Lincolnshire Exercise Referral Evaluation Research

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On behalf of:

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Exercise Referral Evaluation Research

1. Executive Evaluation Summary

The following evaluation research examined the data stored on the Lincolnshire Sports Partnership's parachute system regarding patients attending Lincolnshire's Exercise Referral (ER) Programme. The analysis was in response to four specific questions determined by exercise practitioners, the Lincolnshire Sports Partnership and Public Health Lincolnshire. Around 4000 participants attend the Exercise Referral programme each year in Lincolnshire. The programme is funded by Public Health, and all seven districts in Lincolnshire offer the programme to residents aged 18 years old and above.

With regard to the four questions, the headline findings are that:

- There was a significant relationship between those patients who completed the referral programme and a reduction in body mass index (BMI).

- Those patients completing nine or more (out of 12) weeks of the referral programme were significantly more likely to complete. The number of sessions within a week did not influence completion.

- There was a significantly increased likelihood for those patients who pay for exercise referral then to complete the programme. This is regardless of the deprivation score of their home postcode.

- There was no significant relationship between the way a referral is initiated and a patient completing a referral programme. More than half of these data were missing, however, hence the validity of this finding is impaired.

The evaluation identified some clear answers in regards to the effectiveness of current processes employed and the nature of the data that is collected for Lincolnshire's exercise referral programmes. On the basis of these findings, recommendations for future implementation have been proposed (see Proposed Recommendations, page 17).

1.1. Evaluation Overview

The purpose of this evaluation was to examine the data compiled by Lincolnshire's ER programmes in relation to questions that had been specifically identified by ER practitioners, the Lincolnshire Sports Partnership and Public Health Lincolnshire. The service is not the same countywide. The way they are commissioned and delivered varies enormously, as does the offer to participants, so we are not comparing equal services. There will be biases in the findings due to the weightings of the districts' numbers, which should be borne in mind when reading the report. The questions considered the relationships between the following:

- Completion of the ER programme and a reduction in BMI.

- The number of weekly sessions attended and the completion of the ER programme.

- The cost paid for attending ER and the completion of the ER programme.

- The mechanism for initiating referral and the completion of the ER programme.

The findings of these questions were used to generate recommendations regarding the data that is currently collected via the parachute system and the processes that are employed by the ER programmes. Relevant data were accessed via the Lincolnshire Sports Partnership parachute system and were analysed via a number of statistical methods including Chi-squared and Logistic Regression. The data spanned a period of 3.5 years and included all patients in the database starting a 12-week ER programme between 10th March 2009 through to 22nd August 2012. There were 6637 eligible patients, of which 62.3% completed a 12-week ER programme (Table 1.a). All patients are included in this percentage regardless of the number of weeks attended.

Table 1.a Percentage of patients as completers and non-completers of the ER programme

	Number of patients	%
Completers	4134	62.3
Non-completers	2348	35.4
Missing data	155	2.3
Total	**6637**	**100**

Where appropriate the analysis looked to examine both the county's performance and the individual districts where ER programmes were located; Boston, City of Lincoln, East Lindsey,

North Kesteven, South Holland, South Kesteven, West Lindsey and YMCA. With respect to the number of participants, the district with the fewest patients was North Kesteven at 339 and the greatest number of patients was in East Lindsey at 1662 (Figure 1.a). Completion data per district highlighted a range from 37.1% to 76.3%, with three districts achieving above 70% (Figure 1.a). It must be noted that the reasons for this large range have not been analysed and there could be a number of factors that could have contributed to this range of values. Ultimately districts should be aiming to improve completion, which can factor in individual situations such as isolation, distance or transport options to access the ER facility. Although setting a minimum standard would be recommended, for example at 60%, districts should then aim to gradually increase their completion rates to reach this target.
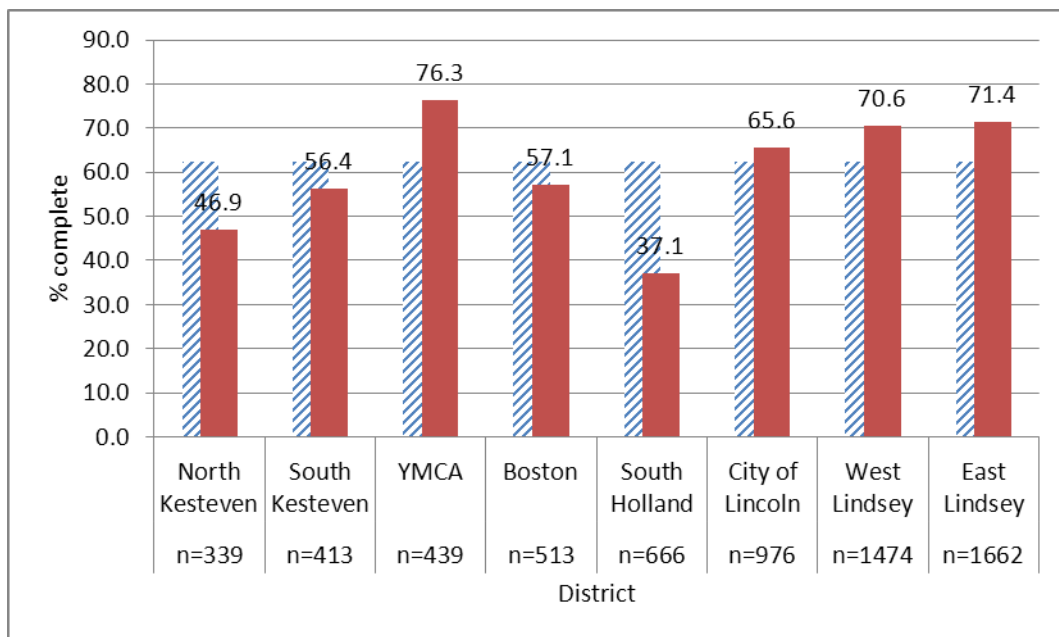

Figure 1.a Completion rates per district
Note, districts are ordered from smallest to largest total participants (n); solid red boxes are district data; shaded blue boxes are mean score for comparison

1.1. Age, Sex and District

In exploring the completion rates of patients, a number of additional factors were explored which may have contributed in some way; the age of the patient, the sex of the patient and the district attended. The highest odds to complete (Figure 1.b), which in comparison to the lowest odds group of 18-29 year olds (1.3 times), were significantly higher for the 70-79 year-old (3.1 times more likely to complete than not to; $p<0.001$) and 80-89 year-old groups (2.8 times more likely to complete than not to; $p=0.01$). James et al. (2009) confirmed that improved adherence and completion is associated with increasing age. These older age groups do also have much fewer patients than in the younger age groups (Figure 1.c**Error! Reference source not found.**), and factors such as greater extrinsic motivation and available time in the fewer elderly patients attending can contribute to better completion rates.
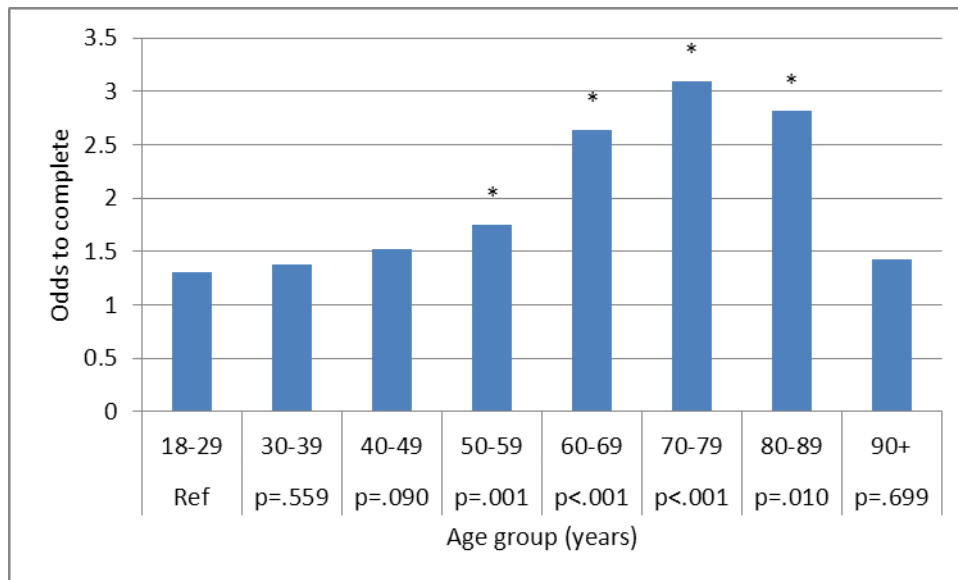
Figure 1.b Odds of completing in relation to age of patient
Note, * is statistically significant difference between age group and reference age group of 18-29 years olds (Ref; p values provided)

Of the total referrals made, 59.8% were females and 37.8% were male (2.4% unknown). Yet despite this greater number of female patients the completion rate for both sexes remained approximately the same at 62% (i.e. similar to the average completion rate). Gidlow et al. (2007) identified that for those taking up referral, completion was greatest in men over the age of 70 years old. Whilst this is the same age group in the current findings, not just men but both males and females have been found to have equal completion rates in Lincolnshire.

Figure 1.c Completion rates per age group

Note, n is total participants per age group; solid red boxes are age completion data; shaded blue boxes are the mean completion rate
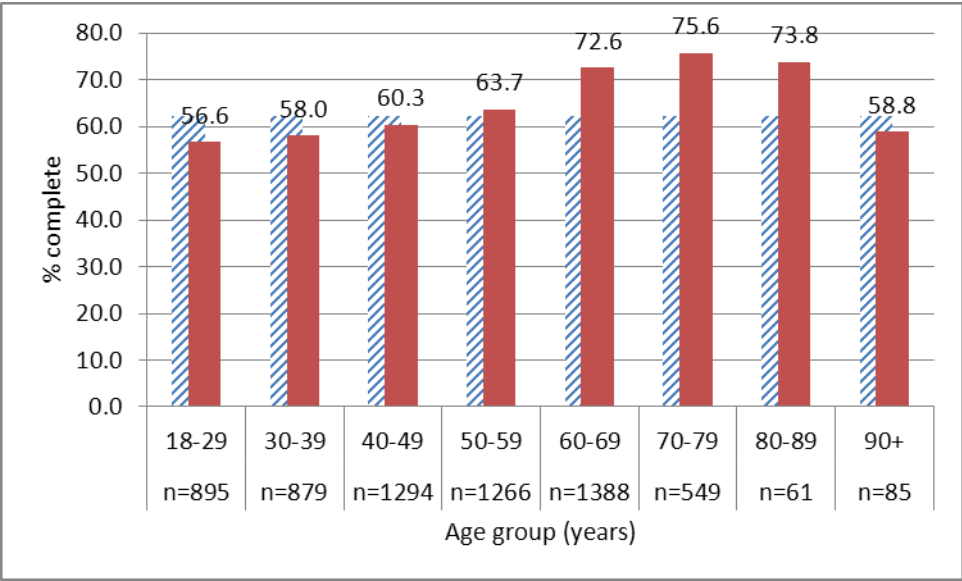
2. Key Findings

2.1. Weekly Attendance and BMI

Whilst patients attend the ER programme over a period of 12 weeks, they are entitled to access this service as many times as they would like during each week. As obesity was the highest primary referral condition (51.7%), it was of interest to establish whether there was an optimal attendance to maximise decreases in BMI.

There was found to be no significant relationship between the number of sessions a patient attended and their decrease in BMI. There was however a significant ($p<0.001$) decrease in BMI of 1.1 kg/m^2 in patients who completed the 12-week ER programme (Table 2.a). This perhaps is unsurprising on the basis of if you continue to exercise you will continue to lose weight, as James et al. (2009) confirms that a decrease in BMI is associated with completion. This is not a large decrease but it is meaningful as often weight loss does not often accompany initial exercise.

Table 2.a Patient BMI data pre and post a 12-week ER programme

	Pre BMI Mean ± SD (kg/m^2)	Post BMI Mean ± SD (kg/m^2)
Completers (n=4134)	32.7 ± 7.0	31.6 ± 7.5*
Non-completers (n=2348)	33.6 ± 7.4	n/a

Note, * is statistically significant reduction from pre to post ER programme ($p<0.001$)

To explore the BMI further, in Figure 2.a the change pre to post the ER programme is presented for different BMI categories. In the lightest group with a BMI of less than 25 kg/m^2 there was a slight but non-significant increase of 0.17 kg/m^2 ($p=0.32$). For all other BMI groups there was a significant decrease ($p<0.001$), with larger decreases for higher BMI values.
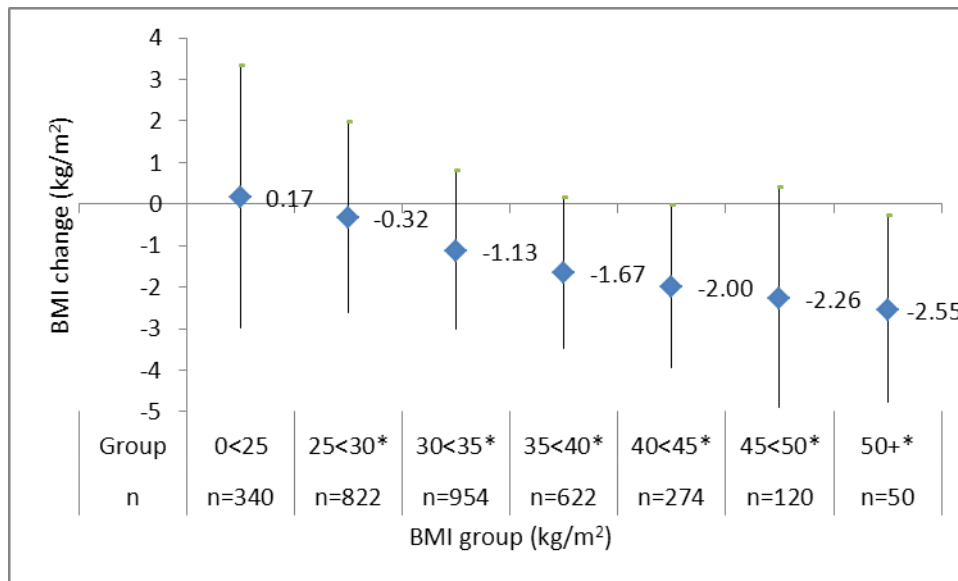
Figure 2.a Patient BMI change pre to post a 12-week ER programme for completers
Note, symbols are means; whisper bars are ±1 SD; * is statistically significant reduction from pre to post ER programme (p<0.001); n is sample size per BMI group for patients who completed the ER programme and possessed both pre and post BMI values

As a supplement to BMI data, in an attempt to further support the usefulness of the ER it might be useful to record brief qualitative responses, such as a measure of how the patient feels. Recording these feelings remains largely undervalued (Gidlow et al., 2008) and yet provides a useful contribution to the evidence-base (McKenna and Mutrie, 2003) by further demonstrating the positive impact of the ER programme, particularly when physical measures such as BMI are often slower to change.

2.2. Weekly Attendance and Completion

As identified in section 2.1, patients are free to attend the ER facility as many times a week as they wish during the course of their 12-week programme. It was therefore beneficial to determine if there was an optimal weekly attendance that would lead to the successful completion of the 12-week programme. Ultimately there was no significant relationship between the number of occasions the patient visited the facility and completion of the programme. In contrast, the number of weeks a patient attended was a major factor in distinguishing a non-completer from a completer.

Nine weeks in the ER programme was found to be a critical point. If a patient attended less than nine weeks of the programme then their odds of completing the ER programme were significantly poorer ($p < 0.001$). Those who completed 9, 10, 11 and 12 weeks had odds of 2.6, 7.6, 21.7 and 62.1 times more likely to complete than not. This was regardless of how many times they had attended each week.

This is further illustrated in Figure 2.b with the number of patients as completers and non-completers. Of the non-completers, 716 (11%) patients only attended the induction visit and did not participate in any exercise session. Out of all the patients, 4134 (62.3%) completed the ER programme, and nearly all of these completers attended 9 or more weeks (i.e. 96.7% of completers attended 9 or more weeks). This emphasises the importance of encouraging weekly attendance. Literature (James et al., 2009; Gidlow et al., 2007) has previously defined a completer as someone who attends the final assessment (regardless of number of weeks attended), however these current findings go further in suggesting that by attending 9 or more weeks can lead to improved completion rates.
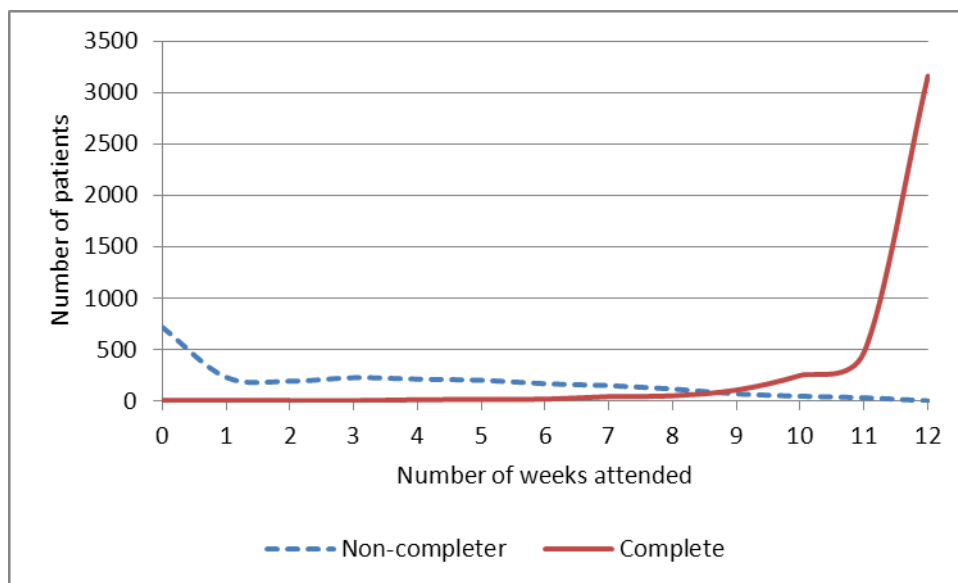
Figure 2.b Weekly attendance in relation to completion of a 12-week ER programme

Although the determinants for attendance and ultimately completion have not been assessed here, a patient attending on a weekly basis is important if they are to successfully complete the full 12 weeks. The number of occasions that a person attends each week seems less important, which questions the need for ER practitioners to record attendance on a session-by-session basis. In addition, with regard to the 11.0% of patients registering for the ER program but then do not attend any exercise session, the reasons for and methods to address this poor up take of the exercise should be investigated.

2.3. Cost, Completion and Deprivation

Lincolnshire's districts impose varying charges for patients on the ER programme. At present, City of Lincoln and YMCA currently charge £15 for 12 weeks, whilst East Lindsey charge a £10 administration fee, which is refundable to the patient on completion of the 12 weeks. The remaining districts (Boston, North Kesteven, South Kesteven, South Holland and West Lindsey) offer ER for free. Whilst there is a small variation between these charges, it was important to determine whether charging impacted on a patient completing the full 12 weeks.

In consideration of completion rates, in relation to the cost patients were charged, far more patients were attending for free than were paying (63% or 4699 out of 6482; Table 2.b). However, those who had paid for their ER programme were significantly (p<0.001) more likely to complete the programme with a ratio of 2.5, which was higher than for those who had not paid with a ratio of 1.7.

Table 2.b Fee paid in relation to completion for all patients

	No. of Completers	No. of Non-completers	% Completers (% all patients)	% Non-completers (% all patients)	Ratio
Charged	1115	450	71.2 (17.2)	28.8 (6.9)	2.5
Free	2960	1739	63.0 (45.7)	37.0 (26.8)	1.7*
Unknown	59	159	(0.9)	(2.5)	

Note, * is significantly lower ratio for the Free v Charged ER programme; percentages without brackets are for the row total, and those in brackets are percentages for all patients (n=6482)

Within the analysis, two districts had changed their charges in January 2012, with East Lindsey moving from a free ER service to charging a £10 administration fee, and Boston removing their charges completely to provide a free service. Both districts demonstrated an improvement in their completion rates, with Boston increasing but non-significantly from 55.4% to 59.5% (p=0.366) whereas East Lindsey showed a much larger statistically significant (p<0.001) increase from 64.0% to 82.6% (Figure 2.c). This greater increase further highlights how charging patients for the ER programme may prove successful in improving completion of the programme, although there are many factors that may have been changed that could have led to the improvements that have not been evaluated.
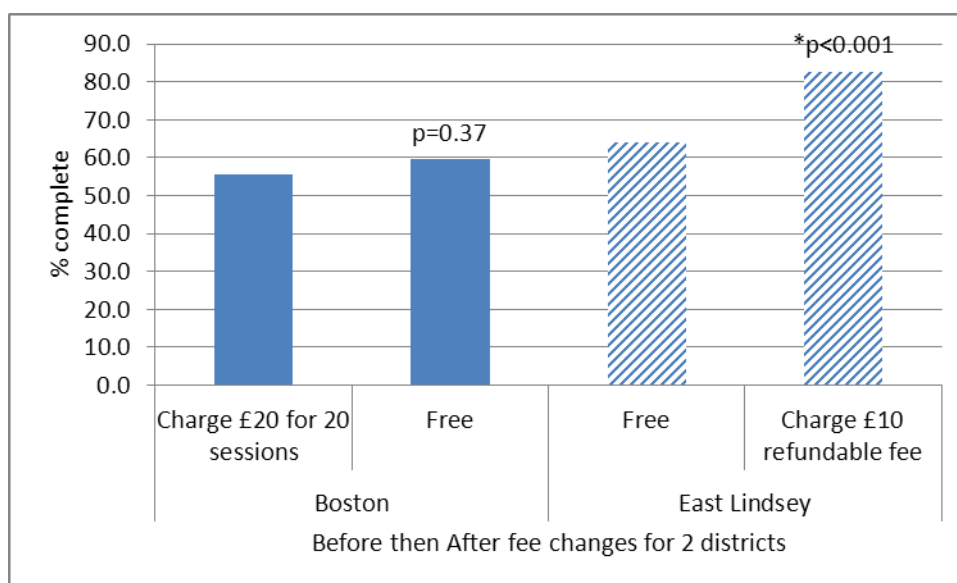
Figure 2.c Completion rates in two districts before and after changing their fees
Note, * is statistically significant improvement from before to after the fee change

There is evidence that charging can both positively and negatively affect adherence. A willingness-to-pay for exercise prescription has been found to be positively associated with higher levels of education, income and BMI, and an expectation of an immediate health improvement (Rome et al., 2010). In contrast, a 'lack of money' has been found to be a determinant of exercise adherence, with patients four times more likely to drop out of exercise even if they had not previously stated this as a potential reason for drop out (Tai et al., 1999) and patients attended more frequently when their programme was fully subsidised in comparison to those who were only partially subsidised (Shepich et al., 2007).

Understanding completion rates of ER programmes is complex, hence the contradictory findings in previous literature. As the data from this current analysis finds that charging statistically improves completion rates supports that paying a fee for ER is effective in Lincolnshire and is therefore recommended. These findings present some important considerations for those districts that do not currently charge for their ER programme. Charging may prevent some individuals from abusing ER for cheap facility membership, which anecdotally has been highlighted as an issue in the past.

With regard to charges for ER programmes, it is also important to consider the impact of deprivation on a district, as this may have influenced those patients who were prepared to pay for the ER service and ultimately complete. There was no statistically significant relationship between completion rate and deprivation score (Index of Multiple Deprivation deciles ranging from 1 most to 10 least deprived based on home postcode). The completion rates fluctuated with the lowest in deciles 3, 6, 8 and 10 ranging from 58.9-61.3% to the highest in the remaining deciles with completion rates ranging from 64.4-69.1% (Figure 2.d).
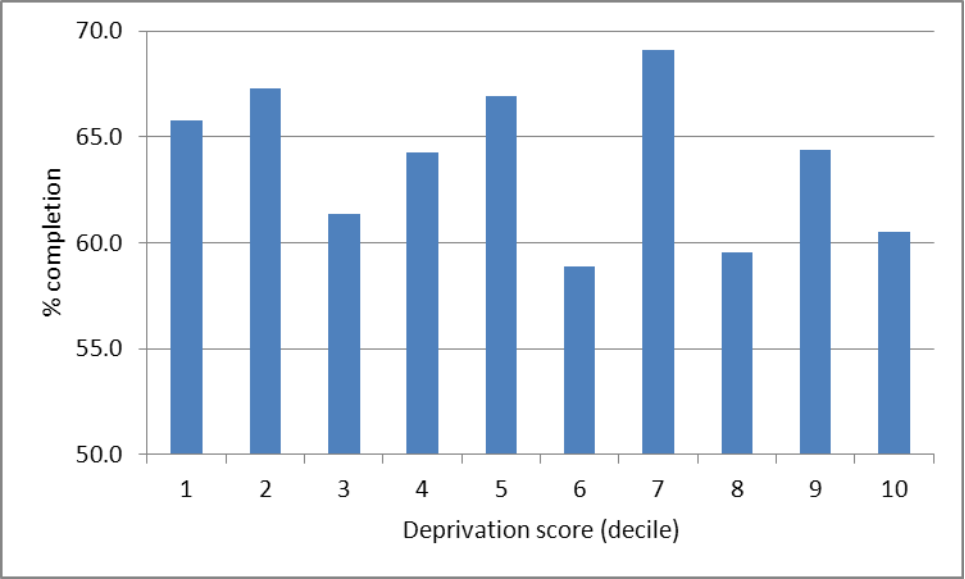
Figure 2.d Completion rates per deprivation score
Note, score is Index of Multiple Deprivation deciles ranging from 1 most to 10 least deprived
based on home postcode

2.4. Referral Initiation and Completion

It has been identified that different districts instigate their referral process via different mechanisms as described in Table 2.c. These mechanisms include, for example, Boston allowing the patient to bring in their completed referral form to initiate the process whereas City of Lincoln choose to write to their patient on receipt of the form requesting that the patient makes contact. There is a consideration that these mechanisms may influence the patient's completion of the programme, perhaps as a reflection of their motivation levels (e.g. if they choose to initiate the process themselves are they more motivated to complete?).

Table 2.c Mechanism used to initiate ER by district

District	Mechanism used	Other
Boston YMCA	Ring patient	Patient brings form
City of Lincoln	Letter sent to patient	
East Lindsey North Kesteven South Holland South Kesteven West Lindsey	Ring patient	

On analysis it was identified that there was no significant relationship between any of these mechanisms in relation to the completion rate of patients. However, the limited range of mechanisms across the districts makes this a weak analysis, and would require a more experimental approach to investigate what referral mechanisms are effective.

Within the referral, the source (e.g. General Practitioner or Physiotherapist) has in past not been found to affect attendance rates (Leijon et al., 2010). Instead a patient's self-determination to seek help was viewed as a far stronger determinant of adherence in comparison to a health professional referral (Moore et al., 2011). Whilst the link between the referral source and the exercise practitioners can be considered an important part of the referral chain, ultimately, if the patient wants to attend the programme then they will, regardless of how that process is initiated. In the current analysis unfortunately an accurate assessment of the impact of the referral sources is not possible as 58.9% of the data were missing (Figure 2.e).
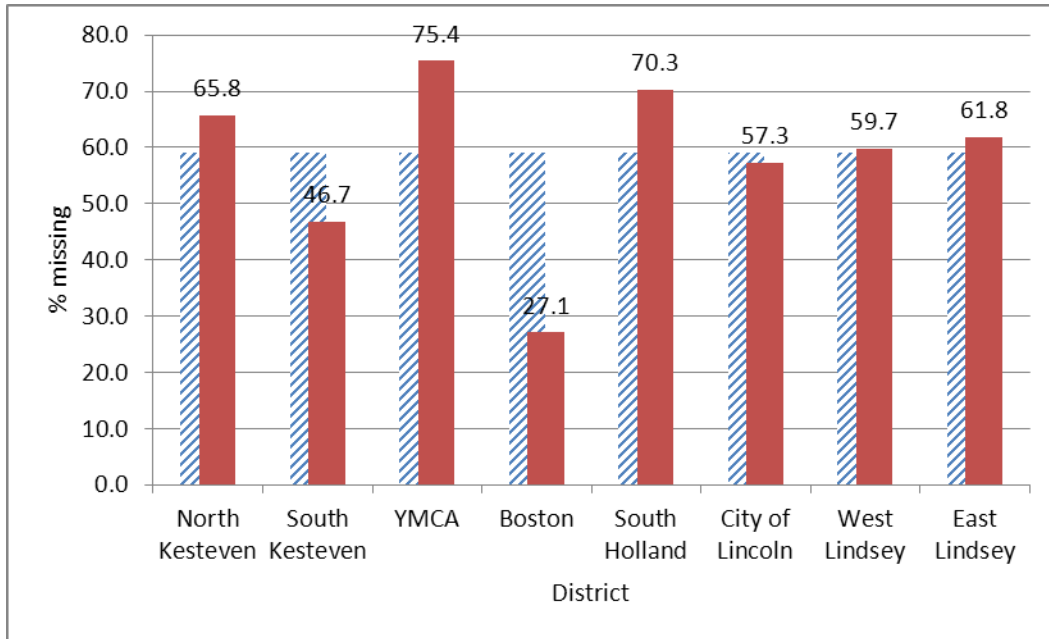
Figure 2.e Amount of missing date for reporting Referral Source

Note, districts are ordered from smallest to largest total participants; solid red boxes are district data; shaded blue boxes are mean score for comparison

2.5. Proposed Recommendations

Following analysis and evaluation of the data it is possible to make recommendations for implementation. These recommendations are targeted at improving the quality of the data currently collected via the parachute system and the processes that are employed by Lincolnshire's ER programmes.

Recommendation 1

Ensure that data entry is fully completed. For some variables there were too much missing data, which created difficulties in generating an accurate analysis on those variables. For example in categorising the health professional responsible for making a referral 58.9% of the data were missing, making it impossible to rule out data biases in providing accurate findings. An incentive may want to be offered to encourage accurate completion, for example, by releasing payment on receipt of complete data entry.

Recommendation 2

Refinement of data capture. It could be considered that in some areas of the parachute system there are too many options to complete, therefore leading to either extremely small numbers within a category or failure to complete correctly due to being too time consuming. For example the reason given for referral resulted in 38 categories, with many categories including fewer than 10 patients. Reducing the number of categories would increase sample sizes that aid statistical analysis, but also would simplify data entry and possibly lead to better completion rates. The National Health Service use fewer categories for the Quality and Outcomes Framework, which may provide a starting point for categories to include in the parachute system. Such a category system may also provide scope for comparison to national incidence rates in the future.

Recommendation 3

Inclusion of qualitative questions. Whilst quantitative data is valuable in establishing the effectiveness of the ER programme, the use of qualitative questions would help further support findings particularly where physical measures such as BMI are often slower to change. For example collecting data to use in scales such as the Transtheoretical Stage of Behaviour Change model (Prochaska and Diclemente, 1983) would assess patient's readiness to change. This would be a quick and effective method to implement both pre and post programme, and would highlight patients' improvements when the quantitative data may not always illustrate change.

Recommendation 4

Do not record session-by-session attendance. Based on those findings highlighted in 2.1 and 2.2 it is clear that the number of sessions attended shows no relationship to factors such as decreasing BMI or completion of the programme. ER practitioners would only be required to record patient attendance on a weekly basis therefore simplifying the data capture process and proving less time consuming that may also facilitate more complete data entries.

Recommendation 5

Charge for the ER programme. The data has highlighted that those patients in Lincolnshire who pay to attend ER demonstrate greater odds of completing the 12-week programme, regardless of the deprivation score associated with their home postcode. There is the possibility that paying for such a service will add value and increase completion rates across all the districts.

Recommendation 6

Set a minimum completion rate. The average completion rate was 62.3%, and across the districts there was a large range from 37.1% to 76.3%. Whilst three of the eight districts achieved completion rates above 70% it is important to encourage others to strive for similar achievements. It is noted that this increase should be applied gradually and be mindful of individual circumstances particular to the district including size of and access to the facility itself.

3. Evaluation Conclusion

Lincolnshire's ER programmes and the Lincolnshire Sports Partnership must be commended on their use of the parachute system. It is an effective approach to collating a large volume of detailed data, and is rarely used by counties. The parachute is an effective tool in providing valuable information about ER processes in Lincolnshire and the impact on its patients.

The purpose of this evaluation was to examine the data compiled by Lincolnshire's ER programmes in relation to four clearly defined questions, where the following was found:

- There was a significant relationship between those patients who completed the referral programme and a reduction in body mass index (BMI).

- Those patients completing nine or more (out of 12) weeks of the referral programme were significantly more likely to complete. The number of sessions within a week did not however influence completion.

- There was a significantly greater likelihood of those patients who pay for exercise referral completing the referral programme. This is regardless of the deprivation score of their home postcode.

- There was no significant relationship between the way a referral is initiated and a patient completing a referral programme. However, the accuracy of this finding is impaired by over half of the data having not been entered.

In light of these findings it has been possible to propose suitable recommendations regarding the data that is currently collected and the processes that are employed by the ER programmes:
1. Ensure that data entry is fully completed.
2. Refine data capture for multiple options.
3. Include qualitative questions.
4. Do not record session-by-session attendance.
5. Charge for the ER programme.
6. Set minimum completion rate targets.

If referral is to continue to develop within the county, it is vital to review the data both in terms of what is collected and what it illustrates. The proposed recommendations provide an initial stepping stone in how the county could move forward and develop in continuing to provide a high quality service. A summary of findings and their relationship to the recommendations are provided in Table 3.a.

Table 3.a Snapshot of findings cross referenced with recommendations

Finding	Recommendation
58.9% of some referral data missing, so not all referral effects cannot be analysed	1 (data entry not complete; instigate methods to encourage complete data entry)
51.7% of patients referred for obesity, but small samples in most of the 38 categories	2 (reduce categories; so analysis of categories can be performed)
1.1 kg/m^2 significant but small reduction in BMI pre- to post- ER programme	3 (include qualitative views, as often sensitive in contrast to often small BMI changes)
Number of session per week does not influence completion	4 (simplify parachute system; record weekly attendance only as yes/no)
No deprivation effect and no difference between the sexes in completion rates	4 (simplify parachute system; additional examples to reduce data entry requirements)
2.5 times more likely to complete when charging versus 1.7 times when free	5 (charge for all ER programmes, as appears effective in Lincolnshire)
37.1% to 76.3% completion rate range across the districts	6 (set minimal completion rate target to be gradually worked towards)
62.3% of patients complete the programme	Additional findings potentially of use to investigate, address and monitor in setting targets
9 or more weeks attended is critical point at which odds of completion favourable	
12 weeks attended increases odds of completion to 62.1 times more likely	
70-79 year olds most likely age group to complete at 3.1 times	
59.8% women enter the ER programme	
11% of patients enrol but do not start the ER programme (i.e. drop-out immediately)	

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