



Cost-effectiveness analysis of Housing First

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Key findings

1. We find that Housing First has the potential to be cost-effective in the UK. Our base case analysis suggests Housing First may cost approximately £4,000 for each extra life satisfaction year point and £9.00 for each extra day in stable accommodation achieved compared with typical UK homeless accommodation services.
2. However, we find that there is significant uncertainty in our results. We are unable to make long-term estimates and our results are particularly sensitive to the cost of supported accommodation and the cost of providing Housing First support. It is unclear what the correct costings for these are and it is likely these will vary across the UK.
3. Future research should focus on collecting long-term outcome data and accurate costs for the accommodation and support services homeless people likely to be targeted by Housing First use in order to make a clearer assessment of the cost-effectiveness of Housing First.

Background

Homelessness has increased substantially in the UK in recent years. Since 2010, the number of households in temporary accommodation in England has risen by over 50% (DCLG, 2017a), while the estimated number of rough sleepers has more than doubled (DCLG, 2017b).

Homelessness is associated with a number of health and social problems. While these may contribute to a person's becoming or remaining homeless, they are also exacerbated by the situation (Caton et al., 2005). Given this, homeless people are responsible for a disproportionate amount of government spending. Pleace (2015) estimates the cost to the UK government of a typical rough sleeper is approximately £20,000 per annum.

Typical services aimed at combatting homelessness in the UK follow a 'Staircase' approach. Broadly speaking, this is where homeless people are graduated from temporary and/or supported housing to permanent, independent housing and temporary 'floating' support conditional on demonstrating 'housing readiness'. This approach has been shown to not work well for all people, particularly those with the highest support needs (Pleace, 2016).

'Housing First' is an alternative model of homelessness service delivery in which homeless people are given immediate, unconditional access to permanent housing with intensive support offered which is not time limited. Housing First models adopt a harm reduction approach (i.e. without setting pre-conditions for housing readiness) and engage service users in active choice relating to their housing. Housing First and Staircase models are both run with varying levels of staff resource. Housing Link (2015) note a typical caseload of 20-40 people per floating support worker in the Staircase model and recommend reducing this to 5-7 people for a Housing First support worker. This report notes, "*Smaller caseloads enable more intensive, flexible and personalised support for a cohort of people who have not been successfully engaged and supported by other housing services due to the level and complexity of their needs*" (Housing Link, 2015, p.2).

Randomised controlled trials from the United States and Canada have shown strong evidence that Housing First is effective in improving the housing stability of high needs service users compared with the Staircase approach (Chambers et al., 2017).

To date, Housing First has only been adopted in a small number of pilot sites in the UK. These have seen positive results. However, it is claimed that wider adoption is partly being held back by a lack of good evidence on the cost of providing the service (Homeless Link, 2015). More recently, funding for three Housing First pilots has been announced by the UK Government (Inside Housing, 2017). In this document, we describe the results of a cost-effectiveness analysis of Housing First which takes a UK perspective. Our results are pertinent for the design of future Housing First trials.

There are three economic evaluations of Housing First which have been previously been carried out in the UK. Bretherton and Pleace (2015) analyse nine pilot services in England, comparing observed support costs against a hypothetical alternative. Bramley et al. (2016) use before/after data from Bretherton and Pleace to estimate health, crime and housing costs under both alternatives. Finally, Blood et al. (2017) compare support costs for a hypothetical Housing First service in Liverpool against typical UK homelessness service costs.

In each of these studies, the authors find that Housing First has the potential to save money. However, each has several issues. Bretherton and Pleace (2015) and Bramley et al. (2016)

do not base their data on the results from randomised controlled trials (RCTs), which is important as service users' outcomes tend to improve over time (Ly and Latimer, 2015). Each study is also only based on a limited set of unit cost estimates. But there are several, varied unit cost estimates available. Consequently, the results may not generalise or may understate the level of uncertainty. Finally, the evaluations do not use data on the wellbeing effects of Housing First. Housing First has consequences for the budgets of multiple Government departments. Incorporating wellbeing data is useful for assisting collaboration between these departments which have multiple, varied obligations.

Aims

During 2017 the What Works for Wellbeing Communities Evidence Programme conducted a systematic review of housing interventions and wellbeing for housing-vulnerable adults (Chambers et al, 2018). Evidence around Housing First formed a key part of that review. This systematic review presented an opportunity for an associated cost-effectiveness model to be developed which could be used to:

- 1) Act as a case study to demonstrate the use of decision analytic models commonly used in economic evaluations of health care to another sector, such as housing, where health is not the main outcome of interest
- 2) Consider whether Housing First interventions could be judged to be cost-effective

The systematic review explored the outcome measures used in evaluations of interventions for housing-vulnerable adults in terms of their direct and indirect links to individual and community wellbeing (Chambers et al, 2018).

This cost-effectiveness analysis report aims only to present the methods, data sources and findings of the cost-effectiveness model for Housing First.

In the cost-effectiveness analysis described here, we utilise the evidence from international RCTs to estimate what the wellbeing and service use consequences might be in the UK were Housing First to be adopted more widely. We use multiple sets of published outcome and unit cost data to assess the level of uncertainty in the cost-effectiveness estimates. Besides informing funding decisions, this information may guide the direction of future research undertaken to better predict the consequences of implementing Housing First more widely across the UK.

Methods

Our cost-effectiveness analysis compares Housing First with the Staircase approach in a population of homeless people with existing mental health needs. We use two main outcomes: life satisfaction years and days stably housed. Life satisfaction years are measured on a 0-10 scale with 10 equal to one year spent at maximum life satisfaction. Days stably housed is defined as days spent in accommodation with an expected or secure tenancy of six months or longer. Days stably housed, or related measures, are frequently used as primary outcomes in trials of Housing First, while life satisfaction measure has previously been used by researchers to estimate the wellbeing consequences of being homeless and using homelessness services (see, for instance, Fujiwara and Vine, 2015, and Hubley et al., 2014). Life satisfaction can be viewed as measure of how well the individual considers their life to be going overall. It can therefore encompass a broad range of potential outcomes from Housing First, such as safety, physical and mental health, meaningful activity and social relationships.

We estimate housing and support, criminal justice and health care costs. These are incurred by Government at a local and national level. Housing First has the potential to lower costs through the increased attainment of permanent accommodation – which is cheaper to provide than supported or temporary accommodation – and through decreased health and criminal justice system resource use. However, the intensive support provided alongside is more costly than the floating support offered under the Staircase approach.

We estimate costs and outcomes for two years only due to data availability. Housing First is likely to have longer-term and wider impacts on service users' wellbeing and resource use, however. Short-term estimates may not reflect longer-term results.

The housing and support costs included our analysis are: permanent accommodation costs; supported accommodation costs; night shelter use; homeless day centre visits; outreach services used while rough sleeping; floating support provided while service user is in permanent accommodation (incurred only under Staircase model); and Housing First support worker costs (provided regardless of accommodation). The criminal justice costs included are number of arrests; court case costs; and time spent in prison. The health costs are A&E visits and time spent in rehab and in hospital (general and psychiatric).

We draw outcome and service use estimates for the Housing First and Staircase models from the recent 'At Home/Chez-Soi' randomised controlled trial from Canada, and we apply unit cost estimates from several UK sources. Randomised controlled trials of Housing First have also been run in the United States. However, stakeholders note that standard homelessness services in the United States are far less extensive than in the UK (Johnsen and Teixeira, 2012). We believe the Canadian results are more applicable, though differences in the systems exist (see discussion).

The At Home/Chez-Soi trial ran from 2011 to 2013, involving 2,148 homeless people with mental health needs from five Canadian cities, Vancouver, Toronto, Montreal, Winnipeg, and Moncton (Goering et al, 2014). Participants were randomised to receive either Housing First or 'Treatment as Usual'. 'Treatment as Usual' differed by the city, with Toronto providing the most extensive services as standard, but is similar to the Staircase approach used in the UK.

Higher needs participants receiving Housing First were provided with support through Assertive Community Treatment (ACT), while moderate needs participants were supported

through Intensive Case Management (ICM). ICM is a type of support in which service users are provided with a support worker, part of whose role is to help the service user access other existing services they may need (such as mental health, GPs and housing advice services). ACT is a type of support in which the social and health services a person may need are provided directly (e.g. psychiatrists, housing officers, and GPs are generally employed as part of the ACT team). To date, only ICM has been provided alongside Housing First in the UK, and we cost Housing First assuming an ICM approach has been followed.

We use the multiple estimates from the At Home/Chez Soi trial in separate analyses to capture some of the uncertainty in choosing the most appropriate results (for instance, in the level of need of the service users the service will be delivered to and in the appropriate level of standard services). Our unit cost estimates are drawn from ten sources and include multiple estimates for several of the unit costs. We run separate 'scenario' analyses with different combinations of these costs to see how sensitive the results are to the input data used. The data used in this evaluation is described in further detail below.

Costs

Housing First Support

A major component of Housing First is the provision of intensive support from caseworkers with small caseloads (generally fewer than 10 cases per worker). Support is provided regardless of whether the service user is in permanent accommodation or not. Though service users are able to exercise choice over whether they receive support, caseworkers are active in trying to engage service users.

There are two sources for the cost of Housing First support available in the UK literature. Bretherton and Pleace (2015) report low, mid and high estimates of the one-year per-client cost of a support worker which is derived from an analysis of nine UK pilot studies (£4056, £5304, and £6240 respectively). These are based on three different estimates of the hourly costs of a support worker. Blood et al. (2017) cost a hypothetical Housing First support team in Liverpool which equates to £12,607 per client per annum. This estimate includes salary and on-costs for 1 manager, 4 caseworkers, and 2 part-time mental health support and wellbeing coaches (0.3 FTE), subsidy to a lettings agency to manage tenants' accommodation, and shares of operational and central resources spread across a caseload of 20 clients. We add a 20% mark-up to this to estimate London costs and then take a weighted average of the two to get an England-wide cost (weights are proportion of homeless applications in 2016/17 inside and outside of London). The final figure is £13,254.

In the base case, we use the mid estimate from Bretherton and Pleace (2015) as this is derived from observed data, though as shares of central costs are not included in this figure (e.g. human resources), this is likely to be an underestimate. The greater detail in the Blood et al. (2016) estimate means the latter may in fact be more accurate.

It should be noted, that the support provided is likely to decrease over time as service users' situations improve. This means that using one figure for Years 1 and 2, as we do, may not be correct over a longer-term.

Floating Support

In the Staircase model in the UK, floating support is often provided to service users who secure permanent housing. This type of support is less intensive than the level of support provided by Housing First.

We use the unit cost estimate from Pleace and Culhane (2016), who estimate that floating support costs are an average £11 a day (based on three hours contact per week). We assume this cost is incurred throughout the time permanently housed and is equivalent to £4,015 per client per annum. This approach has two problems, though: first, not all local authorities always provide floating support; second, it is often time limited. However, we include the cost in this way as Housing First is focused on those with high needs who are likely to have ongoing support needs.

Permanent Accommodation

For all types of accommodation, we assume that rent and support costs are borne by government through the housing benefit system. In their evaluation of nine UK pilot services, Bretherton and Pleace (2015) state that rents were paid entirely or largely through welfare benefits.

We assume that the rent paid is equivalent to the one-bedroom Local Housing Allowance (LHA) rate. This is the housing benefit paid to private landlords. While some service users may be tenants in local authority (LA) housing or in the social rental sector (for which housing benefit is lower), it is assumed that LA and social housing is at capacity: service users will displace other households eligible for housing benefit into the private rental sector. Therefore, the cost to Government is the LHA rate.

The LHA rate differs across the country (Entitled To, 2017). We calculate the average LHA rate by weighting lower-tier local authority LHA rates by the number of households making homeless applications in each local authority in 2016/17 (taken from DCLG [2017a]). The resulting figure is £128.87.¹

Alternative weighting options are available. Lankelly Chase (2015) estimate the number of homeless persons with multiple and complex needs in each local authority using data from 2010/11. However, as these estimates are prior to the full onset of government cuts, which have been found to have increased homelessness claims (Loopstra et al., 2016) and have not been equally distributed across local authorities (SPERI, 2014), we use the more recent DCLG (2017a) figures for weighting in all of our analyses.

Supported Accommodation

The cost of supported accommodation in this evaluation is the sum of the rent and support costs. We assume it is paid for through the benefit system. In reality, local authorities also invest money in supported accommodation.

Several estimates of the cost of supported accommodation are available in the literature. One issue is that there are different levels of support available with commensurate differences in costs. Service users eligible for Housing First are likely to require more intensive forms of support and so be placed in more costly forms of supported accommodation. However, it isn't certain which level of support they will receive.

Bretherton and Pleace (2015) provide three estimates of support costs derived from a survey of local authorities. The figures are £98, £180, £330 per week for low, medium and high intensity support, respectively. Bretherton and Pleace (2015) do not include the rent costs, but Pleace and Culhane (2016) state that rent and support costs are typically equal.

¹ For some local authorities, there is more than one LHA rate. Where this was the case, we used the average of the relevant LHA rates for that local authority.

Blood et al. (2016) estimate that the average support cost of supported accommodation for single homeless individuals across the UK is £124 per week. Blood et al. (2017) use data from services in Liverpool and estimate support costs for accommodation with 24-hour cover is £17253 per annum (£330 per week) while support costs for accommodation without 24-hour cover is £9000 per annum (£173 per week). Blood et al. (2017) remove the LHA rate to estimate this cost, implying that rent costs may actually be lower than support costs, contrary to Pleace and Culhane (2016).

In the base case analysis, we use the Bretherton and Pleace (2015) middle estimate of support costs (£180 per week) with rent costs equal to the average LHA rate as in Blood et al. (2017). In scenario analyses, we use other support costs drawn from Bretherton and Pleace (2015) and Blood et al. (2016, 2017) and we use the rule that support and rent costs are equal as in Pleace and Culhane (2016).

Night Shelter

As with supported accommodation, the cost of night shelter is equal to support and rent costs. We draw figures for both of these from Blood et al. (2016), who estimate the average weekly rent and service charges for accommodation provided to rough sleepers to be £94 and £119, respectively (2014/15 prices).

Rough Sleeping

We assume the cost of rough sleeping is the cost of contacts with homelessness outreach services. We use Pleace and Culhane's (2016) estimate from interviews with 3 homeless persons who used out-reach services over the previous 90 days, which is equal to £476.67 per person on average (equivalent to £37.07 per week). Ignoring the problem of drawing from such a small sample, this estimate is likely to be an overestimate of this cost as the persons interviewed are likely, by implication, to be more easily contactable than those not interviewed and arguably more likely to use outreach services.

Institutionalisation

In the At Home/Chez Soi trial, data was collected on the time participants' spent in hospital (psychiatric and general), rehab, and prison. However, the results are only reported as a combined figure for time spent institutionalised.

We use two approaches to cost this outcome. In the base case analysis, we adopt a conservative approach and use the unit cost for least expensive type of institution. This is the cost of male open prison (£538 per week), which is taken from 2015/16 Ministry of Justice (2016) figures and is estimated for all prisoners (i.e. previously homeless or not).

In scenario analyses, we use two alternative figures. The first is an average of the average costs for each type of institution. For average prison costs, we use the average cost across all categories of prison from the previous Ministry of Justice (2016) figures. This is again based on the total prisoner population and is equal to £625 per week. For rehab costs, we use average residential rehab costs reported in the Unit Costs of Health and Social Care (PSSRU, 2016, p.50), which is equal to £684 per week (2014/15 prices). This is drawn from a sample of services provided to those homeless or not. For hospital costs, we use the study by McCormick and White (2016), who estimate average hospital treatment costs for patients reporting no fixed address. Their estimate are equal to £2,369 per week hospitalised across all types of treatment (2007/08 prices). The average of these three figures, inflated to 2017 prices, is £1,367.

The second alternative figure we use in scenario analysis is the highest of the individual unit costs. This is the average cost of hospital treatment taken from McCormick and White (2016).

Time in Each Type of Accommodation

Costs are calculated for the housing and institutional outcomes by multiplying each unit cost by the time spent in each type of accommodation/institution. Time spent is drawn from various analyses of the At Home/Chez Soi trial.

Days spent in permanent accommodation is estimated using figures for the percentage of time stably housed, the trial's primary outcome measure. We use three estimates for this. In the base case analysis, we use Stergiopoulos et al. (2015). This reports moderate needs participant results at 24 months separately for four of the five trial cities. We use random-effects meta-analysis to combine these results and assume that the same time is spent in stable housing in Years 1 and 2. (It is necessary to make an assumption to discount second year results.) The I-squared statistic from the meta-analysis is 74.58. This suggests there is large variation between the individual city results (i.e. in the relative effectiveness of Housing First). This is likely caused, at least in part, by differences in the availability of services available to homeless people as standard across the trial cities.

Aubry et al. (2016) provide the results for the high needs participants for all cities combined. These are reported for each three-month period in the trial, so we are able to directly calculate estimates of time stably housed in Years 1 and 2. Finally O'Campo (2016) provides results for the high needs Toronto participants at 24 months. As with Stergiopoulos et al. (2015), we assume that the same time is spent in stable housing in Years 1 and 2 when these are used.

Time spent in supported accommodation, night shelter and living on the streets is only available from Goering et al.'s (2014) report of the pooled results for all trial cities. This reports the time spent in temporary accommodation, emergency shelter, living on the streets, and institutionalised at 24 months. We take supported accommodation to be the same as temporary accommodation and emergency accommodation to be the same as night shelter. As the proportions of time spent in each type of accommodation must sum to 1, we first calculate a percentage of time not stably housed from the stable housing data above and then allocate proportions of time to temporary accommodation, emergency shelter, living on the streets, and time institutionalised using the Goering et al. (2014) results.

Day Centre Visits

Besides housing and institutionalisation costs, the other costs we include are day centre visits, A&E visits and crime and justice costs. Pleace and Culhane (2016) estimate day centre costs to be £8 per visit. This is taken from the costs of one London service. We multiply this by the number of drop-in centre visits in Years 1 and 2 from the Goering et al. (2014) pooled At Home/Chez Soi results to get a yearly cost for each intervention.

A&E Visits

We take the average numbers of A&E visits from Stergiopoulos et al. (2015) study of moderate needs At Home/Chez Soi participants and we use two estimates for A&E visit unit costs. In the base case analysis, we use average A&E visit costs drawn from the 2015/16 NHS Reference Costs (Department of Health, 2016), excluding chapters where the patient was dead on arrival. This is equal to £138 per visit and is based on data from the general patient population. In scenario analysis, we conservatively use average A&E visit costs

where no treatment was required (£74 per visit), again taken from Department of Health (2016). We use this figure as homeless people can have difficulty accessing primary health care services and may present at A&E instead. Due to unavailability of primary care resource use estimates from the At Home/Chez Soi trial, we are unable to assess the validity of this assumption or include primary care use estimates directly.

Crime and Justice Costs

Besides time spent in prison, we estimate two types of crime and justice costs: arrests and court visits. These costs vary by the type of crime committed and whether the defendant is detained or not. However, results from the At Home/Chez Soi are only available for overall number of arrests and do not delineate by type of crime or specify detention rates.

We estimate one unit costs for arrests. We assume that 83.7% of arrests lead to detentions in line with (general population) figures published by the Ministry of Justice (2015)² and use this to weight costs for average arrest costs with and without detention published in the New Economy Manchester Unit Cost Database (2015) (£719 and £345, respectively). This gives an average cost per arrest of £659.

The At Home/Chez Soi studies do not report the proportion of arrests leading to court cases, so we use the same Ministry of Justice (2017) proceeding rate as above. To estimate the average court case cost, in the base case analysis, we assume the same proportional split for each type of crime as observed in Hanratty (2011), a US observational study of Housing First. This study splits arrests into livability, drug-related, violent, property, and other crimes. We assume these correspond to the 'Criminal Damage', 'Drug offences', 'Violence against the person', 'Burglary', and 'Other indictable offences' categories used, respectively, in the New Economy Manchester Unit Cost Database (2015). This gives a weighted average court case cost of £2,089.

In scenario analysis, we conservatively assume the cost of a court case is £511 which is equal to the cost of a criminal damage court case, the smallest of these court case costs.

We use arrest figures from the Stergiopoulos et al. (2015) study of the moderate needs arm of the At Home/Chez Soi trial, as this is the only study which reports the data in a usable format. Arrests are actually higher under Housing First in this study, which is contrary to other analyses of the At Home/Chez Soi data (see, for instance, O'Campo et al. [2016]).

Outcomes

Life Satisfaction

Life Satisfaction was captured in the At Home/Chez Soi trial using the Quality of Life Interview 20 (QOLI-20) global life satisfaction question, which asks "How do you feel about the following...your life as a whole?" This is measured on a 1 (terrible) to 7 (delighted) scale.

Life satisfaction was captured at baseline, 6, 12, 18 and 24 months. We use the difference in difference estimate (vs baseline) for the treatment effect at 6, 12, 18 and 24 months. We average the 6 and 12 month and the 18 and 24 month estimates to get the overall estimates for Year 1 and Year 2, multiplying each by 10/6 to put the effects onto a 0-10 scale.

² This is equal the proportion of indictable and non-motoring summary offences in 2016/17 which were proceed against (i.e. led to a court case).

Life satisfaction results for two years are available in two At Home/Chez Soi studies: Stergiopoulos et al.'s (2015) study of all moderate needs participants and O'Campo et al.'s (2016) study of high needs participants in Toronto. We use the Stergiopoulos et al. (2015) results in the base case analysis, and the O'Campo (2016) results in scenario analysis.

Days Stably Housed

Days stably housed are calculated directly from the estimate of time stably housed used in the cost calculation. As mentioned above, in the base case analysis, this is based on the meta-analysis of moderate needs results reported in Stergiopoulos et al. (2015). Days stably housed was a primary outcome measure in the At Home/Chez Soi trial.

Analyses

There is substantial uncertainty in this evaluation due to the range of data available and the lack of information on which sets of data are most appropriate. There are multiple sources available for the unit costs and the effectiveness estimates, each of which may not be valid. Further, many of the data are subject to sampling error.

To account for the numerous sets of estimates available, we conduct one-way sensitivity analyses in which we vary each input across its estimate range while holding the other inputs at their base case levels and evaluate the impact this has on the cost-effectiveness results.

To account for sampling error, we input estimates stochastically where standard errors are available. With this data, we are able to produce cost-effectiveness acceptability curves (CEACs). These provide information on the decision uncertainty at different willingness-to-pay values. There are two issues with this approach, however. First, standard errors are only available for the estimates of time stably housed and changes in life satisfaction. Second, due to data availability, we assume the stochastic estimates are independent of one another, which is unlikely to be correct. (For instance, we assume that changes in life satisfaction in Years 1 and 2 are independent.) Both issues mean that the stochastic results will display less variation than is actually the case. The CEACs should be thought of as a bottom estimate of the overall level of uncertainty.

Our results are presented in discounted and undiscounted form. When discounting, we use a discount rate of 3.5% per annum applied for future costs and 1.5% per annum for future benefits. This follows in accordance with HM Treasury (2016) Green Book guidelines.³

We express all costs in 2017 prices. To inflate housing and criminal justice costs we use the CPI Index. For support costs we use a 1% per annum increase, in line with the public sector

³ In order to compare costs and benefits arising at different time points, it is necessary to discount future costs and benefits because people prefer to receive benefits now and incur costs later. The Green Book discount rate for costs (3.5%) comprises of three components (1) uncertainty about the future (the likelihood of a catastrophic event which makes the programme invalid - such as a natural disaster or major new technology); (2) the pure time preference (people's preference to have benefits sooner rather than later) (3) an element to account for diminishing marginal utility of consumption where income is growing. The Green Book estimates the first two components give a discount rate of 1.5%. The additional 2% capturing declining marginal utility is not applied to benefits in this case because the outcomes - life satisfaction and days stably housed - are measures of benefit themselves, rather the *means* to attain benefit (i.e. increased income).

pay spending cap. For health costs we use the PSSRU (2016) Hospital & Community Health Services Pay & Prices index (to 2015/16) and the CPI Index (for 2016/17).

Findings

We conduct analyses for combinations of each unit cost, service use and outcome estimate from the sources mentioned above. The assumptions made have a large effect on the results of the incremental cost effectiveness of Housing First. The range of results from these analyses is displayed in Table 1.

Table 1: Range of Analysis Results (Discounted)

		Housing First	Staircase	Change	ICER
Assumptions favourable to Staircase Model	Cost	£46,915	£28,681	£18,234	
	Life Satisfaction	-	-	0.60	£30,355
	Days Stably Housed	520	169	351	£51.91
Assumptions favourable to Housing First	Cost	£32,759	£34,571	-£1,812	
	Life Satisfaction	-	-	0.60	-£3,017
	Days Stably Housed	533	201	332	-£5.46

In some analyses, Housing First is cost-saving. In others, the incremental cost ratio is very large. For context, NICE uses a maximum incremental cost-effectiveness ratio 'threshold' value of £20,000 to £30,000 per Quality Adjusted Life Year, a measure of health benefit anchored on a 0-1 scale (0 equal to dead and 1 equal to a year in full health). The maximum estimate of £30,355 per Life Satisfaction Year point is large compared with this (i.e. approximately 10x the QALY threshold), though it should be noted the two values aren't directly relatable and that long-term outcomes are not included in these analyses.

While there is a large spread in the estimates, not all of the estimates are equally likely as some input data are more plausible than others. In Table 2, we display the results of our 'base case' analysis which we believe is the most credible. In this, we use effectiveness data from the moderate needs arm of the At Home/Chez Soi trial and the mid-range estimate of Housing First support from Bretherton and Pleace (2015). In this scenario, Housing First is more expensive to provide than the Staircase approach.

Table 2: Results from Base Case Analysis

		Housing First	Staircase	Change	ICER
Discounted	Cost	£31,463	£28,694	£2,769	
	Life Satisfaction	-	-	0.66	£4,182
	Days Stably Housed	521	226	296	£9.36
Undiscounted	Cost	£32,006	£29,185	£2,822	
	Life Satisfaction	-	-	0.67	£4,232

Days Stably Housed	525	227	298	£9 .47
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While there is large uncertainty around the input data to use, there is also considerable uncertainty in individual input data. The data used are collected from samples, rather than the full population of homeless people and services, so are subject to sampling error. Though hopefully unbiased, the estimates from these samples may not be the same as the underlying value for the population. The estimates would be different were another randomly selected sample used instead.

To capture this type of uncertainty, we use data from the At Home/Chez Soi to input the outcome and service use estimates probabilistically: that is, by using a distribution of population values that are likely given the results observed in the trial. We display the results of this analysis in Figures 2 and 3. The two lines are cost-effectiveness acceptability curves (CEACs) for the base case analysis shown in Table 2. CEACs plot the likelihood of an intervention being cost-effective at different willingness-to-pay values for a unit of benefit. In other words, the graph shows the likelihood of Housing First being worthwhile funding at different willingness-to-pay values for a Life Satisfaction Year or Day Stably Housed (given a set of model assumptions).

Figure 2: Cost-Effectiveness Acceptability Curve - Life Satisfaction Year Points (1,000 Simulations)

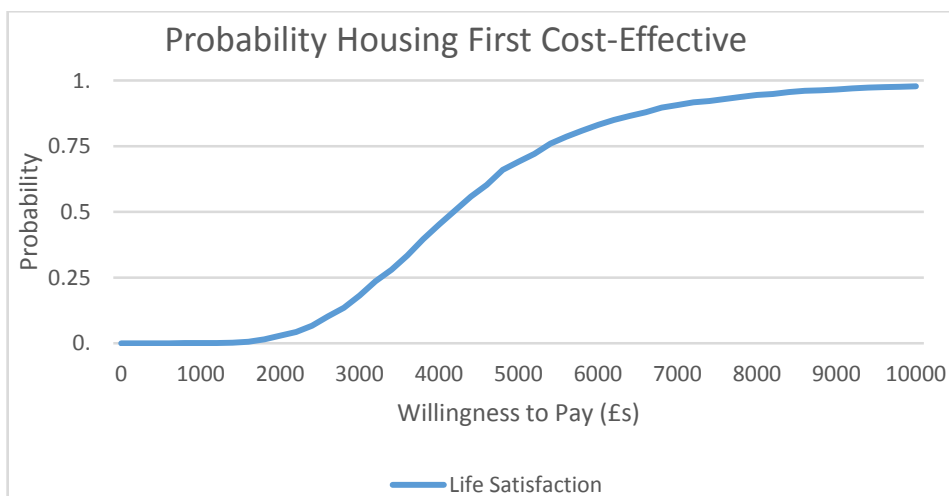
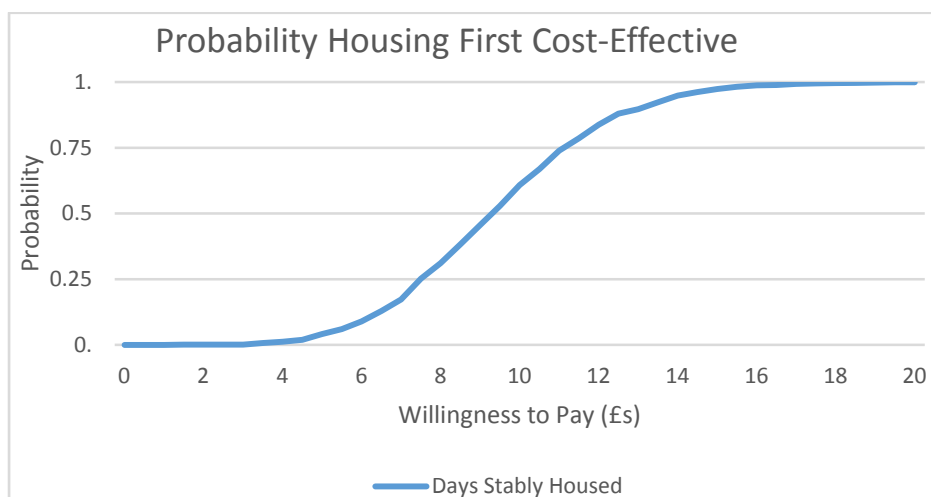


Figure 3: Cost-Effectiveness Acceptability Curve - Days Stably Housed (1,000 Simulations)



The graphs show that there is considerable uncertainty underlying the estimates given in Table 2. Using our base case analysis data, at a threshold of £3,000 per Life Satisfaction Year point the probability of Housing First being cost-effective is 18.2%. Understanding the level of uncertainty is important both for capturing the degree to which outcomes may differ from that previously observed and also in suggesting whether further research will be beneficial: there is little benefit to improving the precision of estimates where current evidence gives a good basis to say an intervention is or is not likely to be cost-effectiveness. In the current case, our results show there is substantial uncertainty in whether Housing First may be cost-effective or not.

Another way of approaching this question of uncertainty is to ask the extent to which the results change given the range of possible values for a given input. In Table 3, we report the results of one-way sensitivity analyses in which we change the value of one factor over its low and high estimates in turn while keeping the other inputs at the level in our 'base case' analysis. As can be seen, our results are particularly driven by the estimates of the cost of Housing First support and of the support costs incurred in supported accommodation.

Reducing the uncertainty by collecting more accurate figures for these is likely to have the largest effect in reducing the uncertainty around the cost-effectiveness of Housing First.

Table 3: One Way Sensitivity Analysis Results (Discounted)

Input	Low Input Level		High Input Level	
	Incremental Cost	ICER: Life Satisfaction	Incremental Cost	ICER: Life Satisfaction
Days Stably Housed	£2,812	£4,247	£2,155	£3,588
Life Satisfaction	£2,769	£4,182	£2,155	£3,588
Rent, Supported and Temporary Housing	£2,769	£4,182	£1,500	£2,265
Support Costs, Housing First	£266	£402	£18,191	£27,469
Support Costs, Supported Housing	£4,741	£7,159	-£838	-£1,265
Unit Cost, A&E Visits	£2,852	£4,306	£2,769	£4,182
Unit Cost, Institutionalisation	£2,769	£4,182	£538	£812
Unit Cost, Court Case	£2,602	£3,928	£2,769	£4,182

Discussion and recommendations

Our results must be treated with caution. There are several issues with the data used in this analysis which will impact on the accuracy of the results. (Indeed, the wide variation in estimates means we are unable to make a clear assessment of the cost-effectiveness of Housing First.) Most notably, the data used may not be representative of costs and outcomes associated with Housing First were it adopted more widely in the UK. There are dissimilarities between Canada and the United Kingdom, both in homeless services available and the wider socio-economic and legal environment, which will affect outcomes.

One difference is in the availability of appropriate housing. Amongst pilot services in London, Bretherton and Pleace (2015) find the time to securing permanent accommodation ranged from 12 to 24 weeks. In the At Home/Chez Soi trial, amongst high needs participants, the average time to first housing was 10 weeks (Aubry et al., 2016). Another important difference is in the availability of support services available in the community, which may be higher in some parts of Canada than in the UK.

We are unable to directly compare the efficacy of the Canadian and UK usual homeless service systems using data from the UK. However, 2010/11 data from English homeless accommodation providers shows that approximately 35% of service users with mental health issues moving on to new accommodation move to permanent accommodation,⁴ while Crane et al. (2011) show high tenancy sustainment rates (81%) amongst homeless people 15/18 months after being resettled. Participants in the 'Treatment as Usual' arms of the At Home/Chez Soi trial were stably housed 32% on average (Goering et al., 2014). It should be noted, though, that recent Government cuts have put strains on the homeless service system. This may negatively impact on outcomes.

The unit cost data used may also not be accurate, though collected in the UK. In general, unit costs were drawn from studies using small samples or particular populations different to the population of homeless people with mental health issues modelled here. For instance, we use criminal justice unit costs (arrests, court case, and prison) from data collected from the general public, while our homeless service costs are drawn from only a few service providers. We have used several data sources where possible, but results may still be inaccurate. Certain figures are likely to be biased. For instance, the Housing First support worker cost used in our base case analysis does not include shares of central costs (and is thus an underestimate). As there is variation in service availability and costs across the country, one figure is also unlikely to be reflective of all locations (for instance, wages and housing costs are higher in London). It may be the case that Housing First is cost-effective in some parts of the country and not others.

The results are further limited by missing data. We had to make assumptions about the time spent in each type of institution (prison, hospital, rehab, etc.), other health costs (e.g. primary health care use) were missing, and data on arrests were only available in a usable format from one At Home/Chez Soi study. This showed higher arrests under Housing First, which is the opposite finding to other At Home/Chez Soi studies. Further, differences in life satisfaction were only measured for homeless people themselves, though benefits may accrue to their family and friends and to the wider community (through reduced rough

⁴ Own analysis of Supporting People Short-Term Outcomes data.

sleeping, for example). Estimates of the level of uncertainty in the data were also not available in every instance. The consequence is that the variation in our results is an underestimate of the overall level of uncertainty.

We were only able to look at results over a two-year period. Yet, US evidence from a four-year trial shows the difference between Housing First and Staircase approaches may change over time (Stefancic and Tsemberis, 2007). It is unclear which way this will bias incremental cost-effectiveness estimates, though it has been argued that cost-savings and improved outcomes of Housing First may be seen more over the longer term (see, for instance, Goering et al., 2014). Note, too, that our results do not provide estimates of average yearly operating costs of Housing First services as, in the long-run, services will contain a mix of clients at various points in the service pathway.

Another potential issue with our analysis is the use of life satisfaction as an outcome measure. Given the substantially greater housing attainment for those receiving Housing First,⁵ the relatively modest gains in wellbeing observed have been considered surprising by some researchers (Powell et al, 2017). It is possible that the true effect may be partly masked by adaption to circumstances for those continuing to receive standard services, to changes in priorities or standards for those entering stable housing situations, or to random variability in individuals' responses to the single-item life satisfaction question through time. However, re-analysing the At Home/Chez Soi data, Powell et al. (2017) are unable to find evidence that participants' interpretations of the life satisfaction question changed systematically through time and by intervention.

While our results should be treated with caution, we are able to draw a number of conclusions. First, though there is considerable uncertainty, our results show that Housing First has the potential to be a cost-saving or cost-effective intervention in the UK. Second, and following from this, our results show there is a need for further research in this area. Our results are particularly sensitive to the estimate of the cost of providing Housing First support and of the cost of supported accommodation. Data on these was drawn from small samples or from hypothetical costings which may not generalise. Future research should pay attention to collecting robust cost data from across the UK, and should focus on the costs of higher needs homeless people who are likely to benefit most from the Housing First approach. The services they use are likely to be particularly high cost. Collecting this data will allow the production of more accurate and localised cost-effectiveness estimates. It may also be useful in carrying out evaluation of other aspects of homelessness policy.

Next steps for research

Aside from the collection of more accurate cost data from across the UK, further work should be carried out on the long-term and wider effects of Housing First. Changes in engagement with services is likely to have long-term impacts on mortality, morbidity and overall wellbeing. Maintaining stable accommodation is also likely to impact on service users' relationships with family and friends, while changes in rough sleeping and contacts with the criminal justice system imply wider benefits to society at large than are captured by the direct, financial costs of service use used here. Future research should also address other omissions in this analysis, including inputting data on the time spent in each type of

⁵ In the moderate needs arm of the At Home/Chez Soi trial, participants receiving Housing First spent 63% of days stably housed, with a corresponding figure of 30% for those receiving treatment as usual (Stergiopoulos et al., 2015).

institution and on the use of other services, such as primary care. Incorporating these effects into an economic evaluation may substantially alter the results.

An RCT of Housing First has recently been completed in France.⁶ Using the results of that trial may increase the robustness of this economic evaluation and will also allow further sensitivity testing of the results. The recently announced pilots of Housing First also offer an opportunity to address many of the gaps identified here. In addition to the data outlined above, we recommend that these pilots collect information on wellbeing, including life satisfaction and other measure such as health-related quality of life which may aid future buy-in from different Government departments. Attention should be given to selecting wellbeing measures which are likely to have a consistent meaning to service users over time and to also how frequently wellbeing is measured and the number of items used in order increase the reliability and accuracy of true treatment effect estimates. Finally, the pilots should also ensure adequate comparison groups are recruited to calculate unbiased treatment effect and cost-effectiveness estimates.

⁶ For study protocol, see Tinland et al. (2013).

References

Aubry, T., Goering, P., Veldhuizen, S., Adair, C.E., Bourque, J., Distasio, J., Latimer, E., Stergiopoulos, V., Somers, J., Streiner, D.L. and Tsemberis, S., 2016. *A multiple-city RCT of Housing First with assertive community treatment for homeless Canadians with serious mental illness*. *Psychiatric Services*, 67(3), pp.275-281.

Blood, I. et al., 2016. *Supported Accommodation Review*.
https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/572454/rr927-supported-accommodation-review.pdf

Blood, I. et al., 2017. *Housing First Feasibility Study for Liverpool City Region*.
https://www.crisis.org.uk/media/237545/housing_first_feasibility_study_for_the_liverpool_city_region_2017.pdf

Bramley, G., Leishman, C. M., Cosgrove, P. J. & Watkins, D., 2016. *What would make a difference? Modelling policy scenarios for tackling poverty in the UK*.
https://researchportal.hw.ac.uk/files/10844984/Bramley_WhatWouldMakeADifference_Report.pdf

Bretherton, J., and Pleace, N., 2015. *Housing First in England: An Evaluation of Nine Services*. <http://www.homeless.org.uk/sites/default/files/site-attachments/Housing%20First%20in%20England%20-%20full%20report.pdf>

Caton, C.L., Dominguez, B., Schanzer, B., Hasin, D.S., Shrout, P.E., Felix, A., McQuiston, H., Opler, L.A. and Hsu, E., 2005. *Risk factors for long-term homelessness: Findings from a longitudinal study of first-time homeless single adults*. *American Journal of Public Health*, 95(10), pp.1753-1759.

Chambers, D, Cantrell, A., Preston, L, Peasgood, T., Paisley, S, Clowes, M. A systematic review of the evidence on housing interventions for 'housing-vulnerable' adults and its relationship to wellbeing, 2017

Crane, M., Warnes, T. and Coward, S., 2011. *Moves to Independent Living: Single homeless people's experiences and outcomes of resettlement. Final report of the FOR-HOME study*. <https://www.kcl.ac.uk/sspp/policy-institute/scwru/pubs/2011/craneetal2011forhomefinalreport.pdf>

DCLG, 2017a. *Statutory Homelessness and Prevention and Relief Statistical Release*.
https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/621556/Statutory_Homelessness_and_Prevention_and_Relief_Statistical_Release_January_to_March_2017_corrected.pdf

DCLG, 2017b. *Rough Sleeping Statistical Release*.
https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/585713/Rough_Sleeping_Autumn_2016_Statistical_Release.pdf

Department of Health, 2016. *NHS Reference Costs 2015 to 2016*.
<https://www.gov.uk/government/publications/nhs-reference-costs-2015-to-2016>

Entitled To, 2017. *Local Housing Allowance Rates 2016-17*.
<https://www.entitledto.co.uk/help/Local-Housing-Allowance-Rates>

HM Treasury, 2016. *The Green Book: Appraisal and Evaluation in Central Government*. https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/220541/green_book_complete.pdf

Homeless Link, 2016. *Housing First in England: The Principles*. <http://www.homeless.org.uk/sites/default/files/site-attachments/Housing%20First%20in%20England%20The%20Principles.pdf>

Inside Housing, 2017. *Government announces £28m funding for Housing First pilots*. <https://www.insidehousing.co.uk/news/news/government-announces-28m-funding-for-housing-first-pilots-53329>

Johnsen, S. and Teixeira, L., 2012. 'Doing it already?': stakeholder perceptions of Housing First in the UK. *International Journal of Housing Policy*, 12(2), pp.183-203.

Lankelly Chase, 2015. *Hard Edges: Mapping Severe and Multiple Disadvantage*. <https://lankellychase.org.uk/wp-content/uploads/2015/07/Hard-Edges-Mapping-SMD-2015.pdf>

Loopstra, R., Reeves, A., Barr, B., Taylor-Robinson, D., McKee, M., and Stuckler, D., 2016. The impact of economic downturns and budget cuts on homelessness claim rates across 323 local authorities in England, 2004-12. *Journal of Public Health (United Kingdom)*, 38(3), 417–425. <https://doi.org/10.1093/pubmed/fdv126>

Ly, A., and Latimer, E., 2015. *Housing First Impact on Cost and Associated Cost Offsets: A Review of the Literature*. *The Canadian Journal of Psychiatry*, 60(11), pp.475-487. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4679128/pdf/cjp-2015-vol60-nov2015-475-487.pdf>

McCormick, B. and White, J., 2016. *Hospital care and costs for homeless people*. *Clinical Medicine*, 16(6), pp.506-510.

Ministry of Justice, 2016. *Prison Performance Statistics 2015 to 2016*. <https://www.gov.uk/government/statistics/prison-performance-statistics-2015-to-2016>

Ministry of Justice, 2017. *Criminal Justice Statistics Quarterly: March 2017*. <https://www.gov.uk/government/statistics/criminal-justice-system-statistics-quarterly-march-2017>

New Economy Manchester, 2015. *Unit Cost Database*. <http://www.neweconomymanchester.com/our-work/research-evaluation-cost-benefit-analysis/cost-benefit-analysis/unit-cost-database>

O'Campo, P., et al., 2016. *How did a Housing First intervention improve health and social outcomes among homeless adults with mental illness in Toronto? Two-year outcomes from a randomised trial*. *BMJ open*, 6(9), p.e010581.

Pleace, N., 2015. *At What Cost? An Estimation of the Financial Costs of Single Homelessness in the UK*. https://www.crisis.org.uk/media/20677/crisis_at_what_cost_2015.pdf

Pleace, N., 2016. *Housing First Guide Europe*. http://housingfirstguide.eu/website/wp-content/uploads/2016/06/HFG_full_Digital.pdf

Pleace, N., and Culhane, D., 2016. *Better than cure?* https://www.crisis.org.uk/media/20680/crisis_better_than_cure_2016.pdf

Powell, G. A., Adair, C. E., Streiner, D. L., Mayo, N., and Latimer, E., 2017. *Changes in quality of life from a homelessness intervention: true change, response shift, or random variation*. *Quality of Life Research*, 26(7), 1853–1864. <https://doi.org/10.1007/s11136-017-1522-8>

PSSRU, 2016. *Unit Costs of Health and Social Care 2016*. <http://www.pssru.ac.uk/project-pages/unit-costs/2016/>

SPERI, 2014. *Local authority spending cuts and the 2014 English local elections*. <http://speri.dept.shef.ac.uk/wp-content/uploads/2014/07/Brief6-local-authority-spending-cuts.pdf>

Stefancic, A. and Tsemberis, S., 2007. *Housing First for long-term shelter dwellers with psychiatric disabilities in a suburban county: A four-year study of housing access and retention*. *The Journal of Primary Prevention*, 28(3-4), pp.265-279.

Stergiopoulos, V., Hwang, S. W., Gozdzik, A., Nisenbaum, R., Latimer, E., Rabouin, D., ... Goering, P. N., 2015. *Effect of scattered-site housing using rent supplements and intensive case management on housing stability among homeless adults with mental illness: A randomized trial*. *JAMA - Journal of the American Medical Association*, 313(9), 905–915. <https://doi.org/10.1001/jama.2015.1163>

Tinland, A., Fortanier, C., Girard, V., Laval, C., Videau, B., Rhenter, P., Greacen, T., Falissard, B., Apostolidis, T., Lançon, C. and Boyer, L., 2013. *Evaluation of the Housing First program in patients with severe mental disorders in France: study protocol for a randomized controlled trial*. *Trials*, 14(309).