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Reconnections: Impact Evaluation

Final Report

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CPEC Report

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SUMMARY

This report examines the impact of participation in Reconnections, a service that aims to reduce loneliness in older people in Worcestershire, on their use of health and social care services, as well as capturing qualitative insights into the experience of participating in Reconnections. Self-report data on use of a range of health and care services were collected at baseline and post participation in Reconnections. The analysis here focuses on 121 individuals for whom pre and post Reconnections service use data are available. There were significant reductions both in loneliness score for both this cohort of 121 service users and the wider Reconnections service user group. These lower loneliness scores were still evident at second follow up 18 months after enrolling in Reconnections. Around 20% of individuals who had been classed as severely lonely (a UCLA score of 10 or more) at baseline were no longer deemed lonely at six month follow up, with this level maintained at 18 month follow up for the whole Reconnections group.

In our 121 service user cohort there were no significant differences in overall health service costs post Reconnections, but there was almost a significant reduction in A&E costs, while outpatient costs were significantly lower. In regression analysis, achieving remission from loneliness was associated with 47% lower overall costs compared with those that did not. Loneliness remission was also associated with significantly lower A&E costs. When five high cost outliers were excluded from the model, remission from loneliness was also associated with a 56% reduction in inpatient costs. Having a higher level of loneliness at baseline was also associated with a significantly increased likelihood of achieving remission from loneliness at follow up.

These results suggest that interventions that tackle loneliness may have short term positive impacts on the need for health service utilisation. It might however be the case that other factors that are not measured by the evaluation, such as improvements in wellbeing and quality of life, may explain some of these changes in service utilisation. Our sample of Reconnections participants is also younger than that seen in the overall Reconnections cohort, although loneliness scores at baseline are similar. This analysis is also an uncontrolled before and after analysis meaning that caution must be exercised in assuming that any associations between changes in costs and outcomes are due to Reconnections alone.

We have also gained insights on the experience of Reconnections from participants in this evaluation. Overwhelmingly these insights provide positive messages illustrating clearly the impact that Reconnections has had for many participants. It has helped build self-esteem and confidence, and capabilities to cope with bereavement and the onset of disability. These insights are about much more than loneliness and it would be prudent in future evaluations to measure other outcomes. This includes measures of mental health and wellbeing, as well as overall quality of life.

Commissioners, policy makers and others will want to know not just about short-term but also long-term impacts of investing in Reconnections. To illustrate these longer term impacts we have also created a return on investment model; this conservatively illustrates the scope for positive longer-term impacts, but this is highly dependent on the cost of delivering the programme as well as observed levels of impact on loneliness. We believe that this model nonetheless is conservative as it does not capture many of the potential additional benefits associated with direct mental (and perhaps physical) health benefits associated with interventions to tackle loneliness.

1 INTRODUCTION

Loneliness is increasingly recognised as a societal challenge and the evidence base on the association between loneliness and long-term poor health and wellbeing continues to grow. This association between health and loneliness means that investment in programmes that focus on individuals identified as being lonely, which typically may include a strong element of socialisation and group activities, may be important mechanisms from a public health perspective for promoting better physical and mental health and wellbeing in older people.

There is a growing body of literature that has looked at the association between loneliness in older people and their use of health, social care and other services. The evidence remains mixed. Some studies point to strong associations between loneliness and some health service utilisation (1). A recent systematic review, with few UK studies, only found weak evidence suggesting that more social support may be associated with reduced hospital admissions and a reduced length of stay, but concluded that there was no evidence supporting an association between a lack of social support and increased use of primary care, outpatient and community services (2). Analysis of data from the English Longitudinal Survey of Ageing also suggests that, even when controlling for characteristics such as dementia diagnosis, loneliness is independently associated with a significantly increased risk of admission to long-term residential care (3).

Reviews of evaluations of interventions that aim to tackle loneliness and social isolation have also highlighted some limited evidence on effective interventions but that the relationship with health care utilisation is mixed (4). In the UK, NICE guidelines deemed the evidence strong enough to recommend investment in group-based social activities to tackle social isolation and loneliness as a way of promoting the mental wellbeing and independence of older people (5), while the potential economic benefits of promoting the mental wellbeing of older people through addressing loneliness have been modelled for Public Health England to inform public mental health planning (6).

Recent UK data on loneliness and utilisation of health services is limited. Recently the Cambridge City Over-75s cohort study was able to follow up more than 400 individuals over four years, with over 200 of these followed up over seven years (7). The study collected self-reported use of health and social care services, as well as self-reported levels of loneliness using a single item question where individuals were categorised as not lonely, slightly lonely and lonely. This study only found very limited evidence to support the association between loneliness and service utilisation. Being slightly lonely at baseline was associated with more regular use of GP services at follow up; in addition, at each wave of the survey being lonely was associated with significantly higher rates of use of community nursing and meals on wheels services; no other significant relationships were found.

A limitation of the Cambridge analysis is the reliance on self-reported use of services; ideally data on service utilisation might be obtained from routine medical records, but few analyses of this type have been published in the UK. One exception is a recent analysis making use of more than 25,000 records from a GP practice in London (8). This did not measure loneliness, but it did look at how health service utilisation patterns over 12 months for 1,457 people aged 64 and over varied depending on whether they lived alone or

not. This study found that living alone was associated with significantly greater likelihoods of using GP (40%) and A&E (50%) services. For individuals aged 70 or more there was also a significantly greater likelihood of having at least one hospital admission (45%). Therefore, social isolation and loneliness may well be among additional explanatory factors for the higher rates of service utilisation in older people who live alone.

Given this limited evidence base, this report examines the impact of participation in Reconnections on the use of health and social care services, as well as capturing qualitative insights into the experience of participating in Reconnections.

2 OVERVIEW OF THE RECONNECTIONS SERVICE

Reconnections is a personalised support and community response to loneliness that operated in Worcestershire between 2015 and 2020, led by AgeUK Herefordshire & Worcestershire and a number of other local voluntary and community sector organisations[β]. The service worked with people aged 50+ over a period of 6-9 months to understand their individual strengths and needs; rebuilding confidence and supporting them to connect with people, places or activities in their community.

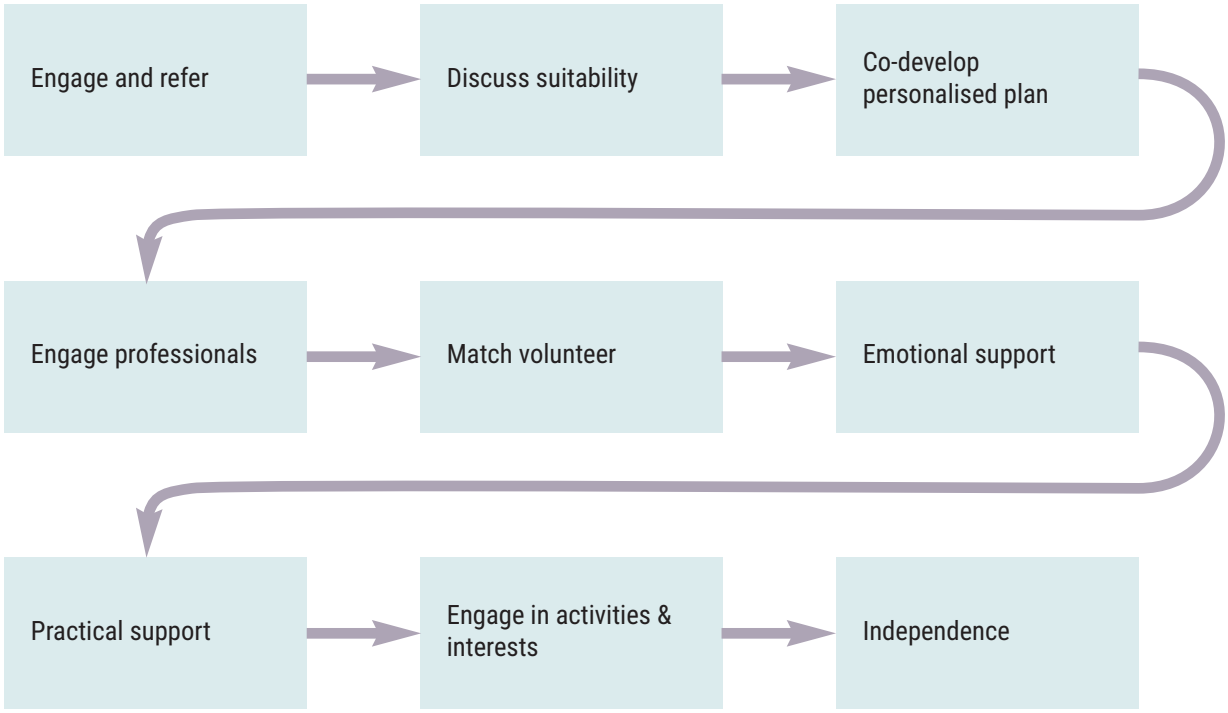
Tackling social isolation and loneliness has been shown to improve older people's immediate quality of life and is linked to improved physical health and mental health outcomes in the medium to long term. By association, the service sought to test whether reduced loneliness led to reduced inappropriate demand for health and care services, and could prevent premature progression to higher levels of need for health and social care services in the future. Specifically, the Reconnections Service sought to:

- Address loneliness in service users by providing them with access to proactive time-limited personalised support led by a named volunteer and/or paid case worker;
- Encourage service users to increase their social connectedness, maximise their independence, develop resilience, confidence in their abilities and positive self-esteem;
- Contribute to increasing the diversity and sustainability of provision through partnership working, identifying service gaps and stimulating new provision and opportunities for civic engagement;
- Contribute to the prevention of any premature progression, amongst service users, to higher levels of need for health and social care services;
- Provide the service in an adaptive way, with sufficient flexibility to respond to changes in the needs of services users and/or other relevant circumstances;
- Deliver robust evaluation and a culture of continuous learning and improvement.

While there is no 'one size fits all' model for service users, as Figure 1 illustrates, a typical journey begins with initial engagement and referral mechanisms, and where eligibility criteria are met, is followed by the development of a personalised plan, matching individuals with volunteers, and also linking them to relevant activities and community services that are of interest. This approach potentially might not only tackle social isolation and loneliness but also ultimately promote the independence of older people. Each of the steps in Figure 1 are described in more detail in Appendix 3.

[β] A new local service, People Like Us (PLUS), operated by the charity Onside Independent Advocacy (one of the Reconnections delivery partners) sustains the approach used in Reconnections, but the new scheme covers adults of all ages www.onside-advocacy.org.uk/plus

FIGURE 1: THE RECONNECTIONS SERVICE PATHWAY



3 METHODS

This impact analysis was conducted alongside a wider evaluation of Reconnections, which looked at changes in levels of loneliness prior to and post participation in Reconnections. Specifically, loneliness was measured using a short 4 item version of the UCLA loneliness scale (UCLA-4) (9) first at initial triage, then after the end of initial support (6-9 months) and finally 18 months after triage. Follow up loneliness levels were collected by phone and independent checks of validity were conducted to ensure the scale was being administered appropriately. Changes in loneliness levels in this wider evaluation are also discussed in section 4 of this report.

In order to explore whether there was any association between participation in Reconnections and change in use of health and social care services over time, participants were also invited to complete a modified version of the Client Service Receipt Inventory (CSRI), a validated tool, initially developed for mental health service use (10), which is now widely used and validated for collecting health and social care service use data in the UK. This instrument was completed prior to participation in Reconnections; service users were asked to provide information on their use of selected primary, secondary and community health services, including number of nights spent in hospital, over the previous three months.

At the end of participation in Reconnections, typically six months later, these service users were also invited to complete a follow up CSRI looking at service use over the previous three months. At follow up a subset of service users who completed the CSRI by phone also provided some comments on their experience of Reconnections. In addition, satisfaction with service scores and changes in UCLA loneliness scores were also available for analysis.

Published unit costs were attached to this service use to estimate costs to the public purse. Sources for costs included the PSSRU Unit Costs for Health and Social Care and national NHS reference cost tariffs for hospital services. All costs in the evaluation are reported in 2016 prices; only costs to public sector funders for health and care services are included; out of pocket payments by Reconnections participants or receipt of unpaid informal care by family or friends are not included in the analysis.

Here we report per protocol results, focusing on individuals for whom follow up data were available. They all needed to have an initial UCLA loneliness score of at least 7, which was the target minimum loneliness score to be included in Reconnections. As cost data were not normally distributed the Wilcoxon Signed Rank Test was used to determine whether there were significant differences in costs pre and post participation in Reconnections. Regression analyses were conducted to look at the relationship between changes in loneliness levels and use of health services, controlling for a variety of personal characteristics and differences in ways of participating in Reconnections. We also have separately used a decision-modelling approach to model the potential return on investment in a loneliness alleviation intervention from a public purse and societal perspective.

4 RESULTS

4.1 STUDY AREA AND POPULATION CHARACTERISTICS

The study is set in the county of Worcestershire, population 588,000 in 2017. The north-east of Worcestershire includes part of the industrial West Midlands; the rest of the county is largely rural; it has a low level of ethnic diversity compared to England (92.4 White British 2011 Census versus 79.8% for England). 40% of service users in this evaluation were located in the Wyre Forest, a further 18% were located in the borough of Redditch with 16% in Worcester City. All three of these areas have significant challenges with deprivation and health inequalities (11). Table A1 in the appendix provides further information on geographical area of residence.

Table 1 compares the 121 Reconnections service users who agreed to participate in this evaluation with the 1,275 Reconnections service users who met the eligibility criteria and participated in Reconnections. Our impact evaluation participants ranged in age from 50 to 93, with a mean age of 74.9 (median 75.0). Table 1 indicates this is 2.8 years younger than for all Reconnections participants. This is significantly younger (p=0.003) compared to the total population. 23.0% of participants were under the age of 66 compared with 16.9% of all Reconnections participants. 32 (26.4%) were men compared with 31% of all Reconnections service users. All 121 service users in our analysis lived on their own; the majority of participants in the full Reconnections study also lived on their own, but a minority lived with other family members.

4.2 RECONNECTIONS AND LONELINESS OUTCOMES

Table 1 indicates that there was no difference in mean UCLA scores at triage between impact evaluation service users (9.3) and the entire population (9.3). Mean improvements in loneliness scores were greater in the impact evaluation sub-group (1.75 points versus 1.37). These changes in loneliness scores post Reconnections (UCLA 2) and also at subsequent follow-up 18 months post enrolment (UCLA 3) are significant (p=0.000) in both the overall programme and for the 121 service users included in the economic analysis. We also looked at the proportion of individuals whose UCLA scores post Reconnections were 6 or less in both groups at both follow up periods. More than 30% in both groups had loneliness scores of 6 or less, suggesting that they had little or no loneliness at first follow up. Where UCLA scores have been collected at second follow up the impact evaluation group have maintained these levels of remission from loneliness. We can also see that at post Reconnections follow up around 20% of individuals who had been classed as severely lonely (UCLA score of 10 or more) at baseline were no longer deemed lonely, with this level maintained at 18 month follow up for the whole Reconnections group.

TABLE 1: AGE, GENDER AND LONELINESS SCORES FOR ALL RECONNECTIONS AND IMPACT EVALUATION PARTICIPANTS

	All Reconnections (n=1,275)	Service users in Impact Evaluation (n=121)
Overall age	mean =77.7, median = 80	mean = 74.9, median = 75.0
Age groups (percentage)		
50 – 55 (%)	3.2	3.3
56 – 65 (%)	13.8	19.8
66 – 75 (%)	21.8	26.4
76 – 85 (%)	33.1	33.9
86 – 95 (%)	26.9	17.4
96 plus (%)	1.3	0
Gender (percentage)		
Male (%)	31.2	26.4
Female (%)	67.1	73.6
UCLA scores (mean)		
UCLA 1	9.27	9.30
UCLA 2	**7.9§	**7.55¥
UCLA 3	**8.00§	**7.54¥
%UCLA 2 scores <7	30.5%	35.5%
% move from UCLA 1 score 10-12 to <7 at UCLA 2	19.1%	22.4%
%UCLA 3 scores <7	28.4%	36.5%
% move from UCLA 1 score 10-12 to <7 at UCLA 3	19.1%	15.6%

** P<0.05 Wilcoxon signed ranked test as non-normally distributed data.

§ to date 817 service users have completed first post-Reconnections UCLA score and 457 have completed the second post Reconnections UCLA score.

¥ to date 121 service users in the evaluation have completed first post-Reconnections UCLA score and 74 have completed the second post Reconnections UCLA score

4.3 HEALTH SERVICE UTILISATION

Tables 2 and 3 report health service utilisation for the prior three months to baseline and prior three months to Reconnections follow up. Most reported service use is highly positively skewed meaning that in most cases the use of these services is very low, with many zero values. This is to be expected in a study of this type where recruitment is not primarily based on health status. GP consultation was the most commonly used service. 95 participants had at least one GP consultation in the three months pre Reconnections, while 90 service users had come into contact with this service in the three months prior to follow up. In nearly all cases the number of Reconnections participants making use of each health service was lower at follow up compared to baseline. The exceptions were professional carers, increasing from 2 to 8 individuals, occupational therapists, 0 to 2 individuals, physiotherapists, 11 to 14, while contact with counsellors increased from 1 to 2 individuals.

TABLE 2: HEALTH SERVICE CONTACTS PRE RECONNECTIONS (N=121)

	Number of ppl who used service	Maximum	Sum	Mean	Std. Deviation
GP Consultations	95	13	300	2.48	2.754
GP nurse consultations	71	18	196	1.62	2.835
A and E visits	28	8	61	0.50	1.403
Outpatient hospital visits	45	20	109	0.90	2.196
Other hospital visits	29	6	41	0.34	0.842
Planned hospital admissions nights	10	21	44	0.36	2.117
Unplanned hospital admissions nights	22	17	98	0.81	2.838
Nurse visits	16	91	224	1.85	9.170
OT service visits	0	0	0	0.00	0.000
Physiotherapist visits	11	6	27	0.22	0.861
Stroke team visits	0	0	0	0.00	0.000
Psychiatrist visits	1	2	2	0.02	0.182
Professional carer visits	2	61	97	0.80	6.416
Counsellor visits	1	12	12	0.10	1.091
Podiatrist visits	2	1	2	0.02	0.128
Psychologist visits	1	1	1	0.01	0.091
Psychiatric nurse visits	4	10	26	0.21	1.233
Unspecified visits	9	6	26	0.21	0.942

TABLE 3: HEALTH SERVICE CONTACTS POST RECONNECTIONS (N=121)

	Number of ppl who used service	Maximum	Sum	Mean	Std. Deviation
GP Consultations	95	13	300	2.48	2.754
GP nurse consultations	71	18	196	1.62	2.835
A and E visits	28	8	61	0.50	1.403
Outpatient hospital visits	45	20	109	0.90	2.196
Other hospital visits	29	6	41	0.34	0.842
Planned hospital admissions nights	10	21	44	0.36	2.117
Unplanned hospital admissions nights	22	17	98	0.81	2.838
Nurse visits	16	91	224	1.85	9.170
OT service visits	0	0	0	0.00	0.000
Physiotherapist visits	11	6	27	0.22	0.861
Stroke team visits	0	0	0	0.00	0.000
Psychiatrist visits	1	2	2	0.02	0.182
Professional carer visits	2	61	97	0.80	6.416
Counsellor visits	1	12	12	0.10	1.091
Podiatrist visits	2	1	2	0.02	0.128
Psychologist visits	1	1	1	0.01	0.091
Psychiatric nurse visits	4	10	26	0.21	1.233
Unspecified visits	9	6	26	0.21	0.942

The highest mean number of contacts with any service was for GP contact at baseline (mean 2.48), while at follow up mean contacts with professional carers were highest (8.46) due to the very high levels of daily care support used by just 6 individuals who had 84 or more contacts during this period. The increase in mean nurse visits was driven by an increase in the number of contacts of one service user from 91 to 168 contacts. It should be noted that

Reconnections was initially expected to exclude anyone who received, or went on to receive, a package of social care or community nursing but over the life of the programme commissioners considered that the service could, at their discretion, accept such service users or allow them to continue on the programme. Therefore, results concerning professional care should be treated with caution.

TABLE 4: COMPARISON OF PRE AND POST RECONNECTIONS HEALTH SERVICE USE

	PRE				POST					
	Mean	Std Dev	Median	Max	Mean	Std Dev	Median	Max	Z	Sig
GP Visits	2.48	2.754	2.00	13	2.31	2.941	2.00	20	-0.898	0.369
GP Nurse visits	1.62	2.835	1.00	18	1.18	2.630	1.00	26	-1.478	0.139
A&E visits	0.50	1.403	0.00	8	0.25	0.767	0.00	5	-1.908	0.056
Outpatient visits	0.90	2.196	0.00	20	0.96	2.959	0.00	30	-0.188	0.851
Planned hospital nights	0.36	2.117	0.00	21	0.07	0.488	0.00	4	-1.845	0.065
Unplanned hospital nights	0.81	2.838	0.00	17	1.22	5.004	0.00	42	0.767	0.443
Nurse visits	1.85	9.170	0.00	91	2.44	16.073	0.00	168	-1.074	0.283
Carer visits	0.80	6.416	0.00	61	8.48	41.936	0.00	364	2.240	**0.025

**P<0.05 Wilcoxon Signed Rank Test.

Given the non-normal (skewed distribution) of resource use data, with many individuals having low or zero resource utilisation, the Wilcoxon signed-rank test was used to determine whether there were significant differences in the median of differences in health service utilisation pre and post Reconnections (Table 4). For almost all services there were no significant changes, however both contacts with A&E services and the number of nights in hospital for planned admissions tended towards being significantly lower post participation in Reconnections (Z score = -1.908, p = 0.056) and (Z score = -1.845 p=0.065). Carer resource utilisation was significantly higher at follow up (Z score = 2.240 p=0.025), as seven individuals received substantive home care post Reconnections compared with two pre Reconnections.

4.4 HEALTH SERVICE COSTS

Table 5 provides a breakdown in mean and median costs pre and post participation in Reconnections for all 121 service users. Overall, there was little difference in costs pre and post participation, although median costs were lower at £188 vs £252. When looking at different elements of costs, median costs for all elements were unchanged. Given the non-normal (skewed distribution) of cost data, with many individuals having low costs and only a few individuals having very high costs, the Wilcoxon signed-rank test has been used to determine whether there are significant differences in the median of differences in costs pre and post Reconnections.

Overall, the test indicates that the median of differences in costs is not significantly different pre and post Reconnections, however outpatient costs are significantly lower post participation in Reconnections (Z score = -2.126, p = 0.034 whilst the costs of A&E Visits tended towards being significantly lower (Z score = -1.908, p=0.056). Potentially this is suggestive of better managed care with fewer unanticipated visits to A&E and subsequent outpatient visits. Cost savings for A&E and outpatient care will also be conservative given low NHS tariffs that have uniformly been applied to these health service contacts. The difference in costs may also be conservative if Reconnections might have helped some service users remain supported in the community rather than make use of health services, but data from a comparator group would be needed to test for this.

TABLE 5: MEAN & MEDIAN COSTS PRE AND POST USE OF RECONNECTIONS (N=121)

	PRE				POST					
	Mean	Std Dev	Median	Max	Mean	Std Dev	Median	Max	Z	Sig
General Practice	107	111	72	511	96	111	72	752	-1.293	0.196
A&E visits	57	157	0	896	28	86	0	560	-1.908	0.056
Outpatient visits	168	327	0	2720	132	403	0	4080	-2.126	**0.034
Inpatient stays	521	1464	0	9453	448	1193	0	5800	-0.278	0.781
Community services¥	98	337	0	2948	252	1187	0	11264	1.553	0.120
Total costs	951	1802	252	11409	955	1776	188	11852	-0.634	0.526

¥ Includes all services from nurse visits downwards in Tables 2 and 3.

** P<0.05 Wilcoxon Signed Rank Test.

4.5 SUB-GROUP ANALYSIS

Rather than participation in Reconnections having an impact on costs, an alternative hypothesis might be that high health care service users at initial enrolment were subsequently transferred to care in the community. It might be expected therefore that individuals receiving very intensive packages of community care would previously have had high use of hospital services. To look at whether this might be the case we looked at whether the seven individuals with community care costs over £1,000 at follow up similarly had been highly ranked for different aspects of hospital health care costs at baseline. As Table 6 shows none of these seven were among the seven highest total hospital costs pre Reconnections, and only two in the top 10 hospital costs at baseline, suggesting that this hypothesis does not apply.

TABLE 6. TOP COMMUNITY CARE COSTS POST USE OF RECONNECTIONS AND RELATED HOSPITAL COSTS PRE USE OF RECONNECTIONS (N=121)

Post Reconnections use of hospital services		Pre Reconnections use of hospital services									
Follow up community care		A&E baseline		Outpatient		Planned Inpatient		Unplanned Inpatient		Total hospital baseline	
Ranking	Costs	Costs	Ranking	Costs	Ranking	Costs	Ranking	Costs	Ranking	Costs	Ranking
1	11,264	896	=1	1,224	2	0	=11	0	=23	2,120	15
2	5,802	112	=9	408	=13	0	=11	2,900	=3	3,420	=10
3	2,194	0	=29	272	=20	0	=11	0	=23	2,72	=40
4	1,940	0	=29	272	=20	0	=11	0	=23	272	=40
5	1,640	112	=9	136	=34	0	=11	1,232	=10	1,480	=17
6	1,146	784	3	2,720	1	0	=11	0	=23	3,504	=9
7	1,145	112	=9	0	=57	0	=11	616	=12	728	=27

In Table 7 we also considered changes in costs pre and post Reconnections, excluding five service utilisation outliers whose costs were more than two standard deviations away from mean costs at baseline. These outliers may not be representative of our Reconnections cohort because of greater levels of disability and poor health prior to enrolment in Reconnections. Removing these outliers did not change overall findings, with only the reduction in outpatient care costs being significant. Median total costs post Reconnections were still lower than pre Reconnections, £158 versus £219 although this difference was not significant. In a further analysis (not shown) we excluded just one extreme outlier at follow up with costs that were almost £12,000 and nearly double those of the next highest costs; again, this made no difference to overall findings, with just outpatients costs being significantly lower at follow up. We also reran the analysis excluding all personal care costs, and again this made no significant difference to the overall findings.

TABLE 7: MEAN & MEDIAN COSTS FOR SERVICE USERS PRE & POST USE OF RECONNECTIONS (N=116) EXCLUDING HIGH COST OUTLIERS

	PRE				POST					
	Mean	Std Dev	Median	Max	Mean	Std Dev	Median	Max	Z	Sig
General Practice	101	103	72	511	87	100	72	752	-1.557	0.119
A&E visits	40	118	0	896	24	78	0	560	-1.444	0.149
Outpatient visits	136	220	0	1,224	98	180	0	816	-2.007	**0.045
Inpatient stays	314	805	0	3,653	368	988	0	5800	0.707	0.480
Community services	59	182	0	1,152	203	1,092	0	11,264	1.626	0.104
Total costs	650	958	219	3,915	780	171	158	11,852	-0.277	0.781

** P<0.05 Wilcoxon Signed Rank Test.

We also looked solely at changes in costs for all 28 individuals referred to Reconnections by health care professionals other than GPs (Table 8). This referral type is likely therefore to come from contacts with specialist health care professionals managing more severe health care conditions. Overall mean costs were lower post Reconnections and there were significant differences in the median of differences in costs pre and post Reconnections (£1,079 versus £358), so that total costs can be said to be significantly lower at follow up (Z score = -2.368, p=0.018). A&E contacts and inpatient stay costs were also significantly lower. Although this is a very small sub-group sample this suggests that providing Reconnections to individuals with more severe health conditions potentially may be associated with reductions in some future inpatient care and avoidable A&E contacts, but this needs to be further explored in a dataset with more observations.

TABLE 8: MEAN & MEDIAN COSTS FOR SERVICE USERS REFERRED FROM HEALTH CARE PROFESSIONALS (EXCEPT GPS) PRE & POST USE OF RECONNECTIONS (N=28)

	PRE				POST					
	Mean	Std Dev	Median	Max	Mean	Std Dev	Median	Max	Z	Sig
General Practice	114	91	94	375	102	72	88	281	-0.528	0.598
A&E visits	76	137	0	560	40	115	0	560	-2.138	**0.033
Outpatient visits	175	228	68	680	121	190	0	816	-1.465	0.143
Inpatient stays	999	1,296	616	3,653	670	1,491	0	5,800	-1.992	**0.046
Community services	214	587	0	2,948	269	1,092	11	5,802	0.610	0.542
Total costs	1578	1,635	1079	6,512	1,203	1,803	358	6,245	-2.368	**0.018

** P<0.05 Wilcoxon Signed Rank Test.

We also looked at whether the results differed depending on whether participants were 80+ or in the younger age group. Median costs for those 46 service users aged 80 and over fell from £280 to £238, while median costs for those 75 service users aged under 80 fell from £216 to £183. Neither of these differences were significant and only the reduction in GP costs for the under 80s post Reconnections was almost significant p=0.069 (Tables not shown).

4.6 REGRESSION ANALYSES

We conducted a series of regression analyses to identify explanatory factors for changes in costs and service use over time. (See Appendix for supplemental tables). Table 9 reports the results of generalised linear regression modelling where we sought explanatory factors for changes in overall costs, considering gender, use of a volunteer, improvements in loneliness scores, differences in total costs at baseline and satisfaction with the service scores. We also included an activity measure, which indicated whether service users had at least one contact/participation in one or more of 11 different types of Reconnections activity. These included building social connections, provision of emotional and therapeutic support, participation in various social activities and phone/ face to face contacts with volunteers. While this is only a partial representation of activities, 53% of all participants had at least one activity recorded and more than 25% of service users were reported to be taking part in formal social activities.

We have already noted that there was a significant improvement in mean loneliness scores in the study population. 43 (36%) of the study population saw their UCLA loneliness scores fall to six or less, scores which can be considered to mean an individual is not lonely or only slightly lonely. The model finds that attaining an improvement in loneliness is significantly associated with lower health care costs. As Table 9 shows individuals who achieve 'remission' from loneliness were associated with 47% lower costs compared to service users who did not attain remission from loneliness. No other significant explanatory factors were identified.

We then went on to look for explanatory factors that might explain changes in different components of cost. Only a few models indicated any significant factors. Looking at determinants of GP costs (table not shown), men had 38% lower costs than women (p=0.01), but no other factors were significant. Looking solely at impacts on A&E costs several potential explanatory factors were identified (Table A2).

TABLE 9: PARAMETER ESTIMATES, GENERALISED LINEAR MODEL FOR OVERALL COSTS

Parameter	B	Std. Error	95% Wald Confidence Interval		Hypothesis Test			Exp(B)	95% Wald Confidence Interval for Exp(B)	
			Lower	Upper	Wald Chi-Square	df	Sig.		Lower	Upper
(Intercept)	5.703	1.2416	3.269	8.136	21.095	1	.000	299.616	26.287	3414.992
Male vs. female (ref)	.122	.2942	-.454	.699	.173	1	.678	1.130	.635	2.011
Volunteer yes vs. no (ref)	.483	.2660	-.039	1.004	3.291	1	.070	1.620	.962	2.729
Loneliness improved vs not improved (ref)	-.632	.3086	-1.237	-.027	4.196	1	.041	.531	.290	.973
Age	.019	.0121	-.005	.043	2.478	1	.115	1.019	.995	1.044
Satisfaction Score	-.017	.0728	-.160	.125	.057	1	.812	.983	.852	1.134
Activity recorded yes vs no (ref)	-.362	.2809	-.912	.189	1.661	1	.198	.696	.402	1.207
Total Costs Baseline	.000	.0000	.000	.001	25.764	1	.000	1.000	1.000	1.001

Loneliness improvement was associated with 32% lower A&E costs (p=0.02), while having a volunteer was associated with 31% lower A&E costs than non-volunteers (i.e. where a caseworker led the support) (p=0.02), while each year of increased age was associated with 3% higher A&E costs (p=0.00).. Each year of additional age was associated with a 2% increase in inpatient costs (p=0.05), while having a volunteer was associated with a 97% increase in these costs p=0.01. Loneliness improvements were not associated with lower inpatient costs (Table A3). As well as looking at inpatient costs, where inpatient costs are costed in terms of a standard tariff, we also looked at whether there may be an impact on the total number of nights spent in hospital (Table not shown). Men had four times as many nights in hospital as women, and hospital stays were also longer for service users with volunteers, no other factors were significant. No explanatory variables were identified for community care costs, which reflects the very small number of observations of use of these services.

4.6.1 Further model adjustments

Our regression model was then further adjusted to look at how inclusion of referral type would impact on potential explanatory variable for changes in overall costs. Referrals from charitable organisations, excluding delivery partners, were associated with threefold greater costs, but no other referral sources had an impact on the model. Improvements in loneliness were still associated with lower total costs than those with no improvements (p=0.01). Geographical district itself was not an explanatory variable. Taking account of whether individuals were over 80 or not did not change model findings.

In Table A4, the overall model is again run but this time excluding five outlier individuals whose costs were more than two standard deviations higher than mean costs. This did not change model results; remission from loneliness remained significant (p=0.01) and was associated with 52% lower costs while having a volunteer was significantly associated with 90% higher costs (p=0.01). In Table A5 the same model is run, but this time with inpatient costs as the dependent variable. Loneliness improvements were a significant explanatory factor; improved loneliness scores were associated with a 56% reduction in total costs, relative to those without improvement p=0.03. Having a volunteer was associated with higher hospital costs (p=0.03).

We also ran binary logistic regressions for the full sample and also excluding the five cost outliers to separately look at the association between baseline characteristics prior to participation (age, gender, loneliness levels and health service utilisation) and achieving loneliness remission at follow up. As shown in Tables A6 and A7 the analysis suggests that individuals with higher loneliness scores at baseline have a significantly greater chance of becoming less lonely at follow up – each one point increase in the UCLA at baseline was associated with a 47% and 50% increased chance of not being lonely at follow up (P<0.001), while men reached by the programme also have a threefold chance of becoming less lonely (P=0.04).

5 PARTICIPANT INSIGHTS

5.1 OVERVIEW

We have noted that average levels of loneliness for Reconnections participants were lower at 18 month follow up. This can be contrasted with data from the English Longitudinal Survey of Ageing (ELSA) which suggest that levels of loneliness are relatively constant over time (12). Interviews with some study participants were undertaken to obtain additional insights on the programme, to help better understand what worked well and less well, as well as capture some personal impacts of participation.

These insights from some Reconnections service users were obtained when follow up interviews were conducted by phone on their use of health services. The predominant view from these interviews was that Reconnections had made a very positive contribution to many participants' emotional wellbeing and sense of confidence. Everyone included in this evaluation was living on their own, meaning that most, but not all, had limited social networks. This has meant that for most participants social networks have been strengthened. Participation in Reconnections has encouraged them to participate and, in some cases, reengage in everyday activities of daily living, such as eating out or shopping that had been lost to them. There were also overwhelmingly positive views on the support and friendship provided by volunteers, some of whom appear to have continued to sustain relationships with service users beyond the end of contact with Reconnections.

At the same time the interviews suggest that Reconnections did not work as well for a minority of those interviewed. Physical frailty made it more difficult for some interviewees to participate in community activities; for them the service was perceived more as a befriending service rather than an enabling service. Practical barriers to sustained participation included transportation difficulties. Views on the merits of the programme also varied. Some service users seemed to really benefit from multiple activities that were readily available from centre-based delivery partners. In other cases, service users preferred the focus on a single one-to-one relationship with a volunteer that in turn might ultimately lead on to other external activities and relationships.

A key limitation of these insights is that service users' views may also be influenced by very different levels of contact with other people and/or other services that can complement or substitute for Reconnections; this makes it difficult to attribute the extent to which changes in loneliness and other outcomes measures can be linked specifically to Reconnections. If individuals become more engaged with participatory activities in their local communities, paradoxically they will have less incentive to stay in contact with Reconnections making it more difficult to know about the extent of their community participation.

In the section that follows some of these themes are expanded on, illustrated with selective quotes. In all case the names of participants are fictitious, and some other comments/ personal characteristics have been withheld to ensure anonymity. Words in italics are direct quotes from service users. Our interpretation of these themes should be treated cautiously, as interviewees represent just one third of participants in our analysis, covering people aged from 52 to 93, with very different health, disability and life experiences.

5.2 PERCEIVED IMPACT OF RECONNECTIONS

Overwhelmingly Reconnections was highly appreciated by most participants across the age span interviewed, helping to reduce feelings of negativity and social isolation, as well as improve confidence. Reconnections has given some participants a sense of purpose that they felt they had lost from their lives, as well as capabilities to better cope with bereavement, relationship breakdowns and transition to retirement.

"I have found it a very positive experience. I was very withdrawn when I first started there, but now they have given me a lot of confidence. I don't know what I would have done without them." 'Sarah' aged 60

"It's really helped change my worldview. I was in a very dark place and isolated; but it's a bit different now – I have made new friends" 'Alan' aged 82

"[Reconnections has meant] I have accepted that my husband is dead. Nothing you can do about it and I am getting out a bit. I am going out for meals." 'Gloria' aged 71

"Since I have left work I have really missed the people connection and you get a bit of stir crazy in your own four walls and not seeing anyone from day to day – so there is a need to get out there and get back into things – it's important for self-esteem" 'Amy' aged 66

Many interviewees also spoke on how Reconnections has helped them engage more with their communities and build up social relationships, all of which can help protect against loneliness.

"I think it's done me a lot of good; I'm involved in two weekly clubs and have a visit from a volunteer once every two weeks. I do hope it goes on" 'Susan' aged 73

Not all participants experienced these positive impacts. While it is not possible to understand individual circumstances and links with Reconnections a few of those interviewed (mainly men) stated that they had not had much contact with services.

"No-one comes round to take me out anywhere or to have a chat. I don't go out much now – there's nowhere to go. I have a cat. I've not really had much contact with [Delivery Partner]. I would like someone to help me with writing letters, get support and take me to different places" 'Leonard' aged 75

In discussing these findings with the service, Reconnections acknowledged that in the first 18 months of the service in particular, there were insufficient volunteers and some service users did not receive sufficient support. Moreover, not all service users are willing to receive volunteer support. Furthermore, memory difficulties may mean that some service users do not recall receiving visits from Reconnections, even though other family members have confirmed that visits have taken place.

5.3 LINKS WITH VOLUNTEERS

Volunteers have been a key component of the Reconnections programme and the majority of participants in our impact evaluation have been supported by volunteers. Linking up with volunteers was generally viewed very favourably by participants. This was, in part, about how volunteers went out of their way to help participants, helping them to build up their confidence and self-esteem.

"[Volunteer] has been really helpful and gone out of their way to help, she has made a big difference" 'Beryl' Aged 79

"I only have sight in one eye, she [the volunteer] takes me out and you know she is by my side all the time. She helps me get things that I want. She's very good, a very nice person. She'll take me out downtown

and if there is anything I want we will go shopping and we'll go and have a cup of coffee before we come home and then she brings me back home…… She's lovely she really is…she puts you at your ease – she's given me the confidence to try crossing the road" 'Ruby' aged 79

Genuine relationships and friendships have developed, some of which have continued beyond the end of the Reconnections support period:

"[Volunteer] phones me occasionally….she was a student and I helped her out with her coursework; I became her sort of guinea pig she could practice on and she was very nice. She wanted to talk, she was what you call it a psychologist and I did part of her coursework with her." 'Gloria' aged 71

"I got introduced to [Volunteer] who is a visitor kind of thing, which has been lovely as I have made a new friend with her, cos its sort of a six-month scheme, but we are remaining friends anyhows so that's lovely." 'Tracy' aged 64

Volunteering itself is associated with better health and wellbeing and some participants have themselves become volunteers for delivery partners helping others. In some cases they have identified more with other volunteers rather than other service users, particularly for younger participants in Reconnections.

"I found it very rewarding. I've made new friends. I'm actually going to start voluntary work with them as well [Up to 6 hours per week] ….Yeah they're very helpful, very understanding, very nice people to work with." 'Sarah' aged 60.

"I am still going, I have just come back from there actually. Yes I like it; I go occasionally you know for lunch and to talk to the elderly. In a way I suppose I am volunteering there, I help out in the café sometimes". ' Eileen' aged 52

5.4 VIEWS ON SERVICES / SUPPORTS PROVIDED

Views on the services that Reconnections linked participants up with were generally positive, with some participants highlighting the value of specific activities. This was particularly the case for older participants.

"I must say it's been a very good experience… We do craft work, sing songs and play darts…and we have lunch. The minibus takes me down there [to the Delivery Partner]. I pay for lunch that's all. Everything is good – they are very helpful, I can't praise them enough… ..and I'd recommend to anybody. They are all top people" 'James' aged 79.

"I used to like to go for the exercises and that…we'd have a cup of tea and cup of coffee and a bun and sing songs from the wartime. They are very nice, they are lovely people down there, very very nice" ' Penny' aged 89

Critical comments on services tended to revolve around the perception that centre-based services are aimed at 'old people' and don't meet the needs for some younger service users, or indeed those service users that feel young at heart.

"It would be better if they had more younger ages. They do knitting and craftwork, but I am sorry I am just not interested."
'Lesley' aged 74

"I found the people down there a bit old for me. It's not their fault; they were lovely, they were nice, the people who run the centre are very nice, but the people who go are a bit old for me"
'Theresa' aged 70

"I'm 78 and I don't consider myself to be old – that's my problem. Do I really need that you know? I've been lucky and I've had some good people help me. There may be a time when I will be glad to go [to a centre based service] but I don't feel I am ready for it just yet… They do have coffee mornings. That would appeal to me, but you know it's like in an old people's home – if it was in a different venue then it might appeal. And also if it was people that were not just elderly but younger people." 'Mary' aged 78

5.5 ENGAGEMENT OF PARTICIPANTS IN OTHER ACTIVITIES

Ultimately Reconnections aims to encourage service users to take up and sustain activities that meet their own interests rather than simply participating in services that are being offered to them. The experience of engaging with Reconnections may have been a catalyst and influenced decisions of individuals to actively participate in other social activities. In some cases, individuals who felt that potential activities offered through Reconnections delivery partners may not be ideal and instead took the initiative to look for and engage in other activities, such as film clubs and other coffee mornings, or joining the University of the Third Age (U3A).

"I go to the U3A [University of the Third Age]; they are very good and they are more my age. I've been to the quizzes there and I'm going to the history group; I go to their coffee morning on a Thursday morning; they have social's. I'm going to meals out and they go on holiday but I was too late for the holiday as they are all booked up." 'Gloria' aged 71

5.6 PATHWAYS INTO RECONNECTIONS

Interviews also provided an opportunity to ask participants about how they came into contact with Reconnections and four life events / routes emerged:

1. Recent spousal bereavement
2. Recent contact with secondary health care services, e.g. hospital inpatient stays
3. GP referral
4. Self-referral

Spousal bereavement is often a devastating experience, even if the bereavement had been anticipated. It is a profound loss in an individual's social network and can be associated with a deep sense of insecurity and social isolation. Several participants had been referred to Reconnections as a result of a bereavement, for instance, some participants were referred via family members:

"I think it was through Age Concern. My daughter got in touch with them and explained that I had just lost my husband and that I was struggling a little bit. It all started from that I think." 'Mary' aged 78

Some referrals appear to follow periods of hospital care and other health concerns:

"I was told about it [Reconnections] when I came out of hospital. I had some carers and I think it was the carers" 'Caroline' aged 84

"My doctor [referred me] 18 months ago because I live on my own – I live a sort of indoor life, – I don't get out much, he thought it would be a good idea to put my name forward. I didn't know he was going to do that. I had two ladies phone me up and they came and visited me and I did get a buddy who came out to see me." 'Sheldon' aged 92

Some individuals heard about Reconnections through local adverts and also through word of mouth:

"I saw an advert about Reconnections in The Shuttle [Local Newspaper], about helping visit people who were lonely or being visited if lonely and applied for it and sent off an e-mail and whatever." 'Tracy' aged 64

"I had a friend who was already going to [an exercise group]. I first went to the [exercise group] a few times, so I have done a few of those and then got involved with other things" 'Abigail' aged 82

5.8 BARRIERS TO PARTICIPATION

We have already noted that the 'age mix' of typical group activities on offer can sometimes be a barrier to participation. Several other themes came up in interviews. Transport was a key concern, due to a lack of access to cars and/or suitable public transport:

"The trouble is I haven't got any transport and it's very difficult. When I first went [to Reconnections] they provided me with transport but then the people who used to take me transferred somewhere else and then when I wanted to do something else there wasn't the transport. I don't think they have anyone who can help with the transport. – it's a three mile journey and I don't walk very much – I've lost my confidence and I've lost my balance" 'Caroline' aged 84

"I don't go to the [Delivery Partner Centre] – my balance is not very good and I found that it is better for me to go for a walk with my buddy or even on my own. I recently had to give up driving and my buddy now helps with shopping – I'll be 93…… The lack of mobility is the key issue." 'Sheldon' aged 92.

Perhaps surprisingly another barrier is the need to juggle participation in Reconnections with ongoing employment (including post state-pension age), or in the case of one participant the need to reskill to get back into the job market:

"She [someone from the delivery partner] said to me do you want to come and help, but I am not being nasty but I said no I don't. I've got a bit of waitressing and I get a bit of cooking for people so I don't want to say that I would go every Tuesday because someone might offer me something else, or a day out or something. So I didn't volunteer for that." 'Helena' aged 63

"My problem at the moment is trying to find permanent work, going to the job centre. Going on courses to improve skills to get jobs, interviewing skills…." Eileen aged 52

Financial restrictions were also a limitation on participation for one younger service user who had retired, but was not yet eligible for the State Pension.

> "I would like to go to more classes but it is money every time and my income is not great – I don't get my state pension until next year. It's not much a time maybe £1.50 but if you go two or three times a week…… Hopefully next year when I get my pension I'll have more money flowing though." 'Tracy' aged 64

Although not strictly a barrier to participation, there may be less incentive for the minority of participants living in sheltered housing to participate, who have access to support and potentially pre-existing social networks. We do not know, whether Reconnections might have had some positive impact on their engagement with these pre-existing supports.

> "I live in Housing Association sheltered accommodation. There's a warden who comes round about every six months, and I am friends with the lady who lives next door, X, who is a widow, cos there's lots of us about, and the chap next door is X and he is a widower and he goes ballroom dancing. And I know people up the road and across the road. It's very social, and we've got a communal garden and they sit in the garden in the summer. I am in a good place, I know I am". Theresa aged 70

5.9 OPPORTUNITIES FOR FUTURE PROGRAMME DEVELOPMENT

Overall experiences of Reconnections were positive, and the programme clearly appears to have been a catalyst for the development of new friends, greater levels of confidence and increased participation in a range of activities for many participants. The input of volunteers was valued greatly by many participants. Going forward these insights suggest that areas where action might be taken include the determination of the target group of interest. There may be a case for looking for more opportunities for intergenerational activities that bring people into touch with different generations so as to widen the appeal of Reconnections and similar programmes. They might seek to raise awareness of/ and/or partner with local organisations that provide opportunities for younger people, including U3A. Alternatively programme planners may wish to consider whether they should narrow the age at which individuals are eligible for the programme, so that it caters more specifically for older age groups. Programme planners might also offer younger people who meet the loneliness criteria at triage volunteering roles instead, as this proved to be effective in improving their own sense of belonging, purpose and happiness.

Programmes also need to work with various stakeholders, including local government, as well as incentives for volunteers with transport or public service vehicle driving licenses, to look for ways to widen access to affordable transport options.

Interviews also suggest that some participants in Reconnections particularly value the one-to-one relationships developed through Reconnections, but have less interest, or feel they are too frail, to engage in other types of activity in the longer term. This can mean that some participants in Reconnections do not cope well with the formal ending of any one-to-one relationship at the end of Reconnections. Some volunteers have continued to stay in touch with Reconnections participants after the end of the Reconnections experience, but this in turn may impact on their ability and willingness to provide support for other future service users.

Going forward in future evaluations of Reconnections and similar programmes it would be helpful to collect information on changes in the use of other interventions to address loneliness, as well as more information on participation in social activities by Reconnections participants. Some changes in participation in these activities may be due to participation in Reconnections, and in turn may further impact on loneliness and other outcomes

relevant to Reconnections. Knowing more about the use and appeal of different activities and services could help volunteers and staff be more creative when linking-up individuals with activities that they are more likely to enjoy, and where needed, Reconnections can act as a catalyst for new activities in an area where these are lacking. This will help in maintaining the high levels of sustained participation that have been seen to date and hopefully drive better and sustained outcomes for individuals.

6 RETURN ON INVESTMENT ANALYSIS

This evaluation has focused on some short-term impacts of Reconnections and on qualitative insights from individuals who have participated in Reconnections, to help, for instance, in understanding how programmes can foster sustained engagement with their services. Service commissioners and policy makers will also want to know about the potential longer-term impacts of any intervention to improve health and other outcomes. Here we have constructed a return on investment model drawing on multiple data sources from the UK, as well as on data from Reconnections, to look at the potential impact on health, social care and informal care costs over a five-year period. This compares the level of investment in Reconnections with net costs averted as a result of reducing levels of loneliness. This builds on a previous decision model that we constructed for Public Health England looking solely on the impacts of tackling loneliness on mental health outcomes (6). Additional information on the potential consequences of loneliness on health were taken from a variety of sources including an interim report for Reconnections (13), a past review on the use of economic evidence in evaluations of loneliness alleviation interventions (14), a meta-analysis of the effects of loneliness on coronary heart disease and stroke (15), as well as increased risk of dementia (16), self-harm (17), and non-dementia-related residential care (3).

6.1 MODEL STRUCTURE AND ASSUMPTIONS

All costs in the model have been set to 2019 prices. The model looks at a Reconnections service model and assumes that 500 people per year enrol in Reconnections at a cost of £752 per person. The model assumes that 30.5% of individuals will move from having a UCLA score of 7 or more to a score of 6 or less, a rate of improvement that was observed at initial follow up for the full Reconnections cohort of 1,275 service users. In the absence of a comparator group in this model we initially assume that all of these changes in loneliness are due to participation in Reconnections; we can vary the effect size in sensitivity analysis and see what impact this has on likelihood of generating a positive return on investment. The model runs over a five-year time period, and in line with observed experience in Reconnections assumes that there are potential benefits for participants during as well as post Reconnections. From observation, impacts on loneliness post Reconnections persist at least until 18-month follow up. Here we assume that individuals will continue to engage in social activities and that these benefits will persist further. To be conservative no benefits are assumed to accrue to individuals who drop out of the programme. The dropout rate is assumed to be 11% in line with observed experience. Conservatively we assume that the costs of programme delivery are the same as for those that do not drop out – in practice costs may be lower.

The analysis is intended to be conservative; with the exception of self-harm risk, the analysis currently assumes that there is only a very small positive impact, equivalent to just 10% of the excess risk for those with severe levels of loneliness, on risks to health for those who have moderate levels of loneliness. This may underestimate the benefits to the health and social care sectors of reducing all levels of loneliness, but insufficient data are available in the literature on the increased risks of moderate levels of loneliness (scores of 9 or less on the UCLA-4). Thus, most of the benefits for return on investment here in the

baseline scenario are due to a reduction in severe levels of loneliness (scores of 10 or more at baseline on the UCLA-4). Here we assume that initially 44% of model participants will meet the criteria for severe levels of loneliness based on observed recruitment levels in Reconnections, with the remainder having moderate levels of loneliness.

The model highlights changes in overall costs over time related to health and social care services, residential care costs, volunteering and levels of informal care. It should be noted that benefits in terms of reduced social care and residential care costs do not make any assumptions about the proportion of individuals who would qualify for public support for these costs. Our analysis also identifies impacts on loneliness levels, but no monetary value is placed on these loneliness improvements.

6.2 RESULTS – BASELINE RETURN ON INVESTMENT

Table 10 provides an overview of the potential return on investment in our baseline scenario. Costs for providing the service would amount to £376,000, with these costs incurred within one year. Conservatively, the model estimates, that over five years more than £417,000 in economic costs would be avoided, leading to a net positive gain of £41,000 for this cohort and a total return on investment of £1.11 for every £1 invested. In addition, the model estimates that an extra 486 loneliness free years would be gained. As Table 11 shows, most of the economic savings included in the model are for reduced long term care use. These savings will be shared mainly between local authority social services and families. Approximately one third of all savings are for the health sector, but all of these potential savings may be conservative. For example, impacts which we have not modelled include any impact on the need for carer assessments by local authority social services, as well as many further social care services provided to people living in the community.

6.3 SENSITIVITY ANALYSIS

The model is sensitive to the proportion of Reconnections service users who enter the programme with severe levels of loneliness. In our baseline model, 44% of service users are assumed to have severe levels of loneliness, if this were to increase to 66% of service users, holding all else constant, then the overall return on investment would increase to £1.54. The model is also sensitive to delivery costs; if further economies of scale could be achieved and the delivery costs reduced by 10% then the return on investment would increase to £1.23. Conversely a 10% increase in delivery costs would reduce ROI to just £1.01. Again, all other things being equal, if the rate of effectiveness were to increase by 10% then ROI would increase to £1.36 with an additional 111 loneliness free years gained, whilst a 10% reduction in effectiveness would reduce the ROI to £0.86. If the drop-out rate for the programme exceeds 30% then the programme is unlikely to break-even.

6.4 DISCUSSION

This model is illustrative, and estimates of mid to long term health, social and long-term care costs that can be avoided are reliant on a small set of literature, not all of which is from an English context. It does indicate that there is a positive return on investment alongside a reduction in loneliness levels. Several factors to consider when designing programmes include:

- Increasing the relative proportion of service users who meet the criteria for severe levels of loneliness may increase the overall return on investment
- Much of the economic benefits associated with reduced levels of loneliness is due to a reduction in new long-term care admissions
- Initiatives to increase the efficiency of programmes and therefore reduce costs of delivery

Investing in measures to ensure that programmes meet the needs of service users in order to minimise drop-outs from the programme, given the potential impacts on overall return on investment.

We have also not identified all potential impacts on the health service that may be linked to loneliness. This notably includes the impacts of moderate rather than severe levels of loneliness on use of services. The current model assumes that there will only be a very small impact on health service use linked to non-severe levels of loneliness. We may also underestimate the consequences of remaining lonely because the mean age of the population in the case of Reconnections is almost 78, but many of the estimates of the impacts of loneliness on health service use in this model only report impacts on a population with an average age of 65.

It is also important to stress that this return on investment analysis only includes social care related to dementia and strokes and not any other social care related costs. For instance, if loneliness may be associated with a greater risk of hospital admission (our regression modelling indicates avoidance of severe loneliness may be associated with substantive reductions in A&E contacts and hospital admissions), this in turn is likely to have a knock on impact on the need for social care to aid in recovery. There are potentially also benefits related to the delay in receipt of social care packages that might increase value from a local authority perspective; there will also be additional impacts on the need for informal care over and above those included in the model for dementia, stroke and coronary heart disease.

TABLE 10: RETURN ON INVESTMENT: BASELINE SCENARIO (2019 £S)

	Year 1	Year 2	Year 3	Year 4	Year 5	Total cost/saving
Total cost Reconnections	£376,000	£0	£0	£0	£0	£376,000
GP Visits	-£18,256	-£17,639	-£16,654	-£15,722	-£14,843	-£83,114
Depression Treatment	-£264	-£255	-£238	-£222	-£206	-£1,185
Self-Harm Treatment	-£13	-£12	-£11	-£11	-£10	-£57
CHD Treatment – Health and Social Care	-£377	-£364	-£341	-£319	-£298	-£1,699
CHD Treatment – Informal Care	-£106	-£103	-£96	-£90	-£84	-£479
Stroke Treatment – Health and Social Care	-£503	-£486	-£455	-£426	-£399	-£2,270
Stroke Treatment – Informal Care	-£1,294	-£1,250	-£1,171	-£1,096	-£1,026	-£5,837
Dementia – Health and Social Care	-£6,194	-£5,984	-£5,637	-£5,310	-£5,001	-£28,126
Dementia – Informal Care	-£5,068	-£4,896	-£4,612	-£4,344	-£4,092	-£23,012
Hospital Admissions	-£3,326	-£3,213	-£3,007	-£2,813	-£2,632	-£14,991
A&E Admissions	-£1,787	-£1,727	-£1,627	-£1,533	-£1,444	-£8,117
Residential Care	-£53,195	-£51,396	-£48,579	-£45,915	-£43,396	-£242,482
Value of Additional Volunteering	-£1,317	-£1,253	-£1,191	-£1,132	-£1,076	-£5,970
Total cost consequences (saving if negative value)	-£91,699	-£88,579	-£83,619	-£78,934	-£74,507	-£417,339
Total net costs (saving if negative value)	£284,301	-£88,579	-£83,619	-£78,934	-£74,507	-£41,339
Cumulative Return per Pound Invested	£0.24	£0.48	£0.70	£0.91	£1.11	£1.11
Loneliness Free Years Gained	102	101	97	95	92	486

TABLE 11: RETURN ON INVESTMENT TO DIFFERENT SECTORS (2019 £S)

	Year 1	Year 2	Year 3	Year 4	Year 5	Total cost/saving
Programme cost	£376,000	£0	£0	£0	£0	£376,000
Payoffs:						
NHS and Social Care	-£30,720	-£29,681	-£27,970	-£26,355	-£24,833	-£139,559
Informal Care	-£6,468	-£6,249	-£5,879	-£5,530	-£5,202	-£29,328
Long Term Care	-£53,195	-£51,396	-£48,579	-£45,915	-£43,396	-£242,482
Volunteers (Local community)	-£1,317	-£1,253	-£1,191	-£1,132	-£1,076	-£5,970
Total cost consequences (saving if negative value)	-£91,699	-£88,579	-£83,619	-£78,934	-£74,507	-£417,339
Total net costs (saving if negative value)	£284,301	-£88,579	-£83,619	-£78,934	-£74,507	-£41,339
Cumulative Return per Pound Invested	0.24	0.48	0.70	0.91	1.11	1.11
Loneliness Free Years Gained	102	101	97	95	92	486
Cumulative ROI by sector:						
NHS and Social Care	£0.08	£0.08	£0.07	£0.07	£0.07	£0.37
Informal Care	£0.02	£0.02	£0.02	£0.01	£0.01	£0.08
Long Term Care	£0.14	£0.14	£0.13	£0.12	£0.12	£0.64
Volunteers (Local community)	£0.00	£0.00	£0.00	£0.00	£0.00	£0.02
Total	£0.24	£0.24	£0.22	£0.21	£0.20	£1.11

7 CONCLUSIONS

Participation in Reconnections is associated with reductions in loneliness. While there is no control population in the analysis, these results might be viewed with cautious optimism as average levels of loneliness in broadly comparable cohorts of older people in the ELSA surveys have not changed substantively, although a small reduction in levels of severe loneliness has been seen in the most recent waves. Robust comparative evaluations are needed to confirm this finding.

Our economic evaluation also supports the view that investing in measures to alleviate loneliness such as Reconnections may have short term positive impacts on some health service utilisation and overall health service costs. Our analysis indicates that remission from loneliness, that is achieving a UCLA score of 6 or less, was significantly associated with a 47% reduction in total health care costs compared to participants who remained lonely. Our analysis also suggests that individuals who were more lonely at baseline were significantly more likely to achieve loneliness remission post participation in Reconnections.

We also gained insights on the experience of Reconnections from participants in this evaluation. Overwhelmingly experiences were positive, although some participants (both younger and older) felt that some services offered by some delivery partners did not match their interests and needs. For instance, some participants, including some of advanced years, wanted to engage in activities that would bring them into contact with younger generations. This is consistent with a more personalised approach tailored to the needs and preferences of individuals, something that Reconnections as a whole sought to provide. Qualitative analysis also suggests that individuals are engaged in a range of social activities, and future evaluation could explore the extent to which Reconnections has been the catalyst for participation in these activities.

Using data from Reconnections and other published literature, our return on investment model, also suggests that in the mid-term (5 years) there is likely to be a positive return on investment from a societal perspective. Our estimate of benefits is likely to be conservative, as we have only modelled a small number of changes in incidence of poor health as a result of severe levels of loneliness.

In respect of future evaluations, not only is it important to invest in studies where it is possible to have a comparative group for analysis, but it is also essential not only to look at loneliness as an outcome measure. It would also be prudent in future evaluations to measure other outcomes, in particular measures of mental health and wellbeing, as well as overall quality of life.

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9 APPENDICES

APPENDIX 1: GEOGRAPHICAL DISTRIBUTION OF SERVICE USERS IN EVALUATION SAMPLE

TABLE A1: GEOGRAPHICAL DISTRIBUTION OF SERVICE USERS WITHIN EVALUATION SAMPLE

District	Number of service users	%	Area Population
South Wychavon	9	7.4	99, 216
Wyre Forest	48	39.7	99,902
Droitwich	3	2.5	23,727
Worcester City	19	15.7	102,338
Redditch	22	18.2	84,971
Bromsgrove	16	13.2	96,679
Malvern	1	.7	76130
Other	1	.7	
Unknown	2	1.7	
Total	121	100.0	582,963

2016 Population Data Source: (18).

APPENDIX 2: FURTHER REGRESSION MODELS

TABLE A2: PARAMETER ESTIMATES, GENERALISED LINEAR MODEL FOR A&E COSTS

Parameter	B	Std. Error	95% Wald Confidence Interval		Hypothesis Test			Exp(B)	95% Wald Confidence Interval for Exp(B)	
			Lower	Upper	Wald Chi-Square	df	Sig.		Lower	Upper
(Intercept)	6.310	1.6460	3.084	9.536	14.695	1	.000	549.968	21.839	13849.746
Male vs. female (ref)	-.217	.1898	-.589	.155	1.302	1	.254	.805	.555	1.168
Volunteer yes vs. no (ref)	-.368	.1634	-.688	-.048	5.070	1	.024	.692	.502	.953
Loneliness improved vs not improved (ref)	-.395	.1689	-.726	-.063	5.454	1	.020	.674	.484	.939
Age	.032	.0099	.013	.051	10.552	1	.001	1.033	1.013	1.053
Satisfaction score	-.292	.1336	-.554	-.030	4.778	1	.029	.747	.575	.970
Activity recorded yes vs no (ref)	.165	.1662	-.161	.491	.982	1	.322	1.179	.851	1.633
Total costs baseline	.000	.0000	.0000	.000	18.707	1	.000	1.000	1.000	1.000

TABLE A3: PARAMETER ESTIMATES, GENERALISED LINEAR MODEL FOR INPATIENT COSTS

Parameter	B	Std. Error	95% Wald Confidence Interval		Hypothesis Test			Exp(B)	95% Wald Confidence Interval for Exp(B)	
			Lower	Upper	Wald Chi-Square	df	Sig.		Lower	Upper
(Intercept)	6.039	1.7333	2.642	9.436	12.140	1	.000	419.500	14.040	12534.122
Male vs. female (ref)	.375	.2815	-.176	.927	1.777	1	.182	1.455	.838	2.527
Volunteer yes vs. no (ref)	.680	.2454	.199	1.161	7.674	1	.006	1.973	1.220	3.192
Loneliness improved vs not improved (ref)	-.444	.3214	-1.074	.186	1.906	1	.167	.642	.342	1.205
Age	.020	.0103	.000	.040	3.768	1	.052	1.020	1.000	1.041
Satisfaction score	-.004	.1595	-.316	.309	.001	1	.980	.996	.729	1.362
Activity recorded yes vs no (ref)	.303	.2501	-.187	.793	1.468	1	.226	1.354	.829	2.211
Total costs baseline	.000	5.1619 E-5	6.216 E-5	.000	10.012	1	.002	1.000	1.000	1.000

TABLE A4: GENERALISED LINEAR MODEL TOTAL COSTS OUTLIERS EXCLUDED (N=116)

Parameter	B	Std. Error	95% Wald Confidence Interval		Hypothesis Test			Exp(B)	95% Wald Confidence Interval for Exp(B)	
			Lower	Upper	Wald Chi-Square	df	Sig.		Lower	Upper
(Intercept)	5.927	1.2588	3.460	8.394	22.172	1	.000	375.071	31.817	4421.534
Male vs. female (ref)	.055	.2863	-.506	.616	.037	1	.848	1.057	.603	1.852
Volunteer yes vs. no (ref)	.640	.2643	.122	1.158	5.865	1	.015	1.896	1.130	3.183
Loneliness improved vs not improved (ref)	-.745	.3013	-1.335	-.154	6.106	1	.013	.475	.263	.857
Age	.016	.0125	-.008	.041	1.688	1	.194	1.016	.992	1.041
Satisfaction score	-.045	.0723	-.187	.097	.388	1	.534	.956	.830	1.101
Activity recorded yes vs no (ref)	-.380	.2797	-.928	.168	1.845	1	.174	.684	.395	1.183
Total costs baseline	.001	.0002	.000	.001	24.825	1	.000	1.001	1.000	1.001

TABLE A5: GENERALISED LINEAR MODEL TOTAL INPATIENT COSTS OUTLIERS EXCLUDED (N=116)

Parameter	B	Std. Error	95% Wald Confidence Interval		Hypothesis Test			Exp(B)	95% Wald Confidence Interval for Exp(B)	
			Lower	Upper	Wald Chi-Square	df	Sig.		Lower	Upper
(Intercept)	5.129	1.6931	1.810	8.447	9.176	1	.002	168.774	6.112	4660.771
Male vs. female (ref)	.284	.2800	-.264	.833	1.032	1	.310	1.329	.768	2.300
Volunteer yes vs. no (ref)	.639	.2886	.074	1.205	4.905	1	.027	1.895	1.076	3.336
Loneliness improved vs not improved (ref)	-.825	.3722	-1.554	-.095	4.910	1	.027	.438	.211	.909
Age	.023	.0097	.004	.042	5.574	1	.018	1.023	1.004	1.043
Satisfaction score	.100	.1612	-.216	.416	.383	1	.536	1.105	.806	1.516
Activity recorded yes vs no (ref)	.059	.2790	-.488	.605	.044	1	.834	1.060	.614	1.832
Total costs baseline	.000	.0001	-6.231 E-5	.000	1.893	1	.169	1.000	1.000	1.000

TABLE A6: BINARY LOGISTIC REGRESSION ON ASSOCIATION BETWEEN ACHIEVEMENT OF REMISSION FROM LONELINESS AND BASELINE CHARACTERISTICS (N=121)

		B	S.E.	Wald	df	Sig.	Exp(B)
Step 1*	Age	-.010	.020	.262	1	.608	.990
	Gender	-.826	.503	2.695	1	.101	.438
	Total cost at baseline	.000	.000	1.221	1	.269	1.000
	UCLA baseline score	.386	.132	8.528	1	.003	1.471
	Volunteer	.307	.412	.556	1	.456	1.360
	Constant	-1.283	2.262	.322	1	.571	.277

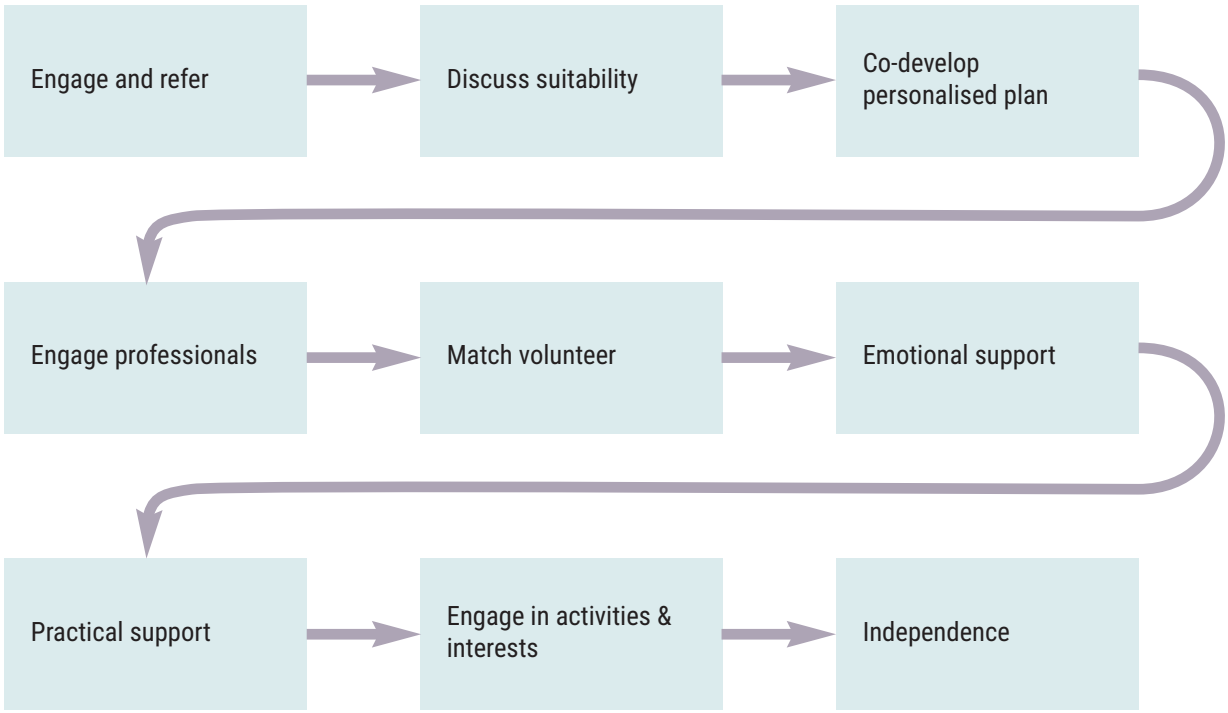
* Variable(s) entered on step 1: Age, Gender, Total Cost at Baseline, UCLA Baseline Score, Volunteer.

TABLE A7: BINARY LOGISTIC REGRESSION ON ASSOCIATION BETWEEN ACHIEVEMENT OF REMISSION FROM LONELINESS AND BASELINE CHARACTERISTICS (N=116

		B	S.E.	Wald	df	Sig.	Exp(B)
Step 1*	Age	-.014	.021	.441	1	.507	.986
	Gender	-.761	.513	2.206	1	.137	.467
	Total cost at baseline	.000	.000	1.215	1	.270	1.000
	UCLA baseline score	.405	.136	8.903	1	.003	1.500
	Volunteer	.258	.420	.377	1	.539	1.294
	Constant	-1.282	2.325	.304	1	.581	.278

* Variable(s) entered on step 1: Age, Gender, Total Cost at Baseline, UCLA Baseline Score, Volunteer.

APPENDIX 3: DESCRIPTION OF RECONNECTIONS SERVICE PATHWAY



Engage
Engagement through a variety of outreach activities that are accessible and welcoming to all who could benefit from or assist the programme, including the hardest to reach.

Refer
Single referral route into the service, open to anyone including professionals, family, self-referrals and other third parties. Established mechanisms with local statutory and voluntary organisations to ensure appropriate cross-referrals and signposting where appropriate.

Discuss suitability and develop personalised plan
Initial telephone call (or in person conversation) to check basic eligibility criteria, followed by a guided conversation led by a caseworker typically at a home visit, to ensure the service is appropriate for the potential service user. Through this process, the team seek to better understand the roots of the service user's loneliness and any barriers in place, and how they can best be supported through a personalised and adaptable plan for reconnection. The personalised plan is co-created between the service user, case worker and volunteer (if applicable) and builds on their strengths and interests.

Volunteer and caseworker led time-limited support tailored around the individual
A 6-9-month proactive support period, led by a volunteer and/or caseworker (determined by complexity of individual needs and volunteer availability) providing personalised practical and emotional support required, listening to what would make life better. Each interaction builds on the last, whereby the volunteer and/or caseworker supports the individual through techniques such as goal setting, building resilience, motivational interviewing and coaching to become increasingly independent. Some volunteer relationships continue in a personal capacity after the formal support period ends.

Engage professionals
Where Reconnections is just one part of someone's wider heath and care support, the caseworkers seek to work alongside other practitioners, to help ensure the individual has a holistic and joined up experience to best meet their needs and aspirations. The caseworkers also help service users access other professional services if they identify an unmet need.

Community development

While Reconnections does not directly provide activities, the team engage and initiate wider community development initiatives. These include setting up and running gateway activities and community events (e.g. Talk to Me Worcester, Big Community Dog Walk, Outdoor Lounges, etc.) to provide safe spaces for first steps of reconnection and increase community awareness of the project and loneliness in general.

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