Benchmarking of Emergency Admissions with LOS > 0 days in Thames Valley

Links between deprivation, ethnicity, distance to nearest acute site, system thresholds and higher NHS usage

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Aims

- To provide commissioners with a benchmarking tool for hospital activity applicable to the needs of Practice Based Commissioning
  - Able to be used at small area level
  - Scalable at all levels of geography
  - With adjustment for the known factors effecting emergency admission
  - Initially at HRG Chapter level with potential to extend to high volume HRGs

- To separate out the fundamental population characteristics influencing demand from the system characteristics directly amenable to change

- To locate specific geographic areas with above average levels of activity which are contributing to overspends

- To indicate which HRG Chapters may be most subject to data quality and counting issues

Choice of Model Parameters

- Lower super output area (LSOA) data is the lowest unit of geography which has a wide range of nationally available data from the 2001 Census and other sources. Each LSOA contains around 1,500 head of population[1].

- Population characteristics known to influence acute healthcare demand
  - Deprivation using the 2004 revision of the Index of Multiple Deprivation (IMD)[2]
  - Age using the more precise 5 year age bands rather than the wider DOH age bands
  - Ethnicity to reflect the known prevalence of particular conditions among particular ethnic groups (Asian, Black and all others)[3]

- System characteristics known to influence acute healthcare demand
  - Distance to the nearest acute site
  - Thresholds for admission and coding at acute sites

[1] The model was formulated in such a way as to be able to use output area statistics (where available) to enhance the local application to practice list populations. An output area is the lowest geographic unit comprising around 300 head of population.

[2] IMD was chosen in preference to other measures of deprivation such as Carstairs, Townsend or Jarman due to the fact that it encapsulates the output of a major national study designed to measure the multiple aspects of deprivation per se. Measures such as Jarman were designed for specific aspects of primary care and are therefore less suited to understanding the wider influence of deprivation on acute care while Carstairs and Townsend used a limited range of indicators of 'material' deprivation. IMD uses a far wider range of indicators and therefore gives a more balanced view.

[3] Chinese was not included as a distinct ethnic group due to the relatively low proportion of Chinese in the UK and the fact that of all the ethnic groups Chinese tend to be the most uniformly distributed, i.e. their % distribution at LSOA level is relatively uniform and therefore does not allow a model to adequately discriminate their particular contribution.

Executive Summary

This work analyses the results from 2.13 million head of population having144, 000 emergency admissions per annum with length of stay (LOS) >0 days. Analysis is at lower super output area level (LSOA)[4] covering all extremes of age profile, deprivation, ethnic composition (Asian & Black) and distance to the nearest acute site[5] found across Thames Valley using data for the three years 2003/04, 2004/05 and 2005/06 with volumes normalised to 2005/06 out-turn. Data is analysed at Health Resource Group (HRG) chapter level where each chapter corresponds to a body system, i.e. Nervous System, Vascular System, etc. Emergency admissions with a 0 day LOS were excluded from the analysis and are covered in a separate report.

A unique relationship between deprivation and increased emergency admission is confirmed for each individual HRG Chapter. Appendix One gives details of the measurement of deprivation using the Index of Multiple Deprivation (IMD). Appendix Two details how the model works. Ethnicity has a variable effect depending on the specific HRG chapter.

In general, emergency admissions increase with decreasing distance to the nearest acute site. They are especially high for the population living within 5 km of the acute site. However this relationship is unique to each acute site and for some sites such as the Oxford Radcliff there is no increase in emergency admissions for patients living close to the hospital. The highest increase is seen in Milton Keynes and this is seen as a 15% higher volume of total non-zero LOS emergency admission (above the TV average after adjusting for the effects of age, deprivation and ethnicity).

The key finding of this work is that distance specific relationships for emergency admission and site thresholds to admission drive the overall volume of 'excess' emergency admissions. These distance specific relationships can be further sub-divided into the relative contribution of push into the acute site (by primary care, out-of-hour's services and ambulance services) and pull into the acute site due to condition-specific clinical and non-clinical coding thresholds for admission at the acute site. The MKGH and ORH sites account for 45% of the TV excess.

In this study the 12 acute hospital sites (both within and outside of TV) providing care to the residents of TV is used to define 12 hospital emergency catchment areas[6]. Each output area was allocated to a catchment using straight line distance[7]. Each acute site at the centre of a catchment area does not provide a full range of services, i.e. spinal surgery, burns care, etc; however, it is illustrative to see how relative rates of emergency admission vary between different catchment areas. The implications to Practice Based Commissioning (PBC) and the development of a small area capitation formula are discussed. HRG chapter benchmarks and estimates of excess activity have been calculated for each Ward, Local Authority and PCT.

[4] Each LSOA contains around 1,000 to 3,000 head of population. LSOA nest together into electoral wards and can be further nested into PCT or Local Authority boundaries.
[5] Straight line distance is measured in km.
[6] The 12 acute sites are as follows: Basingstoke, Frimley Park, Heatherwood, Hemel Hempstead, Hillingdon, Horton, Milton Keynes, Oxford Radcliff, Royal Berkshire, Stoke Mandeville, Swindon, Wexham Park, and Wycombe.
[7] This method assumes that the bulk of the population would normally go to the nearest acute site for emergency care. Around 5% of emergency admissions are to out-of-area hospitals; however for the purpose of establishing good correlations the approximation is fit for purpose.

Key Points

Effect of Population Characteristics

- **Rates <u>increase</u> with the Index of Multiple Deprivation (IMD)[8], i.e. areas of highest deprivation have highest levels of emergency admission.**
    - Maximum increase is for Chapter D (Respiratory System) and K (Endocrine & Metabolic Systems) with a 33% and 32% respective increase in emergency admission for every 10 unit increase in IMD.
    - Minimum increase is for Chapter B (Eyes & Periorbita) with a 6% increase in emergency admissions for every 10 unit increase in IMD.

- **Some HRG chapters show <u>increased</u> levels of emergency admission due to ethnic population.**
    - Greatest effect for people of Asian descent is in Chapter K (Endocrine & Metabolic Systems).
    - Greatest effect for Black people is in Chapter N (Female Reproductive System).

- **Age and IMD have the greatest contributory effect to overall levels of admission**
    - Ethnicity plays a secondary role
    - High proportion of ethnic population and IMD are often related

- **Attempts to analyse Chapter N (Maternity & Neonatal) were frustrated by what appears to be widespread inconsistency in how events are counted and coded.**
    - Events during gestation but not birth are inconsistently counted.
    - The coding and counting of neonates appears in total disarray.
    - The coding and counting of HRG N12 'Events during pregnancy other than birth' are likewise subject to high variation.
    - Some delivery events are counted as 'elective' in one place and 'non-elective' in another

- **The effect of Age is incorporated into the analysis using national rates of admission per 5 year age band up to 85+ which are specific to each HRG chapter.**
    - Rate per 1,000 head is usually highest for the 85+ age group
    - Exceptions are Chapter N (Female Reproductive) age 25 to 29, Chapter M (Obstetrics & neonatal) age 20 to 24 and Chapter P (Childhood) age 0 to 4.
    - These are applied to the age profile of each LSOA to compare actual and expected volumes of admission.

[8] See Appendix One for a wider discussion on the Index of Multiple Deprivation

Effect of the Healthcare System

- **System thresholds to admission can be sub-divided into 'push' and 'pull' factors**
  - Push describes the push into the acute site due to primary care, out of hour's services and ambulance services, i.e. how effective are these services at diverting what will otherwise become excess emergency admissions or receiving back patients unsuited to acute care.
  - Pull describes the pull into the acute hospital due to thresholds for admission arising from the arrangement of medical & diagnostic services, i.e. how effective is the acute site at rapid diagnosis and handing back to primary care what may otherwise become excess overnight emergency admissions.

- **The Push into the Acute site appears to increase with decreasing distance**
  - A power function[9] describes the very high levels of admission closer to the acute site. There is no additional push beyond 20 to 30 km from the acute site
  - There is an additional level of higher emergency admission (over and above the power function) which operates up to around 5 km
  - Both factors depend on the acute site
    - No increase with reducing distance at the ORH, RBBH and Swindon sites implying effective primary care functions and/or ambulance triage.
    - A very large increase as distance reduces at the Milton Keynes, Stoke Mandeville and Wexham Park sites implying the need to strengthen primary care functions and/or ambulance triage.

- **The Pull into an acute site is a function of the threshold to admission determined by the acute Trust and/or its ability to hand back to primary care those cases which are not fully appropriate to an acute setting.**
  - Leads to a 10% increase in levels of emergency admission at the ORH, Banbury and Swindon acute sites.
  - Leads to a 5 to 8% reduction in levels of emergency admission at the Stoke Mandeville, RBBH and Wexham Park sites.

Wider Applications

- **Areas of highest IMD within 5 km of an acute site are most likely to gain greatest benefit from the input of emergency admission avoidance programmes, i.e. community matrons, ambulance triage, etc.**
  - The top 250 LSOA with greatest potential for return on investment are identified in Appendix Five.
  - Only 18% of the population live in such areas but they account for 27% of emergency admissions.

- **There are implications to the development of a small area formula suited to the needs of practice based commissioning**
  - Comments are made throughout the report
  - The small-area local formula developed in this work can be used as an alternative to the national capitation formula to help PCT and practice based commissioners to identify the pocket of excess 'expressed' demand

[9] A power function is a mathematical relationship of the form, Push into the hospital = Constant 1 x Distance to the power of Constant 2.

Introduction

The current form of the capitation formula has the unfortunate limitation of assuming that outpatient attendances, emergency & elective admissions all behave in the same way in terms of their response to age, deprivation, etc. The formula uses the standard DOH age bands rather than more detailed 5 year age bands and only works down to electoral ward level rather than the smaller population groups found at Lower Super Output Area (LSOA) level relevant to local GP Practices.

Finally the formula is only designed to allocate money and so cannot strictly speaking be used as a measure of activity. Indeed attempts to use the formula to 'benchmark' activity rely on apportionment of total activity for England down to PCT level based on funded share. Detailed analysis shows that this breaks down at regional level due to differences in the way care events are counted across the NHS

These limitations mean that the ability to make meaningful practice based commissioning (PBC) activity calculations using the capitation formula is seriously compromised. This report will investigate the specific factors influencing emergency admission with a length of stay greater than zero days. The report will aim to explain the factors leading to higher emergency admission and to enable the development of a formula suitable for local use in supporting PBC calculations and benchmarking. This work is a development of an earlier study at specialty level which showed that emergency admissions tend to increase more rapidly with IMD than elective admissions and that each specialty has its own unique relationship with IMD[10].

At this point several comments need to be made about capitation formulae in general. Firstly, there is no such thing as a perfect formula and nor will there ever be. The 'formula' attempts to take general population characteristics and to allocate resources accordingly. The specific and rare conditions experienced by individuals are assumed to be average across the population and the effects of environment such as pollution and weather patterns are not included in the models although both are known to have a disproportionate effect upon certain disease groups[11]. Hence at a local level there will always be winners and losers from any formula, indeed, this work appears to indicate that the current national formula may over-allocate funds to Milton Keynes in relation to other TV PCT's[12].

At the end of the day resources have to be allocated and healthcare is not exempt from its obligation to manage within the budget so allocated especially so if system thresholds are so widely different; as has been demonstrated in this report.

Exclusion of Zero Day Stay Emergency Admissions

In recent years Thames Valley has shown the highest apparent growth in the volume of emergency admissions in England, however, analysis backing this work reveals that this growth is almost exclusively due to emergency admissions with a zero day stay, i.e. there has been almost no growth in the volume of non-zero day emergency admissions over the past three years. These zero day stay emergency admissions appear to arise when an acute trust shifts the interface from A&E to an Assessment

[10] Refer to Jones, R (2006) Analysis of Inpatient admissions in Thames Valley. Report prepared for Thames Valley Strategic Health Authority by Healthcare Analysis & Forecasting.
[11] As demonstrated by the MET Office Health Forecasting Unit.
[12] Which appears to have partly hidden the magnitude of the problem from the attention of the local healthcare system?

Unit, i.e. activities which would previously have been reported as an A&E attendance are now counted as an 'emergency admission'.

Table One: National HRG chapter percentage of non-zero day stays

HRG Chapter	% non-zero day stays	HRG Chapter	% non-zero day stays
M	56%	R	81%
N	61%	E	81%
P	62%	A	85%
B	63%	F	86%
T	70%	L	87%
S	75%	Q	88%
H	76%	K	89%
J	79%	D	91%
C	80%	G	96%
All	**79%**		

While part of this shift may represent best practice it acts to confound the analysis and creates a specific PbR problem for two reasons. Firstly the majority of current HRGs do not have a short stay tariff, i.e. a zero day stay is paid for at the same price as a full length stay. Secondly the current short stay tariff includes 0 and 1 day stays and appears to over-remunerate the vast majority of zero day stays. For this reason all zero day stay emergency admissions have been excluded and are analysed in a separate report to facilitate meaningful PBC calculations.

National data for 2004/05 from HES is given in Table One to indicate the percentage of non-zero day emergency stays in each HRG Chapter. As can be seen this ranges from 56% in Chapter M (Obstetrics & Neonatal) through to 96% in Chapter G (Hepato-biliary & Pancreatic) with an average of 79%.

Table Two: HRG with the highest volume of non-zero day stays in each Chapter

HRG	Description	% of chapter volume
H37	Closed Pelvis or Lower Limb Fractures <70 w/o cc	9%
P13	Other Gastrointestinal or Metabolic Disorders	14%
D40	Chronic Obstructive Pulmonary Disease or Bronchitis w/o cc	15%
E36	Chest Pain <70 w/o cc	16%
A22	Non-Transient Stroke or Cerebrovascular Accident >69	16%
J41	Major Skin Infections >69 or w cc	16%
F47	General Abdominal Disorders <70 w/o cc	16%
Q18	Non-Surgical Peripheral Vascular Disease w/o cc	20%
S16	Poisoning, Toxic, Environmental and Unspecified Effects	20%
G19	Biliary Tract Disorders <70 w/o cc	21%
B33	Non Surgical Ophthalmology with los >1 day	21%
L09	Kidney or Urinary Tract Infections >69 or w cc	22%
K07	Fluid or Electrolyte Disorders >69 or w cc	22%
M09	Threatened or Spontaneous Abortion	24%
R16	Thoracic or Lumbar Spinal Disorders <70 w/o cc	30%
C17	Intermediate Medical Head, Neck or Ear Diagnoses w/o cc	31%
T12	Alcohol or drugs dependency	35%
N12	Antenatal Admissions not Related to Delivery Event	62%

Table Two details which individual HRG are responsible for the highest volume of non-zero stays in each chapter. As can be seen the highest volume HRG contributes to between 9% and 62% of the total chapter volume with an average of around 20%. Almost all are medical diagnoses rather than surgical conditions, i.e. they can be subject to the higher ambiguity. In this respect note that HRG's T12 and S16 (both in

Table two) are potentially interchangeable given imprecise or short-hand recording of the diagnosis and treatment.

Factors Influencing the Volume of Emergency Admission

The earlier work conducted at specialty level identified that age, IMD and ethnicity had a significant effect on the volume of emergency admissions. It identified limitations of working at specialty level in that there are considerable specialty overlaps.

This work aims to overcome these limitations by using HRG Chapters. HRG's are the currency for PbR and PBC and so it is sensible to make use of HRGs as the basis of segregating emergency admissions into different types. HRGs are structured into body systems and so are likely to be a suitable basis for analysis of the common factors influencing emergency admission[13].

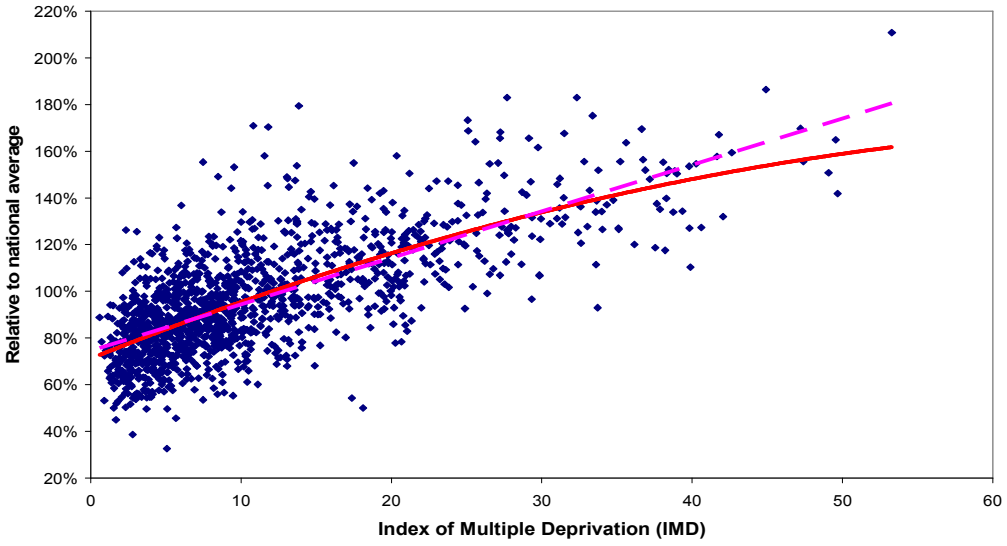
The analysis presented here takes the previous work one step further by expanding ethnicity into Asian and Black racial origins and by including the effect of distance to the nearest acute site. In addition the precision of the analysis has been increased by using three years of data instead of one, i.e. the effect of random variation due to Poisson statistical variation has been reduced thereby allowing greater specificity in locating the 'true' value of the model parameters.

The effect of students and private health are not included since model testing demonstrated that they have no effect on emergency admissions. The analytical methods used in this report are covered in Appendix Two. Results of the investigation will now be discussed.

IMD and Volume of Emergency admissions

Figure One demonstrates the relationship between IMD and the relative volume of total admissions to all HRG Chapters (excluding M – Obstetrics & T - mental health).

Figure One: Increasing volume of emergency admissions and IMD



[13] The implication of Table Two is that it will be the high volume HRG within the chapter which will exert the greatest influence on the model.

The data in this figure has been adjusted for the effects of site thresholds and distance (see later). Note that of all the factors incorporated into the model IMD has by far the greatest ability to 'explain' the volume of emergency admissions more so than age and catchment thresholds. See Appendix Two for a more detailed discussion.

Several points emerge from this figure:

1. The observed scatter at LSOA level is high and this is mainly due to the unavoidable effects of Poisson randomness. At LSOA level the maximum number of emergency admissions across all HRG chapters (including Chapters N & T) is 285 giving a 99% confidence interval which will always be greater than ± 20%. The average total emergency admissions at LSOA level are 104 giving a 99% confidence interval of ± 30%. There are about 5 LSOA where the outcome is unexpectedly low and this may be to do with LSOA whose ownership has been in dispute between PCTs, i.e. the data set is incomplete.
2. Given an upper quartile practice list size of 10,000 head a larger practice is composed of just 7 LSOA (approx 1,500 head per LSOA) and so random variation will play an important part in PBC. At a list size of 10,000 this reduces the maximum variation to ± 7% (higher for smaller list size below 10,000[14]).
3. Effectively the formula allocation of money is the equivalent to the red line (the average) while the actual performance is the data points. By implication to <u>always</u> save money in the face of Poisson randomness in emergency demand against the assumed funded level (the average trend line) each practice would need to reduce their local average number of emergency admissions to 7% below the funded average This is probably more easily achievable in some locations than others. Recall that practices with above average levels must first reduce to the average and then go below the average to avoid the effects of Poisson variation. There is a clear message regarding grouping practices into larger networks.
4. The relationship is non-linear with the rate of increase declining as IMD increases, i.e. deprivation has a declining effect and probably reaches an upper limit set by human biology.

The final point is relevant because the current form of the national capitation formula assumes a straight line relationship between rate of admissions and deprivation[15]. This fact alone is likely to benefit all practices operating in areas where the IMD is >50 units[16]. Only 2,300 (7%) of all LSOA have an IMD > 50 (mainly in Birmingham, Liverpool & Manchester) and hence particular areas are likely to benefit from the current allocation formula. See Appendix Six for a full list of areas where local PCTs are most likely to benefit.

The formula is also likely to under-fund a balancing 2,300 LSOA (a balancing set of 2,300 LSOA at the other extreme will have IMD less than five units). Some 369 of these LSOA fall within Thames Valley comprising 30% of all TV LSOA[17]. Thames Valley may experience a material level of under funding due to this non-linear behaviour. See Appendix Six for the locations most likely to be under- funded.

[14] The average list size across Berkshire & Oxfordshire is 8,000 head. The largest list size is 26,000 for a single practice in Wokingham. The smallest is around 600 head in Oxford City.
[15] The national formula does not use IMD but uses several single dimension measures of 'deprivation' in different parts of the formula.
[16] The national formula does NOT use IMD as the measure of 'deprivation'; however, this statement is illustrative of the likely effects.
[17] The exact effect would require re-analysis of the national data used to construct the formula.

A linear relationship is significantly easier to model and the assumption of linear behaviour used in this report is valid for TV since only 5 LSOA occur in the region where the non-linear and linear approximation is significantly different[18].

The slope of the above relationship in Figure One gives the increase in emergency admissions as IMD increases (slope of 0.001 = 1% increase in volume of emergency admissions per 10 units of IMD) while the Y-axis intercept gives the position relative to the national average (100% = national average) applied to the particular age structure of each LSOA[19]. Note that in this work the national average includes zero length of stay admissions while the local data excludes them.

Table Three summarises the percentage increase in emergency admissions for a 10 unit increase in the index of multiple deprivation (IMD). For comparison a 10 unit increase in IMD increases smoking prevalence by 5 percentage units, i.e. from say 2.5% to 7.5%, etc. At a local level IMD ranges between 1 (least deprived) and 50 (most deprived) units and the maximum national value is 86 units for one LSOA in Liverpool.

It is of interest to note that Chapter D (respiratory) which is at the top of the table and has a high proportion of total emergency admissions also contains the bulk of the few HRG which show a seasonal increase during the winter months[20]. It is this chapter which is alone responsible for any winter bed crisis. There are key implications to the focussing of community matrons into elderly and very young populations where deprivation is high.

Table Three: Percentage increase in emergency admissions for a 10 unit increase in IMD

HRG Chapter	Increase	Proportion of total emergency admissions
D Respiratory	33%	9%
K Endocrine & Metabolic	32%	1%
T Mental Health	32%	2%
G Hepato-biliary & Pancreatic	30%	2%
Q Vascular	28%	1%
J Skin, Breast & Burns	26%	4%
L Urinary Tract & Male Reproductive	23%	5%
S Haematology, Poisoning & Non-specific groupings	21%	7%
A Nervous System	20%	6%
E Cardiac	19%	12%
R Spinal	19%	1%
F Digestive	19%	12%
All excluding N, T	19%	67%
M Female Reproductive	14%	2%
H Musculoskeletal	13%	9%
C Mouth, Nose & Ears	13%	2%
P Childhood	13%	8%
B Eyes & Periorbita	6%	1%

These findings are consistent with the known evidence for the effect of deprivation on health inequalities[21] and the secondary effects of smoking on health[22].

[18] In terms of modifying the national formula it may be easier to split the curve into two linear segments covering IMD 0 to 40 and IMD > 40.
[19] Recall that the national average IMD is around 22.
[20] Parts of Chapter D (HRGs D13, D14, D15, D21, D22, D39, D40, D41, D99) plus several respiratory HRG in Chapter P (HRGs P01, P03, P04).
[21] Raleigh,V.S. & Polato,G.M. (2004) Evidence of health inequalities. Healthcare Commission Strategy Document.
[22] Hughes, A and Atkinson (2005) SEPHO report 'Choosing Health in the South East: Smoking'.

Note the differing sensitivity of each HRG Chapter to IMD. This difference partly explains why the ratio of emergency admissions between one HRG Chapter to another differs so widely from one PCT to another. This crucial difference does not appear to be reflected in the current capitation formula, i.e. due to the difference in average price for each HRG Chapter the correct allocation of funds needs to reflect the correct mix of volume across each HRG chapter.

Ethnicity and the Volume of Emergency Admissions

The previous work at specialty level identified Cardiology as a particular specialty where volumes increased with increasing ethnic population.

As can be seen in Table Four the Asian population has higher levels of emergency admission in Chapters E (Cardiac), K (Endocrine & Metabolic) and P (Childhood) while their Black counterparts have higher admissions in Chapters G (Hepato-biliary) and M (Female Reproductive). These findings are broadly consistent with known disease prevalence. All other Chapters show no change with ethnic type and the all chapter total is for a zero overall effect.

Table Four: Incremental increase in emergency admissions for a 10 percentage point increase in proportion of different ethnic types[23]

HRG Chapter	Asian	Black
E Cardiac	9%	
G Hepato-biliary		11%
K Endocrine & Metabolic	8%	
M Female Reproductive		15%
P Childhood	4%	

There are clear implications to PBC calculations of 'fair' practice budgets in areas where particular ethnic types are concentrated.

However, to put ethnicity in context it must be noted that the age profile and IMD of a LSOA act to determine the level of emergency admissions far more so that ethnicity which only has a secondary modifying effect. In addition the non-population characteristics of the healthcare system have a far greater overall effect on all persons than ethnicity. Refer to Appendix Two for specific comments.

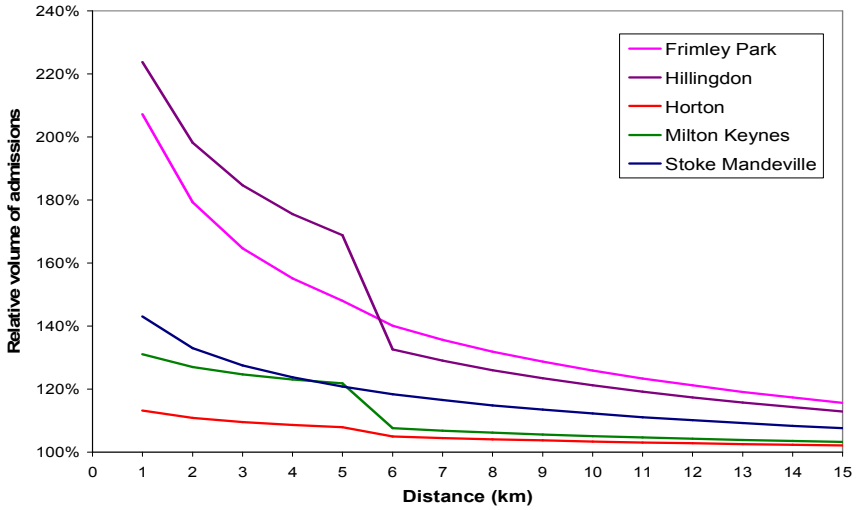
Effect of Distance on Emergency Admission

The effect of distance on the volume of emergency admissions has been recognised for many years. The distance effect is usually modelled with some form of non-linear reduction over distance. A mathematical relationship called a power function is often used to approximate this non-linear reduction.

Initial attempts to use a power function common to all acute sites did not work as well as had been anticipated. Results were then plotted for each acute site and at this point it became clear that the decay in volume is unique to each site.

[23] As discussed in Appendix Two the range within TV at LSOA level is only 0 to 20% for Black ethnic groups. For this reason the coefficients given for Black ethnic groups will be subject to a larger confidence interval than the corresponding Asian group which has a far higher range 0% to 80% upon which to determine the model coefficients.

Figure Two: Decline in volume of emergency admissions with distance for several acute sites. Data covers all HRG chapters except N & T.



The model was then reformulated; however, it was still clear that admissions were higher within 5 km of an acute site than the model was predicting. Visual inspection seemed to indicate a boundary at 5 km and so this was modelled as an additional increment functioning below 5 km. Results are shown in Figure Two for selected acute sites and proportion of the acute site catchment living within 5 km is given in Table Five.

The next major observation was that there were no apparent distance effects surrounding some acute sites such as the Oxford Radcliff, Swindon and Royal Berkshire Hospitals.

Table Five: Proportion of total catchment population living within 5 km.

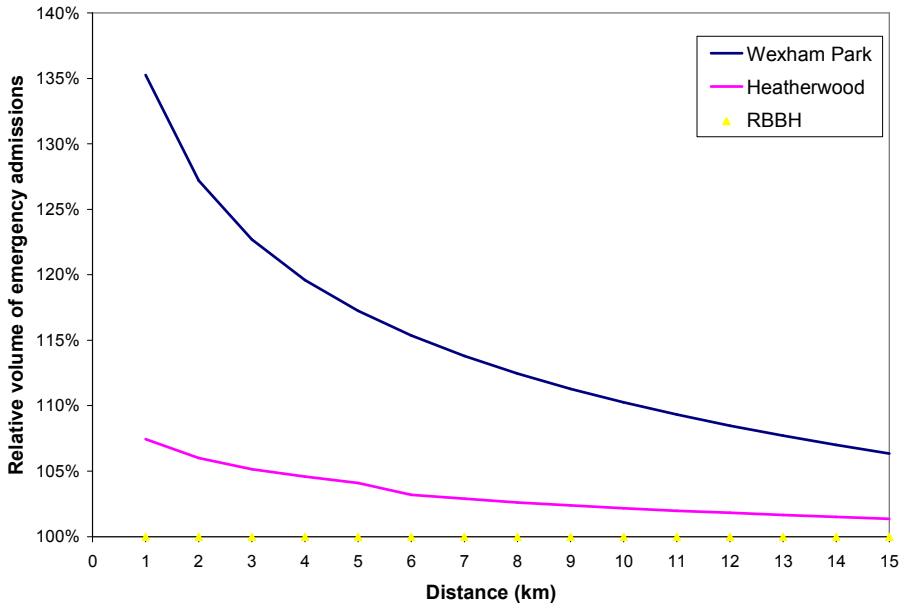
Acute Site	Proportion of catchment population living within 5 km
Horton (Banbury)	56%
Milton Keynes	55%
Royal Berkshire (Reading)	52%
Heatherwood (Ascot)	51%
Wexham Park (Slough)	50%
Stoke Mandeville (Aylesbury)	49%
Wycombe	45%
Oxford Radcliff	31%

This behaviour implies that there are system specific effects. It is suggested that the ambulance service may play an important role in these system specific effects and the Oxfordshire system is worthy of specific comment.

The Oxfordshire ambulance service has been proactive in seeking to triage 999 calls upon receipt of the call and upon arrival at the patient's location. Indications are that this acts to reduce Category C journeys into the hospital by around 45%[24]. It would seem likely that this triage is responsible for the lack of distance related effects surrounding the Oxford Radcliff site.

[24] For specific details of the admission avoidance work of the former Oxfordshire ambulance service contact Steve Young, Integrated Emergency Care Manager, Oxfordshire Division, South Central Ambulance Services NHS Trust; steve.young@oxamb.nhs.uk

Figure Three: Distance related effects for the three acute sites in Berkshire. Data is for Total emergency admissions excluding Chapters N & T.



The Horton site, whilst located in Oxfordshire is serviced by 4 separate ambulance services (Oxfordshire, Two Shires, Warwickshire and Northamptonshire) and it is possible that the absence of triage in the non-Oxfordshire services is responsible for the intermediate distance effects seen at this site.

The differences between the trust sites serviced by the Royal Berkshire Ambulance service are shown in Figure Three.

It is possible that differences between the old East & West Berkshire ambulances services still remain. The intermediate position of the Heatherwood site may be explained by the fact that Heatherwood only admits Orthopaedic, Gynaecology and Medical patients with patients in other specialties travelling to Wexham Park or Frimley Park.

Whatever the reasons it is clear that the healthcare system surrounding each acute site is responding to distance in a unique way[25]. There is clear scope to reduce the volume of admissions is particular areas.

Such a reduction may involve public and GP education, the introduction of ambulance triage at the location of the patient and strengthened primary care services.

Effect of Acute Thresholds to Admission

The fact that there is large variation in acute healthcare structure & practice is widely known and implies that thresholds to emergency admission should be different at different sites.

[25] The national formula makes general recognition for distance effects but will be subject to miss-specification by not recognising the unique system specific effects.

The usual approach to identify a healthcare system is to use a PCT or local authority boundary, however, such boundaries do not reflect the usual flows of patients to the nearest acute hospital site. In this study each LSOA has been assigned to sit in the catchment area of the nearest acute hospital site.

In this study a 100% relative rate of admission represents the TV average while a relative admission rate of 120% implies 20% more emergency admissions than the TV average after adjusting for the effects of age, IMD, ethnicity and distance.

Table Six demonstrates that certain hospital sites have far higher rates of admission, i.e. have a lower threshold to admitting a patient. This appears to be a feature of the Oxford Radcliff, Horton and Swindon sites (10% increase in overall volume of emergency admissions) and to a lesser extent at Basingstoke, Milton Keynes and Heatherwood.

It is possible that the sites with the highest threshold to admission are those with the highest average bed occupancy, i.e. admission avoidance due to lack of beds, while in other cases the location of primary care services adjacent to A&E may also contribute[26].

Commissioners should question admitting practices for sites which are significantly above the TV average.

It must be pointed out that GP specific effects have not been incorporated into the model and it is possible that a part of the so-called Acute site thresholds are due to GP- specific behaviour. Separate work appears to indicate that this is possible. Also note that the site threshold and the distance thresholds appear to interact such that neither can be interpreted in isolation to the other. The values in Table Six are indicative and are there to flag gross differences for further investigation.

Potential Reductions in Emergency Admissions

Obviously PCTs and practices will be interested in the scope for a reduction in emergency admissions. These calculations are given in Appendix Four. The excess admissions at Local Authority are summarised in Table Seven. The effect of IMD and ethnicity is assumed to be a fundamental feature of healthcare and in the short-term, are unlikely to be changed.

The end conclusion of this analysis is that the total saving in emergency admissions across the whole of Thames Valley after eliminating all distance related effects and increasing the threshold to admission up to the Thames Valley average is around

[26] The reader should recall that the so-called admission threshold is an output of the model, i.e. the model is attempting to tell us something about the real world behaviour of each site and its associated catchment population. Rather than reflecting a propensity to admit the threshold may alternately reflect the difficulty of not admitting, i.e. in some locations it is more difficult to return a patient back to primary care than it is to admit and discharge after a few days. If this is the case then some trusts with a low apparent threshold to admission should show what at first appears to be a favourable average LOS, i.e. they are admitting higher numbers of less acutely ill patients which then go on to stay for a shorter period of time. Hence before accusing acute trusts of having a low threshold to admission it is necessary to fully understand the factors contributing to the 'admission threshold'.

In addition the 'admission threshold' must not be seen as a general threshold but is most probably condition specific. Hence one site will admit a higher proportion of say diabetic cases while another will deal with these via outreach type services. This understanding then opens up the way for changes in disease management pathways.

Table Six: Site admission thresholds

Site	A	B	C	D	E	F	G	H	J	K	L	M	P	Q	R	S	T	All excl N, T
Horton	113%	105%	95%	106%	110%	111%	118%	121%	128%	111%	111%	103%	106%	113%	143%	101%	73%	113%
Swindon	109%	95%	90%	120%	114%	114%	111%	115%	68%	110%	110%	113%	97%	101%	121%	115%	89%	112%
ORH	110%	133%	102%	115%	106%	112%	119%	105%	114%	123%	123%	96%	86%	96%	118%	144%	66%	111%
MKGH	97%	116%	95%	95%	128%	105%	97%	103%	98%	119%	119%	107%	105%	104%	120%	76%	118%	104%
Heatherwood	78%	71%	94%	106%	87%	73%	48%	73%	65%	110%	110%	110%	88%	102%	103%	80%	86%	102%
RBBH	94%	69%	112%	94%	85%	97%	93%	92%	88%	89%	89%	68%	100%	97%	89%	87%	133%	95%
Wexham Park	96%	71%	96%	104%	97%	86%	90%	103%	94%	92%	92%	132%	107%	101%	86%	96%	135%	94%
Wycombe	106%	108%	85%	86%	86%	97%	100%	103%	95%	78%	78%	134%	115%	96%	82%	92%	45%	94%
Stoke Mandeville	95%	154%	103%	92%	106%	101%	97%	94%	116%	76%	76%	89%	105%	115%	81%	90%	92%	92%
FPH	76%	47%	89%	93%	88%	66%	71%	65%	98%	91%	91%	93%	65%	66%	72%	70%	104%	73%

A threshold of 125% implies 25% more admissions that the TV average.

Important note: The site admission thresholds need to be interpreted in conjunction with the distance effects. Hence if MKGH admits 170% more people as a result of distance effects the above site admission threshold of close to 100% simply states that there is no additional factor relating to this site other than the distance effects. For sites such as the RBBH and the ORH the lack of any distance effects implies that the site threshold is a direct measure of the relative propensity to admit. The combined effect of distance and site thresholds is reflected in the total excess admissions given in Tables Seven & Eight.

Admissions to Chapter T are a mixture of Mental Health and Acute. There are significant threshold effects between the highest and lowest admitting site. The exact explanation of these thresholds may require further investigation but they do tend to suggest that considerable reductions can be achieved.

Most HRG chapters do not have significant overlaps, however, for some chapters ambiguity in the diagnosis or the recording of the diagnosis could lead to a higher than expected proportion of patients being coded to a particular chapter. In particular Chapter S contains codes for admissions for unexplained symptoms, planned procedures not carried out, etc. Very high relative volumes of admission in Chapter B are exclusively related to non-surgical Ophthalmology admissions which appear to be absent in Ophthalmology departments at other sites.

Non-surgical HRG often account for the higher volumes of admissions in particular Chapters seen at some sites, i.e. the greatest ambiguity in admission thresholds seems to be in non-surgical diagnoses.

Table Seven: Calculated 'excess' admissions for residents of local authorities and PCTs.

Local Authority	A	B	C	D	E	F	G	H	J	K	L	M	P	Q	R	S	T	All excl T	% TV
Milton Keynes	203	34	51	391	814	528	49	211	65	60	53	171	448	14	113	38	194	3,242	21%
Cherwell	83	24	32	207	345	339	94	161	92	47	118	29	192	25	66	126		1,977	13%
Aylesbury Vale	38	45	25	69	471	175	66		105	19	55	50	215	41	21	11	22	1,405	9%
West Oxon	78	17	23	204	126	214	40	138	91	29	120	17		17	37	241		1,393	9%
Wycombe	59	25	9		197	120	26	26	63		15	125	384	17	19			1,086	7%
Vale of White Horse	93	15	15	162	94	125	32	52	48	26	42	23		12	17	281		1,036	7%
Slough	24		24	95	96	74	2	6	32	33	126	137	212	7	10		158	877	6%
South Oxon	59	15	8	47	41	83	22	44	47	37	40	5		18	9	318	5	794	5%
South Bucks	20		20	17	88	90	10	79	32	5	6	40	98	12	14	42	31	572	4%
Bracknell Forest	35		28	139	165	25			22	21	23	46		15	18	31	127	569	4%
WAM			15	71	31			63	8	27	72	94	112	16		27	121	534	4%
Oxford	27	29	20	31	18	21	30	27	36	33					15	235		522	3%
West Berkshire	29		30	55		122	30			8	88		90	27		9	66	490	3%
Chiltern	78	16			9	32		96	38			44	78	6	5	31		432	3%
Reading			62				9				8		64	5			172	148	1%
Wokingham	8		37				11				8		51	12			84	127	1%
TV Total	**835**	**220**	**399**	**1,487**	**2,494**	**1,948**	**420**	**903**	**678**	**346**	**775**	**782**	**1,942**	**243**	**342**	**1,388**	**981**	**15,203**	

Table Eight: Calculated 'excess' admissions for residents living within various acute site catchment areas

	A	B	C	D	E	F	G	H	J	K	L	M	P	Q	R	S	T	All excl T	% TV
MKGH	198	41	58	395	847	526	52	235	74	62	57	167	462	16	116	21	192	3,519	22%
ORH	217	68	79	437	353	478	146	212	198	114	215			35	75	905		3,533	22%
Wexham Park	66		61	190	211	153		135	68	61	209	264	415	27	27	39	294	2,221	14%
Stoke Mandeville	46	44	20	59	477	214	70		126	19	48	63	222	44	16	51	26	1,545	10%
Horton	91	17	13	151	268	223	58	176	68	37	71	15	181	21	52	52		1,494	9%
Wycombe	84	26			193	108	20	77	65			143	394	18	15			1,143	7%
RBBH			124	13			40			17	77		210	44			335	861	5%
Swindon	37		12	98	64	97	20	40	18	10	40	17		14	15	130		612	4%
Heatherwood	15		18	91	84	30			19	23		38	31	20	17	53	100	540	3%
FPH				43	43				10		36						27	160	1%
Hemell Hempstead	32					17		31	15			21	39			14		169	1%
Acute Total	**786**	**197**	**385**	**1,477**	**2,540**	**1,845**	**406**	**907**	**661**	**343**	**753**	**728**	**1,954**	**241**	**334**	**1,265**	**975**	**15,798**	

15,000 admissions which represent 9% of non-zero day stay emergency admissions. This is probably sufficient to remove all financial pressures attributable to emergency admissions from Commissioners budgets.

As can be seen in Table Seven 51% of these potential savings arise from just four local authority areas with just over 20% from Milton Keynes alone[27]. Total savings under full PBR come to around £20M to £30M for PCTs and probably are less than 30% of this amount for acute Trusts since the saved admissions are likely to be at the lower end of the LOS spectrum, i.e. 1 and 2 day stays.

Table Eight shows the same calculated excess as Table Seven but allocated into acute site catchment populations. As can be seen the MKGH and Oxford Radcliff sites account for around 45% of the total 'excess' non-zero day emergency admissions.

Additional Insights into Data Quality Afforded by the Model

Additional insights into factors relating to data quality and coding consistency can be deduced from the model. This is achieved through what is called 'analysis of residuals'. A residual is the difference between the real world (actual number of admissions) and that predicted by the model. The model sums residuals across all LSOA and seeks to minimise the sum of residuals. Results for the various HRG Chapters are given in Table Nine.

Table Nine: HRG Chapters where the sum of residuals is higher than for other Chapters

HRG Chapter	Sum of Residuals
E,F, H, M, P, T	Low
A, C, D, G, J, L, S	Intermediate
B, K, Q, R	High
N	V High

Factors leading to a high sum of residuals are as follows:

1. Inconsistent thresholds to admission, i.e. the same patient will be admitted when beds are freely available but not admitted when beds are 'tight'.
2. Inconsistent diagnosis and coding, i.e. the same patient will be coded to a different HRG Chapter depending on the ward they are admitted to or the medical team that delivers their care.
3. Inconsistent counting, i.e. the same person is admitted as an emergency in one hospital but not in another.
4. Inconsistent length of stay, i.e. the same patient will be discharged on the day of admission in some hospitals but not in others, or for different medical teams.
5. An incomplete or incorrect model, i.e. assuming a linear relationship when the real world is non-linear, etc.

Point No. 5 has been dealt with during the process of analysis where different forms of the model have been tested and it is the results of the final form of the model which are presented here.

[27] Reduce the calculated excess for MK by 3% to account for differential population growth. This has a trivial effect and takes the total potential saved admissions from 3,400 down to 3,300. See Appendix two for detailed calculations.

As can be seen in Table Eight the sum of residuals in some HRG Chapters is higher than in others[28].

HRG chapters where the sum of residuals is very high

This was especially so in Chapter N (Obstetrics & Neonatal) and is the direct result of very inconsistent counting between different hospitals, i.e. point No. 3. While some of this inconsistency has been removed by excluding 0 day LOS admissions (i.e. what may otherwise by classified as an obstetric A&E attendance[29]) there is clearly a source of further inconsistency. Part of this may be related to the proportion of mothers who have given birth and are subsequently discharged on the day of birth[30]; however, the coding of neonates appears to be the main source of the problem.

Many neonates have minor conditions at birth which naturally resolve themselves within a few days. Convention is to count these babies as a 'well baby'. Some hospitals appear to be both counting and coding these 'well babies' as neonates with one or more minor diagnoses even though they are not treated in a special care baby unit or a dedicated neonatal unit.

The national proportion of neonates with one minor diagnosis (HRG N03) is that 38% are discharged on the day of birth which is higher than the 26% of mothers who are discharged on the day of birth. This appears to confirm that in some hospitals well babies are being coded as an overnight admission as either HRG N03 or N02 (neonates with multiple minor diagnoses). In view of the potentially serious consequences to Payment by Results (PbR) it would seem that national guidance is needed to resolve these issues.

HRG chapters where the sum of residuals is high

All four HRG Chapters falling into this group cover those body systems where the volume of admissions is very low, i.e. admissions are infrequent and are unlikely to be covered by care pathways, hence, ambiguity in clinical decision making and thresholds is likely to be high.

Emergency admissions to Chapter B (Eyes & Periorbita) are dominated by two non-surgical HRGs, namely, B32 (Non-surgical Ophthalmology with LOS < 2 days) and B33 (Non-surgical Ophthalmology with LOS > 1 day). Supplementary analysis shows that admissions to these HRG are concentrated in particular hospitals, i.e. point No. 3, with the potential for inconsistent LOS, i.e. point No. 4. These HRGs contain a range of diagnoses ranging from trivial to more serious, i.e. point No. 1 and hence there is ample opportunity for extraneous factors to lead to higher than expected residuals.

Similarly in Chapter K the HRG covering Fluid or Electrolyte disorders gives ample scope for inconsistencies between hospitals and teams. Emergency volumes in Chapters Q & R are likewise dominated by one or two non-surgical HRGs with greatest potential for ambiguity. Hence we have a consistent picture of relatively low volume non-surgical conditions where ambiguity across different dimensions is possible.

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[28] Due to the effect of Poisson variation on the sum of the residuals there is a log-log relationship between the sum of residuals and the volume of admissions. HRG chapters were grouped after plotting the results on a log-log chart.

[29] The national average for HRG N12 (Antenatal admissions not related to delivery event) is that 43% are zero day LOS.

[30] The national average for N07 (Normal delivery without complications) is that 15% are discharged on the day of delivery, i.e. LOS = 0 days.

HRG chapters where the sum of residuals is intermediate

HRG chapters in this group seem to contain a mixed bag of conditions. For example, Chapter A ranges from headache & migraine, disorders of balance aetiology unknown, haemorrhagic cerobrovascular disorders, transient ischemic attack through to intracranial procedures, epilepsy and muscular disorders. Chapter C covers ears, nose, throat, teeth and jaws with both surgical and non-surgical conditions.

HRG chapters where the sum of residuals is low

All other HRG chapters appear to give results which are consistent with higher degrees of specificity and consistency in diagnosis and coding and where consistency between hospitals would likewise be expected to be higher. They are the 'bread and butter' high volume HRG Chapters where defined care pathways are most likely to be available.

Conclusions

This work has now made it possible to calculate both the volume of 'expected' and 'excess' admissions at a local level based on the population characteristics relevant to each HRG chapter.

It presents a local alternative to the national capitation formula specific to hospital activity and allows PCTs in conjunction with the SHA to determine if it is necessary to lobby the DOH to make refinements to the national formula which may include some of the points raised in this report.

Consideration needs to be given to the concept of a 'fair share' since the non-population characteristics of a healthcare system are real and take time to change. In this respect the distance and site thresholds need to be re-measured from time to time to track progress.

Appendix One: The Index of Multiple Deprivation

The Index of Multiple Deprivation (IMD 2004) is a measure of the range of deprivations which can be experienced at small area level. The model which underpins the IMD is based on the idea of distinct dimensions of deprivation. These are experienced by individuals living in an area. People may be counted in one or more of the domains, depending on the number of types of deprivation that they experience. The overall IMD is constructed as a weighted sum of these dimensions of deprivation.

The IMD contains seven domains of deprivation with associated weightings:

- Income (22.5%)
- Employment (22.5%)
- Health and disability (13.5%)
- Education, skills and training (13.5%)
- Barriers to Housing and Services (9.3%)
- Living environment (9.3%)
- Crime (9.3%)

Each of these Domains contains a number of indicators. For example, the Health and Disability Domain contains:

- Years of Potential Life Lost (1997-2001).
- Comparative Illness and Disability Ratio (2001).
- Measures of emergency admissions to hospital (1999-2002).
- Adults under 60 suffering from mood or anxiety disorders (1997-2002).

Hence the specific measure using emergency admissions will only contribute a 3.4% weighting to the total IMD score, i.e. 25% of the health & disability domain times 13.5% weighting for that domain as part of the entire score.

In this work both emergency and elective emergency admissions appear to have an approximately linear correlation with IMD (at least for IMD scores relevant to TV). There is no reason that this correlation should be linear since correlation of the specific indicators within the domains against the overall IMD yields a mixture of linear and non-linear relationships. There is evidence to suggest that at a national level the relationship may be non-linear with a linear approximation holding in TV due to its relatively low overall IMD scores at LSOA level.

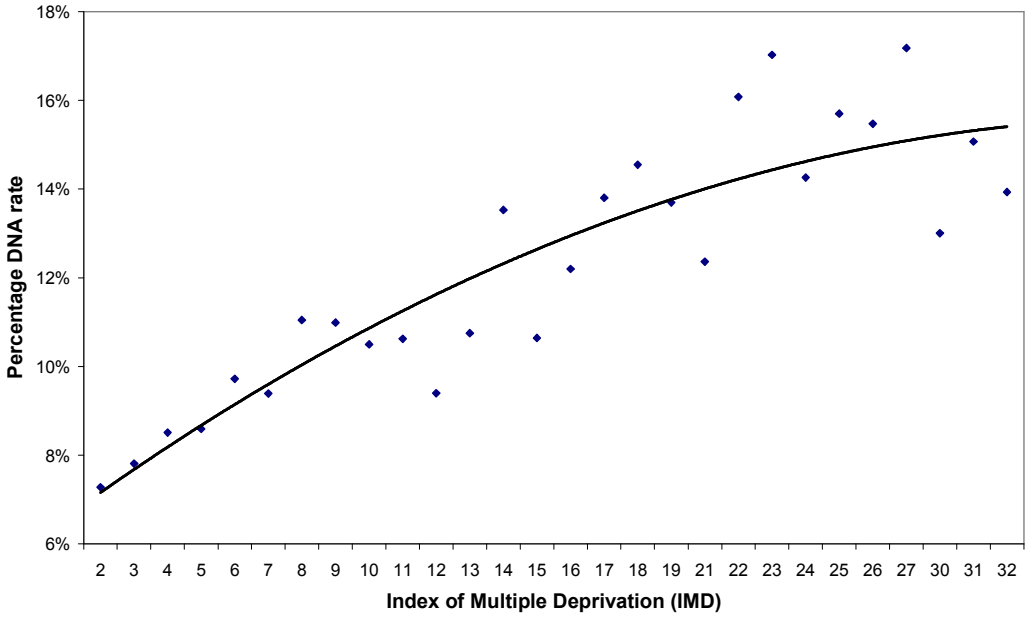
This apparently linear correlation is however exceedingly convenient and allows for relative ease in forecasting the expected number of emergency admissions in any area of TV. It is of interest to note that IMD has a relatively good linear correlation with factors likely to affect overall health such as smoking[31]. In addition there is now a growing body of research literature which indicates that IMD is a useful indicator for a wide variety of activities relating to healthcare. Figure A1.1 gives one of many possible examples. The relationship is non-linear.

The IMD for LSOAs in Thames Valley ranges from 0.6 to 53.3 (Eaton Manor in Milton Keynes with next highest of 49.7 in Oxford) while the full national range is 0.6 to 86.4 (a single LSOA in Liverpool).

[31] Hughes, A and Atkinson, H (2005) Choosing Health in the South East: Smoking. SEPHO report

The national average IMD is 20.4 while the average for Thames Valley is 11.

Figure A1.1: Relationship between IMD and outpatient DNA rate[32].



Average IMD scores for larger areas in Thames Valley are given in Table A1.1. As can be seen Wokingham in Berkshire and Chiltern in South Buckinghamshire have the lowest average score of 5.1 and 6.2 respectively compared to scores of 18.8 (Reading), 19.7 (Oxford City) and 20.9 (Slough).

Table A1.1: Average IMD score for districts in Thames Valley

County/LA	IMD
Milton Keynes	**15.56**
East Berkshire	**12.43**
Slough	20.87
WAM	8.22
Bracknell Forrest	8.61
Oxfordshire	**10.77**
Oxford City	19.72
Cherwell	11.15
South Oxfordshire	7.71
Vale of White Horse	6.90
West Oxfordshire	6.31
West Berkshire	**10.52**
Reading	18.78
West Berkshire	7.92
Wokingham	5.09
Buckinghamshire	**8.36**
Wycombe	9.71
Aylesbury Vale	8.30
South Buckinghamshire	8.07
Chiltern	6.20

[32] Data is for 2005/06 and covers all Berkshire residents. Chart provided by Ms Xiaohong Zhen, PCT Information Officer, WAM PCT.

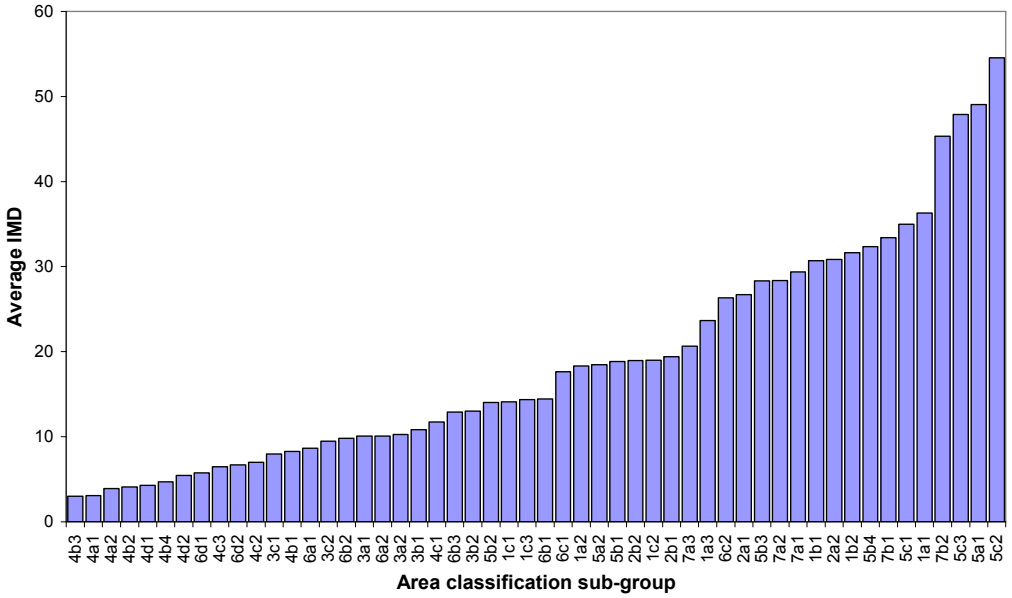
Hence for all emergency admissions these three larger urban LAs would be expected to have around 25% more emergency admissions per head of population than Wokingham or Chiltern (see Appendix Five).

Output Area Level IMD

For precise calculation of demand at practice level it is important to have data available at output area (OA) level (200 to 300 head of population). As part of this work IMD values have been re-calculated at output area (OA) level using the recently developed ONS area classification to apportion IMD to the OA within a LSOA. This is important since pockets of very high deprivation can be located in otherwise more affluent LSOA.

The area classification uses 41 population variables ranging from age, ethnicity, employment type, housing type, mode of travel, education, population density, family circumstances, etc to group each OA into one of 52 sub-groups. Each sub-group has a reasonably consistent average IMD[33] and this enables the calculation of an IMD for each OA such that the weighted average of the OA corresponds to the IMD for the larger LSOA into which they nest. See Figure A1.2.

Figure A1.2. Average IMD at output area level experienced by individuals falling within various area classification sub-groups



Hence for the south east of England at OA-level the extremes of deprivation are calculated to lie between 0.4 (lowest OA in sub-group 4b3) to 104.1(highest OA in sub-group 5c2).

[33] For example, sub-group 4b3 is typically composed of workers in the financial services sector; mainly living in large detached housing and experiencing an average IMD of 3 units. At the other extreme is sub-group 5c2 which is typically composed of single mothers, not in employment, with no higher education, living in council flats that experience an average IMD of 55 units.

Appendix Two: Methodology

The Excel Solver Methodology

Excel Solver is a tool for multi-parametric estimation. Starting values are input into the model and Solver then uses sophisticated mathematical techniques to check if these are the best values and if not to then find the best values which will minimise the sum of residuals (or whatever condition Solver has been requested to fulfil).

Initiating Solver using a wide variety of starting values results in convergence of the model to values of the model parameters which are remarkably consistent, i.e. Solver has been able to locate the best choice of parameters which gives the true minimum sum of residuals. Solver usually takes around 100 iterations to achieve this result.

The model had two constraints to ensure that the outputs were valid.

- The weighted average of emergency admission thresholds had to equal 100%, i.e. an emergency admission threshold of 100% means at the average for Thames Valley. This ensures that the ratio of actual/national average remains consistent for Thames Valley. The method of weighting was to use the number of LSOA in the Trust/Site catchment.
- Residuals were weighted according to the size of the LSOA as measured by the population of each LSOA. Hence a residual for an LSOA twice the size of the average would receive a weighting of 2. This avoids any bias which would occur from mixing different sized LSOA.

Developing the Model

The choice of the form of the model, i.e. linear vs. non-linear effects and how the parameters interact is determined by testing different model forms to see which form is both logically consistent and which gives the lowest sum of residuals.

The next test of adequacy is to confirm that the model behaves like the real world. Hence if the Heatherwood site does not make emergency admissions to a particular specialty does the model arrive at a site threshold close to that of Wexham Park, i.e. the next site to which the patient would be directed? The model passes this test.

The final test is to see if the model detects anomalies in the base data. This was confirmed using date for Chapter M and partly for Chapter T where the provision of mental health inpatient care is usually at a different location to acute care.

In the case of Chapter M the model gave widely different thresholds at the acute sites reflecting the different counting issues which are known to exist. For Chapter T the model tended to give slightly different distance coefficients depending on the starting parameters fed into Solver, i.e. the model is behaving in a consistent way in that it recognises that mental health patients are not flowing exclusively to acute sites.

Modelling of the effects of IMD, Ethnicity and Site Thresholds

The population age distribution for each LSOA was used to calculate the expected number of emergency admissions based on national average emergency admission rates per age band.

The difference between the actual number of emergency admissions and the expected (national average) was assumed to be due to the effects of IMD, Ethnicity, Site thresholds and distance. A linear relationship has been assumed for all relationships except for distance which uses a non-linear relationship.

The model had the following parameters (all at LSOA level).

Ratio of actual/age adjusted national average (age profile unique for each LSOA) =

(Intercept + A x IMD + B x % Asian + C x % Black) x Site Threshold x Distance Factor

The intercept represents the proportion of national average for a LSOA having a zero IMD score and 0 % ethnic population. Hence an intercept of 0.77 implies that any LSOA at close to zero IMD will only have 77% of the age-adjusted national average volume of emergency admissions. The volume of emergency admissions then increases (or decreases) in a linear way as the proportion of the ethnic population is increased.

Trust/Site Thresholds for Emergency admission

More than 20 years of research literature has shown that different organisations and sites have both different clinical thresholds for emergency admission and thresholds for the counting of admission 'events' and then the coding of such patients once admitted.

If a site has a threshold equal to the average for Thames Valley then the value of the threshold will be equal to 100%. Sites with a lower threshold for an emergency admission will have a value greater than 100%, i.e. a value of 125% implies 25% higher numbers of emergency admissions than the average for Thames Valley.

The aim of the threshold is therefore to detect non-average volumes of emergency admissions.

Table A2.1: LSOA from Thames Valley allocated to each Trust/Site catchment area

Site	Number of TV LSOA in catchment
RBBH	310
ORH	263
Wexham Park	179
MKGH	160
Wycombe	132
Stoke Mandeville	106
Heatherwood	76
Horton	66
Swindon	43
FPH	23
Hemel Hempstead	21
Hillingdon	4

Effect of Distance

The distance factor is as follows: Distance factor = D x E
The value of D is set at 1 for any distance above 5 km while the model locates the unique value of D applicable to each Trust catchment for distances below 5 km. Hence

the value of D must be either equal to or greater than 1. The value of E is determined by a non-linear formula called a power law function.

The form of the relationship encapsulated into the value of D was determined from visual inspection of the model outputs. It was observed that the non-linear power law function failed to fully describe behaviour for populations less than 5 km from an acute site and so this adjustment was added in an attempt to capture this behaviour.

Hence the model contains 7 constants and 12 individual site thresholds determined for each of 17 HRG Chapters.

National Average Rates of Emergency admission

Spell-based emergency admission data for England for the three years 2002/03 to 2004/05 was obtained from the NHS Information Authority 'Performance Investigator' data reporting tool. Data was at HRG Chapter level and was split into 5 year age bands (0 to 4, 5 to 9, etc up to 85+). Note that this data included zero day stays. In the model this will be offset by a corresponding change in the value of the intercept such that the model output remains valid.

Age banded emergency admissions were matched against ONS 2003 mid-year population estimates for England to give a national average rate per 1,000 head for each age band.

Local Data for Emergency admissions

Spell- based data for emergency admissions at LSOA level in 2003/04, 2004/05 and 2005/06 was obtained via the Health Informatics Shared Services for Berkshire, Oxfordshire and Buckinghamshire. The data set covers a population of around 2.13 million people and consists of 1,395 individual LSOA. Overlap populations which will revert to other SHA's after the 2006 re-organisation were excluded.

LSOA data was aggregated over the three years, segregated in to Trust catchments and then normalised to the 2005/06 out-turn for each Trust catchment area. This process acts to reduce the impact of Poisson randomness for single year data and adjusts for any underlying growth in emergency admissions over time.

For example, LSOA E01016189 in the Heatherwood catchment had 36 emergency admissions to Chapter A over the three years but only had 9 admissions in 2005/06. For this site catchment there is a 3:1 relationship for the total Chapter A admissions over the three years to the 05/06 out-turn and so the figure of 36 is adjusted to 12 and the figure of 12 (an approximation to the real average) is used in preference to 9 (a single year value which is only one standard deviation different to 12).

Population Data at Lower Super Output Area (LSOA) Level

2001 census population data by 5 year age band was obtained for each lower super output area. A lower super output area (LSOA) is a geographic and socio-economically distinct area containing 960 to 6,500 head of population (average 1,500). LSOAs nest into wards and then into Unitary Authority and PCT boundaries.

For each LSOA an expected volume of emergency admissions was calculated using the age banded population and the age banded national average emergency admission rates.

Index of Multiple Deprivation

ONS data for each LSOA was obtained for the 2004 revision of the Index of Multiple Deprivation (IMD).

Ethnicity

2001 census data at LSOA level on the percentage of persons from different ethnic origins was obtained from the neighbourhood statistics database of the ONS. The percentage ethnic population was calculated as either Asian or Black. For simplicity mixed Asian or Black were categorised as Asian or Black. See below for more detail.

The use of percentage ethnic origin for a LSOA implies that the ethnic group is evenly distributed across all age groups. This is not the case since different ethnic groups have different birth rates and so it is more correct to use an age-adjusted percentage. This involves considerable extra computation and was therefore not incorporated in this work. The calculated coefficients in the model are therefore indicative only but are suited to the needs of a local formula in that they do make allowance for a factor which is clearly contributory to overall rates of emergency admission.

Allocation of LSOA to Trust/Site Catchment Areas

Each LSOA was allocated to a Site catchment area using linear distance. The number of LSOA allocated to the various catchment areas are given in Table A2.1.

The model assumes that the bulk of patients in a catchment area are treated at a common site. A further development of the methodology would be to analyse all emergency admissions by actual site of emergency admission. Unfortunately such an approach multiplies the complexity of any model and does not add to the primary aim of flagging gross differences. See below for the tests conducted regarding this method. See below for the tests which were run to validate and modify this process.

Unavoidable Effects of Poisson Randomness

For some HRG chapters the number of admissions at LSOA level is small. Due to the role of Poisson variation the analysis will become dominated by the randomness at around an average of 1 event per SOA. This is due to the fact that at an average of 1 a value of zero can be expected to occur on 37% of occasions, hence, data at LSOA level becomes a series of zero's and one's. In such cases the calculated model parameters become less precise. Basically the total emergency admissions for these HRG Chapters at practice level will be so low (i.e. around 1 or less) it is immaterial if the model is totally precise or not.

For emergency admission this only affects the smaller HRG Chapters B, K, Q & R – see discussion regarding model residuals. For these Chapters aggregation to ward level may reduce the scatter but at the expense of hiding the specific effects of IMD and ethnicity only seen at the smaller LSOA level.

England Average & Choice of Racial Origin

Equity of access irrespective of racial group is a PCT prescribed target. Equity of access in this instance is guided by the huge body of medical literature characterising the effect of racial origin on the relative incidence of particular diseases and conditions.

For example, black and Asian have a lower incidence of COPD but a higher incidence of asthma and CHD. Asian's have a higher incidence of IBD, etc.

LSOA level data for England and Thames Valley are compared in Table A2.2 and it is from this table that the rationale for the choice of ethnic groups used in this model is derived. As can be seen the 2001 Census gives up to 16 racial groups into which the population can be sub-divided.

It is of passing interest to note that Thames Valley is host to the largest LSOA in England with 6,537 head of population. This is LSOA E1028521 in Oxford which is in the Ward of Carfax and is mainly student halls of residence. It has a unique ethnic mix.

At LSOA level Thames Valley is not far from the England average for most ethnic groups with slightly below average numbers of Black and Bangladeshi sub-groups and slightly above average numbers of Pakistani and Other-White groups. In terms of the maximum possible range it is under-represented in most of the sub-groups. From a modelling perspective this implies that the sub-groups must be aggregated to a meaningful level such that there is a significant range between minimum and maximum for the model to work, i.e. the best groups will have a range between 0 and 100 thereby allowing the model to look at all possible ranges.

Table A2.2: Comparison of Ethnic groups in England and Thames Valley at LSOA level

	Maximum		Average	
Characteristic	England	Thames Valley	England	Thames Valley
Number of persons	6,537	6,537	1,513	1,506
% Asian	94.40	74.66	4.88	4.87
% Black	65.13	16.33	2.94	2.13
White & White British	100.00	99.80	90.99	91.68
British	100.00	98.01	87.06	86.85
Irish	17.87	4.62	1.27	1.32
Other White	69.37	25.71	2.65	3.51
Mixed	14.09	5.89	1.31	1.40
White and Black Caribbean	8.21	4.86	0.47	0.49
White and Black African	5.94	1.10	0.16	0.13
White and Asian	3.73	1.89	0.37	0.43
Other Mixed	5.55	1.96	0.31	0.34
Asian or Asian British	93.71	74.49	4.51	4.44
Indian	83.32	39.65	2.08	1.90
Pakistani	86.09	46.71	1.39	1.98
Bangladeshi	83.92	17.75	0.55	0.17
Other Asian	33.00	13.08	0.48	0.38
Black or Black British	62.17	13.92	2.31	1.51
Caribbean	41.60	9.56	1.15	0.83
African	43.87	9.42	0.97	0.56
Other Black	9.37	1.49	0.19	0.12
Chinese or Other Ethnic Group	36.15	11.33	0.88	0.97
Chinese	22.16	7.91	0.45	0.51
Other Ethnic Group	32.83	6.14	0.43	0.46

For example, were the model to incorporate Chinese as a separate ethnic group the maximum concentration in Thames Valley is 7.91% in LSOA E1028540 which happens to be a mainly student population in Oxford. While the range 0% to 8% is probably just sufficient to allow the model to discern any differential effects this would be confounded by the fact that high values of Chinese are mainly associated with student

populations and hence the age of the particular Chinese population is not representative of the wider population of the LSOA.

Of the other ethnic groups Asian and Black represent the most significant numbers. Black sub-groups have only a maximum concentration of 9.6% and hence it was felt best to sum these sub-groups along with the small proportion of mixed Black giving a range of 0% to 16.3% across Thames Valley. Black was included as a separate group due to the known disposition of this ethnic group to specific conditions of which sickle cell anaemia is the most widely known.

Asian sub-groups are probably present in significant numbers to have justified separation into perhaps 'Indian' and 'Non-Indian' (Pakistani, Bangladeshi & Other) but it was not felt that there was significant enough gross differences in the incidence of specific conditions to justify such a subdivision.

Summing these groups with the small proportion of mixed-Asian gives a range between 0% and 74.7% across Thames Valley which allows the model a full range from which to determine the appropriate coefficient.

Were this model to be replicated at a national level then the wider range afforded by the national ranges could be used to establish the incremental volume contribution for a wider range of ethnic sub-groups at a level appropriate to PBC.

Testing the allocation of LSOA to Trust Catchment

This represents an important component of the model since it contributes to the calculated site thresholds. The allocation and its likely impact on model parameters were tested in four ways:

1. Particular trusts have grossly higher levels of admissions in certain HRG chapters. If the allocation of LSOA to trust catchment is correct then the high numbers should fall into one catchment area. Within the ability to discern differences due to Poisson scatter this logical test appears to have been met.

2. The most distant 15 LSOA in the catchment area of the ORH were re-allocated to the next nearest site (Swindon or Banbury). The model was re-run and the effect on model parameters was observed. On this occasion the sum of residuals dropped from 195.63 to 195.44 (a 0.1% change) indicating that at the margins flows may be directed away from the ORH. The relationship with IMD remained unchanged but the calculated parameters for Asian and black were slightly different (0.0016 vs. 0.0006) and (-0.0090 vs. -0.0092) respectively. These do not have a significant effect on the calculated outputs from the model.

3. Data for Berkshire (the location with the greatest number of overlaps) was collected at LSOA and site level. The site with the highest proportion of emergency flow was calculated and compared to the result from the linear distance method. The actual flows were different to the allocation method in 53 out of 532 LSOA. These changes were all related to Ambulance Trust boundaries, i.e. patients are actively re-directed from the closest hospital to the next nearest site within the Ambulance boundary. The greatest effect was for Wycombe and Basingstoke hospitals which both had 17 LSOA re-directed to within Berkshire. These changes are detailed in Table A2.3.

   Note that Table A2.3 does not imply that every patient was re-directed only that the majority flow was to the nearest site within Berkshire. Also note that the

bulk of the re-directions involved less than a 5 km change in straight line distance. It is important to point out that such re-direction is a valid response by the ambulance service to ensure that scarce resources, i.e. ambulance units, are made available to the maximum possible benefit.

Recall that the greatest population clusters are near to acute sites. If a unit goes out of county it is moving away from the population cluster where it can deliver most benefit. If it moves to the in-county acute site it moves to a location where there is the highest probability of it being needed once the patient is unloaded. Hence the response represents good management of scarce resources with little to no loss of benefit to the patient.

Table A2.3: Berkshire LSOA re-assigned to match actual flows

From	To	Number of LSOA
WYC	WXM	17
BSTK	RBBH	17
HWD	RBBH	12
FPH	RBBH	4
SWN	RBBH	3
Total re-directions		**53**
Total Berkshire LSOA		**532**

The above catchment areas were then changed and the model re-run to see if this gave a significant change in the model outcome. The sum of residuals increased from 195.6 to 197.0 (a 0.5% increase), i.e. at least from the perspective of the model the original linear allocation gave a better result. Once again there was an insignificant change in the model parameters[34]. As expected the coefficients attributable to Black ethnic groups showed the greatest fluctuation. However the overall conclusion is that the model gives stable results even in the face of gross re-allocation of LSOA.

4. Any LSOA in Berkshire with a share of less than 50% was excluded from the analysis along with any other LSOA in TV where the differential distance between the two closest sites was less than 5 km. In all 10% of LSOA were excluded by this process. This step was felt to give the best possible opportunity to calculate the 'true' value of the coefficients. Coefficients were recalculated and are the basis of the various calculations in this report.

Why did the last three tests give only minor changes as LSOA were switched from one catchment to another or excluded from the analysis? The answer is reassuring. Across Thames Valley some 65 and 85% respectively of the population lives within 10 km or 15 km of an acute emergency site. For these locations the flow from the LSOA is almost exclusively to the nearest site[35]. The 85% of flows which are unambiguous therefore remain the guiding force to ensure that the model gives valid outputs. Hence the model remains insensitive to the effect of the small proportion of marginal areas.

[34] The intercept changed from 0.742 to 0.743, IMD and Asian coefficients remained the same while the coefficient for Black changed from -0.009 to -0.014

[35] On average 6% of emergency admissions go to an out-of-area hospital, i.e. patients away on holiday or visiting relatives, etc. These are distributed across all LSOA and do not influence the population specific coefficients since an emergency admission has occurred. In terms of the non-population coefficients they make virtually no effect since they contribute to random background noise.

In conclusion the allocation of LSOA to site catchment is fit for purpose and any ambiguity does not unduly influence the model outputs. However, to ensure the best possible outcome some 10% of marginal LSOA were excluded from the final stage of determining model coefficients.

Population Growth between the Years 2001 and 2005

The availability of LSOA level population data is restricted to the year of the census[36]. All LSOA will be subject to demographic change between base year of 2001 and the 2005/06 data set used to determine the volume of 'excess' admissions.

> It needs to be noted that the unavailability of LSOA level data across all years does not effect the application of the model at PCT or practice level since the input will be the DOH PCT age-banded population or practice list composition. Both are available in yearly increments.

In this respect the higher growth in Milton Keynes may have the potential to over-state the volume of excess admissions. The potential effect of this can be calculated at HRG Chapter level and is given in Table A2.3.

Table A2.3: Calculated four year adjustment factors at PCT level

Chapter	Berkshire West	Berkshire East	Milton Keynes	Bucking-hamshire	Oxfordshire
Ch A	1%	1%	-4%	1%	-1%
Ch B	1%	1%	-4%	1%	-1%
Ch C	1%	1%	-3%	1%	-1%
Ch D	1%	1%	-4%	1%	-1%
Ch E	1%	1%	-5%	1%	-1%
Ch F	1%	1%	-4%	1%	-1%
Ch G	1%	1%	-4%	1%	-1%
Ch H	1%	1%	-3%	1%	-1%
Ch J	1%	1%	-3%	1%	-1%
Ch K	1%	1%	-4%	1%	-1%
Ch L	1%	1%	-4%	1%	-1%
Ch M	1%	2%	-3%	2%	-2%
Ch N	1%	1%	-3%	2%	-1%
Ch P	1%	-2%	-3%	0%	2%
Ch Q	1%	1%	-5%	1%	-1%
Ch R	1%	1%	-4%	1%	-1%
Ch S	1%	1%	-3%	1%	-1%
Ch T	1%	1%	-3%	1%	-2%
All	1%	1%	-4%	1%	-1%

As can be seen the effect is not material, i.e. for Milton Keynes reduce the value of any calculated 'excess' by around 4% to give the corrected value. This will act to reduce the calculated volume of excess admissions for Milton Keynes quoted in Table Five from 3,076 down to 2,960. Hence the conclusions of this work remain a valid benchmark for assessing the volume of excess admissions.

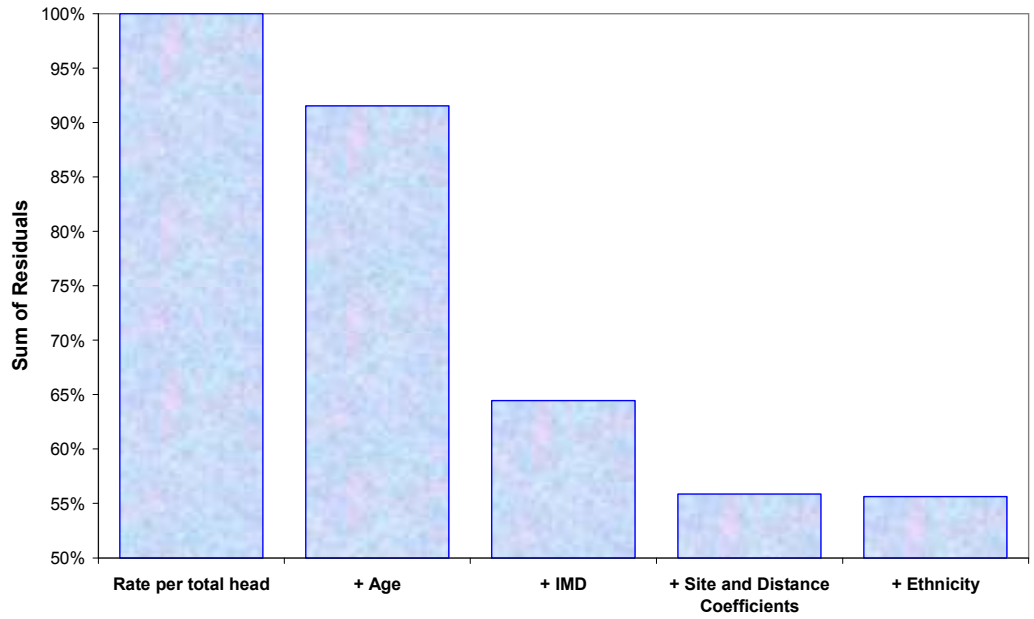
Relative Contribution of the Model Variables

The incremental effect of the various model parameters upon the overall sum of residuals is very good way of judging how important each factor is in determining the

[36] The smallest population unit for which annual growth is available is a Ward. Such estimates are usually prepared by local authorities and include local data on new housing builds, etc.

overall output from the model. This is given in Figure A2.1 where it can be seen that a single average rate per total head gives a total sum of residuals of 100 units. Including adjustment for 5 year age bands reduces the sum of residuals by 8%, adding IMD them makes a considerable 30% reduction while site and distance thresholds lead to a further 13% reduction. Lastly the inclusion of ethnicity only contributes to a further 0.4% reduction in the sum of residuals.

Figure A2.1: Effect of model parameters on the sum of residuals



The remaining 55% of residuals is due to the unavoidable effects of Poisson randomness.

The conclusion is that IMD alone is the single most important parameter explaining higher levels of emergency admission and that site and distance thresholds have a greater overall contributory effect than age! Site and distance thresholds are under the direct control of the healthcare system and so it is the elimination of these which require immediate action.

Appendix Three: Wider Application of the Methodology

The methodology is based on small area statistics and can be used in other contexts (such as A&E attendance, GP referral, targeting of community matrons, specific conditions such as asthma, etc) and when linked to travel time analysis can answer questions such as:

- Where is the optimum location for a service, i.e. a minor injuries unit, diagnostic centre, etc?
- What is the maximum benefit obtained from targeting a specific area?
- Can we reconfigure current services?

Application to Calculating PBC Volume Benchmarks

The method is also directly applicable to establishing baseline budgets for Practice Based Commissioning and avoids the high year to year variation which plagued similar attempts to set GP fund holder budgets. Each practice can be constructed as a composite of all patients where each patient assumes the IMD score of the output area (OA) where they live. Ethnicity can be assigned either directly from the practice register or indirectly via the OA average.

Note that for the purpose of an allocation formula at practice level the IMD and ethnicity values at OA[37] level are preferred since pockets of very high deprivation become apparent at OA level and can be partly obscured at LSOA level and are almost lost at ward level[38].

Before progressing further it may be useful to reflect on the properties of a 'good' capitation formula. A 'good' capitation formula seeks to allocate resources based on the characteristics of the population which influence the demand for acute care. Hence a 'good' formula recognises the existence of Trust and distance thresholds but excludes these from the allocation side of the formula.

To put this another way a 'bad' formula does not fully or correctly recognise the existence of Trust and distance thresholds and so partly includes these effects in the allocation side of the formula, i.e. it institutionalises 'unfair' shares.

Hence the output of this work is to suggest an allocation formula of the form:

HRG Chapter Funded Volume =
Age adjusted volume x (Intercept + A x IMD + B x % Asian + C x % Black)

As can be seen Trust thresholds and distance effects do not appear in the funding formula since they are not directly related to the characteristics of the population, i.e. a practice does not get extra funding just because the local hospital has a low threshold to admission or because it happens to be within 5 km of the acute site.

This implies that adjustment for the effect of system thresholds is vitally important to establishing the correct sensitivity to the effects of IMD and ethnicity. This is illustrated in Table A3.1 where the values of the coefficients in the model are given for Chapter F with and without the inclusion of various factors in the model. The sum of residuals is given for comparison.

[37] OA's nest into LSOA's and contain less than 1,000 head of population.
[38] The current capitation formula has the serious weakness of allocating its parameters at ward level.

As can be seen the value of the four coefficients can be skewed if the effect of different types of system thresholds are ignored or miss-specified when formulating the model. While this skewing appears to be minor, i.e. all the coefficients are roughly similar, the combined effect as a funding formula can be markedly different. The key point is that depending on how well the model is formulated the level of calculated 'fair share'; as demonstrated in this example, could vary from the correct value of 108% up to 130% of national average. For obvious reasons if one area benefits from an incorrectly formulated allocation then somewhere else will suffer a compensating loss. There is clear scope to give 'unfair' shares!

Table A3.1: Comparison of calculated model coefficients with and without adjustment for various factors and effect on relative funding allocation.

Funding Coefficients	All factors Included	Excludes distance effects	Excludes Trust Thresholds	Excluding Distance & Trust Threshold Effects
Intercept	0.750	0.798	0.776	0.791
IMD	0.023	0.027	0.025	0.031
Asian	-0.001	-0.001	-0.002	0.000
Black	-0.009	-0.007	-0.005	-0.014
Funding[39]	**108%**	**130%**	**123%**	**119%**
Residuals		+ 2.7%	+ 2.7%	+ 3%

What the model also points out is that there can be problems associated with 'fair shares' funding purely on the basis of population characteristics. This work has clearly demonstrated that there can be significant non-population characteristics, i.e. distance and acute thresholds to admission, influencing the real spend on healthcare experienced at a practice level. How is a practice to be fairly treated during any required transition from a high to lower cost state?

Conversely there can be problems relating to allocating the benefits of any reduction in the volume of emergency admissions. For example an increase in the threshold to admission by an acute trust should equally benefit all practices; however, a PCT- or ambulance-led strategy which reduces the excess emergency admissions within 5 km of the acute site will give disproportionate benefit to those practices nearest to the acute site. How are costs and benefit to be fairly allocated?

In conclusion, the calculation of a PBC budget is constrained to be that determined by the national formula. However, it is exceedingly beneficial to be able to determine if actual/funded cost at a local level is due to miss-specification of the national formula or to the behaviour of the local healthcare system. It is recommended that the above calculations be used to provide alternative benchmarks to the national formula.

PCTs wishing to do these calculations should contact the author for assistance with national average rates per 5 year age band and other coefficients. PCTs outside of Thames Valley can also use these results as long as there are only a few LSOA with IMD > 40, i.e. most of the south of England excluding parts of London.

[39] In this table the example funding calculation assumes national average age profile applied to an area with an IMD of 25 and a mixed population with 25% Asian and 25% Black.

Appendix Four: Excess admissions at Local Authority & Ward level

LA	Ward	Population	A	B	C	D	E	F	G	H	J	K	L	M	P	Q	R	S	T	All excl N, T	Per 1,000 head
Aylesbury Vale	Aston Clinton	9144	-2	5	4	-6	10	7	3	6	3	4	-1	3	4	3	-1	-3	3	24	3
Aylesbury Vale	Aylesbury Central	2720	-1	2	0	0	25	7	4	0	2	1	3	1	0	0	1	6	2	50	18
Aylesbury Vale	Bedgrove	9172	7	3	2	0	36	16	8	0	11	1	1	6	7	8	-1	6	5	95	10
Aylesbury Vale	Bierton	1771	0	3	0	1	1	-1	0	-1	2	1	2	0	1	0	0	-1	0	4	2
Aylesbury Vale	Brill	2724	-3	0	0	-4	6	-7	-1	-4	0	-1	-5	0	-5	0	1	1	0	-26	-9
Aylesbury Vale	Buckingham North	6429	0	0	-1	-3	2	1	2	5	2	1	2	-1	-5	1	-2	-2	-1	-6	-1
Aylesbury Vale	Buckingham South	5143	0	1	4	0	8	2	-1	-3	0	0	-1	-1	8	2	-1	-4	-1	6	1
Aylesbury Vale	Cheddington	3243	-5	0	0	-3	5	4	0	-2	-1	-1	-2	1	-4	1	1	-3	-2	-17	-5
Aylesbury Vale	Coldharbour	6362	8	1	2	1	26	20	3	10	1	-2	9	7	15	1	4	6	4	100	16
Aylesbury Vale	Edlesborough	2977	3	-1	-1	3	2	1	-1	-2	-3	-1	2	0	2	1	-1	-3	-2	-4	-1
Aylesbury Vale	Elmhurst & Watermead	9259	9	3	3	29	48	15	6	4	11	1	6	2	7	1	1	4	7	140	15
Aylesbury Vale	Gatehouse	5838	7	2	-1	4	15	10	3	-1	11	1	6	0	16	5	4	6	4	83	14
Aylesbury Vale	Great Brickhill	3029	2	1	0	3	7	-5	1	5	5	2	-1	0	-1	0	2	-4	0	14	5
Aylesbury Vale	Great Horwood	2807	0	-1	0	-1	-3	-2	1	6	2	0	3	-2	4	-1	0	-3	-2	-2	-1
Aylesbury Vale	Grendon Underwood	3039	-1	1	1	1	10	11	2	0	6	2	0	0	11	0	0	0	0	41	13
Aylesbury Vale	Haddenham	8368	-1	3	2	10	21	15	0	-5	4	0	5	1	19	2	2	13	0	77	9
Aylesbury Vale	Long Crendon	5358	3	0	1	4	14	-1	3	1	2	1	3	0	0	1	1	2	0	27	5
Aylesbury Vale	Luffield Abbey	3138	-1	1	0	-4	-5	-5	-2	5	-1	0	-4	0	-3	0	-1	-5	2	-30	-10
Aylesbury Vale	Mandeville & Elm Farm	8312	8	2	0	10	35	19	9	-4	8	4	9	8	10	0	-1	-3	-1	102	12
Aylesbury Vale	Marsh Gibbon	2414	-2	0	1	-1	5	-1	-1	4	2	0	6	3	8	1	-1	-2	-2	17	7
Aylesbury Vale	Newton Longville	2453	1	3	4	8	10	8	0	5	-1	0	4	-1	2	0	0	1	0	40	16
Aylesbury Vale	Oakfield	5799	-2	2	2	-4	14	6	3	-2	5	-2	1	1	7	1	2	5	0	30	5
Aylesbury Vale	Pitstone	3024	4	1	-1	1	11	9	0	-3	-1	1	2	1	2	0	0	-2	-1	21	7
Aylesbury Vale	Quainton	2467	1	0	0	-1	8	-1	0	-2	2	0	0	0	-2	1	1	-3	0	1	0

Aylesbury Vale	Quarrendon	5899	2	1	0	4	25	6	3	0	8	1	6	5	15	5	0	-1	-1	69	12
Aylesbury Vale	Southcourt	5847	7	0	5	13	58	22	9	6	8	2	3	6	37	1	1	5	5	177	30
Aylesbury Vale	Steeple Claydon	2888	-1	1	0	1	0	-2	0	4	0	0	-2	1	5	1	1	0	-1	6	2
Aylesbury Vale	Stewkley	2955	-1	2	0	3	1	-3	-2	-2	0	-1	1	0	14	2	0	-3	0	5	2
Aylesbury Vale	Tingewick	1489	1	0	0	-1	3	1	1	1	-1	1	1	-1	-2	0	1	-1	0	0	0
Aylesbury Vale	Waddesdon	2595	1	1	1	4	10	13	1	1	5	-1	0	0	1	-1	0	-1	-1	29	11
Aylesbury Vale	Walton Court & Hawkslade	5961	7	2	2	9	36	9	10	0	9	3	5	3	20	3	1	3	8	111	19
Aylesbury Vale	Weedon	1578	2	0	1	0	1	0	0	-4	0	0	1	-1	0	0	0	-1	-1	-3	-2
Aylesbury Vale	Wendover	8511	-2	0	-1	8	3	6	2	3	1	2	3	4	13	3	2	6	2	41	5
Aylesbury Vale	Wing	2897	2	1	0	4	2	1	2	-3	-1	0	-3	-1	0	0	1	-2	-1	-2	-1
Aylesbury Vale	Wingrave	2690	1	2	-1	-4	3	3	-2	-4	2	-1	-1	0	1	0	0	-3	-1	-8	-3
Aylesbury Vale	Winslow	5868	-3	2	0	9	11	1	1	7	2	-1	2	-1	3	0	3	4	0	29	5
Aylesbury Vale Total	All	164168	50	47	27	97	466	187	66	29	104	19	64	44	209	43	21	18	24	1,241	8
Bracknell Forest	Ascot	5460	-1	-1	1	4	16	1	0	-2	-3	2	5	4	-1	1	0	5	2	21	4
Bracknell Forest	Binfield with Warfield	8190	-2	-1	1	8	10	-3	-5	-2	3	1	4	5	-4	0	0	-6	7	-6	-1
Bracknell Forest	Bullbrook	5065	1	0	5	11	7	5	3	12	2	2	-1	0	9	3	5	8	9	66	13
Bracknell Forest	Central Sandhurst	5294	-1	-1	1	4	8	0	0	-3	1	-1	7	1	-4	1	0	-1	3	4	1
Bracknell Forest	College Town	5903	1	0	5	6	11	13	0	1	2	-1	4	0	-4	0	1	5	2	32	5
Bracknell Forest	Crown Wood	8463	1	0	2	7	13	-2	-1	-3	3	3	-4	4	3	1	2	-3	3	10	1
Bracknell Forest	Crowthorne	5200	7	-1	0	19	8	-4	-2	4	5	4	6	0	-5	-1	0	1	10	35	7
Bracknell Forest	Great Hollands North	4279	5	0	5	-1	6	7	-1	-1	3	0	2	2	14	2	1	0	4	39	9
Bracknell Forest	Great Hollands South	5710	3	0	-2	3	1	3	0	-5	-1	1	-1	0	-1	1	3	-2	5	-11	-2
Bracknell Forest	Hanworth	8851	17	0	2	13	18	5	5	0	2	2	5	7	5	2	0	12	13	80	9
Bracknell Forest	Harmans Water	7282	-2	-1	4	4	8	-1	-2	-12	2	2	-1	0	1	0	2	-1	17	-10	-1
Bracknell Forest	Little Sandhurst & Wellington	5706	-3	-1	-2	3	3	-5	0	-8	2	0	4	1	-8	0	0	-4	2	-27	-5
Bracknell Forest	Old Bracknell	4676	4	-1	7	10	9	6	1	5	-2	2	0	0	3	2	0	3	18	42	9
Bracknell Forest	Owlsmoor	5414	3	-1	-1	12	9	-4	-1	-5	-2	1	7	2	0	0	0	-3	5	7	1
Bracknell Forest	Priestwood & Garth	7386	-1	0	0	22	27	1	-4	8	3	1	-3	4	0	2	-1	8	12	58	8

Bracknell Forest	Warfield Harvest Ride	8122	1	-1	0	13	-1	3	-3	-9	-2	0	-2	3	-1	0	0	-2	3	-20	-2
Bracknell Forest	Wildridings & Central	4535	5	-1	1	9	8	7	5	4	3	0	-2	1	-5	1	0	13	12	48	10
Bracknell Forest	Winkfield & Cranbourne	4082	5	-1	1	9	2	-2	0	0	-2	2	-2	5	-6	1	4	2	1	11	3
Bracknell Forest Total	All	109618	42	-12	29	156	164	30	-6	-16	22	21	29	41	-5	16	18	34	128	380	3
Cherwell	Adderbury	2712	4	1	4	-4	12	3	3	5	1	2	9	0	3	1	1	5	-2	47	17
Cherwell	Ambrosden & Chesterton	3330	-2	0	1	2	4	8	0	10	2	2	3	2	8	-1	2	5	-1	39	12
Cherwell	Banbury Calthorpe	5382	8	0	0	14	35	17	2	6	4	7	9	1	16	0	7	1	-1	118	22
Cherwell	Banbury Easington	7598	3	4	1	11	50	20	7	2	2	1	4	1	6	0	1	-2	0	103	14
Cherwell	Banbury Grimsbury & Castle	8893	7	0	4	21	34	32	5	22	8	1	14	1	31	3	7	4	2	189	21
Cherwell	Banbury Hardwick	5977	4	5	2	7	14	14	5	8	7	0	5	3	25	2	2	3	-3	97	16
Cherwell	Banbury Neithrop	5533	9	0	-2	22	18	30	11	24	9	5	4	1	18	2	4	1	-1	150	27
Cherwell	Banbury Ruscote	8420	15	1	2	3	26	32	6	-1	9	7	-4	3	37	2	8	0	-7	131	16
Cherwell	Bicester East	6181	-2	1	5	15	13	21	4	4	3	1	8	-1	2	1	5	11	0	81	13
Cherwell	Bicester North	5650	0	2	-1	9	3	8	3	-2	3	2	4	1	5	-1	3	4	-2	30	5
Cherwell	Bicester South	4370	0	0	2	7	5	16	2	-3	0	-1	2	4	18	1	1	2	0	45	10
Cherwell	Bicester Town	4922	6	1	0	30	26	28	11	17	5	0	9	1	8	3	6	23	5	170	35
Cherwell	Bicester West	7547	6	1	-1	15	18	12	5	2	2	2	7	1	11	-1	1	10	-4	76	10
Cherwell	Bloxham & Bodicote	5827	0	2	3	6	19	8	2	7	4	4	9	-1	2	1	3	-5	2	55	9
Cherwell	Caversfield	2899	5	-1	-1	8	0	5	1	6	2	2	3	2	-3	1	1	1	1	26	9
Cherwell	Cropredy	2702	0	0	2	-3	2	4	2	1	3	3	2	1	5	2	0	2	-1	23	8
Cherwell	Deddington	2643	0	0	0	1	5	3	1	2	0	0	1	-2	8	1	0	0	1	17	6
Cherwell	Fringford	2338	-1	0	0	-3	-2	2	0	-4	-1	0	2	3	-1	1	0	-3	-2	-12	-5
Cherwell	Hook Norton	2493	2	1	0	2	4	5	0	7	0	3	5	-1	4	2	0	4	0	32	13
Cherwell	Kidlington North	5269	5	3	1	7	1	7	1	4	2	1	-1	0	-3	3	2	9	0	33	6
Cherwell	Kidlington South	8448	11	1	6	13	14	20	6	9	6	3	12	4	-8	2	3	21	-2	111	13
Cherwell	Kirtlington	2856	-1	0	2	11	-1	7	2	4	4	0	-3	-1	-3	-1	2	2	-2	20	7

Cherwell	Launton	3048	4	1	2	4	6	7	0	3	6	1	6	-2	-1	2	0	13	-1	49	16
Cherwell	Otmoor	2455	-2	0	1	10	1	2	4	4	5	0	1	1	-2	-1	0	-1	0	23	9
Cherwell	Sibford	2512	2	1	-1	2	8	-1	0	4	0	0	4	2	1	1	3	-2	-1	21	8
Cherwell	The Astons & Heyfords	4705	0	-1	-3	2	10	6	4	6	1	1	3	0	1	-1	3	-3	-2	22	5
Cherwell	Wroxton	2530	3	0	0	3	4	4	0	-1	-2	-1	-3	-1	3	0	0	2	-1	9	3
Cherwell	Yarnton, Gosford & Water Eaton	4541	0	1	2	5	15	5	8	11	4	2	7	1	-2	-1	-1	11	-1	61	13
Cherwell Total	All	131781	86	26	29	218	346	327	95	155	89	46	124	24	187	26	65	117	-21	1,766	13
Chiltern	Amersham Common	2416	3	0	0	-2	2	4	-1	2	-1	-1	0	2	0	-1	0	-2	0	2	1
Chiltern	Amersham Town	4392	1	0	-2	-5	-1	6	-1	2	2	0	-2	3	5	2	0	0	0	3	1
Chiltern	Amersham-on-the-Hill	4506	9	2	-1	5	11	11	2	12	3	1	9	3	4	-1	2	6	0	73	16
Chiltern	Asheridge Vale & Lowndes	4495	3	0	-2	-5	0	-3	0	7	1	-2	-1	5	5	2	0	0	0	8	2
Chiltern	Ashley Green, Latimer & Chenies	2183	-2	0	-1	-4	-6	-2	-1	-3	2	0	-4	1	-2	0	1	0	0	-25	-11
Chiltern	Austenwood	2197	-2	0	0	-4	-4	-2	1	-3	1	0	-2	-1	-2	0	0	0	0	-22	-10
Chiltern	Ballinger, South Heath & Chartridge	2204	-2	0	0	-2	-2	-2	-1	-1	1	2	-2	-1	0	-1	0	0	-1	-14	-6
Chiltern	Central	4086	2	2	1	8	-4	3	0	13	4	1	3	6	-2	-1	1	5	0	37	9
Chiltern	Chalfont Common	4545	19	2	-1	17	7	12	0	2	0	2	4	-2	6	0	3	4	-3	70	15
Chiltern	Chalfont St Giles	6696	7	3	-1	-3	-4	-4	-3	11	2	0	-2	3	8	1	-1	4	-2	10	1
Chiltern	Chesham Bois & Weedon Hill	4921	2	1	0	-7	-7	-1	0	5	-2	-2	-5	0	5	-1	0	1	-1	-19	-4
Chiltern	Cholesbury, The Lee & Bellingdon	2290	2	1	-2	-5	1	0	0	0	1	-1	-4	-1	1	2	0	-1	-1	-10	-4
Chiltern	Gold Hill	2109	2	1	1	2	-1	0	5	8	2	2	-1	3	2	0	0	-1	-1	22	10
Chiltern	Great Missenden	2192	2	1	2	1	6	2	-1	11	4	0	2	0	2	1	0	2	2	32	14
Chiltern	Hilltop & Townsend	4404	4	1	1	-1	-1	-1	0	4	2	-1	-2	0	0	1	0	0	0	2	0
Chiltern	Holmer Green	4077	7	0	1	3	7	3	0	7	0	-1	-3	2	4	0	1	4	2	29	7
Chiltern	Little Chalfont	4497	6	1	1	4	-1	-3	-1	11	4	0	0	1	6	-2	2	-2	-1	20	4

Chiltern	Little Missenden	2433	1	0	1	-2	-5	2	1	4	1	-1	-4	2	2	0	0	-2	-1	-3	-1
Chiltern	Newtown	2311	3	1	0	3	5	1	2	2	-2	2	-1	2	4	0	-1	0	-1	16	7
Chiltern	Penn & Coleshill	4357	5	-1	-2	-4	-7	-10	-3	0	-3	-2	-2	1	-3	0	0	2	-2	-37	-9
Chiltern	Prestwood & Heath End	6537	3	1	0	-1	10	3	-2	10	5	0	4	3	7	6	-1	1	-3	37	6
Chiltern	Ridgeway	2523	-2	-1	1	-1	-8	1	1	-1	2	0	3	2	4	2	0	3	-1	1	0
Chiltern	Seer Green	2267	-4	0	1	3	-1	1	0	0	2	-1	-3	0	2	-1	1	-2	0	-5	-2
Chiltern	St Mary's & Waterside	4511	10	2	3	-1	11	9	3	3	3	0	3	2	10	0	-1	6	-1	57	13
Chiltern	Vale	2077	5	2	-3	2	-1	4	2	2	1	1	-2	3	8	0	-1	0	-1	20	10
Chiltern Total	All	89226	84	17	1	0	7	35	3	107	37	0	-13	41	77	8	4	30	-15	305	3
Milton Keynes	Bletchley & Fenny Stratford	11234	22	3	1	46	79	58	0	27	14	3	20	8	34	2	12	19	27	344	31
Milton Keynes	Bradwell	12446	13	3	2	16	37	45	-1	14	7	1	7	11	13	2	8	8	20	172	14
Milton Keynes	Campbell Park	12977	7	4	4	25	39	29	-1	28	11	5	-1	14	36	1	3	16	29	210	16
Milton Keynes	Danesborough	4002	5	1	0	16	12	4	3	9	4	0	-1	-1	4	0	2	2	2	53	13
Milton Keynes	Denbigh	7606	19	1	4	30	48	22	1	5	2	1	-2	3	38	0	4	2	10	170	22
Milton Keynes	Eaton Manor	8081	14	2	3	22	52	38	5	8	0	9	-2	5	4	2	6	-6	6	145	18
Milton Keynes	Emerson Valley	10751	17	4	4	20	51	46	9	19	6	4	9	20	60	2	6	6	5	260	24
Milton Keynes	Furzton	8014	10	2	2	20	35	27	1	3	1	1	4	9	21	0	4	-1	9	126	16
Milton Keynes	Hanslope Park	3988	1	-1	1	4	20	8	-1	3	1	2	4	-2	4	-1	1	-1	0	40	10
Milton Keynes	Linford North	8633	10	3	1	16	36	16	0	13	-1	4	6	2	11	1	3	6	10	119	14
Milton Keynes	Linford South	8279	1	2	1	11	25	8	0	9	-3	2	1	5	9	0	2	4	4	69	8
Milton Keynes	Loughton Park	12504	27	0	1	30	56	30	2	12	4	1	3	5	26	1	6	4	8	186	15
Milton Keynes	Middleton	5446	1	2	2	10	27	23	5	9	6	1	7	15	46	0	7	-2	6	150	27
Milton Keynes	Newport Pagnell North	7448	0	1	-1	8	10	7	-1	10	1	2	-7	4	2	-2	3	-5	3	21	3
Milton Keynes	Newport Pagnell South	7293	2	1	-1	10	15	11	6	10	1	1	-2	3	0	2	7	-2	0	54	7
Milton Keynes	Olney	8165	2	0	-1	-3	3	1	-2	7	-2	5	-8	1	-5	2	1	-4	1	-18	-2
Milton Keynes	Sherington	3953	0	1	-1	-3	-4	7	-1	5	-1	-1	-3	2	-5	3	0	-4	1	-9	-2
Milton Keynes	Stantonbury	8940	5	3	-1	15	25	27	5	6	-2	-2	6	3	24	1	7	-6	9	107	12
Milton Keynes	Stony Stratford	14287	14	1	5	23	67	16	5	6	-5	7	-5	8	20	3	2	-9	9	140	10

Milton Keynes	Walton Park	13152	10	2	2	19	20	19	2	-2	4	4	1	13	13	0	6	5	9	90	7
Milton Keynes	Whaddon	8601	2	2	9	42	60	48	0	18	2	7	16	12	24	1	7	15	6	256	30
Milton Keynes	Wolverton	11037	12	-1	5	10	40	3	3	14	5	3	6	9	27	-1	2	2	13	122	11
Milton Keynes	Woughton	10222	24	1	13	58	55	47	7	14	11	1	5	11	21	-2	12	1	14	269	26
Milton Keynes Total	All	207059	217	36	54	444	809	540	46	249	64	61	67	160	428	16	112	52	199	3,076	15
Oxford	Barton & Sandhills	5881	2	2	-1	7	3	-1	6	11	12	5	-5	2	2	2	0	10	-7	56	9
Oxford	Blackbird Leys	5803	2	1	1	0	2	10	1	6	-5	5	5	-2	-13	1	2	15	-5	30	5
Oxford	Carfax	8886	-7	1	-6	-10	-3	-38	-1	-28	-7	-2	-8	-26	-16	-1	-2	-2	-8	-162	-18
Oxford	Churchill	6075	3	0	0	9	4	4	3	5	7	2	-2	1	-8	4	1	25	-3	55	9
Oxford	Cowley	5460	3	0	5	7	3	15	1	2	9	5	1	0	-9	0	2	14	-2	59	11
Oxford	Cowley Marsh	4884	-2	2	0	8	8	9	1	5	3	0	-5	6	4	-1	3	23	-2	65	13
Oxford	Headington	5619	8	3	4	7	17	7	0	23	8	3	2	-1	-1	1	4	28	11	110	20
Oxford	Headington Hill & Northway	4887	6	-1	1	8	5	7	0	6	2	4	0	-2	1	2	1	4	-1	40	8
Oxford	Hinksey Park	5821	-2	1	0	1	-3	-1	2	1	6	1	7	-4	-7	1	2	12	0	11	2
Oxford	Iffley Fields	5215	3	1	6	-3	5	4	0	6	-2	2	3	-3	0	-2	3	6	-4	27	5
Oxford	Jericho & Osney	5870	3	2	-3	2	-9	-8	-1	-10	-1	-1	-3	-7	-2	2	0	1	-1	-40	-7
Oxford	Littlemore	5651	9	2	2	9	2	4	-1	1	2	7	1	1	3	1	-1	12	-3	54	10
Oxford	Lye Valley	6157	-1	1	3	12	8	4	6	9	2	1	5	-1	0	0	0	10	-2	54	9
Oxford	Marston	6114	2	3	0	8	5	10	5	17	-4	1	13	0	-2	2	-1	8	0	63	10
Oxford	North	5467	-2	0	-1	-1	-9	-4	-1	-12	-2	0	-4	-5	-5	-2	0	-2	-3	-55	-10
Oxford	Northfield Brook	6391	-4	1	4	0	-4	4	5	-3	3	1	-1	-1	-3	-1	-2	14	-10	-1	0
Oxford	Quarry & Risinghurst	5978	5	0	0	10	-2	11	3	2	3	4	2	1	-6	0	4	8	-1	41	7
Oxford	Rose Hill & Iffley	6024	1	3	2	-7	-1	1	1	3	-5	-4	-4	-1	-17	-3	-1	12	-3	-21	-4
Oxford	St Clement's	5731	-2	2	0	0	-2	-13	0	3	-2	-1	0	-11	4	-1	-1	4	-2	-24	-4
Oxford	St Margaret's	4605	4	1	-1	-2	3	-7	-3	5	-2	1	-6	-3	1	-1	1	1	-3	-13	-3
Oxford	St Mary's	5040	-2	1	-1	2	1	-6	4	-8	3	1	-4	-8	-1	1	0	19	-1	1	0
Oxford	Summertown	7041	-1	2	3	-5	-6	13	-4	2	-3	-1	1	-2	-1	-2	0	8	-1	-3	0
Oxford	Wolvercote	5642	7	1	3	8	-10	-5	0	0	6	-1	-1	1	-5	-1	1	9	0	9	2
Oxford Total	All	134242	35	31	19	71	17	19	29	45	34	35	-4	-65	-80	0	14	239	-49	357	3
Reading	Abbey	8228	2	-1	10	9	-11	-1	3	4	3	5	6	-11	8	0	0	-4	30	23	3

Reading	Battle	9231	-7	-1	10	-11	-12	-2	4	1	-3	2	-4	-10	2	3	-2	-1	10	-35	-4
Reading	Caversham	9266	-4	0	10	-11	-8	-5	-2	-9	1	1	-3	-7	-1	0	-3	1	2	-50	-5
Reading	Church	10316	-6	0	7	12	-14	-29	-4	-3	-13	-2	6	-11	-1	-1	-1	-13	6	-80	-8
Reading	Katesgrove	8388	1	-1	-4	-3	-15	-19	1	1	-4	-1	0	-10	6	1	0	-7	16	-58	-7
Reading	Kentwood	9741	2	-1	1	2	-13	-4	0	-4	-4	-3	4	-8	3	0	2	-2	11	-36	-4
Reading	Mapledurham	3046	0	-1	2	-7	-8	4	-1	1	1	-1	-2	-1	1	0	0	-5	0	-21	-7
Reading	Minster	9146	7	-1	5	11	-18	1	1	-3	-10	0	-1	-10	5	3	2	-7	19	-17	-2
Reading	Norcot	9918	1	0	6	18	-31	17	-1	-5	0	-2	10	-4	-6	2	1	-4	10	-2	0
Reading	Park	9548	-6	-1	1	4	-25	-13	0	0	-5	-1	4	-14	2	-1	-2	-9	11	-72	-8
Reading	Peppard	9278	2	-1	5	-11	-8	3	2	13	6	4	0	-3	7	2	3	0	5	14	2
Reading	Redlands	9393	-4	0	-1	2	-17	-22	3	-8	-2	-5	-7	-16	10	1	-3	-3	12	-78	-8
Reading	Southcote	8486	4	-1	6	23	-17	22	-2	1	0	2	4	-6	-3	-1	1	12	24	46	5
Reading	Thames	9365	-5	-1	0	-2	-12	5	-1	-1	-2	-2	-1	-3	5	-1	0	-10	8	-48	-5
Reading	Tilehurst	9671	8	0	12	19	24	4	2	3	0	5	9	-4	-2	-1	1	0	3	71	7
Reading	Whitley	10076	-13	-1	2	-1	-19	-8	-2	-5	-4	-4	0	-8	8	0	2	-11	8	-72	-7
Reading Total	All	143097	-18	-10	69	55	-205	-46	5	-12	-34	-1	23	-125	46	7	-1	-64	174	-414	-3
Slough	Baylis & Stoke	10332	1	1	4	8	12	23	2	-1	4	2	18	10	5	0	3	5	14	103	10
Slough	Britwell	9328	4	0	-5	13	18	16	0	-1	11	7	23	3	14	1	2	8	18	109	12
Slough	Central	10084	0	0	5	16	11	13	2	10	1	4	9	11	29	2	-1	2	10	122	12
Slough	Chalvey	7412	13	0	6	12	15	17	-1	26	7	3	19	17	43	1	0	10	29	196	26
Slough	Cippenham Green	8618	6	0	6	16	6	0	-2	7	1	1	12	9	13	0	-1	1	12	70	8
Slough	Cippenham Meadows	9299	-5	-1	-2	8	0	-1	-3	13	-2	3	8	9	1	0	3	-5	8	22	2
Slough	Colnbrook with Poyle	5409	-4	-1	3	-3	-1	-4	0	4	-1	-1	8	-1	-3	1	0	-1	6	-8	-1
Slough	Farnham	8798	20	1	3	10	16	22	3	10	4	2	9	16	14	-1	2	7	14	145	16
Slough	Foxborough	6417	-2	0	3	8	11	12	3	10	0	1	10	9	11	4	0	0	8	80	12
Slough	Haymill	9937	0	-2	1	0	-2	9	0	2	-8	1	-2	12	-4	3	-1	1	13	3	0
Slough	Kedermister	8695	5	-2	1	7	-23	-2	2	12	2	1	13	5	10	-2	2	2	26	35	4
Slough	Langley St Mary's	7449	2	1	0	8	5	2	-2	9	4	1	2	5	18	2	0	2	3	55	7
Slough	Upton	7423	3	-1	-1	3	0	-1	0	6	0	0	3	5	9	0	-1	-5	6	27	4
Slough	Wexham Lea	9863	4	0	4	39	16	25	1	16	7	5	2	7	35	2	3	4	18	171	17

Slough Total	All	119064	48	-4	29	142	83	131	5	122	31	29	133	119	194	15	10	32	187	1,130	9
South Bucks	Beaconsfield North	4546	3	-1	-2	-4	5	5	2	2	2	0	-8	1	2	-2	-1	-1	1	-4	-1
South Bucks	Beaconsfield South	3132	2	1	0	1	8	-3	0	15	4	0	-1	4	5	-1	-2	1	1	30	9
South Bucks	Beaconsfield West	3001	2	0	1	-1	6	3	2	4	2	1	-1	4	2	-1	2	0	1	20	7
South Bucks	Burnham Beeches	1252	-2	0	0	-3	-2	-5	0	3	1	0	1	-1	-2	1	0	1	1	-11	-9
South Bucks	Burnham Church	4921	4	0	2	6	16	8	2	1	3	-1	0	6	7	2	0	0	2	48	10
South Bucks	Burnham Lent Rise	4509	0	-1	0	1	13	8	2	10	-1	1	1	1	6	0	3	0	8	40	9
South Bucks	Denham North	2640	1	0	3	4	10	7	0	7	-1	5	5	1	6	4	2	9	2	61	23
South Bucks	Denham South	3341	2	1	0	-5	3	1	1	1	-1	-1	-2	3	-2	-1	-1	-2	-1	-6	-2
South Bucks	Dorney & Burnham South	1543	0	1	1	-1	-2	0	-1	0	0	-1	-3	1	9	0	1	0	0	5	3
South Bucks	Farnham Royal	5002	-1	1	4	7	14	13	1	5	1	1	6	3	5	-2	2	9	5	63	13
South Bucks	Gerrards Cross East & Denham South West	1768	2	0	0	6	2	-3	0	2	3	-1	-1	0	3	1	0	0	1	13	7
South Bucks	Gerrards Cross North	2923	3	0	0	-4	-5	-4	-1	5	1	-1	-5	-1	0	0	0	6	-1	-11	-4
South Bucks	Gerrards Cross South	3218	-2	-1	0	-6	-12	1	-3	3	0	-1	-2	0	7	2	-1	0	-1	-17	-5
South Bucks	Hedgerley & Fulmer	1385	2	0	2	-1	-1	3	1	3	0	0	1	2	1	0	-1	1	2	10	7
South Bucks	Iver Heath	4567	4	0	1	3	10	18	2	13	5	1	5	4	17	3	5	3	2	88	19
South Bucks	Iver Village & Richings Park	4675	2	-1	5	15	16	13	1	8	6	4	9	4	8	2	2	5	1	93	20
South Bucks	Stoke Poges	4839	2	0	2	-4	-1	16	0	3	5	-2	4	3	12	3	2	11	7	50	10
South Bucks	Taplow	1584	-3	0	0	-3	4	0	0	-1	0	-1	0	0	0	0	0	-1	-1	-5	-3
South Bucks	Wexham & Iver West	3099	2	0	0	9	3	8	2	2	1	1	3	3	11	0	2	-1	2	45	14
South Bucks Total	All	61945	24	1	19	22	87	91	11	86	31	5	9	38	97	13	14	40	34	513	8
South Oxfordshire	Aston Rowant	2380	-2	0	0	-3	1	-2	1	-1	1	-2	-5	-1	1	-1	0	-2	0	-16	-7
South Oxfordshire	Benson	6094	-3	1	0	1	-2	14	1	-1	2	2	1	0	-1	-1	-1	8	-2	11	2

South Oxfordshire	Berinsfield	5773	-1	0	2	4	-1	8	5	-6	3	1	0	0	-6	2	3	20	-3	22	4
South Oxfordshire	Brightwell	2567	2	-1	-2	-3	-2	3	-2	-1	-1	0	-2	0	-5	0	-1	4	-1	-14	-5
South Oxfordshire	Chalgrove	2909	1	1	0	7	-2	-1	2	-2	0	0	1	1	-4	0	-1	1	0	-3	-1
South Oxfordshire	Chiltern Woods	2267	-5	0	-1	-5	-1	-2	-1	0	1	1	1	0	1	-1	0	-1	0	-16	-7
South Oxfordshire	Chinnor	5856	2	2	-1	0	11	-2	1	4	7	1	6	2	0	1	1	2	0	28	5
South Oxfordshire	Cholsey & Wallingford South	5072	2	0	0	1	0	2	-1	-2	1	2	-6	-1	-2	2	-1	18	0	9	2
South Oxfordshire	Crowmarsh	2414	4	0	-1	-1	-3	0	-1	2	2	-1	0	0	-4	-1	1	6	-1	-1	0
South Oxfordshire	Didcot All Saints	5472	10	2	4	1	16	11	3	5	3	6	14	1	-9	0	2	21	0	79	14
South Oxfordshire	Didcot Ladygrove	7098	1	2	0	6	3	6	1	-1	2	1	4	1	-2	0	1	4	-1	11	2
South Oxfordshire	Didcot Northbourne	5287	6	0	-1	13	15	9	4	0	5	6	6	0	5	2	0	14	1	75	14
South Oxfordshire	Didcot Park	5592	15	1	0	20	12	5	-1	12	1	6	8	2	-9	2	3	27	5	96	17
South Oxfordshire	Forest Hill & Holton	2879	1	0	-1	0	-1	1	0	0	-1	0	1	-2	-3	0	-1	6	-1	-3	-1
South Oxfordshire	Garsington	2672	0	1	0	3	-1	5	4	1	2	0	-2	-1	-2	0	1	5	-1	15	5
South Oxfordshire	Goring	5506	5	0	-1	0	1	2	-3	12	6	2	2	0	0	-1	-1	14	4	32	6
South Oxfordshire	Great Milton	2708	2	1	-1	-4	-2	-2	3	0	0	2	0	0	-2	0	0	3	-1	-4	-2
South Oxfordshire	Hagbourne	2708	-3	0	2	3	1	0	1	-3	1	0	-1	-1	-4	2	0	7	-1	-1	0
South Oxfordshire	Henley North	5202	3	0	1	5	-15	-2	0	5	1	1	7	1	13	2	0	37	1	55	11
South Oxfordshire	Henley South	5444	1	0	3	-4	-3	-1	-1	0	-1	1	1	-2	5	1	-1	26	1	17	3
South Oxfordshire	Sandford	2587	7	-1	0	7	-2	-1	-1	7	3	3	5	0	-2	0	-1	3	-1	28	11
South Oxfordshire	Shiplake	4914	1	0	0	-4	-12	2	-2	6	-6	0	2	-1	5	-1	-2	12	-1	-6	-1
South Oxfordshire	Sonning Common	5251	1	1	1	5	-4	2	2	4	5	0	3	2	8	0	4	2	-1	25	5
South Oxfordshire	Thame North	5822	0	1	2	0	1	5	2	-1	2	2	-2	1	-2	1	0	7	1	7	1

South Oxfordshire	Thame South	5250	1	2	0	3	7	6	1	4	6	0	0	1	-2	3	-1	5	0	30	6
South Oxfordshire	Wallingford North	5331	7	2	1	3	10	5	4	4	4	0	3	-1	-6	4	1	45	4	79	15
South Oxfordshire	Watlington	5141	-4	1	0	-8	2	-6	-3	-5	-2	1	-3	1	-7	0	2	3	-1	-37	-7
South Oxfordshire	Wheatley	5277	11	0	2	7	6	8	0	2	-1	2	2	-3	0	2	-1	8	1	40	8
South Oxfordshire	Woodcote	2715	2	1	0	3	6	1	1	1	-1	2	1	0	9	-1	0	5	2	25	9
South Oxfordshire Total	All	128188	65	17	7	60	41	78	22	45	45	37	46	1	-23	20	9	312	6	580	5
Vale of White Horse	Abingdon Abbey & Barton	4526	4	2	-1	13	15	8	4	9	7	1	1	0	0	0	2	36	0	95	21
Vale of White Horse	Abingdon Caldecott	4416	0	0	2	7	10	23	4	0	3	1	6	2	-7	2	0	15	1	61	14
Vale of White Horse	Abingdon Dunmore	4772	4	0	1	7	-4	1	0	-1	2	1	1	0	-2	-1	0	15	0	14	3
Vale of White Horse	Abingdon Fitzharris	4298	3	0	0	3	0	4	2	6	3	0	4	0	-4	1	2	21	-1	37	9
Vale of White Horse	Abingdon Northcourt	4604	7	1	0	8	12	5	1	2	1	2	-3	3	-4	0	0	21	0	47	10
Vale of White Horse	Abingdon Ock Meadow	4153	8	1	6	12	13	6	0	15	6	2	6	1	-2	0	1	27	2	97	23
Vale of White Horse	Abingdon Peachcroft	4523	5	0	-3	1	-1	0	2	-3	2	2	-3	1	-8	0	0	4	1	-10	-2
Vale of White Horse	Appleton & Cumnor	6400	9	0	3	10	12	10	-1	7	-1	-1	4	4	-7	-2	1	5	-2	45	7
Vale of White Horse	Blewbury & Upton	1942	4	1	0	7	-4	0	0	1	-1	1	-2	0	-3	0	0	10	-1	12	6
Vale of White Horse	Craven	2233	-1	0	3	0	0	-2	1	-3	0	0	-3	0	-6	0	0	1	-2	-13	-6
Vale of White Horse	Drayton	2218	2	0	0	14	1	2	1	1	2	2	4	0	0	2	2	7	-1	34	15
Vale of White Horse	Faringdon & The Coxwells	7015	6	1	-3	12	4	5	5	0	-3	4	9	0	-6	-1	5	7	1	32	5
Vale of White Horse	Greendown	2182	1	0	-1	7	2	2	0	-3	-1	1	-3	0	0	-1	0	1	-1	3	1
Vale of White Horse	Grove	7417	7	1	1	7	9	12	2	4	6	0	6	2	-6	1	2	18	-1	57	8
Vale of White Horse	Hanneys	2180	3	3	0	3	-5	3	1	0	2	-1	6	4	-4	1	0	0	0	14	6
Vale of White Horse	Harwell	3780	-1	0	1	8	12	5	2	2	6	3	-1	0	-1	2	0	6	1	40	10

Vale of White Horse	Hendreds	4061	7	1	0	10	-8	0	1	1	-3	0	1	-1	-5	-1	-1	6	0	2	0
Vale of White Horse	Kennington & South Hinksey	4264	2	1	0	-2	6	5	-1	7	-1	3	4	1	-1	-2	1	5	0	22	5
Vale of White Horse	Kingston Bagpuize with Southmoor	2269	1	1	0	2	-2	5	1	-1	-1	1	1	1	1	1	-1	1	0	7	3
Vale of White Horse	Longworth	2243	-1	1	3	2	-2	-1	1	-1	-2	2	-1	0	-3	0	-1	-1	-1	-10	-4
Vale of White Horse	Marcham & Shippon	3856	1	-1	3	-3	6	3	2	5	2	0	5	-1	-3	0	0	8	-2	22	6
Vale of White Horse	North Hinksey & Wytham	4447	8	0	2	14	12	6	0	3	7	0	2	-1	0	1	-1	6	2	54	12
Vale of White Horse	Radley	2772	1	0	0	4	6	-1	2	-5	0	-1	-1	1	-3	0	0	-1	-1	-2	-1
Vale of White Horse	Shrivenham	1390	0	0	-1	-1	-1	-6	0	-5	-2	0	-1	0	-9	1	0	-3	-1	-32	-23
Vale of White Horse	Stanford	2136	1	-1	-1	3	2	1	0	3	0	0	-1	1	0	0	0	7	-1	10	5
Vale of White Horse	Sunningwell & Wootton	4186	5	1	2	13	7	1	3	4	8	1	6	-1	-2	3	4	13	2	62	15
Vale of White Horse	Sutton Courtenay & Appleford	2772	5	1	0	0	1	5	0	5	-2	0	3	0	0	1	-1	9	-1	23	8
Vale of White Horse	Wantage Charlton	6139	6	3	0	9	5	9	1	6	4	2	-5	0	-7	1	0	24	-1	51	8
Vale of White Horse	Wantage Segsbury	4358	4	1	0	3	-13	9	-1	-6	3	0	-1	-1	-8	3	1	7	-2	-5	-1
Vale of White Horse Total	All	111552	98	16	14	171	94	120	32	53	47	26	47	19	-100	13	17	276	-10	770	7
West Berkshire	Aldermaston	2602	-2	0	-2	4	-4	7	2	0	-2	-1	1	1	0	-1	0	-2	-1	-2	-1
West Berkshire	Basildon	2841	0	0	-2	-5	-7	2	-1	-3	3	0	-2	1	3	0	0	-3	-1	-20	-7
West Berkshire	Birch Copse	8158	-1	1	1	-7	-4	-3	2	-3	-6	0	2	-5	13	-1	0	-5	1	-29	-4
West Berkshire	Bucklebury	5922	-4	0	-2	-7	-10	1	-2	-7	-4	0	-6	-3	1	0	-2	0	0	-53	-9
West Berkshire	Burghfield	5894	1	0	2	0	-3	7	5	1	2	-1	-1	-3	6	0	0	-4	1	1	0
West Berkshire	Calcot	9097	-2	0	-1	-7	-5	6	-2	-1	-2	2	1	-6	8	0	-1	0	4	-22	-2
West Berkshire	Chieveley	2710	-4	0	0	-4	-3	2	-1	-6	-3	-1	-2	-1	3	0	1	-6	1	-29	-11
West Berkshire	Clay Hill	5705	0	-1	0	18	15	8	1	-6	0	3	5	1	6	5	-1	0	6	45	8
West Berkshire	Cold Ash	3206	1	1	3	-2	-8	-2	-2	-4	-1	-1	-3	-2	3	2	0	-3	0	-23	-7
West Berkshire	Compton	3045	0	0	0	-5	-4	0	-1	-1	-1	-1	-2	1	-5	1	-1	2	3	-23	-7
West Berkshire	Downlands	2968	3	0	0	-1	-6	1	-1	0	-2	-1	-2	-2	-3	-1	-2	-4	-3	-24	-8

West Berkshire	Falkland	5885	3	-2	1	-5	3	2	4	-8	-2	1	4	0	4	1	0	-3	4	-6	-1
West Berkshire	Greenham	4842	-4	0	0	2	0	5	0	-3	0	-1	5	0	-4	0	-1	-2	4	-12	-2
West Berkshire	Hungerford	5559	17	-1	2	9	15	11	2	9	-4	-1	9	5	9	1	1	16	1	92	17
West Berkshire	Kintbury	4898	0	1	2	-1	-4	4	0	4	-5	-1	2	2	8	1	1	-2	-1	5	1
West Berkshire	Lambourn Valley	5445	1	0	3	16	32	20	3	22	-3	-2	16	6	16	3	1	0	-1	125	23
West Berkshire	Mortimer	5089	-4	-1	2	-1	-3	1	2	1	1	-2	0	-3	3	2	-1	2	3	-9	-2
West Berkshire	Northcroft	4881	5	-1	6	9	3	3	0	-7	3	3	12	1	2	6	1	15	9	53	11
West Berkshire	Pangbourne	2981	-1	0	2	8	-2	0	0	-5	0	-1	0	-2	0	-1	0	-3	1	-10	-3
West Berkshire	Purley on Thames	6435	2	1	2	5	-11	6	-1	1	-2	1	1	-2	5	0	-1	-6	4	-10	-2
West Berkshire	Speen	5653	-2	0	-4	0	-14	0	3	0	-2	1	5	0	-2	4	-2	1	2	-18	-3
West Berkshire	St Johns	5529	6	1	3	6	-3	0	8	-3	4	2	4	2	-3	0	1	2	8	22	4
West Berkshire	Sulhamstead	2727	0	0	-1	-3	-3	1	0	-1	-3	0	-1	0	0	-1	0	-3	-1	-21	-8
West Berkshire	Thatcham Central	6119	1	0	2	11	8	11	5	-3	2	5	15	-5	-3	3	1	-1	8	41	7
West Berkshire	Thatcham North	5259	3	0	1	2	2	7	0	5	-3	-1	5	-2	18	-1	-1	-2	1	22	4
West Berkshire	Thatcham South & Crookham	5074	6	0	0	12	3	10	1	-3	0	2	11	-2	0	2	-1	-1	1	32	6
West Berkshire	Thatcham West	6372	-1	2	0	10	8	-1	-1	0	-1	0	3	-2	1	0	-1	-3	0	2	0
West Berkshire	Theale	2771	2	0	2	4	-1	-4	0	1	-3	0	0	0	-2	1	-1	1	0	-4	-1
West Berkshire	Victoria	3958	7	0	3	0	-4	10	5	1	4	3	12	0	5	1	1	20	11	65	16
West Berkshire	Westwood	2864	3	0	2	2	-2	4	0	0	0	0	1	-1	1	0	0	0	2	6	2
West Berkshire Total	All	144489	36	-1	30	71	-13	119	31	-19	-27	8	95	-19	87	29	-7	5	67	200	1
West Oxfordshire	Alvescot & Filkins	1684	1	2	2	-3	-1	2	-2	-4	3	0	0	-1	-2	2	2	4	0	2	1
West Oxfordshire	Ascott & Shipton	1968	0	1	0	-1	-2	-5	-1	0	1	0	-2	0	1	1	-1	2	-1	-8	-4
West Oxfordshire	Bampton & Clanfield	3634	1	0	5	22	15	10	1	5	5	2	7	1	8	0	0	14	0	88	24
West Oxfordshire	Brize Norton & Shilton	2743	-4	1	3	1	-6	0	-1	2	1	0	3	-2	0	1	0	1	-2	-4	-1
West Oxfordshire	Burford	1878	-2	-1	0	-1	-3	1	1	0	1	0	0	2	-1	-1	0	2	0	-5	-3
West Oxfordshire	Carterton North East	2994	-2	0	-1	4	5	12	2	-2	3	0	5	3	-5	1	1	2	0	20	7
West Oxfordshire	Carterton	4597	5	2	0	8	7	12	4	6	4	4	-1	-2	-3	4	2	26	-1	68	15

West Oxfordshire	North West Carterton South	4209	1	0	1	17	7	3	3	9	3	0	3	1	3	1	3	8	0	57	13
West Oxfordshire	Chadlington & Churchill	1938	-1	1	0	-4	2	-2	0	8	0	0	-1	0	0	-1	1	-1	0	1	0
West Oxfordshire	Charlbury & Finstock	3777	6	2	-1	1	3	2	1	4	5	0	-1	-1	-4	0	2	8	1	21	6
West Oxfordshire	Chipping Norton	5972	20	-1	1	34	16	14	3	19	10	2	4	-1	14	5	2	9	2	140	23
West Oxfordshire	Ducklington	2063	9	0	0	2	2	0	1	-1	1	0	4	0	-1	0	0	7	0	21	10
West Oxfordshire	Eynsham & Cassington	5725	1	2	4	33	10	36	2	8	6	2	15	4	-5	0	1	15	0	123	21
West Oxfordshire	Freeland & Hanborough	4123	6	1	1	4	0	16	2	4	2	3	9	2	-1	1	0	10	0	54	13
West Oxfordshire	Hailey, Minster Lovell & Leafield	3866	0	1	-2	14	0	2	2	8	2	0	6	1	1	0	2	10	-2	43	11
West Oxfordshire	Kingham, Rollright & Enstone	4122	7	1	-2	11	-1	8	3	21	6	1	1	0	5	0	5	-1	-1	60	15
West Oxfordshire	Milton-under-Wychwood	1953	-3	0	1	3	2	0	1	14	-1	0	0	0	0	-1	1	3	1	16	8
West Oxfordshire	North Leigh	1919	3	0	3	15	4	7	1	0	4	1	1	2	-1	0	1	0	0	38	20
West Oxfordshire	Standlake, Aston & Stanton Harcourt	3972	7	1	0	-1	2	8	-1	-2	6	1	6	1	-4	1	3	13	-1	33	8
West Oxfordshire	Stonesfield & Tackley	4043	-1	1	2	5	5	9	1	-2	1	1	2	-1	2	0	1	6	0	24	6
West Oxfordshire	The Bartons	1937	-1	0	1	1	1	4	2	1	1	0	2	0	0	0	1	1	-1	9	5
West Oxfordshire	Witney Central	3870	2	1	1	4	16	13	4	8	6	2	9	-2	1	1	-1	14	1	74	19
West Oxfordshire	Witney East	4490	3	1	2	3	6	17	1	9	6	5	12	7	-1	-1	3	20	0	85	19
West Oxfordshire	Witney North	4163	-1	2	3	4	3	7	3	3	3	1	27	0	0	1	3	8	0	60	14
West Oxfordshire	Witney South	5964	23	1	-3	30	23	24	4	14	10	4	9	3	-5	1	5	26	1	157	26
West Oxfordshire	Witney West	4278	-1	0	1	3	-1	2	3	-1	2	1	1	1	-6	1	0	8	-1	5	1
West Oxfordshire	Woodstock & Bladon	3755	3	0	1	5	12	12	0	10	2	0	2	-1	1	2	1	21	0	68	18
West Oxfordshire Total	All	95637	83	18	22	213	125	212	41	141	90	29	124	14	-3	18	36	238	-5	1,249	13
Windsor & Maidenhead	Ascot & Cheapside	5065	3	-1	5	16	5	4	-3	6	-1	6	4	3	-2	2	1	5	11	46	9
Windsor &	Belmont	7541	1	-1	1	6	0	4	9	6	-4	1	6	9	8	0	-1	1	10	36	5

Maidenhead																					
Windsor & Maidenhead	Bisham & Cookham	6668	-5	0	1	0	-8	-6	-3	7	-3	-2	3	6	2	0	-1	-5	0	-23	-4
Windsor & Maidenhead	Boyn Hill	6973	3	-1	-1	1	7	-5	4	3	-2	1	8	5	-1	-1	0	-7	6	7	1
Windsor & Maidenhead	Bray	6983	-4	-1	-1	-6	-9	-1	0	1	0	0	2	2	1	1	1	-2	3	-25	-4
Windsor & Maidenhead	Castle Without	6176	1	0	2	0	-1	-2	-2	5	2	2	6	2	5	0	0	5	6	18	3
Windsor & Maidenhead	Clewer East	4393	-3	-1	3	4	13	1	1	15	0	1	9	4	3	0	1	9	5	56	13
Windsor & Maidenhead	Clewer North	7234	-1	0	0	-1	4	0	-2	2	-1	0	1	4	7	0	-1	-3	9	0	0
Windsor & Maidenhead	Clewer South	5222	2	0	3	7	6	8	-2	1	4	-1	7	3	20	1	0	1	7	51	10
Windsor & Maidenhead	Cox Green	7207	1	0	2	-3	2	6	1	-1	0	1	3	5	8	2	1	1	8	18	3
Windsor & Maidenhead	Datchet	4646	1	0	-1	7	5	0	-1	8	1	1	-1	3	7	1	-1	-1	4	25	5
Windsor & Maidenhead	Eton & Castle	3023	-3	0	-2	-3	-9	-5	0	-2	-2	1	-1	-1	-1	0	0	-5	0	-38	-13
Windsor & Maidenhead	Eton Wick	2299	-1	0	1	6	-1	-2	0	3	2	1	4	0	-2	1	-1	-2	2	6	3
Windsor & Maidenhead	Furze Platt	7162	-5	1	-1	13	-1	13	0	2	1	0	8	15	7	3	-1	-4	10	39	5
Windsor & Maidenhead	Horton & Wraysbury	4624	9	1	2	5	2	5	2	3	0	-1	5	-1	6	1	1	7	1	43	9
Windsor & Maidenhead	Hurley & Walthams	6115	6	1	2	6	3	1	2	-1	5	-2	1	2	5	3	1	9	3	34	6
Windsor & Maidenhead	Maidenhead Riverside	6987	1	1	-1	-1	6	-9	0	0	5	3	11	3	12	-1	-1	5	11	26	4
Windsor & Maidenhead	Old Windsor	4775	-4	0	-1	7	6	0	1	0	-3	1	-1	3	4	0	-1	2	6	9	2
Windsor & Maidenhead	Oldfield	7327	-3	-1	0	3	4	2	-2	6	-1	2	1	3	13	1	-1	10	7	32	4
Windsor & Maidenhead	Park	4964	-3	0	1	-2	-7	2	-1	6	1	2	4	6	4	1	-1	-2	3	3	1
Windsor & Maidenhead	Pinkneys Green	6836	-2	2	-1	10	-8	-6	-2	5	1	2	4	7	7	0	0	-4	3	4	1
Windsor & Maidenhead	Sunningdale	4875	-4	-1	-1	0	-3	-5	-2	1	0	3	-3	1	-3	3	1	2	2	-19	-4
Windsor & Maidenhead	Sunninghill & South Ascot	6538	5	-1	1	7	14	-2	2	1	4	3	-3	2	-1	0	2	4	9	27	4
Windsor & Maidenhead	All	133633	-5	-5	14	82	30	0	3	79	6	25	78	87	109	19	1	25	128	375	3

Total																					
Wokingham	Arborfield	2042	2	0	-1	9	0	4	0	-1	-2	0	0	0	3	0	1	0	1	8	4
Wokingham	Barkham	4176	-3	0	1	-2	-8	6	2	-7	-3	0	-1	-3	2	0	1	-2	1	-24	-6
Wokingham	Bulmershe & Whitegates	8386	8	1	4	14	-6	7	7	5	3	2	6	-3	6	2	1	1	2	53	6
Wokingham	Charvil	2990	6	0	2	0	-1	0	0	3	-2	0	-1	0	-2	0	1	-1	1	-2	-1
Wokingham	Coronation	5869	-2	0	3	0	-1	1	-1	-2	0	-1	0	-2	7	2	0	1	4	-4	-1
Wokingham	Emmbrook	7575	-5	1	3	-6	-11	0	1	2	4	-1	1	-4	4	1	-2	-8	7	-30	-4
Wokingham	Evendons	8961	0	-1	2	0	-11	-12	4	-11	-6	1	-4	-2	-5	-1	0	-8	2	-72	-8
Wokingham	Finchampstead North	5606	-5	1	4	1	-3	-5	-2	-4	-1	0	-4	-1	0	2	0	-5	2	-34	-6
Wokingham	Finchampstead South	5729	4	0	0	4	0	-4	1	2	0	1	3	-3	-1	1	0	-5	4	-5	-1
Wokingham	Hawkedon	9138	-1	-1	5	1	-9	4	0	7	-3	2	0	-5	8	0	-1	-13	5	-21	-2
Wokingham	Hillside	9118	-4	0	-3	-3	-1	1	-2	1	-3	-2	1	-2	5	4	1	-2	6	-22	-2
Wokingham	Hurst	2803	1	-1	2	3	1	3	-2	-1	-3	1	0	-2	-1	1	-1	-3	3	-7	-3
Wokingham	Loddon	8942	-2	1	-2	-2	-8	-3	5	-1	3	7	7	-5	-4	4	2	-2	7	-16	-2
Wokingham	Maiden Erlegh	9623	5	1	-2	0	-17	-3	1	-1	-5	-2	-5	-5	-1	0	-1	-8	4	-57	-6
Wokingham	Norreys	8137	3	0	6	2	-6	-6	-1	-1	7	4	-4	0	18	0	1	1	5	12	1
Wokingham	Remenham, Wargrave & Ruscombe	5484	1	0	4	-3	-7	2	2	3	-2	-1	-10	1	2	-1	-1	0	10	-16	-3
Wokingham	Shinfield North	2427	1	0	0	0	-3	0	1	1	2	0	10	-1	5	1	-1	-3	1	10	4
Wokingham	Shinfield South	5039	0	-1	1	2	-4	-2	1	-2	-4	0	5	-3	2	0	0	-4	-1	-15	-3
Wokingham	Sonning	2838	0	1	-1	-2	-3	-4	-1	2	-1	-1	2	0	1	0	0	-2	3	-13	-4
Wokingham	South Lake	5995	2	-1	3	4	-5	-4	1	-6	-4	-1	2	-5	8	1	2	-8	-1	-21	-3
Wokingham	Swallowfield	2629	-2	-1	0	-2	-9	-1	0	2	-2	-1	-1	-1	-5	-1	0	-3	1	-30	-11
Wokingham	Twyford	5423	5	0	5	-2	-3	2	2	1	-1	-1	0	-2	2	1	2	2	3	3	1
Wokingham	Wescott	5250	3	-2	0	-7	-11	-1	-2	1	-4	0	-2	-3	4	0	0	-10	3	-42	-8
Wokingham	Winnersh	7934	4	-1	2	13	-9	-8	0	-5	1	-2	2	-5	2	-1	-2	-1	5	-24	-3
Wokingham	Wokingham Without	8097	1	0	0	1	0	-5	-3	-10	-1	0	11	-1	-11	-1	-1	0	7	-34	-4
Wokingham Total	All	150211	22	-4	40	21	-133	-27	12	-21	-27	3	15	-53	48	14	1	-82	85	-403	-3
Wycombe	Abbey	9178	2	2	6	3	12	21	2	4	6	-2	-4	7	15	4	2	11	-1	86	9
Wycombe	Bledlow & Bradenham	2971	-1	-1	1	-2	-4	0	0	1	0	0	3	1	9	1	-1	-5	-2	-2	-1

Wycombe	Booker & Cressex	4756	2	-1	2	19	14	12	3	8	4	1	1	0	8	0	2	7	-3	83	17
Wycombe	Bourne End-cum-Hedsor	5404	2	0	1	3	12	12	1	11	4	5	0	4	3	3	-1	6	-1	58	11
Wycombe	Bowerdean	5528	4	0	0	2	10	2	-1	3	7	0	4	2	18	-1	2	-1	-2	49	9
Wycombe	Chiltern Rise	5390	-1	1	0	10	6	2	0	4	4	-2	-3	3	4	1	0	1	-3	23	4
Wycombe	Disraeli	5592	1	3	1	1	-4	8	4	1	2	-1	-5	6	4	2	1	-6	-2	15	3
Wycombe	Downley & Plomer Hill	4849	0	2	0	5	-6	1	-1	1	-2	-2	1	1	11	-1	1	-3	-1	1	0
Wycombe	Flackwell Heath & Little Marlow	7205	10	0	-1	4	18	0	0	3	0	-1	2	2	9	0	1	2	-1	39	5
Wycombe	Greater Hughenden	8506	7	0	2	-1	8	14	4	-2	1	-1	10	5	17	2	4	1	-1	55	6
Wycombe	Greater Marlow	5192	-3	1	-3	-1	-9	-3	2	0	-3	-2	-2	2	-2	0	0	-2	-1	-33	-6
Wycombe	Hambleden Valley	2617	0	2	-1	-8	-4	-5	-2	-3	-3	0	-4	0	0	0	0	-3	-1	-34	-13
Wycombe	Hazlemere North	4814	8	2	-1	1	10	0	2	1	-1	0	1	4	11	1	-1	-1	-1	30	6
Wycombe	Hazlemere South	4537	2	0	1	10	11	4	1	7	5	0	0	1	15	-1	0	2	0	50	11
Wycombe	Icknield	3038	-2	1	-1	-5	2	-1	0	-5	3	-1	1	2	4	0	1	-2	1	-8	-3
Wycombe	Lacey Green, Speen & the Hampdens	2672	0	0	0	-3	-2	2	1	0	0	-1	-2	3	1	-1	-1	-1	1	-9	-4
Wycombe	Marlow North & West	8607	7	2	2	-7	-1	-5	2	22	-4	-1	4	4	17	-1	1	8	-4	37	4
Wycombe	Marlow South East	5397	4	0	-1	-8	-10	6	-2	7	-2	0	1	4	2	-1	0	2	0	-7	-1
Wycombe	Micklefield	5531	8	1	4	1	12	5	1	5	5	2	2	8	28	2	1	5	-4	87	16
Wycombe	Oakridge & Castlefield	8694	2	2	2	1	21	9	-3	4	-4	-1	-5	14	56	2	0	-2	-4	94	11
Wycombe	Ryemead	4984	5	0	-1	3	6	10	3	5	4	-2	1	3	17	-1	2	-2	-2	49	10
Wycombe	Sands	5654	3	2	1	-3	12	4	-4	0	3	0	-1	8	16	0	0	2	-2	38	7
Wycombe	Stokenchurch & Radnage	5459	1	0	1	-4	0	7	1	6	-1	2	3	3	16	0	2	-6	-3	25	5
Wycombe	Terriers & Amersham Hill	8747	-1	1	-1	5	4	2	6	2	6	-1	4	5	22	1	0	-3	1	44	5
Wycombe	The Risboroughs	7978	2	1	3	3	30	19	3	7	11	3	8	4	12	2	-1	10	1	104	13
Wycombe	The Wooburns	4853	6	0	1	-1	20	16	0	4	9	-1	3	5	20	3	0	-4	-1	73	15

Wycombe	Totteridge	5371	6	3	2	15	11	9	3	14	5	1	3	12	40	4	5	7	-5	137	25
Wycombe	Tylers Green & Loudwater	8581	3	3	-2	6	9	11	1	-6	3	1	1	4	2	1	0	-5	1	17	2
Wycombe Total	All	162105	81	27	16	48	186	162	25	105	64	-5	26	116	373	20	19	19	-40	1,103	7
Thames Valley	Grand Total	2086015	949	198	420	1,872	2,103	1,977	419	1,149	576	337	866	441	1,644	278	333	1,291	893	12,225	6

Appendix Five: Top 250 LSOA Where Emergency Admission Avoidance Schemes May Yield the Greatest Return

Emergency admission avoidance will encompass the input of community matrons plus other initiatives aimed at reducing the higher 'push' in to the acute sites arising from populations living within 5 km.

How to use this table:

The table may be copied and pasted into an Excel spreadsheet to allow for further manipulation. LSOA codes can be used to map the data to allow specific geo-spatial location of areas within a ward. Data is currently grouped by Local Authority and then by volume of admissions relative to national average.

LSOA's are listed according to the volume of emergency admission relative to the national average. The volume of admissions relative to the national average has been used in preference to 'excess admissions' because in this table it is assumed that community matrons, etc are able to alter the fundamental response to IMD and ethnicity and that other schemes will be more specifically targeted to those LSOA within 5 km of an acute site. Distance, IMD and ethnicity data are all given in the table to enable the reader to visually determine which factor is likely to be the main cause of the higher rate of admissions and then to brainstorm likely appropriate interventions.

The rank score (far right) ranges from 1 (highest) to 250. The level of admissions in these high volume emergency admission locations ranges from 133% to 233% of national average.

Colour coding for distance to the acute site up to 5 km is blue while in all other columns red highlights the top 50 while pink highlights the next highest 51 to 100.

Should more detailed calculations be required please contact the author.

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LSOA	LA	Ward	Acute Site	Distance (km)	Population	IMD	%Asian	%Black	% Relative to National Average	Rank
E01017709	Aylesbury Vale	Southcourt	Stoke Mandeville	1	1,446	23.8	23.3	5.7	194%	17
E01017711	Aylesbury Vale	Southcourt	Stoke Mandeville	1	1,515	24.4	10.0	5.6	185%	30
E01017707	Aylesbury Vale	Quarrendon	Stoke Mandeville	4	1,464	26.5	24.8	7.6	177%	36
E01017712	Aylesbury Vale	Southcourt	Stoke Mandeville	1	1,473	26.1	29.3	3.6	171%	43
E01017723	Aylesbury Vale	Walton Court & Hawkslade	Stoke Mandeville	1	1,423	19.6	21.9	8.8	170%	47
E01017661	Aylesbury Vale	Elmhurst & Watermead	Stoke Mandeville	3	1,577	18.7	17.1	7.9	165%	57
E01017724	Aylesbury Vale	Walton Court & Hawkslade	Stoke Mandeville	1	1,420	19.1	18.8	5.2	157%	86
E01017687	Aylesbury Vale	Mandeville & Elm Farm	Stoke Mandeville	0	1,486	14.8	15.6	10.7	155%	97
E01017655	Aylesbury Vale	Coldharbour	Stoke Mandeville	2	1,682	4.6	3.5	4.2	152%	107
E01017708	Aylesbury Vale	Quarrendon	Stoke Mandeville	3	1,587	24.0	16.9	8.4	150%	114
E01017633	Aylesbury Vale	Aylesbury Central	Stoke Mandeville	2	1,488	16.4	13.2	3.8	150%	116
E01017710	Aylesbury Vale	Southcourt	Stoke Mandeville	1	1,413	15.7	9.3	7.2	141%	164
E01017663	Aylesbury Vale	Elmhurst & Watermead	Stoke Mandeville	2	1,618	16.6	72.2	5.1	140%	171
E01017665	Aylesbury Vale	Gatehouse	Stoke Mandeville	3	1,499	19.4	10.7	6.2	138%	183
E01017666	Aylesbury Vale	Gatehouse	Stoke Mandeville	3	1,542	17.2	34.3	6.9	135%	203
E01017674	Aylesbury Vale	Grendon Underwood	Stoke Mandeville	14	1,773	10.8	3.4	5.3	130%	248
E01016248	Bracknell Forest	Wildridings & Central	Heatherwood	5	1,515	14.5	5.7	1.7	149%	126
E01016240	Bracknell Forest	Priestwood & Garth	Heatherwood	5	1,527	20.9	3.9	3.1	143%	159
E01016210	Bracknell Forest	Great Hollands North	Heatherwood	6	1,299	22.4	4.3	4.0	139%	176
E01016189	Bracknell Forest	Bullbrook	Heatherwood	3	1,887	13.7	4.7	7.6	138%	187
E01016231	Bracknell Forest	Old Bracknell	Heatherwood	5	1,510	16.5	3.5	2.8	136%	192
E01016198	Bracknell Forest	College Town	Frimley Park	4	1,212	2.3	4.3	1.2	133%	222
E01016220	Bracknell Forest	Hanworth	Heatherwood	5	1,511	9.8	3.8	0.5	133%	225
E01028436	Cherwell	Banbury Grimsbury & Castle	Horton	2	1,547	27.3	15.5	2.9	209%	8
E01028468	Cherwell	Bicester Town	ORH	16	1,609	13.9	1.6	2.3	200%	16
E01028448	Cherwell	Banbury Neithrop	Horton	1	1,503	27.1	9.7	1.3	194%	18
E01028450	Cherwell	Banbury Ruscote	Horton	2	1,438	38.9	4.7	3.1	187%	26
E01028449	Cherwell	Banbury Ruscote	Horton	1	1,331	39.0	5.2	1.8	187%	27
E01028441	Cherwell	Banbury Hardwick	Horton	3	1,479	23.0	4.5	2.8	180%	34
E01028454	Cherwell	Banbury Ruscote	Horton	2	1,510	34.8	6.4	0.9	172%	42
E01028435	Cherwell	Banbury Grimsbury & Castle	Horton	1	1,442	31.0	18.1	4.3	167%	53
E01028494	Cherwell	Kidlington South	ORH	8	1,227	13.2	6.4	2.1	161%	74
E01028456	Cherwell	Bicester East	ORH	17	1,546	14.6	0.6	1.6	159%	78
E01028445	Cherwell	Banbury Neithrop	Horton	2	1,428	22.8	11.1	1.5	158%	81
E01028453	Cherwell	Banbury Ruscote	Horton	2	1,371	28.3	3.4	1.5	156%	91
E01028446	Cherwell	Banbury Neithrop	Horton	2	1,471	15.7	5.1	0.2	156%	94
E01028442	Cherwell	Banbury Hardwick	Horton	3	1,376	10.0	0.7	1.9	148%	130
E01028451	Cherwell	Banbury Ruscote	Horton	3	1,373	14.0	1.7	1.9	147%	137
E01028452	Cherwell	Banbury Ruscote	Horton	2	1,397	25.7	4.6	1.9	145%	148

E01028500	Cherwell	Launton	ORH	13	1,664	13.7	3.7	6.0	144%	149
E01028447	Cherwell	Banbury Neithrop	Horton	1	1,131	18.0	14.2	1.3	144%	155
E01028466	Cherwell	Bicester Town	ORH	16	1,721	21.5	1.0	2.7	140%	169
E01028437	Cherwell	Banbury Grimsbury & Castle	Horton	2	1,464	9.8	27.6	1.0	139%	181
E01028430	Cherwell	Banbury Easington	Horton	1	1,322	13.8	3.9	2.0	138%	185
E01028440	Cherwell	Banbury Grimsbury & Castle	Horton	2	1,478	17.4	12.7	1.6	136%	195
E01028479	Cherwell	Cropredy	Horton	8	1,283	9.7	0.0	0.0	135%	197
E01028427	Cherwell	Banbury Calthorpe	Horton	0	1,293	11.6	4.8	3.3	135%	200
E01028510	Cherwell	Yarnton, Gosford & Water Eaton	ORH	9	1,440	10.1	3.6	1.1	135%	205
E01028475	Cherwell	Bloxham & Bodicote	Horton	2	2,065	6.3	1.0	0.5	134%	216
E01028429	Cherwell	Banbury Calthorpe	Horton	1	1,120	5.5	7.3	0.8	133%	226
E01028428	Cherwell	Banbury Calthorpe	Horton	1	1,467	3.7	5.1	1.8	132%	228
E01028458	Cherwell	Bicester East	ORH	17	1,624	10.8	1.3	1.2	132%	230
E01028463	Cherwell	Bicester South	ORH	16	1,522	4.4	3.6	2.7	131%	235
E01017758	Chiltern	Chalfont Common	Wexham Park	10	1,327	32.3	3.8	0.9	193%	20
E01017781	Chiltern	Newtown	Hemel	14	1,065	17.5	45.7	1.8	158%	85
E01017792	Chiltern	St Mary's & Waterside	Hemel	13	1,456	8.7	4.7	0.8	140%	170
E01016742	Milton Keynes	Eaton Manor	MKGH	6	1,550	53.3	9.6	4.5	233%	1
E01016779	Milton Keynes	Loughton Park	MKGH	5	1,745	27.7	6.8	11.2	229%	2
E01016848	Milton Keynes	Woughton	MKGH	1	1,425	31.5	10.7	7.9	226%	3
E01016847	Milton Keynes	Woughton	MKGH	2	1,404	47.2	6.4	6.2	224%	4
E01016844	Milton Keynes	Woughton	MKGH	2	1,539	49.6	6.8	7.1	216%	5
E01016747	Milton Keynes	Emerson Valley	MKGH	5	1,474	10.8	10.4	5.9	213%	6
E01016712	Milton Keynes	Bletchley & Fenny Stratford	MKGH	3	1,455	27.2	6.5	12.1	212%	7
E01016843	Milton Keynes	Woughton	MKGH	2	1,365	41.7	7.2	11.5	207%	9
E01016743	Milton Keynes	Eaton Manor	MKGH	6	1,708	44.9	5.7	4.9	205%	10
E01016842	Milton Keynes	Woughton	MKGH	2	1,507	47.4	5.0	14.7	205%	11
E01016785	Milton Keynes	Middleton	MKGH	2	1,448	11.6	6.3	3.5	204%	13
E01016729	Milton Keynes	Campbell Park	MKGH	1	1,554	38.4	9.1	20.9	203%	14
E01016845	Milton Keynes	Woughton	MKGH	1	1,467	49.1	4.5	9.5	200%	15
E01016782	Milton Keynes	Middleton	MKGH	1	1,063	11.8	10.8	6.4	192%	23
E01016733	Milton Keynes	Campbell Park	MKGH	1	1,361	33.6	14.4	19.2	189%	24
E01016806	Milton Keynes	Stantonbury	MKGH	5	1,578	37.2	6.4	5.3	186%	28
E01016738	Milton Keynes	Denbigh	MKGH	4	1,523	25.8	4.7	4.8	185%	29
E01016804	Milton Keynes	Stantonbury	MKGH	4	1,516	24.4	7.7	12.2	174%	39
E01016749	Milton Keynes	Emerson Valley	MKGH	5	1,503	6.0	7.0	4.1	171%	46
E01016834	Milton Keynes	Whaddon	MKGH	5	1,582	19.5	6.1	7.5	170%	48
E01016835	Milton Keynes	Wolverton	MKGH	5	1,514	31.2	3.4	3.8	169%	50
E01016830	Milton Keynes	Whaddon	MKGH	6	1,248	9.5	2.2	3.0	169%	51
E01016744	Milton Keynes	Eaton Manor	MKGH	6	1,521	38.3	9.5	5.9	166%	55
E01016819	Milton Keynes	Stony Stratford	MKGH	5	1,177	29.4	11.1	5.0	164%	61
E01016737	Milton Keynes	Denbigh	MKGH	4	1,432	13.7	7.6	5.2	164%	62
E01016726	Milton Keynes	Campbell Park	MKGH	1	1,449	36.2	9.8	15.6	163%	63
E01016718	Milton Keynes	Bradwell	MKGH	2	1,553	35.1	7.1	21.1	163%	64
E01016714	Milton Keynes	Bletchley & Fenny Stratford	MKGH	4	1,550	22.2	40.6	5.9	163%	66

E01016746	Milton Keynes	Eaton Manor	MKGH	5	1,600	24.4	16.7	4.1	162%	69
E01016832	Milton Keynes	Whaddon	MKGH	4	1,358	11.3	6.0	5.5	162%	71
E01016725	Milton Keynes	Campbell Park	MKGH	2	1,367	21.8	11.0	14.7	162%	72
E01016724	Milton Keynes	Bradwell	MKGH	3	1,477	20.9	9.3	7.2	160%	77
E01016716	Milton Keynes	Bletchley & Fenny Stratford	MKGH	4	1,763	18.9	19.6	4.5	158%	79
E01016810	Milton Keynes	Stony Stratford	MKGH	6	1,329	33.2	5.9	11.8	158%	80
E01016710	Milton Keynes	Bletchley & Fenny Stratford	MKGH	5	1,678	16.1	7.5	2.4	158%	82
E01016829	Milton Keynes	Whaddon	MKGH	5	1,496	18.3	3.1	3.6	158%	83
E01016846	Milton Keynes	Woughton	MKGH	0	1,515	19.2	7.4	4.4	157%	89
E01016756	Milton Keynes	Furzton	MKGH	4	1,636	21.0	7.5	8.1	155%	95
E01016715	Milton Keynes	Bletchley & Fenny Stratford	MKGH	5	1,616	18.9	2.4	3.8	155%	98
E01016717	Milton Keynes	Bradwell	MKGH	4	1,571	16.3	8.1	7.1	153%	102
E01016754	Milton Keynes	Furzton	MKGH	4	1,648	12.2	6.4	5.3	151%	111
E01016811	Milton Keynes	Stony Stratford	MKGH	7	1,452	37.7	6.1	6.3	151%	113
E01016720	Milton Keynes	Bradwell	MKGH	4	1,503	23.3	3.5	5.7	150%	118
E01016741	Milton Keynes	Denbigh	MKGH	3	1,564	23.1	5.9	6.2	149%	123
E01016784	Milton Keynes	Middleton	MKGH	0	1,499	20.4	6.1	5.7	145%	143
E01016837	Milton Keynes	Wolverton	MKGH	6	1,660	18.3	23.2	3.2	144%	150
E01016763	Milton Keynes	Linford North	MKGH	4	1,422	8.3	7.1	3.8	144%	154
E01016822	Milton Keynes	Walton Park	MKGH	3	1,463	19.8	7.7	7.9	144%	156
E01016727	Milton Keynes	Campbell Park	MKGH	1	1,510	19.8	11.5	9.3	141%	168
E01016765	Milton Keynes	Linford North	MKGH	4	1,511	16.0	6.9	5.2	140%	173
E01016831	Milton Keynes	Whaddon	MKGH	5	1,589	9.2	2.8	4.9	138%	184
E01016753	Milton Keynes	Emerson Valley	MKGH	5	1,489	13.8	5.7	9.3	137%	188
E01016721	Milton Keynes	Bradwell	MKGH	3	1,502	20.0	10.3	15.4	134%	208
E01016732	Milton Keynes	Campbell Park	MKGH	1	1,417	12.0	15.7	4.9	134%	210
E01016841	Milton Keynes	Wolverton	MKGH	6	1,496	20.0	3.1	4.8	134%	214
E01016772	Milton Keynes	Linford South	MKGH	3	1,333	22.2	10.2	7.6	133%	220
E01016839	Milton Keynes	Wolverton	MKGH	6	1,744	32.6	4.0	8.9	133%	224
E01016815	Milton Keynes	Stony Stratford	MKGH	5	1,292	8.5	9.4	5.0	133%	227
E01016752	Milton Keynes	Emerson Valley	MKGH	4	1,646	8.3	9.6	7.9	130%	246
E01016759	Milton Keynes	Hanslope Park	MKGH	11	1,298	7.9	0.8	0.8	130%	250
E01028529	Oxford	Cowley	ORH	4	1,272	25.1	14.6	12.8	188%	25
E01028532	Oxford	Cowley Marsh	ORH	2	1,707	25.6	33.5	9.0	183%	32
E01028568	Oxford	Northfield Brook	ORH	5	1,482	42.6	6.3	15.4	177%	35
E01028534	Oxford	Headington	ORH	0	1,259	7.5	7.0	2.2	173%	40
E01028514	Oxford	Barton & Sandhills	ORH	2	1,412	40.3	4.4	8.6	172%	41
E01028513	Oxford	Barton & Sandhills	ORH	2	1,507	39.8	9.2	7.1	171%	45
E01028546	Oxford	Iffley Fields	ORH	3	1,679	31.2	24.0	12.5	165%	59
E01028553	Oxford	Littlemore	ORH	5	1,449	31.0	2.4	3.2	162%	70
E01028569	Oxford	Northfield Brook	ORH	6	1,658	49.7	6.3	13.9	158%	84
E01028552	Oxford	Littlemore	ORH	5	1,458	31.5	6.8	4.3	156%	93
E01028574	Oxford	Quarry & Risinghurst	ORH	2	1,331	20.1	5.1	7.0	153%	101
E01028519	Oxford	Blackbird Leys	ORH	5	1,387	34.3	5.3	15.5	152%	106
E01028518	Oxford	Blackbird Leys	ORH	5	1,545	37.9	2.8	17.4	150%	115
E01028517	Oxford	Blackbird Leys	ORH	5	1,339	33.6	4.1	17.7	149%	122

E01028520	Oxford	Blackbird Leys	ORH	5	1,532	38.8	3.5	17.0	149%	124
E01028587	Oxford	St Mary's	ORH	2	1,720	25.8	23.4	7.9	148%	132
E01028516	Oxford	Barton & Sandhills	ORH	1	1,539	25.0	6.4	6.2	147%	133
E01028577	Oxford	Rose Hill & Iffley	ORH	4	1,636	42.1	14.0	7.6	147%	138
E01028538	Oxford	Headington Hill & Northway	ORH	1	1,411	22.3	5.2	8.1	146%	142
E01028524	Oxford	Churchill	ORH	2	1,448	30.6	10.4	8.0	143%	157
E01028525	Oxford	Churchill	ORH	2	1,463	27.4	8.6	7.7	142%	163
E01028567	Oxford	Northfield Brook	ORH	5	1,697	34.0	4.3	14.3	141%	167
E01028533	Oxford	Cowley Marsh	ORH	3	1,464	21.2	31.6	11.9	140%	174
E01028560	Oxford	Marston	ORH	2	1,458	14.7	4.3	3.2	138%	186
E01028523	Oxford	Churchill	ORH	1	1,449	13.7	11.5	6.0	137%	189
E01028554	Oxford	Littlemore	ORH	4	1,243	22.0	8.5	6.2	135%	202
E01028522	Oxford	Carfax	ORH	3	2,349	37.6	9.9	4.2	132%	229
E01028556	Oxford	Lye Valley	ORH	3	1,583	11.4	14.7	12.0	131%	238
E01016351	Reading	Abbey	RBBH	1	1,634	25.1	13.6	12.0	163%	67
E01016397	Reading	Norcot	RBBH	4	1,481	35.6	6.3	18.7	154%	100
E01016352	Reading	Abbey	RBBH	0	1,870	29.8	21.2	18.0	152%	108
E01016421	Reading	Southcote	RBBH	4	1,339	20.4	2.6	5.0	149%	127
E01016415	Reading	Redlands	RBBH	1	1,471	36.8	10.3	12.9	147%	135
E01016438	Reading	Whitley	RBBH	3	1,304	32.8	6.8	10.7	146%	140
E01016389	Reading	Minster	RBBH	2	1,502	38.1	9.3	26.0	146%	141
E01016420	Reading	Southcote	RBBH	4	1,354	36.9	5.6	14.8	143%	158
E01016378	Reading	Katesgrove	RBBH	1	1,376	27.5	16.9	12.1	141%	166
E01016435	Reading	Tilehurst	RBBH	5	1,515	18.4	5.8	3.6	136%	196
E01016382	Reading	Kentwood	RBBH	4	1,587	28.7	8.9	15.4	134%	212
E01016422	Reading	Southcote	RBBH	4	1,363	19.2	6.9	13.1	134%	217
E01016372	Reading	Church	RBBH	2	1,358	38.3	7.4	15.9	132%	234
E01016466	Slough	Chalvey	Wexham Park	3	1,536	33.4	52.1	17.3	205%	12
E01016463	Slough	Chalvey	Wexham Park	4	1,428	36.6	81.0	19.0	193%	19
E01016465	Slough	Chalvey	Wexham Park	3	1,571	29.2	77.7	15.7	192%	21
E01016451	Slough	Britwell	Wexham Park	4	1,504	41.8	14.3	20.2	192%	22
E01016464	Slough	Chalvey	Wexham Park	3	1,375	35.2	83.1	16.9	180%	33
E01016459	Slough	Central	Wexham Park	2	1,562	29.3	86.7	14.6	176%	38
E01016489	Slough	Foxborough	Wexham Park	5	1,681	21.2	27.9	12.5	170%	49
E01016484	Slough	Farnham	Wexham Park	3	1,277	19.5	94.1	13.8	167%	52
E01016452	Slough	Britwell	Wexham Park	4	1,654	29.0	15.2	7.5	163%	65
E01016485	Slough	Farnham	Wexham Park	3	1,415	20.7	82.5	15.4	157%	87
E01016474	Slough	Cippenham Meadows	Wexham Park	4	1,593	24.7	32.6	14.4	156%	90
E01016458	Slough	Central	Wexham Park	2	1,473	33.0	73.1	18.3	156%	92
E01016462	Slough	Chalvey	Wexham Park	4	1,502	27.5	85.6	14.4	155%	96
E01016511	Slough	Upton	Wexham Park	3	1,460	31.6	49.7	12.7	154%	99
E01016445	Slough	Baylis & Stoke	Wexham Park	2	1,688	27.8	89.2	10.1	153%	104
E01016519	Slough	Wexham Lea	Wexham Park	1	1,733	13.9	34.4	10.0	153%	105
E01016472	Slough	Cippenham Green	Wexham Park	6	1,567	15.9	20.7	5.4	152%	109
E01016444	Slough	Baylis & Stoke	Wexham Park	2	1,705	27.2	90.3	9.7	151%	110
E01016490	Slough	Foxborough	Wexham Park	5	1,580	39.4	26.5	30.3	151%	112

E01016521	Slough	Wexham Lea	Wexham Park	1	1,601	22.5	41.1	6.8	150%	117
E01016516	Slough	Wexham Lea	Wexham Park	2	1,693	22.3	88.6	11.4	150%	119
E01016448	Slough	Baylis & Stoke	Wexham Park	3	1,769	27.7	90.1	9.9	149%	120
E01016456	Slough	Central	Wexham Park	3	1,882	32.4	81.4	18.6	148%	129
E01016450	Slough	Britwell	Wexham Park	3	1,542	35.1	24.0	12.0	148%	131
E01016447	Slough	Baylis & Stoke	Wexham Park	2	1,506	20.7	86.2	13.8	147%	136
E01016475	Slough	Cippenham Meadows	Wexham Park	4	1,522	23.7	88.2	11.8	146%	139
E01016520	Slough	Wexham Lea	Wexham Park	1	1,636	28.0	54.2	18.1	145%	144
E01016453	Slough	Britwell	Wexham Park	5	1,627	21.8	10.1	7.4	144%	151
E01016486	Slough	Farnham	Wexham Park	3	1,575	27.8	41.7	27.8	144%	152
E01016446	Slough	Baylis & Stoke	Wexham Park	2	1,589	22.0	86.5	13.6	144%	153
E01016487	Slough	Farnham	Wexham Park	3	1,612	20.7	90.1	9.9	140%	172
E01016518	Slough	Wexham Lea	Wexham Park	2	1,695	15.7	89.0	11.0	135%	199
E01016498	Slough	Haymill	Wexham Park	4	1,619	19.3	27.0	12.4	135%	206
E01016480	Slough	Colnbrook with Poyle	Wexham Park	6	1,284	28.2	26.3	7.5	135%	207
E01016496	Slough	Haymill	Wexham Park	6	1,264	24.5	10.8	10.6	134%	209
E01016517	Slough	Wexham Lea	Wexham Park	2	1,505	23.6	90.2	9.9	134%	211
E01016460	Slough	Central	Wexham Park	2	1,643	15.0	89.7	10.4	133%	219
E01016488	Slough	Farnham	Wexham Park	3	1,453	19.5	24.0	12.3	132%	231
E01017828	South Bucks	Iver Village & Richings Park	Hillingdon	4	1,471	11.8	4.1	1.0	184%	31
E01017826	South Bucks	Iver Heath	Wexham Park	4	1,500	10.0	6.9	0.9	148%	128
E01017835	South Bucks	Wexham & Iver West	Wexham Park	3	1,578	14.2	7.7	1.9	143%	160
E01017805	South Bucks	Burnham Church	Wexham Park	6	1,796	18.7	3.0	2.5	131%	243
E01028632	South Oxfordshire	Didcot Northbourne	ORH	18	1,414	16.2	2.1	1.1	162%	73
E01028631	South Oxfordshire	Didcot Northbourne	ORH	18	1,053	13.1	1.6	0.7	145%	145
E01028633	South Oxfordshire	Didcot Northbourne	ORH	18	1,349	15.2	2.4	2.9	139%	178
E01028604	South Oxfordshire	Berinsfield	ORH	12	1,458	21.6	1.8	3.7	138%	182
E01028636	South Oxfordshire	Didcot Park	ORH	18	1,265	18.2	3.3	1.1	137%	191
E01028635	South Oxfordshire	Didcot Park	ORH	18	1,499	15.2	0.5	0.8	131%	241
E01028703	Vale of White Horse	Abingdon Ock Meadow	ORH	12	1,366	13.7	1.5	0.7	171%	44
E01028687	Vale of White Horse	Abingdon Abbey & Barton	ORH	11	1,735	13.1	2.6	1.3	165%	58
E01028750	Vale of White Horse	Sunningwell & Wootton	ORH	9	1,384	10.1	1.0	0.4	149%	121
E01028692	Vale of White Horse	Abingdon Caldecott	ORH	12	1,488	28.0	1.1	1.6	142%	162
E01028691	Vale of White Horse	Abingdon Caldecott	ORH	13	1,397	13.0	0.6	0.7	139%	179
E01028704	Vale of White Horse	Abingdon Ock Meadow	ORH	12	1,416	11.2	1.2	0.9	137%	190
E01028697	Vale of White Horse	Abingdon Fitzharris	ORH	10	1,501	14.7	2.9	1.7	135%	201
E01028700	Vale of White Horse	Abingdon Northcourt	ORH	10	1,488	16.6	1.7	0.2	132%	233
E01028717	Vale of White Horse	Faringdon & The Coxwells	Swindon	17	1,447	10.1	2.1	0.2	131%	237
E01016305	West Berkshire	Lambourn Valley	Swindon	14	1,211	8.5	0.8	0.3	163%	68
E01016306	West Berkshire	Lambourn Valley	Swindon	14	1,315	13.6	1.1	0.0	161%	75
E01016279	West Berkshire	Clay Hill	Basingstoke	20	1,516	14.9	3.8	1.8	147%	134
E01016346	West Berkshire	Victoria	Basingstoke	20	1,261	14.7	1.8	1.9	136%	194
E01016310	West Berkshire	Northcroft	Basingstoke	21	1,454	10.9	2.8	0.9	133%	218
E01016347	West Berkshire	Victoria	Basingstoke	20	1,155	13.4	4.4	0.8	132%	232
E01028819	West Oxfordshire	Witney South	ORH	19	1,466	13.1	1.0	0.9	166%	56
E01028771	West Oxfordshire	Carterton North West	Swindon	26	1,470	9.4	1.5	0.4	157%	88

E01028781	West Oxfordshire	Chipping Norton	Horton	20	1,410	16.0	1.8	0.4	143%	161
E01028787	West Oxfordshire	Eynsham & Cassington	ORH	12	1,281	10.8	0.0	0.9	141%	165
E01028812	West Oxfordshire	Witney East	ORH	18	1,554	3.1	1.1	0.4	140%	175
E01028783	West Oxfordshire	Chipping Norton	Horton	19	1,534	7.9	1.4	0.8	139%	180
E01028797	West Oxfordshire	Kingham, Rollright & Enstone	Horton	17	1,103	9.5	1.0	0.0	134%	213
E01028785	West Oxfordshire	Eynsham & Cassington	ORH	11	1,546	4.4	1.4	1.0	133%	223
E01028769	West Oxfordshire	Carterton North East	ORH	26	1,499	6.3	0.0	1.2	131%	239
E01028780	West Oxfordshire	Chipping Norton	Horton	19	1,490	4.1	0.6	0.6	131%	240
E01016590	Windsor & Maidenhead	Oldfield	Wexham Park	10	1,437	17.2	22.4	2.3	145%	147
E01016582	Windsor & Maidenhead	Maidenhead Riverside	Wexham Park	10	1,325	10.6	72.5	3.0	136%	193
E01016529	Windsor & Maidenhead	Belmont	Wexham Park	10	1,496	23.5	31.9	2.1	135%	204
E01016580	Windsor & Maidenhead	Hurley & Walthams	Heatherwood	11	1,510	15.6	3.2	2.5	134%	215
E01016555	Windsor & Maidenhead	Clewer North	Wexham Park	7	1,398	20.8	4.4	2.9	131%	242
E01016593	Windsor & Maidenhead	Oldfield	Wexham Park	11	1,529	19.5	7.1	1.9	131%	244
E01016573	Windsor & Maidenhead	Furze Platt	Wycombe	10	1,405	16.3	17.9	1.4	131%	245
E01016594	Windsor & Maidenhead	Oldfield	Wexham Park	12	1,361	20.0	13.7	0.7	130%	247
E01016673	Wokingham	Norreys	Heatherwood	9	1,622	19.6	1.3	1.2	131%	236
E01017906	Wycombe	Oakridge & Castlefield	Wycombe	2	1,826	33.8	86.5	13.5	176%	37
E01017903	Wycombe	Oakridge & Castlefield	Wycombe	2	1,570	26.4	94.3	16.5	166%	54
E01017899	Wycombe	Micklefield	Wycombe	3	1,496	22.5	18.9	16.2	164%	60
E01017926	Wycombe	Totteridge	Wycombe	2	1,030	26.3	10.4	18.5	160%	76
E01017844	Wycombe	Booker & Cressex	Wycombe	2	1,559	17.5	15.7	9.5	153%	103
E01017925	Wycombe	Totteridge	Wycombe	2	1,450	14.9	22.4	18.3	149%	125
E01017928	Wycombe	Totteridge	Wycombe	2	1,350	12.9	8.1	9.3	145%	146
E01017846	Wycombe	Bourne End-cum-Hedsor	Wycombe	6	1,318	13.6	2.9	0.4	139%	177
E01017902	Wycombe	Micklefield	Wycombe	3	1,494	24.9	19.7	17.8	135%	198
E01017837	Wycombe	Abbey	Wycombe	0	1,688	16.4	34.3	14.8	133%	221
E01017905	Wycombe	Oakridge & Castlefield	Wycombe	1	2,146	23.4	89.2	14.3	130%	249

Appendix Six: Local Authorities where PCT's are most likely to be over- or under- funded due to the non-linear relationship with IMD

LA which may be over-funded	Number of LSOA with IMD > 50 units	LA which may be under-funded	Number of LSOA with IMD < 5 units
Birmingham	190	Wokingham	66
Liverpool	157	South Gloucestershire	43
Manchester	135	Waverley	42
Leeds	80	East Hertfordshire	40
Kingston upon Hull	67	Surrey Heath	39
Nottingham	65	Mid Sussex	38
Bradford	63	Hart	37
Sheffield	55	South Cambridgeshire	37
Tower Hamlets	55	Wycombe	37
Hackney	47	Chelmsford	35
Knowsley	45	St Albans	35
Salford	45	Aylesbury Vale	34
Newcastle upon Tyne	43	Basingstoke and Deane	34
Wirral	43	Elmbridge	33
Middlesbrough	37	Horsham	33
Stoke-on-Trent	37	Bromley	32
Sunderland	34	Guildford	32
Doncaster	32	Chiltern	30
Sefton	31	Vale of White Horse	30
Haringey	30	Dacorum	29
Rochdale	28	Eastleigh	29
Bolton	27	Macclesfield	29
Bristol	27	Solihull	29
Leicester	27	South Oxfordshire	29
Sandwell	26	Windsor & Maidenhead	29
Wolverhampton	26	Woking	28
Islington	25	West Berkshire	27
Oldham	25	Mole Valley	26
Coventry	23	Bracknell Forest	25
Derby	23	Epsom and Ewell	25
Newham	22	West Oxfordshire	25
Easington	21	Winchester	25
Gateshead	21	Fareham	23
Wigan	21	Mid Bedfordshire	22
Camden	20	Reigate and Banstead	22
Hartlepool	20	Test Valley	22
Blackpool	19	Maidstone	21
St. Helens	19	North Wiltshire	21
Walsall	19	East Riding of Yorkshire	20
North East Lincolnshire	18	North Somerset	20
Redcar and Cleveland	18	Stockport	20
Wakefield	18	Harrogate	19
Kirklees	16	Three Rivers	19
Westminster	16	Cherwell	18
Halton	15	North Hertfordshire	18
Rotherham	15	Wealden	18
Stockton-on-Tees	15	York	18
Blackburn with Darwen	14	Cheltenham	17
Greenwich	12	East Dorset	17

Preston	12	New Forest	17
Tameside	12	Rushcliffe	17
Barrow-in-Furness	11	Sevenoaks	17
Brighton and Hove	11	East Hampshire	16
Calderdale	11	Harborough	16
Burnley	10	Huntingdonshire	16
Plymouth	10	Richmond upon Thames	16
Portsmouth	10	South Kesteven	16
South Tyneside	10	Brentwood	15
Lambeth	9	Runnymede	15
Mansfield	9	Sheffield	15
Southwark	9	Tonbridge and Malling	15
Great Yarmouth	8	Basildon	14
Hastings	8	Congleton	14
Brent	7	South Northamptonshire	14
Bury	7	Merton	13
Hyndburn	7	Poole	13
North Lincolnshire	7	Rushmoor	13
North Tyneside	7	Sutton	13
Stockport	7	Bath and NE Somerset	12
Trafford	7	Tewkesbury	12
Wear Valley	7	Bromsgrove	11
Darlington	6	Charnwood	11
Lancaster	6	Stafford	11
Scarborough	6	Uttlesford	11
Thanet	6	Broadland	10
Warrington	6	Dudley	10
West Lancashire	6	Hertsmere	10
Dudley	5	Milton Keynes	10
Pendle	5	Oadby and Wigston	10
Solihull	5	Stratford-on-Avon	10
Waltham Forest	5	Suffolk Coastal	10