-2.400	.017
South Eastern	-.064	.047	-.045	-1.363	.173
Southern	-.066	.047	-.046	-1.415	.157
Western	.027	.050	.018	.543	.587
Supported Living present in area	.684	.077	.241	8.857	.000
GP Supply 2	-.001	.001	-.041	-1.191	.234
supported supply (dist)	.005	.003	.050	1.607	.108
inpatient supply (dist)	.015	.008	.051	1.807	.071
GP Supply 1	.007	.009	.021	.758	.449
Alcohol and Drug Related Admissions	.001	.000	.104	2.319	.021
Living rent free: HRP aged 65+ years	.029	.007	.128	4.234	.000
Unshared dwelling: Flat, maisonette or apartment: Total	.011	.003	.132	3.375	.001
Economically inactive: Long-term sick or disabled: Aged 16-74 years (%)	.040	.006	.279	6.650	.000
Emergency Admissions: 65+yrs	.002	.001	.084	2.963	.003
Rented from: Private landlord or letting agency (%)	.007	.002	.105	3.131	.002

**Shortfall - Unmet Need Test**

**3.37** A final stage of model testing specified to be included in CFRG model development, is the test for unmet need test (this is discussed in appendices). With this technique, the result of the model (the needs indices) is tested against a recognised measure of deprivation (in this case the multiple deprivation measure). This is with a view towards seeing if there is any shortfall or evidence of unmet need in the most deprived areas. This test is illustrated in the figure 5 below. From this figure it can be seen that the needs index increases more rapidly in the deprived areas. An approximate line of fit is included for each region for ease of observation. This super linear increase in the most deprived areas indicates that there is no evidence of shortfall in these areas and thus that unmet need does not appear to be a problem within this model.



**Figure 5 Shortfall test on revised Mental Health model 200 most deprived areas have been highlighted red.**

## Conclusion

- 3.38** The significant reform and modernisation of services in this area in recent years is better reflected through the use of more up to date costing and activity data. New models have been developed with data coverage from all geographies as opposed to the current model which excluded the legacy Southern Board area. The views of Mental Health professionals, including the Bamford Group, were sought during development to ensure the approach and results were in line with professional expectations in this area.
- 3.39** During this research a significant number of different models have been developed via a number of different approaches. Three options were shown in this paper, these were the informed model (1), the full model (2) and the outliers removed model (3). Each of the 3 models represents an improvement on the current model used for Mental Health.
- 3.40** However, it is recommended that the model with the outliers removed is taken forward for new Mental Health allocations. This model incorporates six needs variables which is typical of the other models currently used within the Capitation Formula. The Adjusted R<sup>2</sup> of this model is 0.425 and this is at an acceptable level in the context of resource allocation models. It is possible to produce models with better Adjusted R<sup>2</sup> statistics, however these model are more significantly driven by their incorporated supply variables and more difficult to explain.
- 3.41** **Following this review of the Mental Health formula, it is recommended that the model ‘needs variables with the outliers removed’ (Table 9) is incorporated in the 2016/17 formula.**



# Chapter 4

## Alternative resource allocation methodologies

### Introduction

**4.1** In Northern Ireland a weighted Capitation Formula is used to allocate resources for Health and Social Care. CFRG were asked to compare and contrast the different methodologies for resource allocation in other parts of the UK. This was to assess the continued relevance of the formula used in NI and any potential evidence based improvements in the approach used.

### Northern Ireland

**4.2** The HSCB and PHA receive circa £4.2bn resources annually, of which circa £3.5bn is covered by the Capitation Formula. Family Health Services, including General medical services, is excluded as it has its own formulae.

### Build-up of Formula

**4.3** The Northern Ireland formula is built up from a formula for each of the 9 programmes of care. Each of these has a separate allocation formula with a relevant population base, age, gender and needs adjustment. The majority of these formulae are based on small area modelling, in which utilisation data has been taken as a proxy for health need.

### Population

**4.4** In the Northern Ireland weighted Capitation Formula, the population currently used for all PoCs is the civilian mid-year estimate (MYE) of population which is produced annually by the Northern Ireland Statistics and Research Agency (NISRA). The only adjustment made to the MYE for the Capitation Formula, is the inclusion of cross border workers in the population of the relevant Local Commissioning Group.

**4.5** An appropriate sub-set of the civilian MYE population is used for each PoC; for example all persons aged 65+ in respect of the Elderly PoC. An age/gender weighting and additional need weighting are then applied to the relevant population. The age/gender and additional needs weighted populations in each PoC are then combined in order to produce a single composite weighted population share for each LCG.

### Adjustments

**4.6** Within the Northern Ireland formula there are currently two adjustments in place, these are the rurality and the economies of scale adjustments, which are discussed below.

## Rurality

**4.7** The rurality adjustment was introduced as part of the third review to the Capitation Formula, to adjust for 'Rural Cost', which is the additional cost of providing Health and Social Care to rural communities. The adjustment was derived using the Simplified Modelling of Spatial Systems (SMOSS) model to analyse the travelling behaviour of NI Health and Social Care professionals across a wide range of services and also of the NI Emergency Ambulance and Passenger Transport Services. The SMOSS model was developed for use in Northern Ireland by Tony Hindle, University of Lancaster in 2003, it uses a set of mathematical algorithms to estimate the optimum travelling time between different locations.

## Economies of Scale

**4.8** The economies of scale (EOS) adjustment was introduced in the Fourth review of the Capitation Formula with a view to compensating the then HSS Boards for the EoS costs associated with meeting a given level of demand in their area. The EoS adjustment is based on the Delivering Better Services (DBS) model which identifies the best strategic locations for hospitals as planned for through Departmental policy, and a similar model for delivery of community services. The SMOSS methods used in calculating the rurality adjustment were also used in calculating the EoS adjustment.

## Distance from Target

**4.9** A separate paper has been prepared setting out the current equity position in Northern Ireland.

The structure of the Capitation Formula is shown in figure 6 below.

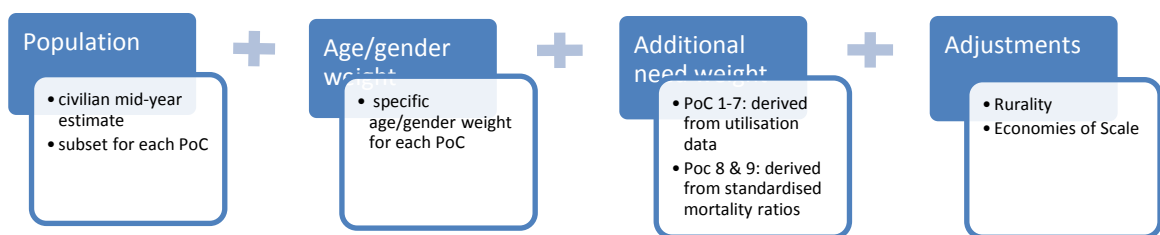


Figure 6 Structure of the Northern Ireland weighted Capitation Formula

## England

### Introduction

**4.10** Currently in England the Department of Health allocates recurrent revenue funding to Clinical Commissioning Groups and Area Teams (CCA). A weighted Capitation Formula determines each CCA's target share of available resources, to enable them to commission similar levels of health services for

populations in similar need, and to reduce avoidable health inequalities. The Department of Health has used a weighted Capitation Formula since 1977-78 to determine target shares of available revenue resources for NHS areas.

**4.11** The NHS England Board meeting on 17 December 2013 agreed 2014-15 and indicative 2015-16 programme allocations to Clinical Commissioning Groups (CCGs) and, for primary care, to NHS England Area Teams (ATs). The agreed allocations reflect the work of the fundamental review of allocations commissioned by the NHS England Board in December 2012. There are currently 3 streams. A short overview of these streams is included below:

- 2014-15 and indicative 2015-16 recurrent programme allocations to Clinical Commissioning Groups;
- 2014-15 and indicative 2015-16 primary care revenue allocations to Area Teams;
- Funding for the 2015-16 Better Care Fund.

There were four steps in the calculation of actual recurrent allocations to CCGs and primary care allocations to ATs, once the national budgets had been set:

- Determine target allocations based on relative need;
- Establish baselines (the previous year's allocations);
- Calculate opening distances from target (baseline minus target);
- Determine pace of change policy, that is how far CCGs/ATs are moved closer to their target allocation within the year through differential growth. Pace of change policy balances providing stability in funding for all organisations with moving those furthest under target closer towards their target.

**4.12** Target allocations are based on the weighted Capitation Formulae recommended by the independent Advisory Committee on Resource Allocation (ACRA). A weighted population is calculated for each CCG. Each CCG's monetary target allocation is calculated by multiplying the CCG's share of the total weighted population for England by the national budget for CCG allocations. The calculation of monetary target allocations for ATs follows the same approach.

#### ACRA

**4.13** ACRA is an independent committee of NHS managers, GPs, academics, public health experts and local authority representatives<sup>5</sup>, with a wide range of

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<sup>5</sup> Lists of ACRA and TAG members are available at <http://www.dh.gov.uk/en/Managingyourorganisation/Financeandplanning/Allocations/index.htm>

expertise from within, and outside, the NHS. ACRA is supported by a Technical Advisory Group (TAG). Each of these groups meets every 2 to 3 months.

### Current Formula

**4.14** The current formulae recommended by ACRA builds on the former formula for PCTs and on the former practice based commissioning toolkit<sup>6</sup>.

The weighted population for each CCG is based on:

- the size of each CCG's population;
- a weight, or adjustment, for need for health care services related to age (all else being equal, areas with older populations have a higher need per head);
- a weight, or adjustment for need over and above that due to age (all else being equal, areas with poorer health have a higher need per head);
- a weight, or adjustment, for 'unmet' need and health inequalities;
- a weight, or adjustment, for unavoidable differences in costs due to location alone (higher unit staff, land and building costs) and the higher cost of providing emergency ambulance services in sparsely populated areas.

**4.15** The weighted Capitation Formula estimates the need of each CCG's population relative to other CCGs and is also known as the fair shares formula. It does not seek to measure an absolute level of need for each area, only relative need between areas.

**4.16** As the need for different types of health services varies, there are separate formulae for general and Acute, Mental Health, Maternity & Child Health and prescribing. These are combined to form the overall need weighted Capitation Formula for CCGs.

**4.17** The weighted Capitation Formula for primary care allocations follows the same principles as that for CCG allocations. There has not previously been a primary care formula covering primary medical care, dentistry and pharmaceutical services, and ACRA viewed the primary care formula recommended as the best available presently but requiring further work for future allocation rounds.

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<sup>6</sup> This is current formula is described fully in at <http://www.england.nhs.uk/wp-content/uploads/2014/03/tech-guide-rev-allocs.pdf>

- 4.18** The populations used in the formula are the registered lists of all GP practice members of each CCG. For the NHS in England, the current allocation formula is made up of three components:
- Hospital and Community Health Services (HCHS) – by far the largest component, accounting for 79% of the formula
  - Prescribing (the cost of drugs prescribed by GPs)
  - Primary medical services.
- 4.19** Each component has adjustments for age related need, and additional need over and above that related to age. The HCHS and primary care components also have an adjustment for unavoidable costs. The prescribing component has no avoidable costs adjustment due to the lack of geographical variation in the price of drugs. In addition, within HCHS there are separate age and additional need adjustments for Acute services, Maternity & Child Health and Mental Health, and a separate adjustment for HIV/AIDS. While these adjustments necessarily differ in detail for each component, they are based on the same common principles.

#### **Hospital and Community Health Services**

- 4.20** There are three steps in calculating HCHS weighted populations. The first is to weight or adjust registered populations for need, the second is to weight or adjust for unavoidable costs due to location, and the third is to adjust for unmet need/health inequalities.
- 4.21** The basic approach in calculating need weighted populations is to multiply the population for each age-sex group for each GP practice by the relative need per head estimated by academic researchers. The products for each age-sex group are summed to give the relative need weighted population for each GP practice. The weighted populations for GP practices are summed to give the relative need weighted populations for each CCG.
- 4.22** The approach for weighting for unmet need is based on the standardised mortality ratio for those under 75 years of age (SMR<75), applied at small area level to take account of inequality in health outcomes within, as well, as between CCGs.
- 4.23** The two adjustments for unavoidable costs due to location are the market forces factor and the emergency ambulance cost adjustment (EACA) are then added at CCG level. The SMR<75 weighted population combined with the need and unavoidable cost weighted population gives the relative overall weighted population for each CCG.

**4.24** Within HCHS, need per head differs for general and Acute, Mental Health and Maternity & Child Health, and the HCHS weighted populations are therefore built up from these separate components. Each is discussed in turn below.

### **General and Acute**

**4.25** Need per head for general and acute was estimated by the Nuffield Trust using a person based approach, building on the research for the former practice based commissioning toolkit. The person based approach uses data at the individual level (anonymised) to provide more accurate estimates of need for small populations, such as GP practice lists. The Nuffield Trust research estimated jointly need related to age and additional need over and above that due to age.

**4.26** The Nuffield Trust's research covered inpatient and outpatients for general and acute and also covered accident and emergency. Mental Health, Maternity & Child Health and specialised services were excluded. CCGs are not responsible for commissioning specialised services, which are directly commissioned by NHS England.

**4.27** The Nuffield Trust estimated relative need based on past patterns of utilisation of health services compared with the characteristics of patients. The quantified relationships found are taken to be predictors of relative future need for health care services, with the exception of the supply variables.

**4.28** The Nuffield model used anonymised data on the diagnoses for each patient admitted to hospital in 2007-08 and 2008-09, their age, and their GP practice. The numbers of anonymised registrations by age-sex group were also obtained for each GP practice to provide information on the proportions of a GP practice's list using health care in 2007-08 and 2008-09.

**4.29** Other data included in the model was data from the population census and 'attributed' to individuals based on their place of residence - these are data only available for small geographical areas (LSOAs) rather than for each individual. It includes data such as the proportion of people from black and minority ethnic groups, and the proportion of people aged 16-74 in semi-routine occupations.

**4.30** The model estimated the relationship for individuals between these 'explanatory' variables for 2007-08 and 2008-09 and actual costs for the individuals in 2009-10. The modelling tested from a wide range of potential variables which were the best in statistical terms and were also plausible indicators of need, to be included in the final model. It was found that diagnoses and age were the most important variables in the model.

- 4.31** The utilisation of health care may also be affected by the relative availability of health care services. Variables were included in the model to adjust for this, known as supply variables. These variables included for example distance travelled to outpatient appointments and the number of operating theatres. While these variables were included in the models as they affected utilisation, they were not included in the formula to calculate weighted populations; instead their value for each area was set to the national average. This means if an area has lower use of health care services because of lower capacity or longer distance, this is corrected for in the formula. It is assumed that the predictors of need in 2009-10 are also accurate predictors of need in subsequent years.
- 4.32** The Nuffield model includes nearly 400 variables which were applied to each individual to provide need per head for each age-sex group for each GP practice. The Nuffield Trust provided the need per head values for each age-sex group for each GP practice directly to NHS England.

### Maternity

- 4.33** The maternity model is based on the number of births and the need weighted cost per birth. The model is from the *Combining Age Related and Additional Need (CARAN) report*. The need weighted cost per birth is based on a model which found the best explanatory variables to be the proportion of births which are low rate births and mean house price in the local area. The CARAN report is based on data for 2004-06. The number of births used is new registrations due to births for the 12 months to April 2013.

### Mental Health

- 4.34** The need per head for Mental health services was estimated by a team led by Manchester University and followed a similar person level, utilisation based approach to the Nuffield Trust, and is known as the person-based resource allocation for Mental Health (PRAMH) formula. Similarly, it jointly estimates need related to age and additional need over and above that due to age.
- 4.35** The PRAMH model is based on analysis of the Mental Health Minimum Dataset (MHMDS) over the period 2008-09 to 2010-11. The MHMDS covers specialist Mental Health services within hospitals, outpatient clinics and the community. Very specialised Mental Health services, which are not commissioned by CCGs but by NHS England, were excluded from the research.
- 4.36** As a relatively small percentage of the population use Mental Health services in a year, the researchers recommended a two-stage model. The first stage models the proportion of individuals who use Mental Health services, and the second stage models the need based costs for the service-using population. Additional data on patient characteristics were available for the second stage.

The modelling for both stages was undertaken for each age-sex group for each GP practice.

- 4.37** There are separate models for males aged 20-64, females aged 20-64 and those aged 65 and over. This is because relative need differs between these groups, the latter being heavily influenced by dementia and related illnesses.
- 4.38** The explanatory variables in the models include for example age, psychiatric diagnosis, severe Mental illness prevalence from the quality and outcomes framework (QoF), categories of condition of Mental Health severity, the proportion who are single, and ethnicity.
- 4.39** As for general and acute, supply variables were included in the model but set to the national average in the calculation of weighted populations. The supply variables included for example the existence of a nearby Mental Health provider and distance to Mental Health team base.
- 4.40** The available data for the research did not cover those aged under 20 and so an alternative method was used by NHS England for calculating Mental Health need per head for the four age bands under 20. The method used bed days and outpatient data with Mental Health diagnostic codes from HES to estimate the national hospital cost per head by age-group. The costs for those aged under 20 were expressed as a percentage of those aged 20-24. These national percentages were applied to the need per head from the PRAMH project for those aged 20-24 for each GP practice as estimates of the need per head for the age-groups aged under 20.

### Prescribing

- 4.41** The prescribing formula uses a two stage, utilisation based approach to its modelling, with separate age gender adjustments made before the need adjustment. This is similar to the current Northern Ireland approaches.

### Primary Medical Services

- 4.42** This formula is based on the global sum formula, which is a nationwide formula used across the UK.

### Population

- 4.43** The starting point and primary determinant of weighted capitation targets is the size of each PCT's population. Each PCT's responsible population consists of:
  - a) The number of people permanently registered with the PCT's GP practices (that is, the GP practices for which the PCT holds the contract). This means that those patients permanently registered with a GP practice in one PCT's area, but who are resident in a neighbouring PCT's area, remain the responsibility of the former PCT.



- b) Residents within the geographical boundaries of each PCT who are not permanently registered with any GP practice, are removed. For allocation purposes, this group is restricted to those for whom accurate data are available for all PCTs, and also to those for whom the PCT has formally been defined as the responsible commissioner of Health services to be funded by PCT revenue allocations. In practice, this group covers prisoners, armed forces and asylum seekers.
- c) For England, the total number of GP registrations exceeds the population as estimated by the Office for National Statistics (ONS). GP registrations for allocation purposes are scaled to match ONS's population projections at the local level, while maintaining the pattern of 'cross-border' flows of patients resident in one PCT who are registered with the GP practice of a neighbouring PCT. For 2011-12 target allocations, ONS population projections for 2011 were used. These 'scaled' populations are referred to as constrained populations.

## Adjustments

### Market Forces Factor

**4.44** The weighted Capitation Formula has to take account of the fact that the cost of commissioning or providing healthcare is, unavoidably, not the same in every part of the country. The Market Forces Factor (MFF) is included in the weighted Capitation Formula to compensate for these unavoidable costs. The MFF consists of four separate elements for:

- staff (excluding medical and dental)
- medical and dental (M&D) London pay weighting
- buildings
- land

Separate indices for each of these are calculated and then combined into an overall index for both provider Trusts and PCTs. Other costs (equipment, consumables, drugs etc.) are assumed not to vary across the country.

### Emergency Ambulance Cost Adjustment

**4.45** The Emergency Ambulance Cost Adjustment (EACA) was introduced for the 1998-99 allocations. It reflects the unavoidable cost variations of delivering emergency ambulance services in different areas. It is based upon a rurality index, a scale index and the case mix of the area.

**4.46** The rurality index was calculated based on standard Health Authority (HA) boundaries and referred to 1991 Census resident populations. Unit cost data and journeys data were obtained from 1995-96 HA outturn data. Emergency journey proportions were taken from the KA34 ambulance return.

**4.47** The HA values have been mapped to PCTs, and, as for other adjustments, the EACA need index is multiplied by each PCT's crude population, the product of which is normalised to the total crude population to produce an EACA weighted population.

#### Health inequalities formula

**4.48** The aims of resource allocation in England are:

- to provide equal access to healthcare for people with equal need
- to contribute to the reduction in avoidable health inequalities.

The English needs formulae discussed above meet this first objective, however they are considered by ACRA to be less successful at meeting the second.

**4.49** The reasons behind this are that utilisation based models do not directly capture unmet need, and it is suspected that unmet need is more prevalent in those with poorer health status. Additionally utilisation based methods are largely driven by the response to current patterns of health status. They are not cognisant of health inequalities and make no effort to target them. In order to try to achieve this second objective, ACRA proposed the health inequalities formula, which is based upon the disability free life expectancy (DFLE) for each area. The DFLE of each area is compared to a benchmark of 70 years, the difference is the index of the area, this is multiplied by the crude population and the results for all PCTs are normalised to the crude population to obtain DFLE weight populations for the PCTs. This adjustment is applied to the formula as 10% of total weight with the exception of the HIV elements. This 10% weight is arrived at by ministerial decision as ACRA could find no clear evidence to set a weight.

#### Supply

**4.50** The English and Northern Irish models differ in how the effect of supply is treated. In England the models are derived including the supply variables and once the final model is decided upon the supply variables are "sterilised", i.e. they are simply removed, in most cases by setting to the national average level for all areas. In Northern Ireland when the supply variables are removed, the model has in the past been subsequently re-estimated. This re-estimation in theory allows the needs variables to pick up additional weight which is assumed to be due to good supply. There was a difference in opinion between the researchers and the peer reviewers of the NI formula, on the issue of whether supply should be dropped or retained and sterilised. This is an issue which should be further considered in future modelling.

#### Pace of Change

**4.51** Traditionally, local commissioning organisations such as the former Primary Care Trust (PCTs) were not immediately given the target allocations as determined by the weighted Capitation Formula, but moved towards their

target allocations over time under pace of change policy. Pace of change balances providing stability in funding for all organisations with moving those furthest under target closer towards their target. Pace of change policy for CCGs is set by NHS England.

**4.52** Pace of change policy involves:

- establishing the baselines (2013-14 allocations based on Month 6);
- establishing the available national budget (growth of 2.54% in 2014-15 and growth of 2.09% in 2015-16);
- determining target allocations from CCG weighted populations;
- Calculating distance from target (the difference between the baseline and the target allocation. If the target allocation is greater than the baseline the CCG is said to be under target. If the baseline is greater than the target allocation then the CCG is said to be over target);
- Setting actual allocations through differential growth in allocations between CCGs, using criteria based on distance from target.

**4.53** At its December 2013 meeting, the NHS England Board considered seven options for pace of change. Option four was adopted. The options considered were as follows.

- Option 1 was uniform growth, under which all CCGs would receive the same percentage growth in their total allocations, and there is no pace of change.
- Options 2 to 4 were all based on per capita allocations and took as their first step an adjustment of resources for growth in expected population in 2014-15 and 2015-16. Option 2 gave all CCGs the same growth of 1.66% in their per capita allocation in 2014-15 and 1.23% growth in their per capita allocation in 2015-16.
- Option 3 sought to maximise pace of change for the most under target CCGs. Growth per capita would be 3.3% for those 5% or further below per capita target, reducing to 1.22% for those between 3% and 5% under target. Growth in total allocations would be limited for significantly (>5%) over target CCGs to 2.14% (= real terms protection per GDP deflator). For 2015-16 the approach is similar, with maximum growth in total allocations of 1.7% for those more than 5% over target (above the GDP deflator of 1.5%).
- Option 4 introduced a floor so that all CCGs would see their total allocation grow by at least 2.14% in 2014-15 and 1.7% in 2015-16. This reduced the resources available for the most under target CCGs. The maximum per capita growth falls to 2.64% in 2014-15. This sought to balance the challenge of directing additional funding to those CCGs under target on a per capita basis with providing stability in funding for all CCGs.

- Option 5 to 7 modelled a more rapid pace of change. These were:
  - 0-5%: where CCGs most above target receive flat cash and those furthest below target receive 5% funding growth, with the position of the transition between the two determined by affordability until target is reached (option 5);
  - Cap and collar: where CCGs more than 6.33% above target receive no more than 0.89% (matching average population growth), CCGs within 5% of target receive 2.14% and CCGs more than 5% below target receive an increase in excess of real terms growth – rising to 10% for the most underfunded CCGs (option 6);
  - years: where growth is set at a pace that, all else being equal, would bring each CCG to within 5% of target within 5 years (option 7).

## Scotland

### Introduction

**4.54** The Scottish Capitation Formula allocates funds for hospital and community health services and GP prescribing which in total account for around 70% of the total NHS Scotland budget - £7.6 billion of the total £10.8 billion resource funding was allocated using the NHS Scotland Resource Allocation Committee (NRAC) formula in 2011/12. The formula aims to provide a transparent and fair mechanism for dividing resources for hospital and community health services and GP prescribing between the 14 territorial Health Boards.

### TAGRA

**4.55** The Technical Advisory Group on Resource Allocation (TAGRA) currently carries on the work of overseeing the maintenance and development of the NRAC formula. TAGRA was formed in response to a recommendation from the NRAC in its Final Report published in September 2007 that there was a need for an on-going review to ensure that the NRAC formula is kept up to date. TAGRA has a membership of 19.

**4.56** Membership of TAGRA is made up of a mixture of Health Board members (mainly finance directors), academics and experts in the resource allocation, representatives from ISD (Information Services Division of NHS Scotland) and analysts from the Health Department of the Scottish Government<sup>7</sup>. The group meets roughly 4 times a year.

### Current Formula

**4.57** The current Scottish resource allocation formula is based upon an area based utilisation methodology. The most recent comprehensive review was carried out by Professor Roy Carr-Hill of the University of York who carried out the most recent review of the Acute and Elderly programmes of care in Northern Ireland. The structure of the NRAC formula is shown in figure 7.

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<sup>7</sup> TAGRA Members can be found at <http://www.tagra.scot.nhs.uk/index.html>

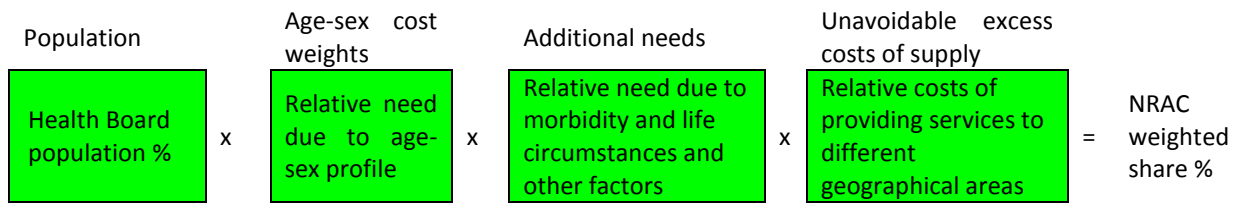


Figure 7 The NRAC Formula<sup>8</sup>

## Care Programmes

**4.58** The Scottish formula has always tended towards fewer indexes covering the activity studied. The previous version of the formula, the Arbutnott Formula, was a single index. However in the last review, the Scottish Capitation Formula was divided into six care programmes for allocation. These care programmes are shown in Table 10 with the services areas of which they are comprised. All these care programmes and associated diagnostic groups were considered when developing the current Scottish formula.

<sup>8</sup> NRAC Final Report, Delivering Fair Shares for Health in Scotland  
<http://www.nrac.scot.nhs.uk/research.htm>

Table 10: Structure of the NRAC formula<sup>9</sup>

Care Programme	Diagnostic Group
Acute services	Circulatory Cancer Respiratory Digestive system Injuries & poisoning Acute outpatients Other
Care of the elderly	None
Mental Health & learning difficulties	None
Maternity	None
Community	District nursing Heath visiting Midwifery Psychiatric team Learning difficulties team Child Health Specialist nursing Addiction services Family planning Clinical psychology (AHPs) Physiotherapy (AHPs) Occupational therapy (AHPs) Chiroprody (AHPs) Dietetics (AHPs) Speech therapy (AHPs) Community dentistry Home dialysis Breast screening Incontinence Health Promotion Other
GP prescribing	Circulatory Gastro-intestinal Infections Mental illness Musculoskeletal Other

**4.59** As a result of the modelling, four indices were created which cover the care programmes shown in Table 11. An adjustment for unmet need is also applied for provision of acute hospital services for circulatory disease (e.g. coronary heart disease).

**4.60** In addition to the four high level indices developed in the current formula, each of the individual service areas was studied and a model was developed for each, with one additional explanatory variable over the main index which covered this activity. These service level formulae are used to further explain the variation in these services but they are only considered indicators.

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<sup>9</sup> NRAC Final Report, Delivering Fair Shares for Health in Scotland <http://www.nrac.scot.nhs.uk/research.htm>

**Table 11: Care Programmes in Scottish Formula**

Index name	Care programme - Elements of index
Acute	Acute, care of the elderly and GP prescribing.
Mental Health	Mental Health & learning difficulties.
Maternity	Maternity.
Community	Community: No specific index – uses cost weighted average of predicted needs using the above 3 indices.

- 4.61** As all of the needs indices in Scotland are developed at a single point in time there is no lag between updating each of the indices, removing the potential for double counting of need if there are changes to the way services are delivered. As in England and Northern Ireland there are also age gender adjustments in all formula except the maternity programme groups, the age costs are considered in 20 bands 0-1, 2-4, from 5-9 up to 85-89 in 5 year bands, and 90 years and over.
- 4.62** The Scottish formula is different to England and Northern Ireland in that each of the indices for the service areas modelled is updated each year. This happens as the variables chosen to form the indices are readily updateable such as the SMR.

### Population

- 4.63** In the Scottish formula two populations are used, one based on the population resident in a Health Board and one based on the population registered with a GP; the choice of population used depends upon the services being considered. For the board of residence the population is taken from re-based population projections; for the GP population this is based on the actual GP lists adjusted to the level of the re-based projections used in the board populations.

### Adjustments

- 4.64** Scotland also employs adjustments to the formula, in Scotland they emphasise two important points to note about their adjustments:
- The intention is that an adjustment corrects solely for the higher unit costs that a Health Board incurs in supplying services – **not** the needs of its population (which are accounted for in the age-sex and additional needs adjustments).
  - That any adjustment is aimed solely at *unavoidable excess* costs – those which arise from circumstances over which the Health Board has no control (e.g. the remoteness of its geography) – **not** avoidable excess costs (e.g. from inefficient services)
- 4.65** Within the Scottish formula there are currently 3 adjustments employed:



- Hospital services excess costs: this is based upon a classification of urban – rural and is used to compensate health boards for the unavoidable additional costs in rural areas. This index used a cost ratio to analyse the variation in local costs relative to the costs for the same service at national average unit costs, this was then aggregated to the 10 Scottish Executive Urban-Rural categories' (SEURC) to produce the index.
- Community services: there are two indices calculated for community services.
- Community travel based services: this is calculated based on a simulation of the additional travel associated with the delivery of services by healthcare professionals, including health visitors, district nurses and allied health professionals, and is similar in its construction to the Northern Ireland rurality adjustment.

**4.66** Community clinic based services: This adjustment for clinic based services is drawn from the formula which allocates funding to GP practices, as a proxy for the excess costs of clinic-based community services. This rurality weighting is based on combined weightings of three variables: The population density of the GP practice population, measured by the number of hectares per resident; the population sparsity of the GP practice population, measured by the population of the GP practice in communities of less than five hundred; and the proportion of people in the GP practice population that attract road mileage payments. The final community clinic excess costs are calculated as a ratio of area's rurality weighting to the national average.

**4.67** To derive the overall excess costs adjustment the indices are summed together based on the proportion of costs that each service accounts for at the national level. In general, hospital service costs account for around 70% of the total HCHS and prescribing costs, community services account for around 15% of these costs and 15% is attributable to GP prescribing. The formula assumes that the community services are then split 2/3 to 1/3 between travel based and clinic based services (i.e. community travel based services account for 10% of total costs and community clinic based services account for 5% of total costs).

#### **Distance from Target**

**4.68** The NRAC formula sets out the target allocations for the territorial NHS Boards. The boards move toward target over time by means of differential growth in board budgets. There was an increase in funding of 3.2%, £24 million, in 2011/12. The cumulative percentage point distance from target of the boards below target, declined from 1.86% points to 1.70% points.

# Wales

## Introduction

**4.69** Although not yet fully implemented, the Welsh formula is unique within the United Kingdom as it proposes to use survey based data on morbidity as the basis for defining the driver for a large proportion of its Health Service expenditure. Reporting in 2000-2001, the targeting poor health initiative reviewed the state of health in Wales and it recommended the development of a direct allocation methodology using survey based data. The methodology was subsequently developed by a team from the Universities of Bristol, Cardiff and Lancaster, led by David Gordon. The main data source employed is the Welsh Health Survey, with supplementary data for specific conditions.

## Proposed Formula

**4.70** The direct needs model in Wales is based upon the following structure.



Figure 8 Structure of direct needs model

- 4.71** To calculate the health needs Wales intend to use the 27 expenditure streams they have considered, listed in Table 16, and allocate resources directly to each area for each stream. In order to do this the research has been designed to determine a single direct measure of health status that can be used to explain the uptake of services for each stream. The indicators for each stream are shown in Table 16.
  
- 4.72** This direct measure of health status for each stream reduces the possibility of unmet need in the formula. In effect most of the allocations are a result of survey data from the Welsh health survey. With a view to supporting this work a number of changes have been made to the Welsh Health Survey, these include an increase in the survey size, change from postal to interview and self-completion methods, and extra questions on children’s health. These changes were made with a view to improving the response rate, and to allow study of response bias in the results. 18 months of data will be used to produce target shares.
  
- 4.73** The allocation methodology is relatively straightforward. The survey is used to estimate the proportion of the national total of people in each of the condition and symptom groups who are resident in each of the 22 local Health board

(LHB) catchment areas. The national spend for each group is then divided between LHBs according to these proportions.

**4.74** At present only about 58% of the expenditure is directly attributed to these condition and symptom groups. The remainder is allocated on a pro rata basis or by average service usage applied to needs indicators. Although there is no evidence to suggest that it discriminates against any local Health board, or group of local Health boards, it is a high priority to reduce this pro-rata element.

**Table 12: The conditions/symptom groups in the Welsh direct allocation methodology**

Hospital and Community Health Services expenditure programmes	% Share of total expenditure	2004-05 Needs indicator description
Heart & Circulatory Disease	6.77	Heart disease (1)
Cancer	6.24	Average number of all malignancies, 1999-2001
Respiratory illness	4.71	Respiratory disease (1)
Arthritis	1.78	Arthritis (1)
Back pain	0.3	Back pain (1)
Epilepsy	0.21	Epilepsy (1)
Stroke	1.96	Stroke (1)
Accidents	5.42	Accident/injury (1)
Diabetes	0.5	Diabetes (1)
Varicose veins	0.14	Varicose veins (1)
Hearing impairment	0.03	Hearing impairment (1)
Dental Health	0.24	Dental problems (1)
Food poisoning	0.01	Total number of incidents of food poisoning, 1999-2002
Other In-patient medical/surgical	21.67	Allocated pro-rata to previous 13 programmes
Accident & Emergency	3.68	Accident/injury (1)
Non-maternity costs: Normal Birth Weight	0.29	Average normal weight births, 1997-2001
Non-maternity costs: Low Birth Weight	0.24	Average low weight births, 1997-2001
Children's dental Health	0.65	Estimated number of children with some decayed and missing teeth, 2002-03 (based on BASCD survey)
Children's physical disability	0.02	Pupils with statements of SEN with physical or profound multiple learning disabilities, Jan 2002
Other children's health costs	4.39	Population aged under 16, 2002, 000s
Maternity costs	5.12	Average births 1997-2001
Learning Disability	2.73	People on local authority Learning Disabilities Registers, all ages, March 2002
Child and adolescent psychiatry	0.71	All pupils with statements of SEN, Jan 2002
Mental Illness & other psychiatric	12.24	Mental illness (1)
Outpatient, Open Access and (part) Day Care allocation	14.72	Estimated number using outpatient services (2)
Community nursing	4.78	Estimated number using community nursing services (2)
Chiropody allocation	0.46	Estimated number using chiropody services (2)

(1) Numbers of people reporting treatment for this condition in the Welsh Health Survey

(2) From the Welsh Health Survey: estimated by combining numbers of people by condition for each local Health board with the all-Wales proportions using services

**4.75** Despite their application in Wales, direct methods for health care resource allocation are still actively debated and, to date, have been rejected in other parts of the UK. The objections are less on issues of principle, but on the difficulties of achieving a satisfactory morbidity data set from a sample survey.

**4.76** Some of the major questions on the workings of the direct method include:

- the likelihood of bias in the sample survey, and the cost of achieving samples that are sufficiently large to record the incidence of specific condition groups
- the nature of self-reports of ill health - their accuracy, whether they will necessarily refer to treatable conditions, and whether they are culturally variable
- whether respondents' reports of treated symptoms and conditions are likely to be independent of the supply of healthcare diagnostic and treatment effort
- whether self-reports can be reliably and accurately translated to potential treatment costs for the purpose of resource allocation
- concerns that the use of national average costs may not reflect the higher treatment cost per head costs associated with greater severity amongst more deprived groups in the population

## Population

**4.77** The recommendation made in the research for developing the Welsh formula was that mid-year estimates of population should continue to be used until such time as GP registered population databases have been purged of list discrepancy.

## Adjustments

### Age Cost Adjustment

**4.78** An age cost adjustment is applied to 47% of expenditure reflecting the in-patient share of costs. The model reflects the impact of the needs of Older People in two ways:

- a) their health needs are captured directly in the Welsh Health Survey and other needs indicators;
- b) the additional costs of treating an older person (compared with a younger person with the same condition) are captured by the age cost weighting

**4.79** The age cost weighting is derived from an evidence based study of the additional hospital costs per case for Older People, reflecting their greater

chances of developing a combination of health problems with more expensive treatment and/or needing a longer period of recuperation following illness.

### Rurality

**4.80** The model includes a rural cost adjustment applied to 5.4% of expenditure, reflecting the additional cost of travel-intensive community services such as district nursing. This adjustment is calculated applying a methodology developed in Scotland to the Welsh population distribution. The analysis uses settlement patterns and assumptions about travelling time and nurse workload.

### Severity

**4.81** An area costs adjustment for additional severity is applied to 5% of expenditure, representing secondary care for respiratory disease. The adjustment is based on a small area analysis of additional inpatient costs for respiratory disease in areas with higher morbidity, measured by the all causes Standardised Mortality Ratio for under 85s.

### Current position

**4.82** As the Welsh direct needs formula has not yet been fully implemented, allocations have been primarily based on historic spend since devolution, with additional funding used to move areas towards their target shares when available. These target shares are based on the direct health needs model. Wales have not published distance from target figures since the new Local Health Boards were established in 2009.

### Conclusion

**4.83** Each of the countries in the United Kingdom has developed its own resource allocation formula, tailored to local commissioning structures and informed by available population and utilisation data. The steering groups overseeing the development of each countries model comprise of a senior membership base with a wide range of expertise including from academia. Regular and lengthy consideration of developments is deemed essential to ensure the complex and challenging issues surrounding formula development are fully considered.

**4.84** Each approach takes account of population size, age and gender as well as additional needs factors. The table 13 below compares the differing approaches:

Table 13: Allocation methodologies in UK countries

	NI	England	Scotland	Wales
<b>Coverage</b>	9 PoCs*	Hospital and Community Health Services	Acute Mental Health & Learning Disability	Hospital and Community Health Services
		Prescribing	Maternity	Prescribing
		Primary Medical	Community	Primary Medical
		Dental	GP Prescribing	Dental
			Care of the Elderly	
<b>Population</b>	MYE	GP list	MYE	MYE
	* GP list		GP Pop	GP Pop
<b>Age Weight</b>	Yes	Yes	Yes	
<b>Additional Needs Weighting</b>	Yes	Yes	Yes	
<b>Unavoidable cost adjustment</b>	Yes	Yes	Yes	
<b>Unmet need adjustment</b>	No		Yes - limited	
<b>Inequality adjustment</b>	No	Yes		

\* Separate formulas existing for FHS - Prescribing, General Medical, Dental

- 4.85** CFRG has concluded that there is merit in each of the approaches discussed in this chapter. However, it is important to recognise that the Northern Ireland model is developed around our local commissioning structures and informed by the availability of accurate local data at postcode level.
- 4.86** Should the commissioning structures change significantly or access to patient level data improve, such as the person level data available in England, the approach used may have to be revisited.

# Chapter 5

## Proposed Future CFRG Modelling Timetable

### Introduction

**5.1** Capitation Formula reviews are normally completed over a 3 – 5 year timescale. CFRG have developed a proposed rolling 3 year modelling plan. In light of current proposals for abolition of the HSCB, it is now proposed to undertake an 18 month escalated work programme to cover the following areas:

- Family & Childcare
- Acute Services

This will ensure the important work of keeping the formula up to date is maintained until revised structures and roles are put in place. At that point, a longer term plan can be developed.

**5.2** POC1 (Acute)—information is available in good quality, coded, electronic format with readily available costing information for both the elective and non-elective acute formulae. The data collection and preparation process is therefore relatively straightforward and the existing statistical regression-based model would be reviewed.

**5.3** The Family & Childcare formula was a priority of the CFRG sixth review. The scoping exercise carried out for the Family & Childcare formula has indicated 70% of the necessary data can be downloaded from existing systems.

**5.4** It is recommended that the Family & Childcare PoC and Acute PoC models are reviewed by CFRG in a limited 18 month review. The work programme and membership of CFRG will be kept under review as the DHSSPS Commissioning Review November 2015 is rolled out.

# Chapter 6

## Conclusion

- 6.1** The Regional Capitation Formula is one of the most sophisticated currently in use in the public sector. Annual updates for demography and finance are provided as part the core workload of CFRG. However, the process to review the individual Programme of Care models underpinning the overall formula is extremely complex and resource intensive.
- 6.2** Since the inception of the Capitation Formula in 1994, the HSC has undergone significant change and modernisation, the pace of which continues to increase. This means there is a challenge and responsibility for HSCB to maintain a robust formula mechanism that can be used to reflect the fair distribution of scarce resources across LCGs. It is for this reason that the HSCB through CFRG has sought a programme of continual improvement in relation to the formula
- 6.3** Following a review of the rurality adjustment, which compensates for the unavoidable costs of providing services in rural and urban settings, an updated rurality model has been provided for incorporation in the 2016/17 Capitation Formula and a methodology for updating future years.
- 6.4** A review of Mental Health services has taken place to update the formula. This reflects the significant reform and modernisation of services in this area through the use of more up to date cost and activity data, whilst maintaining the modelling approach used in the current formula. The result provides a number of new potential models with a preferred model identified in coloration with a peer reviewer and the opinion of Mental Health professionals.
- 6.5** CFRG were asked to compare and contrast the different methodologies for resource allocation in other parts of the UK. This was to assess the continued relevance of the formula used in NI and any potential evidence based improvements in the approach used. It concluded that while there were merits in each approach, the current NI formula best measured the relative need for resources as it is based on local Commissioning structures and local data. Therefore, the formula is tailored to reflect the needs drivers for Health and Social Care in NI. Formula development in UK countries is given high status and priority in the membership and frequency of resource allocation steering groups. The pace of implementation of the formula differs across each country.



- 6.6** A rolling programme has been developed to take forward the future work of CFRG. In light of the Health Ministers announcement on 4<sup>th</sup> November 2015 on the future structure of Health and Social Care, in particular Commissioning, it is proposed that the review of Family & Childcare and Acute formulae are carried out as part of a limited 18 month review and a revised plan put in place when new roles and responsibilities developed.
- 6.7** Previously detailed public consultation has followed the completion of the update of elements of the formula. Former consultations have focused on the methodology and principles of any new models. In the sixth review, it is therefore proposed to focus on the new proposed Mental Health model. Whilst there has been significant engagement with the Bamford group during the formula development, it is important that other stakeholders are given the opportunity to participate in consultation.
- 6.8** **The recommendation therefore is that the HSCB:**
- ***Introduces the updated rurality model into the 2016/17 Capitation Formula***
  - ***Incorporates Model 3 as the new Mental Health formula, as set out in Chapter 3, into the 2016/17 Capitation Formula***
  - ***Continues to use the current approach to formula development including the PoC approach set out in the proposed work programme, chapter 5 (subject to the commissioning review and information availability)***
  - ***Undertakes an 18 month limited review of the Family & Childcare PoC and the Acute PoC models. The work programme and membership of CFRG will be kept under review as the DHSSPS Commissioning Review November 2015 is rolled out.***

# Appendix 1

## MEMBERSHIP OF CFRG

### **STEERING GROUP:**

Paul Cummings (Chair)	Director of Finance, HSCB
Paul Gibson	Head of Financial Planning Unit, DHSSPS
Fionnuala McAndrew	Director of Social Care & Children's Services, HSCB
Dean Sullivan	Director of Commissioning , HSCB
Dr Carolyn Harper	Director of Public Health, PHA
Dr Janet Little	Assistant Director of Public Health, PHA
Dr Eugene Mooney	Senior Principal Statistician, DHSSPS
Dr Sloan Harper	Director of Integrated Care, HSCB

### **TECHNICAL / ADVISORY:**

Dr Erin Montgomery	Principal Statistician, DHSSPS
Dr Daniel McConville	Deputy Principal Statistician, DHSSPS
Christine Frazer	Assistant Director of Finance, HSCB
Fiona Diamond	Senior Accountant, HSCB
Stephen McDowell	Head of Information, HSCB
Peter McLaughlin	Assistant Director of Commissioning, HSCB
Adele Graham	Senior Health Intelligence Manager, PHA
Thomas Doherty	Information Manager, Social Care and Children, HSCB
Adrian Walsh	Head Accountant, HSCB
Aidan Murray	Assistant Director Mental Health and Learning Disability, Social Care and Children's Directorate, HSCB
Dr Oscar Daly	Consultant Psychiatrist, SEHSCT
Sheelin McKeagney	Southern LCG Chair (former), HSCB

# Appendix 2

## Overview of NI Capitation Formula including previous reviews

### How is the Health Service Funded?

- 7.1** HM Treasury allocates resources to the different English Departments and applies the Barnett formula to allocate resources to NI, Scotland and Wales. The formula uses crude population figures to determine the proportion each country receives as a block allocation. NI Government Ministers determine the split of resources between Northern Ireland Departments.
- 7.2** The Department of Health, Social Services and Public Safety (DHSSPS) currently has a budget of some £4.8bn of which £4.4bn is allocated to HSCB and PHA to deliver health care and personal social services to the civilian population of Northern Ireland. This comprises some £800m for Family Health Services and circa £3bn for Programmes of Care.
- 7.3** In 1994 the then Department of Health and Social Services (DHSS) initiated the development of a statistical formulae (known as the Capitation Formula) to inform distribution of resources across legacy Health and Social Care Boards. The formula also known as the weighted Capitation Formula has been developed to measure the relative need for available resources across local populations for Programme of Care areas. The formula has been under constant review by the Capitation Formula Review Group (CFRG). The HSCB has now been given responsibility for future development of the formula and its application across its local commissioning group areas.
- 7.4** Allocations for Family Practitioner Services which now been devolved recurrently to the HSCB relate to dentists, general practitioners and other primary care providers. In the past these resources were allocated directly to these service providers as they are effectively sub-contractors to the HSC. The formulae covering this area have to date been controlled by a different group and not the Capitation Formula Review Group.

### Fundamental Concepts of Health Care Funding in Northern Ireland

- 7.5** *Absolute versus relative need:* One issue that should be considered initially regarding the weighted Capitation Formula is that when thinking of healthcare funding, one must think in terms of relative need as opposed to absolute need. This is because no matter how much money is available to spend on health care there would always be something more that could be done to improve the health of the population being served; and since only a finite amount of money is available we must consider the relative needs of the population of each area

and we must distribute the available resources in the fairest way. Another very important factor in this is that there is no agreed mechanism for capturing and measuring actual “need”. The weighted Capitation Formula works under the principle of “equal resources for equal needs”. This is to enable the Local Commissioning Groups (LCGs) to commission similar levels of healthcare for populations with similar healthcare needs. The Capitation Formula does this by determining the target “fair” share of the available resources for each area. Without the formula, Northern Ireland would revert to the allocation of resources on the basis of political decisions, potentially losing the underlying fairness integral to the formula and Health and Social Care in Northern Ireland.

### Introduction to the Northern Ireland Capitation Formula

**7.6** The current formula is based upon a Programme of Care (PoC) approach which it is believed offers the greatest opportunity to explicitly address the specific needs of individual client groups. There are nine PoCs, as listed below:

- PoC1 – Acute Services
- PoC2 – Maternity and Child Health
- PoC3 – Family and Childcare
- PoC4 – Elderly Care
- PoC5 – Mental Health
- PoC6 – Learning Disability
- PoC7 – Physical and Sensory Disability
- PoC8 – Health Promotion & Disease Prevention
- PoC9 – Primary Health and Adult Community

Each PoC has a relevant formula (PoCs 1 and 2 are each explained by two separate formulae) which is comprised of three elements:

- a) **Relevant Population:** This refers to the client group on which the PoC is based, for example, all persons aged 65+ in respect of the Elderly PoC.
- b) **Age/Gender Weighting:** The rationale for then applying an age/gender weighting is that two populations of the same size could have a different need for health and personal social services due to differing age /gender structures of those populations. Even within the Elderly PoC, persons aged 75 and over generally require more services than those aged 65-74.
- c) **Additional Needs Weighting:** An additional needs weighting is then applied as two populations of the same size and structure could still have a differential need for services due to a differing underlying morbidity associated with, for example, deprivation.

**7.7** The relevant population is established, and a dataset (the mid-year estimate (MYE)) containing the numbers of people in this population are retrieved from the Northern Ireland Statistics and Research Agency which offers a

breakdown of the population numbers by age, gender and small geographical area. All relevant episode and cost data for the Programme of Care is then collated, and used to calculate an age/gender cost curve for Northern Ireland (figure 9) , which is the average cost per head for each gender split into five-year age bands. This is then used in conjunction with population data (Census) to calculate the age/gender weighted population for each small geographical area or Super Output Area (SOA) based on the Northern Ireland average rate and the population structure of the small area.

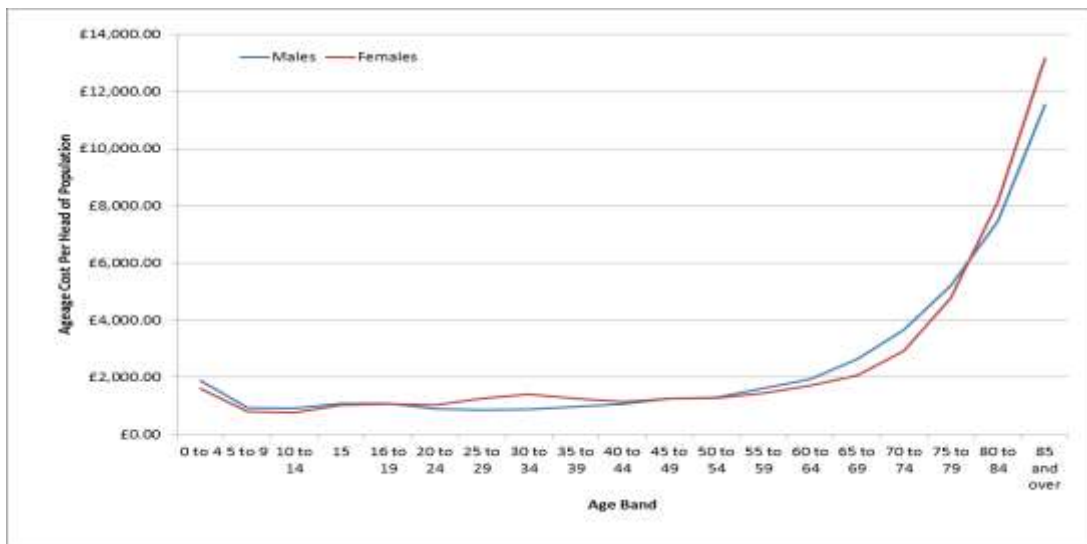


Figure 9: Age cost profile for all Programmes of Care

**7.8** An index is then calculated by dividing the total observed costs for each small area by the age/gender weighted population (also known as total expected costs) for each small area. This is considered to be the needs of the area with age and gender controlled for. The next step involves taking this index and modelling this using the statistical technique of regression to establish what underlying factors contribute to the differences in the needs of each area which have been measured using the age/gender index (or standardised costs). Variables such as the various deprivation indicators, benefits data and census data are included here to see which, if any, make a statistically significant contribution to the formation of the index whilst controlling for the effects of policy and supply. The resulting model calculates the additional needs index.

**7.9** The relevant population is multiplied by the age/gender index (generating an age/gender weighted population) and then this is multiplied by the additional needs index (creating an age/gender/needs weighted population). The age/gender/needs weighted population forms the fair capitation shares for that PoC. These are combined using expenditure weights from the most recent Strategic Resources Framework to calculate the overall fair Capitation shares for each LCG. A number of adjustments are then made to compensate LCGs

for the costs of providing services in rural areas and also for economies of scale.

### **Rurality Adjustment**

**7.10** Areas face differential costs which arise due to the geographical properties of the area and the location of its population. This rurality / sparsity factor is compensated for by the rurality adjustment. Simplified Modelling of Spatial Systems (SMOSS) was used to calculate/model total travel times and distances for certain services; chosen as they were considered to have a large travel component. These modelled distances and times were then costed to produce a rurality budget for the modelled services. This budget was then allocated to each board in respect to the services modelled. Expenditure data is used to uplift this rurality budget on a service by service basis, to bring it in line current expenditure levels.

### **Economies of Scale Adjustment**

**7.11** The EoS work was used to identify and quantify any scale effects that were present in hospital and community services in Northern Ireland so that the relevant scale costs for service providers of different sizes could be estimated.

**7.12** The model assumed that the observed cost per episode (inpatient and outpatient) in Acute facilities was affected by:

- Case mix complexity and marginal differences in length of stay;
- Achievable scale-related efficiencies in delivery; and
- Residual cost differences that reveal no obvious causal relationships

The relationship estimated by the hospital EoS modelling was then applied to estimated demand at the facilities.

**7.13** EoS within the community is considered to arise where a proportion of the community services demands are unpredictable and a standard of service response is desired. Smaller delivery teams need proportionally more capacity in order to respond in an adequate manner to demands on busy days (days where demand is above the average level) than do larger teams. Therefore, cost efficiency will be depressed in smaller teams under such performance assumptions. To quantify the workload at each location for a respective population, the researchers used a computerised model of the type employed in the rural travel costs research.

**7.14** The modelled costs for both community and hospital services were attributed back to HSS Boards based on the modelled service user flows. Several configurations were modelled however the Delivering Better Services model for hospitals and the theoretical model for community formed the final recommendation for the adjustment. It was felt that these took into account relevant EoS affects without rewarding potential inefficient practice.

Expenditure data is used to uplift this EoS budget on a service by service basis, to bring it in line current expenditure levels.

### Unmet Need

- 7.15** The models which have been developed to allocate resources are based on an analysis at small area level of the statistical relationships between the use made of health and personal social services and a wide range of indicators of morbidity, mortality, socio-economic characteristics and supply. This analysis assumes that the use made of health services reflects differences in the relative need for Health and Social Care after adjusting for the effects of supply.
- 7.16** This is based upon the assumption that utilization of services is a good predictor of need. For many reasons this assumption may be questionable. Some groups of the population may be systematically excluded from services, while others may “capture” more resources than their clinical need justifies. Unmet need can therefore be conceptualised as a gap between need and utilisation: if the level of need is greater than the level of utilisation, then there is unmet need.
- 7.17** In order to test for unmet need a shortfall test is used. This involves the comparison of the ‘shape’ of the relationship between resource use and deprivation (or rurality) and the ‘shape’ of the relationship between epidemiological data and deprivation (or rurality) over a specific measure of deprivation (or rurality). The multiple deprivation measure is commonly used as the measure of deprivation.

The Shortfall Test is best illustrated by way of example, as shown below in Figure 10.

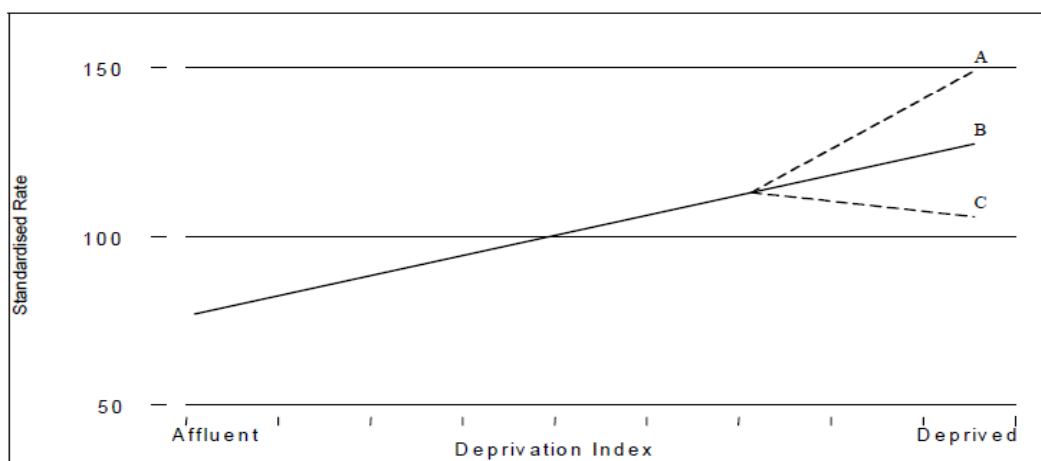


Figure 10 Illustration of Shortfall test

- 7.18** A linear relationship throughout the full range of deprivation is represented by Point B. Point A is the case where the effect of deprivation becomes stronger

at high levels of deprivation. Point C is the case where the effect of deprivation becomes weaker at high levels of deprivation and suggests unmet need.

### Implementing the Formula

**7.19** The formula establishes the fair share of the available resources that each LCG should receive. However, this is not currently equivalent to the funds given to each LCG. Implementing the formula is outside the scope of CFRG’s work. Northern Ireland Capitation Formula Review

**7.20** There have been five reports published by the Capitation Formula Review Group, published in 1995, 1997, 2000, 2004 and most recently in 2008.

**Table 14 Summary of CFRG publications**

Report	Summary
First Report	A Programme of Care approach should be taken using weightings derived from research specific to England. <i>Not implemented</i>
Second Report	A Programme of Care approach recommended again – using NI specific research for the largest POC – Acute and for some aspects of smaller POCs. <i>Implemented</i>
Third Report	Further work to develop NI specific research in Maternity and Child Health, Family and Childcare, Elderly Care and Mental Health. Formulae designed for Health Promotion and Disease Prevention and Primary Health and Adult Community.
Fourth Report	Further work on Family and Childcare, Learning Disability, Physical and Sensory Disability and Mental Health.
Fifth Report	Research carried out into Elderly Care and Acute Services (split into elective and non-elective).



# Appendix 3

## Programme of Care Formula Data

### Programme of Care Formula

Name of formula	PoC1 – Acute Services - Elective
Brief description of service area	<p>An elective admission is one where the patient knows in advance that they are going to hospital, one for whom the decision to admit can be separated in time from actual admission.</p> <p>This includes all activity, and resources used, by any health professional, relating to patient care where the consultant in charge of the patient is a specialist in an Acute Service. The Acute Services PoC covers all hospital specialties with a number of exceptions:</p> <p>Geriatric Medicine;</p> <ul style="list-style-type: none"> <li>• Obstetrics;</li> <li>• Obstetrics (Ante Natal);</li> <li>• Obstetrics (Post Natal);</li> <li>• Well Babies (Obstetrics);</li> <li>• Well Babies (Paediatrics);</li> <li>• GP Maternity;</li> <li>• Psychiatric Specialties</li> <li>• Learning Disability; and</li> <li>• Physical &amp; Sensory Disability</li> </ul>
Last Update to Formula	May 2008 - CFRG 5
Utilisation data dates	2003-04
Variables in Additional Needs Index	<p>Proportion of 65+ population not claiming Attendance Allowance (circa Aug 03) (-ve),</p> <p>Standardised Limiting Long-Term Illness (2001 Census)(+ve),</p> <p>Standardised Cancer Incidence Rate (1993-2003)(+ve),</p> <p>Standardised Birth Rate (2000-2004)(+ve),</p> <p>Proportion of all households not owned outright(2001 census)(+ve),</p> <p>Proportion of households with 2 or less children (2001 Census)(-ve),</p> <p>Proportion of all females aged 45-64(2001 Census?)(+ve)</p>
Relevant Population	All population

Name of formula	PoC2 – Maternity and Child Health
Brief description of service area	<p>The Maternity and Child Health PoC includes all activity, and resources used, by any health professionals relating to an inpatient episode where the consultant in charge of the patient is a specialist in one of the following specialties:</p> <ul style="list-style-type: none"> <li>• Obstetrics;</li> <li>• GP Maternity;</li> <li>• Well Babies (Obstetrics);</li> <li>• Well Babies (Paediatrics);</li> <li>• Obstetrics (Ante-Natal); and</li> <li>• Obstetrics (Post-Natal).</li> </ul> <p>This programme also includes all activity, and resources used, by a hospital consultant in one of the above specialties in relation to an outpatient episode, day case, regular day admission, regular night admission or day care. All community contacts by any health professional, where the primary reason for the contact was for Maternity or child health reasons, are also included.</p> <p>Note: Expenditure on Special Care Baby Units (SCBU) is included in Acute Services.</p>
Last Update to Formula	Oct 2000 - CFRG 3
Utilisation data dates	activity from 97/98 costs from 96/97
Variables in Additional Needs Index	Mothers Age at time of the birth , Low Birth weight (if the child had a birth weight below 2500g) (+ve), No previous births (whether the mother has had previous births) (-ve), Multiple Births(+ve) U75 SMR for the previous 5 years
Relevant Population	Under 5 and all mothers in previous 3 years

Name of formula	PoC3 – Family and Childcare
Brief description of service area	<p>This Programme of Care is concerned with activity and resources relating to the provision of Social Services support for families and/or children.</p> <p>This includes the following:</p> <ul style="list-style-type: none"> <li>• Adoption;</li> <li>• Child Protection;</li> <li>• Children in Need;</li> <li>• Children Looked After;</li> <li>• Day Care;</li> <li>• Family Centres; and</li> <li>• Fostering.</li> </ul>
Last Update to Formula	Aug 2004 - CFRG 4
Utilisation data dates	snapshots on 31/2/02 and 30/9/02
Variables in Additional Needs Index	Proportion of Children in income support households() (+ve), Proportion of 16-18 year olds not in full time education (Census 2001) (+ve), Nobel Social Environment Score (2001) (+ve), Proportion of Children in owner-occupied housing (Census 2001) (-ve)
Relevant Population	0-44

Name of formula	PoC4 – Elderly Care
Brief description of service area	<p>The Elderly PoC includes all community health and social services for those aged 65 and over (except where the reason for the services is because of Mental illness or Learning Disability) and residential and nursing home care.</p> <p>The programme also includes all activity, and resources used, by any health professional, relating to an inpatient episode where the consultant in charge of the patient is a specialist in Geriatric Medicine or Old Age Psychiatry.</p> <p>The programme also includes all activity, and resources used, by a hospital consultant in one of the above specialties, in relation to an outpatient episode, day case, regular day admission, regular night admission or day care.</p> <p>Where a ward, clinic or unit in the specialty of General Medicine is concerned solely with elderly patients (i.e. over 65 years of age) then the activity and associated resources are also included in the Elderly PoC.</p>
Last Update to Formula	May 2008 - CFRG 5
Utilisation data dates	2003/04
Variables in Additional Needs Index	<p>Proportion of elderly population under 85 years of age (Census 2001)(+ve),</p> <p>Standardised Mortality Rate for these aged over 65 (5 year)(+ve),</p> <p>Proportion of 65+ population not claiming Attendance Allowance (circa Aug 03)(-ve),</p> <p>Proportion of pensioners not in social rented housing (Census 2001)(-ve),</p> <p>Potential years of life lost per adult (+ve)</p>
Relevant Population	65+

Name of formula	PoC5 – Mental Health
Brief description of service area	<p>This Programme of Care includes all community services where the primary reason for the service is due to Mental illness. The Programme includes all activity and resources used by any health professional relating to an inpatient episode where the consultant in charge of the patient is a specialist in one of the following specialties:</p> <ul style="list-style-type: none"> <li>• Mental illness</li> <li>• Child and adolescent psychiatry</li> <li>• Forensic psychiatry</li> <li>• Psychotherapy.</li> </ul> <p>This Programme also includes all activity and resources used by a hospital consultant in one of the above specialties in relation to an outpatient episode, day case, regular day admission, regular night admission, or day care.</p>
Last Update to Formula	Original model from Oct 2000 - CFRG 3. In Aug 2004 -CFRG 4 the weighting of the dependent variable was updated and new coefficients for original needs variables were calculated.
Utilisation data dates	1997/98
Variables in Additional Needs Index	<p>Proportion of 16-64 year olds on income support (Census 1991) (+ve),</p> <p>Proportion of dependents not in single carer households(Census 1991) (-ve),</p> <p>Proportion of persons in households with head in manual class(Census 1991)(+ve),</p> <p>Proportion of working age population who are students(Census 1991)(+ve),</p> <p>Standardised mortality ratio 65-74 years of age (pre 1997) (+ve)</p>
Relevant Population	All population

Name of formula	PoC6 – Learning Disability
Brief description of service area	<p>The Learning Disability Programme of Care (PoC) includes all activity and resources used by any professional relating to an inpatient episode where the consultant in charge of the patient has Learning Disability as a main specialty. It also includes all activity and resources used by a hospital consultant in this specialty in relation to an outpatient episode, day case, regular day admission, regular night admission or day care. In addition all community contacts where the primary reason for the contact was due to Learning Disability regardless of age are also included.</p>
Last Update to Formula	August 2004 - CFRG 4
Utilisation data dates	2002/03
Variables in Additional Needs Index	<p>Proportion of Persons in No Carer Households (where at least one person has a self-reported long-standing illness) (Census 2001) (+ve)</p> <p>Proportion of Children in Job Seekers Allowance Households (+ve),</p> <p>Proportions of persons aged 16-74 with no qualifications(Census 2001) (+ve)</p> <p>Proportion of households with no central heating(Census 2001)(+ve),</p> <p>Proportion of children in Disability Living Allowance households(+ve)</p>
Relevant Population	All population

Name of formula	PoC7 – Physical and Sensory Disability
Brief description of service area	Current PoC guidance defines individuals who would be allocated to this PoC as those with: “A permanent physical impairment resulting in a dependency in areas such as mobility, self-care, communication and social/leisure activities. Examples of services provided might be rehabilitation, care services and family support. The patient/client should be under 65 years old.” Hospital activity and related costs are only allocated to the Physical and Sensory Disability PoC on the basis of entire wards, clinics or hospitals which treat only physical and/or sensory disabled patients.
Last Update to Formula	August 2004 - CFRG 4
Utilisation data dates	2001
Variables in Additional Needs Index	Proportion of persons aged 18-64 in disability working allowance households() (+ve), Proportion of persons under 65 with a limiting long term illness (2001 Census) (+ve), Noble Income Score (2001)(+ve)
Relevant Population	0-64

Name of formula	PoC8 – Health Promotion & Disease Prevention
Brief description of service area	This PoC consists of all hospital, community and GP practice based activity relating to health promotion and disease prevention. This includes all screening services, well women/men clinics, child health surveillance, school health clinics, family planning clinics, health education and promotion clinics, vaccinations and immunisations and community dental screening and prevention work. Most work allocated to this PoC will form part of recognised programmes where people receive advice or support specifically for health promotion or disease prevention.
Last Update to Formula	Oct 2000 - CFRG 3
Utilisation data dates	N/A
Variables in Additional Needs Index	Under 75 Standardised Mortality Ratio (SMR) - Updated yearly
Relevant Population	All population

Name of formula	PoC9 – Primary Health and Adult Community
Brief description of service area	The focus of this PoC is adult community contacts. Community patients aged between 16 and 64, for whom the primary reason for the contact is other than Mental illness, Learning Disability or physical and sensory disability should therefore be allocated to this PoC. Screening services carried out by General Medical Practitioners, General Ophthalmic Practitioners, General Dental Practitioners and Pharmacists are excluded from the programme.
Last Update to Formula	Oct 2000 - CFRG 3
Utilisation data dates	N/A
Variables in Additional Needs Index	Under 75 Standardised Mortality Ratio (SMR) - Updated yearly
Relevant Population	16-64

## Cost Adjustments

Name of formula	Economies of Scale
Budget % 09/10 SRF	2.04%
Brief description of service area	This adjustment attempts to compensate Trusts for having hospitals or community services that are of a size that do not promote optimal unit costs. This is because the size of an organisation has an impact on its unit cost. For example, facilities of a smaller size will have pressures in achieving an optimal unit cost for their services. This is because they do not have large patient/client numbers over which to apportion their indirect and overhead costs. Similarly larger facilities can have additional costs related to their size (diseconomies of scale). The combination of economies and diseconomies of scale suggests that there is an optimum size at which an organisation minimises the cost of delivering its services.
Last Update to Formula	August 2004 - CFRG 4
Utilisation data dates	2000/2001
Variables in Additional Needs Index	N/A

Name of formula	Rurality
Brief description of service area	This adjustment was introduced to try to take account of rurality/sparsity factors in allocations. Specifically this is concerned with differential travel costs incurred by Health and Social Care professionals when providing their services.
Last Update to Formula	Oct 2000 - CFRG 3
Utilisation data dates	1996-97
Variables in Additional Needs Index	N/A

# **Appendix 4**

## **Family & Childcare Capitation Advisory Group**

**Family & Childcare Capitation Advisory Group**

**Outcomes of Discussions**

**Regarding Sourcing Data for the Family and Childcare  
Component**

**Of the Regional Capitation Formula**

## Background

- 8.1 Following discussions between members of CFRG and HSCB it was agreed that a Family and Childcare Advisory group would be set up which would enable CFRG to determine what data is available and accessible to help determine the levels of need within Trust Areas.
- 8.2 A group was established which comprised of Information, Finance and professional staff from children's services within the Board and Trusts. The remit of the group was to use the annual financial data provided by Trusts in the 'Trust Financial Return' (TFR) and determine if data would be available for collection which would help to determine levels of need for children's services within Trust Areas.
- 8.3 Three meetings were held 19/12/13, 28/1/14 and 10/3/14.
- 8.4 A summary of the TFR financial expenditure was shared with the group. The TFR return provides a summary of the Trust expenditure on the Family & Childcare programme by a series of headings (see below):
- **Social Work** 38.3% of total spend
  - **Grants, Goods and services** 29.7% of total spend
  - **Residential Homes** 14.4% of total spend
  - **Payments under legislation** 9.0% of total spend
  - **Lakewood centre** 3.0% of total spend
  - **Family Day Centre** 2.3% of total spend

## Data Collection

- 8.5 The group reviewed potential sources of data that would enable client level information to be supplied to CFRG enabling a mapping of needs within each Trust's Super Output Area.

## Social Work

- 8.6 The Social Work heading on the TFR had a spend of 38.3% of total. The heading had four components (Early Years, Aftercare, Family Support and Family Placements). Caseload data is available although the currency of caseloads at Gateway Teams is not recorded consistently.

## Residential Homes

- 8.7 It was agreed that Soscare could be used to run details of all admissions to homes during the year and their length of stay. Additionally queries would be run for any child within a home during the agreed time window irrespective of when they were admitted to care.



8.8 Alternatively a manual exercise covering the entire year could be undertaken for each home. The group felt that if this was required it would be better to undertake this exercise during 14/15 rather than retrospectively i.e. Trusts would begin to collect the agreed data for the forthcoming year.

### Grants, Goods and Services

8.9 The group noted that data could be collected for Sure Start (5.57%) and Payments to Foster Carers (16.32%). Postcode level data would not be available on a consistent basis for SLA agreements with the community/voluntary/private sectors.

### Payments under Legislation

8.10 This section referred to those financial payments made to families under a number of Children Order Articles (e.g. Article 15 - HPSS Order, Article 18 – Children In Need). The group agreed that there is no consistent source for accessing data on recipients of payments. While there are panels within Trusts, these will not deal with all payments made under legislation.

### Family Centres

8.11 It was noted that the Family Centres operated different models across the five Trust areas. Some may have more intensive input with lower throughput while other will have higher throughputs. Client level data is not readily available but with regional agreement the data could be collected over the forthcoming year.

### Summary of TFR Headings and Data Sources

CFRG Heading/Sub Heading	Data Items	Data Source	Availability/Recommendation
<b>Social Work (38.3%)</b>	Caseloads	Soscare	
Early Years(2.63%)	Early Years Provision	Soscare/Local Databases	Data Available
Family Placements (9.29%)	Foster Carers, Adoption/Permanence teams, LAC, Therapeutic services,	Soscare	Data Available.
Aftercare(4.31%)	16+/Transition Teams	Soscare/Local Databases	Data Available
Family Support (22.09%)	Include all Teams mapped to the Family Support heading.	Soscare	Data Available a 'designated field' be identified on Soscare enabling the retention of the child's originating

Gateway Teams	It was agreed that assessments completed at Gateway would be used.	Soscare	postcode.  Development of new reports by BSO will be required to source this data.
<b>Residential Homes (14.4%)</b> Trust Homes	Home Name, Age, originating Postcode, length of current episode.	Soscare; Manual records within homes.  <i>Note: Trusts will aim to reduce occupancy and aim to better meet the diverse range of needs of children.</i>	<b>Partially Available</b> Use Soscare reporting to collect as much data as is available in this area. <i>Alternatively:</i> A manual exercise over a year giving details of all occupants during that time would be required.
<b>Lakewood (3%)/Glenmona</b>	Home Name, Age, originating Postcode, length of episode.	Systems held by regional homes.	Use Lakewood/Glenmona information systems.
<b>Grants, Goods and Services (29.7%)</b>  Sure Start (5.57%)  Payments to Foster Carers (16.32%)  SLAs with Community/Voluntary Sector (7.81%)	Postcode, age and Gender of recipients of this service.  New Sure Start Play Information System.  LAC children with a Fostering placement.  Postcode of recipient or identification of SOAs.	Contract Monitoring attached to SLAs held by HSCB and Trusts Sure start play System  Soscare  This relates to locally targeted contracts	<b>Client level data is accessible from some but not all Trusts.</b>  Data is available  Data is available  Data not available in most Trusts.
<b>Payments Under Legislation (9.0%)</b>  Adoption	Postcode, Age and Gender of recipients of payments.	Not recorded inconsistently across the five Trust areas on the	<b>Data on clients in receipt of payments not consistently accessible.</b>  The sensitivity of this data

Allowances (1.5%)	Originating Postcode, Age and Gender	TFR.  It was noted that it would not be possible to access originating postcode.	was noted. Postcode would only be available for family following adoption and this will not reflect needs.
Family Centres (2.3%)	Postcode, age and gender of children accessing services.	It was noted that different models of family centre are in places across the Trusts.	Data not available.

### Current Position and Recommendations

- The group advised that work should be undertaken to bring regional consistency to the completion of the TFR return – this work has begun and further work on specific areas will be brought forward.
- Work should begin to bring regional consistency to the recording of caseload data on Soscare in specific areas e.g. Gateway. The data collection relies on accurate data on caseloads. The paper suggests that caseload data is required to measure need in between 30-40% of expenditure. Some groups have been set up by HSCB to review data standardisation including day-care and Social work.
- Identify a field on Soscare for holding postcode of origin for Looked After Children
- Trusts should ensure that all data held on Soscare has a postcode attached.
- Determine what data can be extracted in relation to Grant Aid contracts with community/voluntary sector.
- Identify if systems can be put in place to record client level data on recipients of Payments under legislation.
- Community Information Systems should be developed such that they are in a position to supply the data required by the Capitation exercise in the future.

# Appendix 5

## Glossary of Terms

**Additional Needs Weighting** - Two populations of the same size and structure can have a different need for services due to a differing underlying morbidity i.e. such as that caused by deprivation levels. A statistical model is used to calculate this additional needs weighting which is then combined with an age/gender weighting to produce a single composite weighted population share.

**Adjusted R<sup>2</sup>** - This is a modification of the R<sup>2</sup> test and is again used to determine the quality of a fit of a model (See R<sup>2</sup> in this Annex). The addition within the adjusted R<sup>2</sup> is that it takes into account the number of variables included with the model, when evaluating the quality of the fit.

**Bamford** – the Review of Mental Health and Learning Disability. This independent review, set up in 2002, looked at the law, policy and provisions which affected people with mental health needs or a learning disability in Northern Ireland. The review completed its task on 16th August 2007 with the publication of its report on legislative reform.

**Capitation Formula Review Group (CFRG)** - The CFRG is a multi-disciplinary group drawn from both the Department of Health Social Services and Public Safety (DHSSPS) and Health and Social Care Board (HSCB) which has been tasked with responsibility for the Northern Ireland Weighted Capitation Formula.

**Commissioners** – A term used to describe organisations or groups who have been given responsibility for the commissioning of Health and Social Care. Commissioning involves identifying local Health and Social Care needs, making agreements with service providers to deliver services, and monitoring outcomes.

**Confidence Intervals** - Confidence intervals can be used to indicate the reliability of an estimate. Instead of estimating a parameter by a single value, a confidence interval gives an estimated range of values which is likely to include an known population parameter (an interval of 90% has been used as this was the standard level used in English work). The smaller the interval is the more reliable the estimate will be. This provides a means of assessing how accurate an area's allocation will be.

**Day Care** - Day care is provided by a health care provider for the clinical treatment, assessment and maintenance of function of patients, in particular, though not exclusively, those who are elderly, mentally ill or have learning disabilities. They may be called Day Hospitals, Centres or Units, staffing is by Health Service employees.

The facilities specifically do not have hospital beds and function separately from any ward.

**Day Case** – A patient admitted electively during the course of a day with the intention of receiving care who does not require the use of a hospital bed overnight and who returns home as scheduled. If this original intention is not fulfilled and the patient stays overnight, such a patient should be classed as an ordinary admission.

**Demography** - the study of statistics such as births, deaths, income, or the incidence of disease, which illustrate the changing nature of a country's population.

**Differential Need** - Different populations may have a different need for Health and Social Care services, due to need-related factors. This can be caused by factors including deprivation and travelling times in rural areas.

**Economies/ Diseconomies of Scale** - Costs for organisations change as they increase or decrease in size. Although there are additional costs for larger operations, scale benefits in productivity occur as efficiency increases forcing unit costs down. Similarly smaller organisations can have higher costs associated with their operations as their costs of production are spread across a lower output.

**Elderly Care** – Refers to Health and Social Care services provided to people who are aged 65 years or more that are not included in any of the other programmes of care.

**Elective** – A procedure that the patient/physician has decided should be undertaken.

**Fair Share** - The aim of the regional allocation formula is to determine each commissioner's fair share of the available resources that are available. This is based upon population size, age/gender and additional needs profile of that population.

**Health and Social Services Board** - Organisation responsible for commissioning Health and Social Care services for the resident population.

**Health and Social Care Trusts** – Organisations responsible for providing Health and Social Care services. Five Health and Social Care Trusts replaced eighteen Health Social Services Trusts in April 2007. The Ambulance Service Trust remained.

**HRG** – Health Resource Grouper -Standard groupings of clinically similar treatments which use common levels of healthcare resource. They enable comparison within and between different organisations and provide an opportunity to benchmark treatments and services to support trend analysis over time.

**Inpatient** – A non-elective patient (i.e. emergencies and transfers), and any elective patient from a waiting list who remains in hospital for at least one night.

**Local Commissioning Groups** – committees of the regional Health and Social Care Board and are comprised of GPs, professional Health and Social Care staff and community and elected representatives. Their role is to help the Board arrange or commission Health and Social Care services at local level.

**Mid-Year Estimates (MYEs)** - These are estimates of the size, age and sex of the population of Northern Ireland. The MYE has an integral role in ensuring that the Department's Capitation Formula is reflective of the most up to date estimate of the population base.

**Northern Ireland Statistics and Research Agency (NISRA)** - The official statistics organisation in Northern Ireland, which provides a considerable amount of the information used in the Capitation Formula. This includes Census figures, data on births and deaths, and information relating to demographic trends.

**Non Elective Admission-** A patient who is admitted as an emergency. This does not include maternity.

**Outpatient** – An appointment and/or an attendance to enable a patient to see a consultant, a member of his firm or locum for such a member, in respect of one referral. A patient attending a clinic will always be given an appointment (even when arriving with no prior notice, where this facility is available), but appointments will not always result in an attendance. An attendance may involve more than one person e.g. a family. The number of attendances to be recorded should be the number of patients for whom the particular consultant has identifiable individual records and which will be maintained as a result of the appointment/attendance.

**Primary Care** – the care services that people receive while living at home in the community from people such as their GP, district nurse, physiotherapist or social worker

**Rurality** - This term is a measure of the rural nature of an area. Using this term allows a correction to be made to account for any extra costs incurred in delivering services to that area

**R<sup>2</sup>** - The coefficient of determination, this is a statistic which can be used to determine the quality of the fit of a model to the data being modelled. Where a value of R<sup>2</sup>=1 indicates that the fit is perfect.

**Review of Public Administration (RPA)** – A wide ranging review of the delivery of Public Services across Northern Ireland. In the field of Health 5 HSC Trusts were set up April 2007. Further recommendations included that the 4 HSS Boards are replaced by a single Regional Health and Social Care Board which was established in 2010.

**Standardised Mortality Rate (SMR)** – The standardised mortality rate is used to compare the mortality of a particular sub-group of the population relative to a standard, adjusting for differences in population age structures. It is calculated by applying the age-sex specific rates from the standard population to the sub-group to obtain the “expected” number of deaths and comparing the actual number of deaths in the latter with the expected number.

**Super Output Areas (SOAs) – Northern Ireland is split into 890 of these.** Each of these areas has population sizes of between 1,300 and 2,800. They were described by NISRA for the 2001 census and are used in statistical analysis on a wide range of government and academic studies.

**Unmet Need** - This is a concept that there may be an under-utilisation of services in certain areas which can lead to under funding issues for the areas in question. This is a key idea in resource allocation and of prime importance when targeting resources at those who need them most.

**Transforming Your Care** – this is a strategic assessment across all aspects of Health and Social Care services examining the present quality and accessibility of services.

**Variables** – Within this modelling a variable is a measureable characteristic or feature that will vary from one SOA to the next, allowing the differences between each to be studied.

**Weighted Capitation Formula** - The formula used to calculate the fair share of resources for each of the Health and Social Care commissioners within Northern Ireland. This is based on population size, the age gender profile of that population the additional needs profile and other factors such as the rurality of the area