The Causes of Urgent Care Pressures
in Birmingham, Black Country and Solihull during the winter 2012/13

June 2013
Background & Objectives

Although most parts of the acute sector have reported extreme pressure over the winter period of 2012-13, there is little or no consensus about the causes of this pressure.

National media stories and DoH performance reports suggest that this is a National phenomena.

A national review into the recent pressures is being led by Sir Bruce Keogh.

Accident and Emergency in Crisis
(BBC Radio 4 – Simon Cox– 30/5/13)

Reported increase in A&E attendances and explored the causes of this via interviews.

Are Accident and Emergency Attendances Increasing?
(BMJ – Jon Appleby 7/6/13)

“From 2003-04 to 2012-13, attendances in type 1 units have remained more or less unchanged. It is admissions to type 2 and 3 units that account for the bulk of the increase in attendances.”
Objectives

Explore the possible causes of urgent care pressures experienced by the healthcare system in Birmingham, Black Country and Solihull.

This exercise relies upon routinely collected historical data to attempt to draw conclusions about the causes of the urgent care system pressures. Results from observational studies of this type can only be indicative.

Throughout this pack, unless otherwise stated, the winter period is taken to be the period between 1\textsuperscript{st} November and 31\textsuperscript{st} March. Where comparisons are made, these will be between the most recent winter (1/11/12 - 31/3/13) and the last (1/11/11 – 31/3/13).

Data sources are set out in the appendix.
Primary Lines of Enquiry

A. Increased demand
B. Increased acuity / complexity
C. Redistribution of demand
D. Increased volatility in demand
E. Reduced capacity in Trusts to meet demand
F. Increased resource use in response to demand
Two Possible Perspectives

- There are a common causal factor(s) that explains the pressure experienced by all or most Trusts. Should be observable at BBCS aggregate level.
- There are a disparate set of causal factors. All hospitals affected this winter, but not by the same factors. May not be observable at BBCS aggregate level.
increased demand

No evidence of an increase in demand at BBCS aggregate level.

A&E attendances and emergency admissions have fallen marginally since last winter.

Emergency admissions that are the focus of commissioner emergency admissions strategies have fallen at a faster rate that emergency admissions as a whole.

Progress made on
- Zero day length of stay admissions, discharged alive with no procedure
- Acute ambulatory care sensitive admissions
- Self-harm
- Admissions with primary MH diagnosis
- Alcohol related admissions

But increases in;
- Falls
- Vaccine preventable admissions
- Avoidable frail elderly admissions
increased acuity / complexity

Data on acuity / complexity of admissions and attendances is equivocal.

Marginal increases in attendances and admissions of older people, but no more than would be expected as a result of demographic shift.

Attendances are marginally more likely to be conveyed by ambulance but were less likely to be admitted.

There are increases in both high and low cost A&E attendances, with decreases in the middle.

Average costs of emergency admissions (excl. EXBD) have increased slightly despite the tariff deflator.

There was a marginal increase in the average Charlson comorbidity index of emergency admissions.

Admissions were more numerous in patients with primary diagnoses in ICD10 chapters A (Infectious diseases), J (respiratory conditions) and R (signs and symptoms).
There was a greater redistribution of activity by provider this winter than in previous years.

There was a continuation of the trend in A&E attendances towards out-of-hours activity.

There was a marginal shift in both emergency admissions and A&E attendances towards Fridays, Saturdays and Sundays.

There was also an increase in the average number of discharges taking place on Mondays and Sundays, creating a more even pattern of net admissions (admissions minus discharges) over the week. Despite this the underlying pattern of increasing occupancy rates over the weekend remains.
increased volatility of demand

On most measures there was less volatility or variability in demand this winter than in previous years.

However, the distribution of A&E attendances by day of week is becoming more unpredictable.
The number of available acute beds fell to a low point in the first half of the winter and this was accompanied by high occupancy rates. Since then additional capacity has been introduced, but occupancy rates have continued to grow.

Qualified clinical staff numbers appear to have grown slightly since last year, whilst sickness absence levels were marginally higher.
increased resource use in response to demand

Although the duration to being seen in A&E is unchanged, the average time between being seen and leaving the department has increased substantially. This appears to coincide with a marked increase in the number of investigations per patients. There were notable increases in haematology, bacteriology, electrocardiogram, arterial/capillary blood gas, clotting studies and toxicology investigations.

Average length of stay for emergency admission rose substantially in the latter part of the winter period. Only a small part of this is directly attributable to increases in delayed transfers of care.
increased demand
Across the winter period as a whole, A&E attendances for BBCS patients fell by 1.7% in 2012-13 compared with 2011-12.
Across the winter period as a whole, Emergency Admissions for BBCS patients fell by 2.8% in 2012-13 compared with 2011-12.
As a whole the emergency admissions which are commonly the focus or commissioner admission avoidance strategies fell at a greater rate than emergency admissions as a whole. However some subgroups, notably those relating to the frail elderly grew.

<table>
<thead>
<tr>
<th>Significantly greater reduction</th>
<th>Similar level of change</th>
<th>Significantly lower reduction / increase</th>
</tr>
</thead>
<tbody>
<tr>
<td>Zero Day LoS, Discharged Alive, No Procedure</td>
<td>Readmissions</td>
<td>Potentially Avoidable Frail Elderly Admissions</td>
</tr>
<tr>
<td>Acute Ambulatory Care Sensitive</td>
<td>Chronic Ambulatory Care Sensitive</td>
<td>Vaccine Preventable Admissions</td>
</tr>
<tr>
<td>Primary MH Diagnosis Self Harm</td>
<td>Medically Unexplained Symptoms</td>
<td>Falls Related Admissions</td>
</tr>
<tr>
<td>Alcohol – Wholly Attributable</td>
<td>Medication Related Admissions</td>
<td></td>
</tr>
<tr>
<td>Alcohol – Marginally Attributable</td>
<td>End of Life Care</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Smoking Related Admissions</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Obesity Related Admissions</td>
<td></td>
</tr>
</tbody>
</table>
increased demand

No evidence of an increase in demand at BBCS aggregate level.

A&E attendances and emergency admissions have fallen marginally since last winter.

Emergency admissions that are the focus of commissioner emergency admissions strategies have fallen at a faster rate than emergency admissions as a whole.

Progress made on
- Zero day length of stay admissions, discharged alive with no procedure
- Acute ambulatory care sensitive admissions
- Self-harm
- Admissions with primary MH diagnosis
- Alcohol related admissions

But increases in;
- Falls
- Vaccine preventable admissions
- Avoidable frail elderly admissions
increased acuity / complexity
Patients seen in A&E are on average marginally older in the winter of 2012-13 compared to 2011-12 – no more than might be expected from the anticipated demographic shift.

A&E Attendances by Age Group

- 2011-12
- 2012-13

Columns represent different age groups from 0-9 to 90+.
A similar change can be seen in the age profile of patient admitted as an emergency.
The was a small rise (0.8% points) in the proportion of A&E attendances that were conveyed by ambulance. Note that this occurred despite a fall in ambulance conveyance rates.
The was a small decrease (0.7% points) in the proportion of A&E attendances that were admitted.
There were increases in both the high cost and low cost A&E activity, with decreases in the remainder of the activity.
Patients admitted as an emergency score on average marginally higher on the Charlson Comorbidities Index this winter than last.
The average cost of emergency admissions (less EXBD payments) this winter have risen by 0.8% compared to last year despite the tariff deflator.
Despite a fall in the number of emergency admissions overall, there was significant growth in admissions for patients with primary diagnosis in the following ICD10 chapters; A (infectious diseases), J (respiratory conditions) and R (signs and symptoms)

<table>
<thead>
<tr>
<th>ICD10 Chapter</th>
<th>Growth</th>
<th>Driven by growth in admissions for</th>
</tr>
</thead>
<tbody>
<tr>
<td>Infectious diseases</td>
<td>18.7% (+500)</td>
<td>Septicaemia* (+344)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Viral Intestinal Infection (+234)</td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>Infectious diseases</strong></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Septicaemia* (+344)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Viral Intestinal Infection (+234)</td>
</tr>
<tr>
<td>Respiratory conditions</td>
<td>7.1% (+1344)</td>
<td>Pneumonia (+666)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Acute Lower respiratory Infection (+255)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>COPD (+195)</td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>Respiratory conditions</strong></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Pneumonia (+666)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Acute Lower respiratory Infection (+255)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>COPD (+195)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Pneumonitis* (+120)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Pleural effusion (+95)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Common cold* (+73)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Tonsillitis (+91)</td>
</tr>
<tr>
<td>Signs and symptoms</td>
<td>7.0% (+1780)</td>
<td><strong>Signs and symptoms</strong></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Cough* (+204)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Dyspnoea (+427)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Wheezing* (+99)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Chest pain (+276)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Lower Abdominal pain (+112)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Nausea and Vomiting (+130)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Abnormalities of gait (+119)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Disorientation (+130)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Emotional state* (+91)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Fever (+192)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Syncope and Collapse (+93)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Febrile convulsions (+63)</td>
</tr>
</tbody>
</table>

* Denotes that this diagnostic group grew at a higher rate than the chapter as a whole
increased acuity / complexity

Data on acuity / complexity of admissions and attendances is equivocal.

Marginal increases in attendances and admissions of older people, but no more than would be expected as a result of demographic shift.

Attendances are marginally more likely to be conveyed by ambulance but were less likely to be admitted.

There are increases in both high and low cost A&E attendances, with decreases in the middle.

Average costs of emergency admissions (excl. EXBD) have increased slightly despite the tariff deflator.

There was a marginal increase in the average Charlson comorbidity index of emergency admissions.

Admissions were more numerous in patients with primary diagnoses in ICD10 chapters A (Infectious diseases), J (respiratory conditions) and R (signs and symptoms).
redistribution of demand
There has been a greater redistribution of A&E activity between providers this year than in previous years. Market share has shifted from S&WB to UHB and RWH.

* cases assessed and referred to Badger have been removed
** see appendix for details
There has also been a greater redistribution of emergency admissions between providers this year than in previous years. Market share has increased at Walsall and reduced at HoEFT and to a lesser extent S&WB.
There has been a long term shift of A&E activity from in-hour to out-of-hours. This trend continued in 2012-13 but the shifts are no greater this year than has been experienced in previous years.

**Change in A&E Attendances by Hour of Day**

- Midnight to 1am: -1030
- 1am to 2am: -554
- 2am to 3am: -409
- 3am to 4am: -675
- 4am to 5am: -158
- 5am to 6am: -206
- 6am to 7am: -126
- 7am to 8am: -459
- 8am to 9am: -320
- 9am to 10am: -164
- 10am to 11am: -29
- 11am to Midday: 66
- Midday am to 13pm: 359
- 1pm to 2pm: 92
- 2pm to 3pm: 67
- 3pm to 4pm: 262
- 4pm to 5pm: 231
- 5pm to 6pm: 232
- 6pm to 7pm: 227
- 7pm to 8pm: 267
- 8pm to 9pm: 24
- 9pm to 10pm: 77
- 10pm to 11pm: 24
- 11pm to Midnight: 24
There has also been some shift in the distribution of emergency admissions by day of week. With shifts from Mondays and Thursdays towards Saturdays and Sundays.

### Average Daily Attendances by Day of Week

<table>
<thead>
<tr>
<th>Day</th>
<th>2011-12</th>
<th>2012-13</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mon</td>
<td>904</td>
<td>860</td>
</tr>
<tr>
<td>Tue</td>
<td>834</td>
<td>832</td>
</tr>
<tr>
<td>Wed</td>
<td>821</td>
<td>833</td>
</tr>
<tr>
<td>Thu</td>
<td>819</td>
<td>800</td>
</tr>
<tr>
<td>Fri</td>
<td>831</td>
<td>833</td>
</tr>
<tr>
<td>Sat</td>
<td>657</td>
<td>666</td>
</tr>
<tr>
<td>Sun</td>
<td>669</td>
<td>685</td>
</tr>
</tbody>
</table>

### Change in Daily Emergency Admissions by Day of Week

<table>
<thead>
<tr>
<th>Day</th>
<th>Change 2011-12 to 2012-13</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mon</td>
<td>-45</td>
</tr>
<tr>
<td>Tue</td>
<td>-2</td>
</tr>
<tr>
<td>Wed</td>
<td>12</td>
</tr>
<tr>
<td>Thu</td>
<td>-19</td>
</tr>
<tr>
<td>Fri</td>
<td>2</td>
</tr>
<tr>
<td>Sat</td>
<td>9</td>
</tr>
<tr>
<td>Sun</td>
<td>15</td>
</tr>
</tbody>
</table>
Whilst discharge levels remain considerably lower at weekends, there has been some shift away from discharges between Tuesday and Friday towards discharges on Mondays and Sundays.

**Average Daily Discharges by Day of Week**
(of patients Admitted in an Emergency)

<table>
<thead>
<tr>
<th>Day</th>
<th>2011-12</th>
<th>2012-13</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mon</td>
<td>845</td>
<td>865</td>
</tr>
<tr>
<td>Tue</td>
<td>879</td>
<td>854</td>
</tr>
<tr>
<td>Wed</td>
<td>864</td>
<td>847</td>
</tr>
<tr>
<td>Thu</td>
<td>873</td>
<td>861</td>
</tr>
<tr>
<td>Fri</td>
<td>963</td>
<td>934</td>
</tr>
<tr>
<td>Sat</td>
<td>607</td>
<td>601</td>
</tr>
<tr>
<td>Sun</td>
<td>496</td>
<td>542</td>
</tr>
</tbody>
</table>

**Change in Daily Discharges by Day of Week**
(of patients admitted in and Emergency)

<table>
<thead>
<tr>
<th>Day</th>
<th>Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mon</td>
<td>20</td>
</tr>
<tr>
<td>Tue</td>
<td>-25</td>
</tr>
<tr>
<td>Wed</td>
<td>-17</td>
</tr>
<tr>
<td>Thu</td>
<td>-12</td>
</tr>
<tr>
<td>Fri</td>
<td>-29</td>
</tr>
<tr>
<td>Sat</td>
<td>-6</td>
</tr>
<tr>
<td>Sun</td>
<td>46</td>
</tr>
</tbody>
</table>
In the winter of 2011-12, net emergency admissions (admissions minus discharges) were positive on Saturdays, Sundays and Mondays and negative between Tuesdays and Fridays. This suggests that occupancy rises over the weekend and on Monday then falls during the week. The pattern was similar, but less marked in the winter of 2012-13.
redistribution of demand

There was a greater redistribution of activity by provider this winter than in previous years.

There was a continuation of the trend in A&E attendances towards out-of-hours activity.

There was a marginal shift in both emergency admissions and A&E attendances towards Fridays, Saturdays and Sundays.

There was also an increase in the average number of discharges taking place on Mondays and Sundays, creating a more even pattern of net admissions (admissions minus discharges) over the week. Despite this the underlying pattern of increasing occupancy rates over the weekend remains.
increased volatility in demand
There was no greater variation in the number of A&E attendances by day this winter than last. The same is true of activity by week and month.

Difference from Daily Average A&E Attendances

Coefficient of Variation*

<table>
<thead>
<tr>
<th>Year</th>
<th>2010-11</th>
<th>2011-12</th>
<th>2012-13</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0.08</td>
<td>0.07</td>
<td>0.07</td>
</tr>
</tbody>
</table>

*see appendix for details
There was no more variation in the number of emergency admissions by day this winter than last.
Variation in the distribution of A&E attendances by hour of day was lower this winter than last.

Index of Disparity - A&E Attendances by hour of day

Mean Index of Disparity

- 2010-11: 6.9%
- 2011-12: 6.4%
- 2012-13: 6.4%
Variation in the distribution of A&E attendances by day of week has increased substantially, suggesting that patterns of activity by day of week are becoming more variable.
There has been no change in the variability of patterns of emergency admissions by day of week.
There has been a reduction in the variability of patterns of A&E attendances by provider.
There has also been no change in the variability of patterns of emergency admissions by provider.

Index of Disparity - Emergency Admissions by Provider

Mean Index of Disparity

- 2010-11: 5.8%
- 2011-12: 5.4%
- 2012-13: 5.5%
increased volatility of demand

On most measures there was less volatility or variability in demand this winter than in previous years.

However, the distribution of A&E attendances by day of week is becoming more unpredictable.
reduced capacity in Trusts to meet demand
The number of available acute beds fell to a low point in the quarter ending December 2012 and this was accompanied by high occupancy rates. Since then additional capacity has been introduced, but occupancy rates have continued to grow.
After adjusting for TCS transfer, numbers of clinical staff appear to have risen marginally (+0.7%) since last year. Trends for all staff follow a similar pattern.
Staff sickness levels are marginally higher this winter than last. Sickness absence levels of clinical qualified are somewhat lower, but have followed a similar pattern.
reduced capacity in Trusts to meet demand

The number of available acute beds fell to a low point in the first half of the winter and this was accompanied by high occupancy rates. Since then additional capacity has been introduced, but occupancy rates have continued to grow.

Qualified clinical staff numbers appear to have grown slightly since last year, whilst sickness absence levels were marginally higher.
increased resource use in response to demand
Since last winter, the average duration that patients spend in A&E has increased from 2hrs 24mins to 2 hrs 41 mins, an increase of 12%. This means that in total patients spent an additional 90,000 hours in A&E.
Whilst the average time from arrival to being seen has remained static, the growth in duration is between being seen and leaving the department.
Compared to last winter, fewer people attendances are completed with 4 hours.
The number of recorded investigations per patient has risen steadily since the beginning of 2011-12. There was a 10% increase in recorded investigations this winter compared last.
Although the number of recorded investigations have grown by 10% as a whole, certain types of investigations have grown at a faster rate; notably haematology (14%), bacteriology (74%), electrocardiogram (11%), arterial/capillary blood gas, clotting studies (23%) and toxicology (24%).

**Denotes growth is significantly higher than the background rate (3 sigma)

* 2 sigma
A long term downward trend in length of stay for emergency admissions has been reversed in the last 3 months of 2012-13. This recent increase is sufficient means that patients spent an additional 23,000 bed days in hospital, occupying on average an additional 250 beds.
The change in average length of stay is driven by a reduction in the number of zero, one and two days spells and increases in spells between 3 and 28 days.
Delayed Transfers of Care were also higher this winter. Over the course of the winter, more than 1,600 additional bed days were lost to delayed transfers compared with the same period in 2011-12.
increased resource use in response to demand

Although the duration to being seen in A&E is unchanged, the average time between being seen and leaving the department has increased substantially.

This appears to coincide with a marked increase in the number of investigations per patients. There were notable increases in haematology, bacteriology, electrocardiogram, arterial/capillary blood gas, clotting studies and toxicology investigations.

Average length of stay for emergency admission rose substantially in the latter part of the winter period.

Only a small part of this is directly attributable to increases in delayed transfers of care.
local variations
The results and conclusions above are drawn from BBCS aggregate data. There are however some notable variations from these results.

This section aims to highlight these variations for each of the 5 sub-areas;
- Walsall
- Wolverhampton
- Dudley
- Sandwell and West Birmingham
- Birmingham (East, North and South) and Solihull
Walsall

Whilst there were small reductions in attendances and admissions in BBCS, there were increases in both forms of activity for Walsall CCG.

Substantial reported increases in A&E attendances are due to recent capture of activity which relates to the assessment, triage and referral of patient to the Badger (OoH) service.

This addition of this cohort of patients results in a reduction in the average level of acuity of A&E cases.

There also appears to be an increase in the volatility or variability of attendances by day.

Emergency admissions also grew substantially during 2012-13, such that the number of admissions in the winter of 2012-13 was 10% higher than in 2011-12. Further work would be required to understand the driver of this increase.

Over the same period, there are reductions in average levels of acuity or complexity and a reduction in Length of stay.

Delayed transfers of care are down, as are admissions for falls.

There is little change in the number admissions amendable to psychiatric liaison (e.g. self-harm, alcohol related, patients with primary mental health diagnoses.)
Wolverhampton

Whilst for the area as a whole, A&E attendances were lower this winter than the last, in Wolverhampton, there has been a notable increase.

Short stay emergency admissions have increased but this does not appear to be associated with a lowering of admissions thresholds (since average Charlson comorbidity scores for admitted patients have also risen).

There is little change in the number admissions amendable to psychiatric liaison (e.g. self-harm, alcohol related, patients with primary mental health diagnoses.)

There has been a substantial increase in delayed transfers of care.
Both average lengths of stay of and the average Charlson comorbidity index of emergency admissions are down this winter compared to last. This may indicate that lower average level of acuity or complexity.

Readmissions have reduced.

There is little change in the number admissions amendable to psychiatric liaison (e.g. self-harm, alcohol related, patients with primary mental health diagnoses.)

Delayed transfers of care have increased.
Sandwell and West Birmingham

A&E attendances in Sandwell and West Birmingham this winter are substantially lower than last. Unlike other parts of the Area, the average time between arrival and being seen has fallen.

This coincides with an increase in the proportion of patients that are admitted and a reduction in the average Charlson comorbidity score of emergency admissions. This pattern of changes may indicate a lowering of admission thresholds.

Average lengths of stay have not changed.

There has been a reduction in both acute clinical staff and beds.

Delayed transfers of care have increased.
Birmingham (East, North and South) and Solihull

Falls in the number of emergency admissions are more marked in Birmingham (ENS) and Solihull.

Beds and clinical staff have increased at UHB whilst clinical staff numbers have reduced in HoEFT.

The growth in activity for older people is more marked in this patch than in others. Average Charlson comorbidity scores are also up.

Smoking related admissions have fallen this winter compared to last.

Delayed transfers of care have increased.
further work
Further work

At the meeting of the Birmingham, Country and Solihull Urgent Care Board on 10\textsuperscript{th} June 2013, the following additional analyses or investigations were proposed:

**Community Capacity**
A benchmarking exercise to assess of the level and flexibility of capacity in bed based and home based community services.

**Increases in A&E Investigations**
An audit of investigations carried out in A&E to determine

- whether the recent increases in investigations are driven by enhanced clinical guidelines/improved clinical practice or by defensive medicine
- whether these additional investigations result in fewer admissions
For questions relating to this document please contact:

**Steven Wyatt**
Head of Strategic Analytics
NHS Central Midlands Commissioning Support Unit
Email: swyatt@nhs.net
Appendix

Data on A&E attendance data and emergency admissions are taken from the SUS A&E and Inpatient tables.

Data on bed numbers and usage are taken from the KH03 returns.

Staff numbers are sickness levels are drawn from ESR via NHS iView.

Data on delayed transfers of care are taken from the Sitrep returns.

The coefficient of variation and the index of disparity is used extensively in the section on increased volatility. The index of disparity measures the proportion of activity that has been redistributed between groups. The coefficient of variance is a normalised measure of dispersion.

For more details about these measures or on the derivation of the tables and charts in the document, please contact Steven Wyatt (swyatt@nhs.net).