THE
BEHAVIOURAL
INSIGHTS TEAM

Adapting invitation letters to increase breast screening appointment attendance in Greater Manchester

Final Report

I. Contents

Introduction

The Greater Manchester Health and Social Care Partnership (GMHSCP) commissioned the Behavioural Insights Team (BIT) to explore how behavioural insights could be used to increase the proportion of women attending their breast screening appointment.

This report begins by describing the background to the policy challenge before detailing the design and results of a trial to test whether a behaviourally-informed intervention increased screening uptake. The trial was delivered for GMHSCP in conjunction with four breast screening hubs in the Greater Manchester area. The trial involved adapting existing breast screening invitation letters and measuring the impact on attendance at appointments.

Background

The important of screening and screening rates in GM

Routine breast cancer screening is critical for early disease detection. It improves outcomes and chances of recovery, and limits the human and financial costs of treatment. Whilst over-diagnosis and over-treatment remain a cause for concern, a recent Independent Review on the benefits of breast screening concluded that screening significantly reduces breast cancer mortality.[1]

Since 2010 the average breast screening attendance rate in Greater Manchester has been consistently lower than the England average. In addition, uptake in GM (as nationally) has actually fallen by around 1.5 percentage points since 2010. In 2017 the average screening rate in GM was 71.2%, over 4 percentage points lower than the England average of 75.4%. There is large regional variation across GM, with the uptake across districts ranging from 76.2% (Bury) to 61.8% (Manchester).[1] Given these challenges, GMHSCP commissioned BIT to

[1] All information available on the PHE Fingertips Website (and correct as of 26/07/2018): https://fingertips.phe.org.uk/

run a trial with the aim of increasing the attendance at breast screening appointments within GM.

Evidence from the literature

To inform this project (and two other projects on bowel and cervical cancer screening), BIT conducted a literature review in Autumn 2016 in which we explored behavioural principles that could be applied to encourage patients to attend screening appointments. The full literature review is available separately.[2]

The review suggests a number of potential patient-level barriers to screening uptake including:

- Poor knowledge about the test procedure and its indications;
- Considering the test unnecessary or of no benefit;
- Feeling at low personal risk of developing cancer;
- Forgetting to go to the appointment;
- Fear of embarrassment or pain;
- Fear of a positive screen result;
- Dislike of the test;
- Dissatisfaction with previous screening; and
- Socioeconomic and demographic factors.

We used the findings from the literature review to design the new breast screening intervention letters tested in this trial. These were:

- A clear call to action. Simple instructions and limited options helps people to make decisions.[3]
- Tear-off slips. These have been used in a previous trial in Australia run by BIT and have been shown to be an effective way of reminding people to attend their screening appointments.[4] They have also been used with success to encourage people to attend their NHS health checks.[5]
- People are very sensitive to the framing of a particular outcome as a loss.[6] Experimental evidence suggests that loss framing is more effective than gain framing

for detection behaviours.[7] This has been found to apply both to cervical screening[8] and to breast screening.[9] Loss framed messages were around 15 percentage points more effective than gain framed messages at increasing mammogram screening 12 months after the intervention.[10] Overall, these findings suggest that, in the screening context, loss framed messages emphasising, for example, the risk of losing the chance for early and effective treatment, will be particularly effective.

- Scarcity enhances the perceived value of a resource,[11] prompting people to prioritise it. Further restrictions on availability, such as time limitations, can strengthen this effect.[12] Moreover, it has been shown that imposing a clear deadline can help to reduce procrastination and address lack of self-control.[13]

These behavioural approaches have been shown to be effective in other contexts, and this project aimed to test whether such approaches are also effective in encouraging women to attend their breast screening appointments in Greater Manchester.

The trial

In partnership with GMHSCP, we worked with four breast screening centres covering the Greater Manchester area. We also worked with Synertec, the company that prints and posts appointment invitation letters.

Breast screening invitation letters, which include details about a pre-booked appointment, are routinely sent to women between the ages of 50 and 70 who are registered with a GP (some women aged 48, 49 and over 70 are also included). We designed and tested an intervention to try and increase the proportion of women who attend their breast screening appointment in Greater Manchester.

The intervention

We designed two alternative letter templates based on the findings from the literature review summarised above. The two letter templates are included in Annex 1.

We started by simplifying the existing invitation letter used by the NHS. Both new letters had clearer headline messages and contained less text. They also offered patients a specific appointment time and date, and provided straightforward information for how to rearrange

an appointment. Both intervention letters also included a tear-off slip, which people could use as a salient reminder for their appointment.

We also tested two behaviourally informed messages. Two distinct messages were used, one in each letter template:

1. The first revised letter template **made the cost of screening more salient**. Research shows that people are highly sensitive to the framing of a particular outcome as a loss.[14] Raising someone's awareness about a specific opportunity cost[15] at the right moment can be critical. In previous trials including information on the cost to the NHS of missed appointments helped to significantly reduce non-attendance by 25%.[16] Therefore we included a line stating that '*every missed appointment costs the NHS approximately £75*'.

2. The second revised letter template **created a deadline for screening and made the booking date more salient**. Behavioural literature suggests that a sense of scarcity can enhance the perceived value of a resource,[17] prompting people to prioritise it. Further restrictions on availability, such as time limitations, can strengthen this effect.[18] Moreover, it has been shown that providing a clear deadline helps overcome procrastination and self-control barriers.[19] This letter encouraged women to attend a local screening appointment within a defined window of time using the message *"We are only offering women from your GP practice appointments at [local hub] for the next few weeks. Don't miss you chance to get screened close to home."*

While each of these behavioural interventions have been tested previously in other situations, the aim of this trial was to apply these concepts to the specific context of routine breast cancer screening invitation letters in GM.

All of the invitation letters - both standard and revised – were sent alongside the national breast screening leaflet[2] as well as any other information routinely sent out by each of the

[2] The leaflet gives information about the benefits and risks of breast screening,

local screening services. The additional information was added at the discretion of local screening centres and varied between services but included. The type of information included maps of the screening centre, a tear-off slip for people who either do not want to be screened, have special access requirements, or wish to change their appointment. This extra information was printed on the back of the letters.

Trial design

This trial was conducted as an individually randomised controlled trial. Women who were due to receive an invitation during the trial period were randomly assigned to one of the three arms of the trial, receiving either:

1. The business-as-usual invitation letter
2. A simplified letter with a tear off slip and a message stating the cost to the NHS of missing the appointment; or
3. A simplified letter with a tear off slip and a deadline message.

The trial ran for six months across Greater Manchester from 11 November 2016 to 11 May 2016. In total, 39,615 women were eligible for inclusion in the trial and were sent one of the three letters.

Outcome measures

Our primary outcome measure was a binary measure of whether a woman attended a screening appointment within three months of her first assigned appointment date.

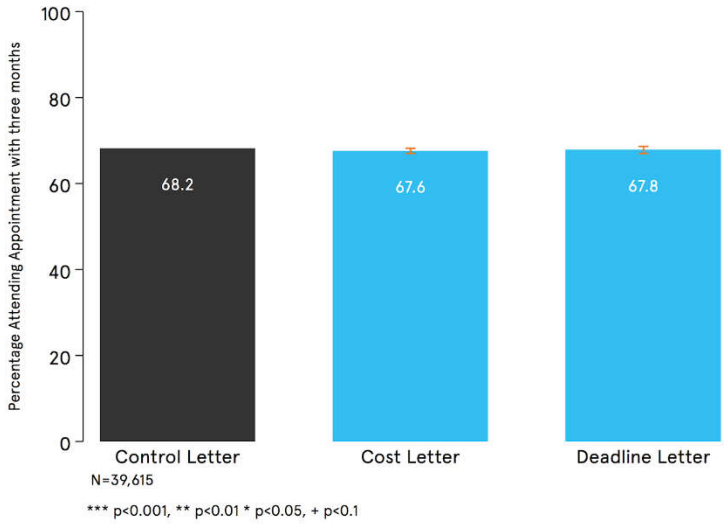
In addition, as a secondary outcome we hoped to measure whether the new letters had an impact on the number of women calling to re-arrange their pre-booked appointment. Unfortunately, this was not possible because of data quality issues (see below for more detail).

Results

Primary outcome

We found no significant difference in attendance at a breast screening appointment between patients who received the usual invitation letter and one of the new letters. A full regression table of our results can be found in Annex 2.

Figure 1: Percentage of women attending a screening appointment within three months of their initial assigned appointment date.



These figures relate specifically to our sample, and because of the way Hubs recorded data we have used a different analytical approach from the PHE Public Health Outcomes Framework. In addition, we measured attendance within a three months of a woman's first invitation letter, rather than measuring the proportion of the eligible population screened. Our figures are therefore not directly comparable with PHE Fingertips Data.

Sub-regional analysis

Following discussion with GMHSCP, we agreed to produce a sub-regional analysis of our primary outcome measure by CCG area because of the wide regional variation in uptake. We did not originally plan to do this and so we had to make two assumptions:

1. We did not receive any identifiable information about women involved in the trial. To complete this analysis we therefore assume that women live in the same CCG

area that their GP is based in. On average this is a reasonable assumption, but it is not always correct.

2. Some batches of letters are excluded because they relate to GP practice groups who cover geographical areas that span multiple CCGs.

We did not find any significant differences in attendance rates between treatments in any of the nine CCG areas in GM represented in the trial (no women from Tameside were invited during the trial period). Screening attendance amongst our trial sample (Table 1) is broadly in line with the latest Fingertips data in most areas of GM (we would not expect it to match exactly for the reasons set out above). A full regression table of our results can be found in Annex 2.

Table 1: Breast screening attendance by CCG area

CCG Area	Percentage of women who attended their appointment within the trial period	Latest Fingertips data on breast cancer screening coverage (2017)
Manchester	59.8%	61.8%
Trafford[3]	61.0%	74.4%
Bolton	70.9%	75.3%
Bury	71.8%	76.2%
Rochdale	72.5%	71.6%
Salford	65.4%	67.7%
Oldham	66.0%	72%
Stockport	69.5%	72%
Wigan	73.6%	74%

[3] Trafford is the one area where rates in our trial are very different to the rates set out in Fingertips. We have spoken to GMHSCP about this and there is no obvious explanation, but we know the Partnership is investigating further.

Data quality issues

There were several data quality issues during our analysis. Table 2 (below) sets out the two main issues, and how we accounted for them in our analysis.

Table 2: Data quality issues

Issue	Approach	
Date of first appointment	The format we received attendance data in has one observation (row) for each booked appointment for any given woman in our trial. In almost all cases we found multiple appointments listed for each woman. There was no indication of which of the appointments was the first assigned to that woman. Our primary outcome measure was a binary measure of whether a woman attended a breast screening appointment within 91 days of their assigned appointment, and we did not know the date of the assigned appointment.	We made the following assumption: 1. *The earliest appointment listed is the assigned one, unless* 2. *The woman has a later appointment listed with a cancellation code which indicates that they called ahead (Note: this only excludes two cancellation codes which are equipment availability, and staffing issues. All other cancellation codes are indicative of a woman calling ahead to re-schedule).*
Cancellation codes and attendance	For each listed appointment date, we had two indicators of whether a woman attended: 1. Reported attendance (marked as 'yes' or 'no'), and 2. A cancellation code indicator. In many cases a woman was marked 'yes' alongside a listed cancellation code for that date (this occurred for 59% of the 5,357 dates listed with a cancellation code). In some rare cases, cancellation codes were present for all listed dates so we could not determine which appointment a woman attended (if any).	We made the following assumptions after discussions with hub leaders: 1. *All codes are indicative of a woman calling ahead to reschedule an appointment aside from Equipment availability, and Staffing Issues* 2. *For women who had cancellation codes listed for all appointment dates, we assume they attended their earliest appointment.*

Secondary outcome measure

Our original trial specification included a secondary outcome measure, testing whether our new letters had an impact on whether women called to rearrange their appointment. Unfortunately, the data quality issues set out above meant that we were not able to conduct this analysis.

Qualitative insights and discussion

Screening behaviour is not easy to change, and the results from this trial further demonstrate the difficulties in changing this health behaviour. There are several possible reasons that may help explain why this intervention did not increase screening uptake.

Our interventions were based on well-established concepts in the literature and aimed to overcome some of the known barriers to breast screening. We focused on including salient reminders (e.g. the tear-off slip); novel information which could attract attention to the value of breast screening (e.g. cost of appointment); and trying to help people overcome procrastination (e.g. providing a deadline). However, it may be that the messaging used in the interventions did not directly target several of the other behavioural barriers which may be accounting for the largest proportion of missed appointments.

We collected qualitative feedback on the letters via the local screening hubs. Of the 40,000 letters that were sent over the duration on the trial, only 25 pieces of feedback were received.[4] The key themes of the feedback were:

- *Confusion over the purpose of the tear-off slip*: The tear-off slip was designed to be used by women to note the details of their appointment and would be used as a reminder. However, some women attempted to use the slip as a way of changing or cancelling their appointment. It may be that clearer wording around the purpose of

[4] Of the four screening hubs, one received no feedback, one received only "one or two calls", and one reported a single piece of feedback. Bolton reported 22 pieces of feedback, but some of these included a number of comments grouped together on the same theme.

the slip, for example *"Tear off this appointment slip and put it on your fridge to remind you"*, would reduce confusion.

- *Information on the reverse of the letter*: During the period of the trial, it became apparent that all screening hubs were printing information on the reverse of the letters, including information such as maps with directions to find the screening hub or how to request the letter in another language. This information was included at the discretion of the screening hubs and was not accounted for during the design of the trial. This might mean that those women who received letters with important information on the back are less likely to have used the tear-off reminder slip.
- *Uncertainty over the cost feedback*: A few women were concerned that they would be charged £75 if they did not attend their appointment.
- *Uncertainty over the deadline*: Some women who received the deadline letter interpreted the message to mean that their local screening centre was closing down and that they would have to go further afield for a screening appointment if they were unable to make the appointment in the next two weeks. Some people reported a concern that they would be unable to receive a screening appointment at all if they could not attend an appointment in the next two weeks. With hindsight we understand how the wording is not as clear as it could have been.[5]
- *Uncertainty over screening hub opening times*: A number of women commented on the fact that screening hub opening times were not included in the screening invitation letters and that it would have been helpful in rearranging appointments. In any future trials it would be helpful to provide opening times to make this easier.

Next steps

We recommend GMHSCP carry out further trials to explore other possible ways to encourage breast screening attendance. It would be interesting to explore whether other

[5] The message may have been clearer without the word 'only' from the line 'We are only offering women from your GP practice at [insert address] for the next few weeks.' The line 'don't miss your chance to get screened close to home' could be removed from the letter and tear-off slip.

ideas suggested in the literature review might be more effective for increasing the proportion of women attending their breast screening appointment. For example:

- **Use a 'network nudge'.** This could involve encouraging daughters to ask their mothers to attend their next screening appointment. This could be an interesting approach to test as it goes beyond simple changes to the invitation letter and process.

- **'Increasing the dose' of the intervention, for example through sending follow up text messages in addition to the invitation letter.** Evidence suggests that interventions which combine different contact channels can be effective at increasing screening rates among non-respondents and difficult to reach populations.[20] [21] This approach would only be possible if phone numbers were available for the women in Greater Manchester receiving breast screening invitations. It would be important to consider whether women would need to consent to being contacted via text message.

- **Use a lottery.** Some research has found that lotteries can be effective for encouraging women to attend their screening appointments. BIT Australia, in partnership with BreastScreen Victoria, sent behaviourally informed letters to women inviting them to book breast cancer screening appointments.[22] One of the letter variants informed women they would be entered into a lottery to win an iPad if they attended their appointment. A third variant offered the possibility to gift the iPad to another person if they won the draw (`giving prize'). The behaviourally-informed letters led to a significant increase in bookings for screenings for previously non-responsive women from 0.6% to 5.2%. We also found that both lottery conditions were more effective than the letter alone, resulting in a 23% increase in bookings. The highest rate of bookings was for the `giving prize' letter, but there was no statistically significant difference between this and the standard lottery. It may be interesting to explore whether such a lottery could have an effect on breast screening rates in Greater Manchester.

Conclusion

The overall conclusion from this trial is that sending patients simplified invitation letters that use messages relating to the costs of missed appointments or the scarcity of appointment

availability do not seem to be more effective than existing letters in increasing the proportion of patients attending breast screening appointments.

The main lesson to draw from this trial is the need to continue to rigorously test new ideas to increase screening uptake before rolling them out to confirm that the behavioural principle in question holds true when applied in new contexts. Interventions that work well in certain settings may not be effective in all settings and may need to be significantly adapted to have an impact. For example, stating the costs of missed appointments has worked well in some healthcare settings, but did not work in this instance.

Countering the behavioural barriers to screening may require a more intensive or regular intervention than a one-off letter. Sending a behaviourally informed letter followed by text messages to remind patients of their upcoming appointment may be more effective in improving uptake. Further research is required to build the evidence base on which interventions lead to sustained behaviour change in breast screening appointment uptake.

We recommend that more organisations follow the lead of GMHSCP by testing ways to improve breast screening appointment attendance with the use of rigorous evaluation. It is also important that the results of any such work are shared to help build a collective evidence base on what works for improving appointment attendance.

Annex 1 – Letter Templates

Control letter (example from one screening hub)

NATIONAL HEALTH SERVICE BREAST SCREENING PROGRAMME
SOUTH LANCASHIRE BREAST SCREENING SERVICE
Tel: (01942) 774752/774753/774712/774713 E-mail : BSUAppointments@wwl.nhs.uk

NHS NO: [redacted]
CLIENT NO: [redacted]

[redacted]

Date: **02-Feb-2016**

Dear [redacted]

We invite you for NHS breast screening on:

Day: **Wed** Date: **24-Feb-2016** Time: **9:00 a.m.**

AT: **THOMAS LINACRE MOBILE UNIT**
Thomas Linacre Centre,
Parsons Walk,
Wigan.
WN1 1RU

The NHS offers breast screening to save lives from breast cancer. Screening does this by finding breast cancers at an early stage when they are too small to see or feel. Women aged 50 to 70 are invited to have breast screening every three years. Some women aged 47 to 49 and over 70 are also being invited, as part of a study of screening older and younger women. Please see the enclosed leaflet Extending the screening age range, for more details.

Your choice
It is your choice whether or not to have breast screening. To help you make a decision we have enclosed a leaflet about the benefits and risks of breast screening and what it is like to have a breast screening test.

If you have any questions about what breast screening involves, please phone the breast screening unit on the above number. If you would like help in deciding whether to have breast screening, please contact your GP.

What happens next?
If you choose to have breast screening, please come along to the appointment above. If the appointment is not convenient, you can make another appointment with the screening unit by phone or email. Alternative locations are available. Please phone the breast unit if you have a physical disability, breast implants, are pregnant or breastfeeding, had macrolane injections or have recently had a mammogram in the last six months.

If you decide not to have breast screening it would help us if you would let the screening unit know you will not be attending, so we can offer your appointment to someone else. You can contact us either by telephone, complete the reply slip on the reverse of this letter or by e-mail. We now have a text/voice reminder service to your mobile/landline. If you wish to opt out please contact the office. If this is your first invite and you would like a text/voice reminder please contact us.

Yours sincerely,

Dr R Tuano Donnelly
Director of Breast Screening

This letter / leaflet is also available in audio, large print, braille and other languag
request.

Intervention letter – cost of a missed appointment

[NHS number]

[Insert address]

[Insert date]

Dear [Insert name],

I have booked you a breast screening appointment on **[Day of week, Date, Month, Time, Full address - in bold font].**

It is important that you let us know if you can't make your appointment. Every missed appointment costs the NHS approximately £75.

Can you make this appointment?

✓ **Yes** – all you need to do is turn up to your appointment.

✗ **No** – please call [insert number] or email [insert email] to rearrange.

The appointment will last less than 30 minutes and will be with a female radiographer. The enclosed leaflet gives more information about the benefits and risks of breast screening.

If you have a physical disability, breast implants or have had a mammogram in the last six months please phone the Breast Screening Unit on [insert number].

Yours sincerely,

Dr R Tuano Donnelly

Director of Breast Screening

It is important that you let us know if you can't make your appointment.
Every missed appointment costs the NHS approximately £75.

Your breast screening appointment is on:

Day, Date, Month, Year at Time

[Insert full address]

Please take 5 minutes to plan how you will get to your appointment.

Intervention letter - deadline for screening

[NHS number]

[Insert address]

[Insert date]

Dear [Insert name],

I have booked you a breast screening appointment on **[Day of week, Date, Month at time at the full address - in bold font].**

We are only offering women from your GP practice appointments at [insert first line of address] for the next few weeks. Don't miss your chance to get screened close to home. If you wish to rearrange, please let us know within 7 days.

Can you make this appointment?

✓ **Yes** – all you need to do is turn up to your appointment.

✗ **No** – please call [insert number] or email [insert email] to rearrange.

The appointment will last less than 30 minutes and will be with a female radiographer. The enclosed leaflet gives more information about the benefits and risks of breast screening.

If you have a physical disability, breast implants or have had a mammogram in the last six months please phone the Breast Screening Unit on [insert number].

Yours sincerely,

Dr R Tuano Donnelly

Director of Breast Screening

We are only offering women from your GP practice appointments at [insert first line of address] for the next few weeks.

Don't miss your chance to get screened close to home.

Your breast screening appointment is on:

Day, Date, Month, Year at Time

[Insert full address]

Please take 5 minutes to plan how you will get to your appointment.

Annex 2 – Regression tables

Primary outcome measure (GM-level analysis)

	Coefficient & (standard error)
Treatment ***(Control omitted as reference group)***	
1	-0.006 (-0.006)
2	-0.003 (-0.005)
Age Band ***(45-49 omitted as reference group)***	
Missing	0.119 (-0.052)
50-54	0.019 (-0.017)
55-59	0.023 (-0.027)
60-64	0.012 (-0.032)
65-69	-0.014 (-0.036)
70-74	-0.049 (-0.033)
Batch ***(nma001342 omitted as reference group)***	
nma001344	0.047 (-0.005)
nma001351	0.036 (-0.005)
nma001358	0.033 (-0.005)
pbo002395	0.025 (-0.004)
pbo002396	0.047 (-0.004)
pbo002403	0.06 (-0.002)
pbo002404	0.06 (-0.007)
pbo002409	0.17 (-0.002)
pbo002410	0.004 (-0.007)

pbo002411	0.049 (-0.006)
pbo002412	0.048 (-0.014)
pbo002413	0.037 (-0.002)
pbo002414	0.067 (-0.001)
pbo002415	0.054 (-0.004)
pbo002416	0.071 (-0.005)
pbo002420	0.075 (-0.005)
pma104110	-0.149 (-0.002)
pma104166	0.031 (-0.001)
pma104179	-0.009 (-0.005)
pma104186	0.036 (-0.003)
pma104187	0.049 (-0.01)
pma104188	0.033 (-0.004)
pma104189	0.053 (-0.011)
pma104190	-0.36 (-0.005)
pma104197	0.108 (-0.002)
pma104198	0.09 (-0.003)
pma104201	0.068 (-0.012)
pma104209	0.097 (-0.003)
pma104212	0.054 (-0.001)
pma104214	0.08 (-0.001)
pma104224	0.075 (-0.001)
pwi-300950	0.037 (-0.006)
pwi300927	0.013 (-0.001)
pwi300928	0.049 (-0.004)
pwi300932	0.038 (-0.009)
pwi300933	0.03 (-0.001)

pwi300936	-0.034 (-0.007)
pwi300937	0.099 (-0.015)
pwi300939	0.067 (-0.001)
pwi300940	0.064 (-0.008)
pwi300943	0.037 (-0.017)
pwi300946	0.069 (-0.005)
pwi300948	-0.175 (-0.004)
pwi300951	0.079 (-0.006)
pwi300953	-0.009 (-0.015)
Attendance Probability	0.857 (-0.013)
Constant	0.1078737 (0.0238739)
Observations	39,615

Note: + p<0.1; * p <0.05; ** p<0.01

Primary outcome measure (CCG-level analysis)

	Coefficient & (standard error)
Treatment and Area ***(Control and Bolton omitted as reference groups)***	
Cost Letter	0.003 (0.013)
Deadline Letter	-0.007 (0.013)
CostXBury	-0.002 (0.022)
DeadlineXBury	-0.007 (0.021)
CostXManchester	-0.028 (0.020)
DeadlineXManchester	-0.017 (0.020)
CostXOldham	-0.030 (0.038)
DeadlineXOldham	0.019 (0.038)
CostXRochdale	-0.009 (0.027)
DeadlineXRochdale	0.023 (0.027)
CostXSalford	0.010 (0.022)
DeadlineXSalford	-0.027 (0.022)
CostXStockport	-0.019 (0.018)
DeadlineXStockport	0.006 (0.018)
CostXTrafford	-0.029 (0.018)
DeadlineXTrafford	0.008 (0.018)
CostXWigan	0.014 (0.017)
DeadlineXWigan	0.020 (0.017)
Bury	0.024 (0.021)

Manchester	0.054+ (0.028)
Oldham	-0.017 (0.029)
Rochdale	0.012 (0.020)
Salford	0.021 (0.019)
Stockport	-0.050** (0.016)
Trafford	0.027 (0.021)
Wigan	0.012 (0.046)
Attendance Probability	0.854** (0.008)
Age band ***(Unknown omitted as reference group)***	
45-49	0.135** (0.019)
50-54	0.153** (0.019)
55-59	0.158** (0.019)
60-64	0.145** (0.019)
65-69	0.119** (0.019)
70-74	0.086** (0.020)
Constant	0.029 (0.022)
Observations	38,529

Note: + p<0.1; * p <0.05; ** p<0.01

Endnotes

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