

## **National Survey of Mental Health Supported Accommodation Services in England; Quality of Life, Autonomy, Satisfaction and Costs.**

Professor Helen Killaspy\*, PhD, Division of Psychiatry, University College London, Maple House, 149 Tottenham Court Road, London W1T 7NF [h.killaspy@ucl.ac.uk](mailto:h.killaspy@ucl.ac.uk)

Professor Stefan Priebe, FRCPsych, Unit for Social and Community Psychiatry, Queen Mary University of London, Newham Centre for Mental Health, London E13 8SP [s.priebe@qmul.ac.uk](mailto:s.priebe@qmul.ac.uk)

Stephen Bremner, PhD, Division of Primary Care and Public Health, Brighton and Sussex Medical School, Mayfield House, Falmer, Brighton, BN1 9PH [s.bremner@bsms.ac.uk](mailto:s.bremner@bsms.ac.uk)

Professor Paul McCrone, PhD, King's Health Economics, King's College London, De Crespigny Park, London SE5 8AF [paul.mccrone@kcl.ac.uk](mailto:paul.mccrone@kcl.ac.uk)

Sarah Dowling, MSc, Division of Psychiatry, University College London, Maple House, 149 Tottenham Court Road, London W1T 7NF [sarah.dowling@ucl.ac.uk](mailto:sarah.dowling@ucl.ac.uk)

Isobel Harrison, BSc, Division of Psychiatry, University College London, Maple House, 149 Tottenham Court Road, London W1T 7NF [isobel.harrison@ucl.ac.uk](mailto:isobel.harrison@ucl.ac.uk)

Joanna Krotofil, PhD, Division of Psychiatry, University College London, Maple House, 149 Tottenham Court Road, London W1T 7NF [j.krotofil@ucl.ac.uk](mailto:j.krotofil@ucl.ac.uk)

Peter McPherson, DPsych, Division of Psychiatry, University College London, Maple House, 149 Tottenham Court Road, London W1T 7NF [p.mcpherson@ucl.ac.uk](mailto:p.mcpherson@ucl.ac.uk)

Sima Sandhu, PhD, Unit for Social and Community Psychiatry, Queen Mary University of London, Newham Centre for Mental Health, London E13 8SP [s.sandhu@qmul.ac.uk](mailto:s.sandhu@qmul.ac.uk)

Maurice Arbuthnott, BA, North London Service User Research Forum, Division of Psychiatry, University College London, Maple House, 149 Tottenham Court Road, London W1T 7NF [mauricea@easy.com](mailto:mauricea@easy.com)

Professor Sarah Curtis, DPhil, Department of Geography, Durham University, South Road, Durham DH1 3LE [S.E.Curtis@durham.ac.uk](mailto:S.E.Curtis@durham.ac.uk)

Professor Gerard Leavey, PhD, Bamford Centre for Mental Health & Wellbeing, University of Ulster, Northland Road, Derry, Londonderry, Northern Ireland BT48 7JL [g.leavey@ulster.ac.uk](mailto:g.leavey@ulster.ac.uk)

Professor Geoff Shepherd, PhD, Centre for Mental Health, Maya House, 134-138 Borough High St, London SE1 1LB [Geoff.Shepherd@centreformentalhealth.org.uk](mailto:Geoff.Shepherd@centreformentalhealth.org.uk)

Professor Sandra Eldridge, PhD, Pragmatic Clinical Trials Unit, Queen Mary University London, Blizard Institute, Barts and The London School of Medicine and Dentistry, 58 Turner Street, London, E1 2AB [s.eldridge@qmul.ac.uk](mailto:s.eldridge@qmul.ac.uk)

Professor Michael King, PhD, Division of Psychiatry, University College London, Maple House, 149 Tottenham Court Road, London W1T 7NF [michael.king@ucl.ac.uk](mailto:michael.king@ucl.ac.uk)

\*Corresponding author

## **Abstract**

### **Background**

There has been little research into the effectiveness of mental health supported accommodation services. We undertook a national survey to investigate service provision, costs, quality and service user outcomes across England.

### **Methods**

We randomly sampled services from 14 representative regions and up to 10 service users per service. Service quality and costs and service users' quality of life, autonomy and satisfaction with care were assessed using standardised tools and compared using multilevel modelling

### **Findings**

619 service users were recruited from 22 residential care, 35 supported housing and 30 floating outreach services. Those in residential care and supported housing had more severe mental health problems than those in floating outreach. Over half were considered at risk of self-neglect and over a third vulnerable to exploitation. Residential care was most expensive but provided for people with the highest needs. Quality of care was highest in supported housing. People in supported housing and floating outreach were more socially included but experienced greater crime. After adjusting for service quality, sociodemographic and clinical factors, quality of life was similar for those in residential care and supported housing (mean diff 0.138, 95% CI -0.402 to 0.126,  $p = 0.306$ ) and lower for those in floating outreach than residential care (mean diff 0.424, 95% CI -0.734 to -0.114,  $p = 0.007$ ), but autonomy was greater for those in supported housing (mean diff 0.145, 0.010 to 0.279,  $p = 0.035$ ). Satisfaction with care was similar across services.

### **Interpretation**

Supported housing may be a cost-effective option but the benefits need to be weighed against the risks associated with greater autonomy.

### **Funding**

Funded by a National Institute for Health Research Programme Grant for Applied Research (RP-PG-0610-10097). The views expressed are those of the authors and not necessarily those of the NHS, the NIHR or the Department of Health.

## Background

Specialist mental health supported accommodation services are a key component of the “whole system care pathway” for people with complex, longer term mental health problems [1], providing graduated support on discharge to the community after hospital admission. Many of those who use these services have a diagnosis of psychosis with associated difficulties in managing everyday activities [2-4]. Supported accommodation services assist people in learning the skills needed to live more independently. Around 60,000 people in England live in mental health supported accommodation [5,6] at considerable cost to the tax payer [7]. The only survey of supported accommodation in the UK was limited in scope but identified three main types; residential care, supported housing, and floating outreach [8]. Residential care homes provide communal facilities, staffed 24 hours a day, where day to day necessities such as meals, supervision of medication and cleaning are provided. Placements are not usually time limited. Supported housing is provided in shared or individual self-contained tenancies with staff based on-site up to 24 hours a day. A focus on rehabilitation means the person is helped to gain skills to move on to a more independent tenancy. Floating outreach services provide support to people living in time-unlimited, self-contained, individual tenancies. Off-site staff visit at least weekly and provide practical and emotional support, with the expectation that this will reduce and eventually cease. In the UK, individuals often move from a placement with higher to lower support every few years as their skills and confidence improve, with the ultimate aim of successfully managing an independent tenancy.

Despite the high costs of these services, there have been few studies assessing their effectiveness [9,10]. The QuEST study (Quality and Effectiveness of Supported Tenancies for people with mental health problems) aims to address this (<http://www.ucl.ac.uk/quest>). It comprises four related work packages (WPs): WP1 - adaptation of a quality assessment tool; WP2i - national survey of mental health supported accommodation in England; WP2ii - cohort study investigating longer-term outcomes ; WP3 - a qualitative investigation of staff and service user experiences; WP4 - a feasibility randomised trial comparing the effectiveness of supported housing and floating outreach. The first three work packages of the QuEST study were approved by Harrow Research Ethics Committee (reference 12/LO/2009). This paper reports on the national survey of mental health supported

accommodation (WP2i). Our research questions were: what is provided by these three models of supported accommodation and how much do they cost; who uses them; and do outcomes for users in the three services differ? Our main objectives were to describe the provision, quality, and costs of mental health supported accommodation in England; to describe the characteristics of users of these services; and to compare service users' quality of life, autonomy, and satisfaction with care, taking account of differences in service and service user characteristics.

## **Methods**

### ***Sample size and recruitment***

Our original sample size was calculated to estimate the difference in proportion of people moving on from each of the three types of supported accommodation 30 months after recruitment (assessed in WP2ii) to within 5%. We aimed to recruit a random sample of 90 services from 14 nationally representative Local Authority areas (Appendix Table 1) and a random sample of 450 users of these services. The 14 areas were selected using an index developed by Priebe et al [11] for their postal survey of supported accommodation, which ranks Local Authority areas on the basis of mental health morbidity, social deprivation, urbanicity, provision of community mental health care, supported accommodation residential care, Local Authority mental health care spend and housing demand. Recruitment was carried out between 1st October 2013 and 31st October 2014. Full details of our approach are given in the Appendix.

### ***Data collection***

The researchers completed face to face interviews with the service manager, keyworker staff and service users as follows:

#### *Supported accommodation service managers - description of the service*

Annual budget, weekly cost per resident, referral process, input from local community mental health services, expected length of stay. Service quality was assessed using the Quality Indicator for Rehabilitative Care - Supported Accommodation (QuIRC-SA) which rates seven domains: living environment; therapeutic environment; treatments and

interventions; self-management and autonomy; social interface; human rights; recovery-based practice [12,13].

#### *Supported accommodation keyworker staff - service user participant assessments*

Clinical and risk history; challenging behaviours - Special Problems Rating Scale (SPRS) [15]; needs - Camberwell Assessment of Needs Short Assessment Scale (CANSAS) [16]; substance use - Clinician Alcohol and Drug Scale (CADS) [17]; social functioning - Life Skills Profile (LSP) [18].

#### *Service user participants*

Sociodemographic details; quality of life - Manchester Short Assessment of Quality of Life (MANSA) [19]; autonomy - Resident Choice Scale (RCS) [20]; satisfaction with services - the Client Assessment of Treatment Scale [21]; social inclusion was rated using the social inclusion index (SIX) [23] from responses to MANSA items.

#### *Service costs*

Service use was estimated from staff and service user interviews using an adapted version of the Client Service Receipt Inventory [24]. Participants provided information on the frequency of contact with specific professionals in the previous three months and whether contacts were one-to-one or in groups. Contacts with supported accommodation staff were categorised into face-to-face, group sessions, and personal care. It was assumed that group sessions consisted of four participants. Details of hospital admissions in the previous 12 months (for mental or physical health problems) were collected from case notes and keyworker staff.

#### ***Data analysis***

Data were entered into a purpose designed database by the researchers and, after cleaning by the study statistician (SB), transferred to Stata statistical software (v.12) for analysis [25]. Differences between service types, including the QuIRC-SA domain scores, service user characteristics, and ratings of standardised assessments, were investigated using simple descriptive statistics. We used multilevel regression to compare service users' ratings of

quality of life, autonomy and satisfaction with care, before and after taking account of service and service user characteristics. All analyses also took account of clustering by Local Authority area. The list of candidate variables for the adjusted multilevel models was agreed a priori: service variables - service size, service quality (QuIRC-SA), area sampling index score; service user variables – age, gender, ethnicity, diagnosis, social function (LSP), needs (CANSAS), substance misuse (CADS), challenging behaviours (SPRS), risk to self/others in last two years. Further details are provided as a footnote to Table 4. Data reduction methods were used to reduce the risk of multicollinearity and of fitting models that included variables with sparsely populated categories, little variation, or a large percentage of missing values. We assumed the convention that in any linear regression analysis at least 10-20 participants are required for each predictor variable included in the model [26].

Service costs were calculated by combining the service use data with appropriate unit cost information [27]. Total costs of services used in the previous three months were calculated and total inpatient costs for the previous 12 months. Total costs for the previous year were calculated by multiplying the three-month service use costs by four and adding the inpatient costs. Comparisons of service use and costs were made between the three types of supported accommodation. Total cost differences were assessed using a mixed-effects multilevel regression model, controlling for clinical and demographic factors (diagnosis, risk, alcohol use, drug use, gender, and age). These costs were in addition to the actual accommodation costs. The annual budget for each service and the weekly cost per resident were not added to the costs described above (to avoid double counting) and are reported separately.

### **Role of the funding source**

The study was funded by the National Institute of Health Research (RP-PG-0707-10093). The funders had no role in the collection, analysis or interpretation of data, in the writing of the manuscript or the decision to submit for publication. The views expressed are those of the authors and not necessarily those of the NHS, the NIHR or the Department of Health. SB, PMcC and HK had access to the raw data. The corresponding author (HK) had final responsibility to submit for publication.

## Results

A total of 22 residential care homes (50% of the sample pool), 35 supported housing services (36% of the sample pool) and 30 floating outreach services (48% of the sample pool) participated (Figure 1). From these 87 services, 619 users were recruited (mean 7 per service, range 3-10).

The characteristics of the three service types are shown in Table 1. Floating outreach services provided more places (median 30, IQR 15-43) than the other service types. Floating outreach and supported housing services expected to work with their users for two years compared to around five years for residential care. All services used similar assessment processes and most supported housing and floating outreach services used standardised measures to monitor service users' progress. Most services had clinical input from a community mental health team, despite the fact that only a third of floating outreach clients were subject to the statutory mental health framework of the Care Programme Approach (vs. most residential care and supported housing clients). Supported housing provided the highest quality services, scoring above residential care and floating outreach on six of the seven QuIRC-SA domains.

Service user characteristics are shown in Table 2. Around two-thirds were male and single and most were white and unemployed. Residential care service users were older and known to mental health services longer (median 23.5 years) than users of the other two service types. The route into the current service showed a non-linear pathway: around two-thirds of floating outreach service users, one third of those in residential care, and one third in supported housing had moved to their current supported accommodation from independent accommodation; around a quarter of those in residential care and a third of those in floating outreach had moved to their current accommodation from a similarly supported accommodation service; a quarter of residential care and supported housing service users had moved there from hospital.

Most residential care (83%) and supported housing (72%) service users had a primary diagnosis of psychosis compared to 52% of floating outreach users, a third of whom had depression or anxiety. The percentage of service users with substance misuse problems was

relatively small (16% alcohol, 12% drugs), with the highest levels amongst supported housing service users. Users of residential care and supported housing had more previous admissions than users of floating outreach and more were subject to some form of community treatment order. Overall, 39% of service users had committed an act of violence ever, but there were few serious incidents in the last two years. Almost one fifth had self-harmed within the last two years, with higher proportions amongst users of supported housing (26%) and floating outreach (21%) than residential care (4%). Risk of self-neglect was reported for at least half of all service users with the highest percentage amongst those in residential care (72%). Vulnerability to serious exploitation was reported for over one third of supported housing and floating outreach users and 41% of those in residential care. Overall, 67%-78% of service users across the three types of supported accommodation were considered a risk to self or others. More users of supported housing (25%) and floating outreach (22%) reported being a victim of crime in the last 12 months than those in residential care (8%). Around half of these incidents involved physical assault.

There were few differences in severity of challenging behaviours (SPRS) [15] and social functioning (LSP) [18] between service users in the three types of supported accommodation, but those in residential care had more needs (CANSAS) [16] than those receiving supported housing or floating outreach. However, there were few unmet needs across all three service types. Those receiving supported housing and floating outreach had higher ratings of social inclusion (SIX) [23] than those in residential care.

In our unadjusted multilevel models, those in supported housing and floating outreach had lower quality of life (MANSA) [19] than those in residential care but higher autonomy (RCS) [20]. There were no statistically significant associations between service type and satisfaction with the care received (CAT-SA) [21].

In our adjusted multilevel models, the QuIRC-SA domains Therapeutic Environment and Recovery Based Practice were highly correlated. We decided to keep Recovery Based Practice in the models as this domain had been found to predict successful discharge from inpatient mental health rehabilitation units in a previous study [28]. Since data could not be collected for Living Environment domain scores for floating outreach services, this domain



was also dropped. After adjusting for service and service user characteristics, the association between service type and lower quality of life remained statistically significant for floating outreach vs. residential care but not for supported housing vs. residential care. The association between service type and autonomy remained statistically significant for supported housing vs. residential care but not for floating outreach vs. residential care (Table 3).

In terms of service use, those in residential care were most likely to receive input from staff through group sessions and to be in receipt of personal care (Appendix Table 2). Users of supported housing had the highest input from community team staff and the highest rate of psychiatric admission. Floating outreach service users generally had lower levels of service use than the other two groups.

Of those who used specific services, the intensity of use did not differ markedly between services (Table 4). However, those in residential care had more nurse contacts, face-to-face sessions and personal care contacts than supported housing and floating outreach service users. They also had longer psychiatric admissions, although this was influenced by some outliers.

The services used that had the highest costs were inpatient care and face-to-face contact with supported accommodation staff (Table 5). The costs of service use (excluding inpatient care) during the previous three months were highest for users of residential care, followed by those receiving floating outreach. Inpatient costs were lowest in the latter and similar in the other two services. This was also reflected in the total costs pertaining to a one-year period. The mean annual budget was £466,687 for residential care (range £276,000 to £777,920), £365,452 for supported housing (range £174,877 to £818,000) and £172,114 for floating outreach (range £17,126 to £491,692). The mean costs per resident per week were £640 for residential care (range £325 to £1260), £317 for supported housing (range £16 to £980), and £107 for floating outreach (range £23 to £160).

After adjusting for demographic and clinical characteristics, the multilevel models showed that the residential care group had annual costs that were on average £2562 per person

more than for supported housing (95% CI -£3631 to £8755) and £5917 more than for floating outreach (95% CI -£62 to £11,897). The average costs for supported housing were £2311 more than for floating outreach (95% CI, -£1516 to £6138).

## **Discussion**

Of the three main types of supported accommodation provided in England, residential care is the most expensive and provides support to people with the highest needs; floating outreach is cheapest and provides support to people with less severe problems. Quality of life is highest for people in settings with greater support, possibly because the greater autonomy and social inclusion associated with more independent settings carries greater risks to personal safety.

Supported housing services were rated highest for quality. Supported housing and floating outreach services expected service users would move to less supported accommodation or manage with less support within two years but we found the system is more complex than a simple, step-down continuum.

In keeping with Priebe et al's [8] survey, we found that most service users were male, single, and unemployed and most had had previous mental health admissions. However, although most users of residential care and supported housing services had a primary diagnosis of psychosis, those in floating outreach services had less severe mental health problems (Priebe et al [8] reported that most service users had psychosis). Those in residential care had the highest number of needs but across all three types of supported accommodation most service user needs were being met. We also found lower rates of substance misuse (less than 20%) than in Priebe et al's survey [8], possibly because we used standardised assessment tools.

High levels of risk were noted for service users across the three types of service, with self-neglect and vulnerability to exploitation being most prevalent and over a quarter of those in supported housing and floating outreach had been a victim of crime in the last 12 months.

One study in the USA reported that people in floating outreach services had greater 'community integration' than people in less independent supported accommodation services [29]. We also found social inclusion was higher amongst users of floating outreach and supported housing services than users of residential care.

Given that quality of life was greatest amongst residential care and supported housing users and autonomy was greatest for those in supported housing, supported housing might represent a good balance between promotion of autonomy and provision of support that ensures a good quality of life. Furthermore, after adjusting for differences in service and service user characteristics, supported housing had similar costs to residential care. Although costs of floating outreach were lower, so was quality of life. A randomised controlled trial in Canada of 'Housing First', a floating outreach model targeted at mentally ill homeless people, reported benefits for housing stability but no advantage over usual care at two year follow up with regard to quality of life and satisfaction with services [30]. Our results appear to concur and suggest that supported housing might offer better value for money than floating outreach as it appears to be associated with better outcomes. This finding is important at a time of economic downturn when investment in cheaper models, such as floating outreach, might be appealing. Cost-effectiveness assessments from longitudinal studies and trials are needed to draw firmer conclusions.

The strengths of our study included our sampling strategy that minimised bias and facilitated generalisability through recruitment of Local Authority areas that were nationally representative in terms of factors relevant to our aims, and sampling services from within these areas and service users randomly. However, we cannot know how similar our sample was to those who declined or lacked capacity to participate. Neither can we extrapolate our findings to contexts outside the UK, although it seems reasonable to consider them relevant to countries that already provide specialist mental health supported accommodation services and to those in the process of developing them. We used standardised measures to assess the quality of care provided, service user morbidity and outcomes. We adjusted our sampling strategy to ensure adequate recruitment for a later phase of the QuEST programme, resulting in a sample size that was more than adequate for the multilevel regression models undertaken, which also took account of clustering within services.

Nevertheless, our data were cross-sectional and therefore we cannot infer causality from our results.

### **Conclusion**

Our results suggest supported housing might be a cost-effective option but this needs to be balanced against the need to ensure safety and the stress of being expected to move to more independent, permanent accommodation in the future. Further cohort studies and trials are needed to inform investment in the most cost-effective models.

## **Research in context**

### **Evidence before this study**

Despite their considerable cost, there is a dearth of evidence for the effectiveness of mental health supported accommodation services. A Cochrane Review in 2006, updated in 2010, identified no RCTs of adequate quality in this area. As part of the QuEST programme, we searched MEDLINE, EMBASE, PsycINFO, CINAHL Plus, International Bibliography of the Social Sciences (IBSS), Applied Social Sciences Index and Abstracts (ASSIA), Sociological Abstracts, Web of Science, The Cochrane Library, OpenGrey, and EthOS for quantitative studies evaluating the effectiveness of mental health supported accommodation on mental health and psychosocial outcomes. Search terms were combined with MeSH terms, subject headings or thesaurus terms (depending on database) as follows: “mental health” (e.g. Mental disorders/, Mental health/, psychologic\* or psychiatric or mental and illness\* or disorder\* or problem\* or disabilit\*, schizophrenia, psychosis, bipolar, depression, anxiety), “supported accommodation” (e.g. Residential facilities/, Assisted living facilities/, Group homes/, Halfway houses/, Nursing homes/, Residential treatment/, residential or supported or sheltered or assisted and care or rehab\* or service or hous\* or home or accomm\* or living, floating or outreach or visiting and support or outreach), and “outcomes” (Hospitalization/, Death/, service and use or utilisation or satisfaction or quality, treatment and satisfaction or quality, eviction, imprisonment, relapse, recall, move on, mental state, social function\*, recovery, empower\*, quality of life, esteem, wellbeing, effectiveness, efficacy, outcome\*). Limits on participant age (18-65 years) and publication date (>1990) were applied. The review considered all relevant papers published in Latin text. It included experimental, quasi-experimental, cohort, case control, controlled and uncontrolled observational studies. Systematic reviews, clinical guidance, and general commentaries/discussion papers were excluded. Studies reporting outcomes for service users with a primary diagnosis of dementia, learning disability, personality disorder, substance misuse, eating disorder or physical disability were excluded. Studies that included a sample with fewer than 50% of participants with a mental health problem were also excluded.

Searches were carried out between January 1, 2015 and January 23, 2015. After review and exclusion procedures, data were extracted from 101 articles. Quality was assessed using the Quality Assessment Tool for Quantitative Studies. We intended to compare outcomes for different types of supported accommodation service but variation in terminology and service description made this unfeasible. The strongest evidence was for 'Housing First', a form of outreach support for homeless mentally ill populations where improvements in housing stability have been consistently demonstrated. However, the evidence in relation to symptoms, quality of life and social functioning for this model was less robust. The evidence for other forms of supported accommodation provided to non-homeless populations was of poorer quality but some studies suggested positive associations with reduced hospitalisation and improved social functioning. There was inconsistent evidence about the impact on symptoms and quality of life.

#### **Added value of this study**

We provide the first detailed description of specialist supported accommodation services in England. Service costs were positively associated with the amount of support provided. After adjusting for differences in service and service user characteristics, we found that quality of life was similar for users of residential care and supported housing services but supported housing was associated with greater autonomy. However, tenants of more independent accommodation (supported housing and floating outreach) were more likely to be victims of crime. Although our data are from England, these findings are relevant in any country with specialist mental health supported accommodation services.

#### **Implications of available evidence**

The evidence for different forms of mental health supported accommodation is limited and inconsistent. Whilst there are obvious benefits in supporting individuals to achieve maximum independence through graduated supported accommodation pathways and outreach models, this has to be balanced against the risks associated with achieving greater autonomy and not be driven by the costs of care.

**Contributors**

HK, SP, MK, SE, PMcC, MA, SC, GL and GS conceived and designed the study. SD, IH, JK, PMcP and SS collected and collated the data which were analysed by SB with supervision from SE. PMcC carried out the health economic analysis. All authors were involved in the interpretation of the data. HK drafted the article which was reviewed and revised by all authors. All authors approved the final version of the manuscript and agreed their accountability in ensuring that any questions related to the accuracy or integrity of any part of the work were appropriately investigated and resolved.

**Declaration of interests**

HK, SP, MK, SE, PMcC, MA, SC, GL and GS report a grant from National Institute of Health Research during the conduct of the study. SB, SD, IH, JK, PMcP and SS report having no conflicts to disclose.

**Acknowledgements**

We thank our funders (National Institute of Health Research), the fund holders (Camden and Islington NHS Foundation Trust), members of our service user reference group (Katherine Barrett, James Bennett and Gavin McCabe) and the participants at each site for their support.

## References

1. Joint Commissioning Panel for Mental Health. *Practical Mental Health Commissioning (Vol 2). Guidance for commissioners of rehabilitation services for people with complex mental health needs*. JCP-MH; London: 2012
2. Wykes T, Dunn G. Cognitive deficit and the prediction of rehabilitation success in a chronic psychiatric group. *Psychol Med*. 1992; 22: 389-398.
3. Wykes T, Katz R, Sturt E, Hemsley D. Abnormalities of response processing in a chronic psychiatric group. A possible predictor of failure in rehabilitation programmes? *Brit J Psychiat*. 1992; 160: 244-252.
4. Green MF. What are the functional consequences of neurocognitive deficits in schizophrenia? *Am J Psychiat*. 1996; 153: 321-330.
5. National Statistics. *Community Care Statistics 2006. Supported Residents (Adults), England*. The Information Centre, Part of the Government Statistical Service; London: 2006. ISBN: 1-84636-082-2
6. Department of Communities and Local Government. *Research into the effectiveness of floating support services for the Supporting People programme. Final Report*. Communities and Local Government; London, 2006.
7. Mental Health Strategies. *The 2009/10 National Survey of Investment in Mental Health Services*. Department of Health; London: 2010.
8. Priebe S, Saidi M, Want A, Mangalore R, Knapp M. Housing services for people with mental disorders in England: patient characteristics, care provision and costs. *Soc Psych Psych Epid*. 2009; 44: 805-814.
9. Chilvers R, Macdonald GM, Hayes A. Supportive housing for people with severe mental disorders. *Cochrane Database of Systematic Reviews*. 2006; 4:CD000453. doi:10.1002/14651858.CD000453.pub2.
10. Fakhoury W, Murrey A, Shepherd G, Priebe, S. Research in SH. *Soc Psych Psych Epid*. 2002; 37: 301-15.
11. Priebe S, Saidi M, Kennedy J, Glover G. How to select representative geographical areas in mental health service research: A method to combine different selection criteria. *Soc Psych Psych Epid*, 2008; 43: 1004-1007.



12. Killaspy H, White S, Wright C, Taylor T, Turton P, Schutwohl M. et al. Development of the quality indicator for rehabilitative care: a measure of best practice for facilities for people with longer term mental health problems. *BMC Psychiatry*. 2011; 11: 35.
13. Killaspy H, White S, Wright C, Taylor T, Turton P, Kallert T, et al. Quality of longer term mental health facilities in Europe: validation of the quality indicator for rehabilitative care against service users' views. *PLoS One*. 2012; 7: e38070
14. Killaspy H, White S, Dowling S, Krotofil J, McPherson P, Sandhu S et al. Adaptation of the Quality Indicator for Rehabilitative Care (QuIRC) for use in mental health supported accommodation services (QuIRC-SA). *BMC Psychiatry*, 2016; 16:101.
15. Leff J, Szmidla A. Evaluation of a special rehabilitation programme for patients who are difficult to place. *Soc Psych Psych Epid*. 2002; 37: 532-536.
16. Slade M, Thornicroft G, Loftus L, Phelan M. The Camberwell Assessment of Need (CAN). Royal College of Psychiatrists, Gaskell, London: 1999.
17. Drake RE, Mueser KT, McHugo GJ. Clinician rating scales: Alcohol Use Scale (AUS), Drug Use Scale, (DUS) and Substance Abuse Treatment Scale (SATS). In LI Sederer & B Dickey (eds). Outcomes assessment in clinical practice. Baltimore; Williams & Wilkins: 1996.
18. Parker G, Rosen A, Emdur N, Hazipavlov D. The Life Skills Profile: Psychometric properties of a measure assessing function and disability in schizophrenia. *Acta Psychiat Scand*. 1991; 83: 145-152.
19. Priebe S, Huxley P, Knight S, Evans S. Application and results of the Manchester Short Assessment of Quality if Life (MANSA). *Int J Soc Psychiat*. 1999; 45: 7-12.
20. Hatton C, Emerson E, Robertson J, Gregory N, Kessissoglou, S, Walsh PN. The Resident Choice Scale: a measure to assess opportunities for self-determination in residential settings. *J Intell Disabil Res*. 2004; 48: 103-113
21. Priebe S, Gruyters T. Patients' and caregivers' initial assessments of treatment predicting hospitalisation, *Schizophrenia Bull*. 1995; 21: 87-94.
22. Sandhu S, Killaspy H, Krotofil J, McPherson P, Harrison I, Dowling S et al. Development and psychometric properties of the Client's Assessment of Treatment Scale for Supported Accommodation (CAT-SA). *BMC Psychiatry*, 2016, 16: 43.
23. Priebe S, Watzke S, Hansson L, Burns T. Objective social outcomes index (SIX): a method to summarise objective indicators of social outcomes in mental health care. *Acta Psychiat Scand*. 2008; 118(1): 57-63.

24. Beecham J, Knapp M. Costing psychiatric interventions, in *Measuring Mental Health Needs*, 2nd ed. Edited by Thornicroft, G. Gaskell; London: 2001
25. StataCorp. *Stata Statistical Software: Release 12*. StataCorp LP; College Station, Texas: 2011.
26. Harrell FE. *Regression modelling strategies: with applications to linear models, logistic regression, and survival analysis (Ch.4)*, Springer-Verlag; New York: 2001.
27. Curtis L. *Unit Costs of Health and Social Care 2013*. Personal Social Services Research Unit; Canterbury: 2013
28. Killaspy H, Marston L, Green N, Harrison I, Lean M, Holloway F et al. Clinical outcomes and costs for people with complex psychosis; a naturalistic prospective cohort study of mental health rehabilitation service users in England. *BMC Psychiatry*. 2016; 16:95
29. Siegel, C, Samuels J, Tang D, Berg I, Jones K, Hopper K. Tenant Outcomes in SH and Community Residences in New York City. *Psychiat Serv*. 2006; 57 (7): 982-991.
30. Aubry, T, Goering, P, Veldhuizen, S, Adair, CE, Bourque, J, Distasio, J et al. A multiple-city RCT of Housing First with Assertive Community Treatment for homeless Canadians with serious mental illness. *Psychiat Serv*. 2016; 67: 275-281.

**Table 1. Characteristics of services by service type**

	<b>Residential care</b> n (%) unless otherwise stated <b>N=22</b>	<b>Supported housing</b> n (%) unless otherwise stated <b>N=35</b>	<b>Floating outreach</b> n (%) unless otherwise stated <b>N=30</b>	<b>Total</b> n (%) unless otherwise stated <b>N=87</b>
<b>Median (IQR) places/service</b>	18.5 (12.0-22.0)	12.0 (8.0-15.0)	30.0 (15.0, 43.0)	15.0 (10.0-24.0)
<b>Median (IQR) % places occupied/service</b>	90.5 (67.0-100.0)	100.0 (92.0-100.0)	100.0 (97.0-100.0)	100.0 (88.0-100.0)
<b>Median (IQR) expected length of stay (yrs)</b>	5.0 (2.3-15.0)	2.0 (2.0-4.0)	2.0 (1.5-2.5)	2.0 (2.0-4.0)
<b>Median (IQR) annual budget (£1000s)</b>	457 (343-480) n=5	298 (216-320) n=5	175 (48-284) n=19	216 (87-320) n=29
<b>Median (IQR) weekly cost per place (£s)</b>	581 (375-850) n=20	261 (173-384) n=19	66 (46-136) n=11	345 (160-560) n=50
<b>Processes used to assess new referrals</b>				
Referral form	20 (91%)	35 (100%)	27 (90%)	82 (94%)
Summaries/reports	16 (73%)	29 (83%)	26 (87%)	71 (82%)
Risk assessment	16 (73%)	29 (83%)	26 (87%)	71 (82%)
CPA care plans	22 (100%)	31 (89%)	26 (87%)	79 (91%)
Face to face interview	22 (100%)	35 (100%)	30 (100%)	87 (100%)
Trial period	21 (95%)	18 (51%)	3 (10%)	42 (48%)
<b>Use standardised tools to monitor service user progress</b>	13 (59%)	32 (91%)	29 (97%)	74 (85%)
<b>Service has input from community mental health team (CMHT)</b>	21 (95%)	35 (100%)	25 (83%)	81 (93%)
<b>Service has input from community mental health rehabilitation team</b>	14 (64%)	25 (71%)	18 (60%)	57 (66%)
<b>Median (IQR) CMHT/rehabilitation team visits last 3 months</b>	24.0 (15.0-30.0)	12.0 (5.0-20.0)	10.0 (2.0-60.0)	15.0 (6.0-30.0)
<b>Median (IQR) % service users subject to CPA</b>	100.0 (87.5-100.0)	100.0 (50.0, 100.0)	37.0 (21.1, 75.0)	87.5 (40.0, 100.0)
<b>Mean (SD) % QuIRC domain scores</b>				
<i>Living Environment</i>	78.3 (10.0)	83.0 (7.2)	n/a	81.2 (8.7)
<i>Therapeutic Environment</i>	58.1 (7.8)	65.4 (5.4)	59.2 (5.6)	61.4 (6.9)
<i>Treatments &amp; Interventions</i>	54.1 (6.8)	58.9 (7.1)	48.8 (6.9)	54.2 (8.1)
<i>Self-Management &amp; Autonomy</i>	64.6 (8.7)	71.7 (5.6)	66.2 (4.7)	68.0 (6.9)
<i>Social Interface</i>	54.1 (8.9)	68.2 (10.4)	51.7 (8.4)	58.9 (12.1)
<i>Human Rights</i>	79.5 (7.8)	85.9 (5.3)	89.6 (4.5)	85.5 (6.9)
<i>Recovery-Based Practice</i>	63.4 (11.8)	75.5 (7.2)	66.2 (6.7)	69.2 (9.9)

**Table 2. Service user characteristics**

	<b>Residential care N=159</b>	<b>Supported housing N=251</b>	<b>Floating outreach N=209</b>	<b>Total N=619</b>
<b>Mean (SD) age in years</b>	55.0 (12.5)	40.6 (12.3)	45.7 (12.2)	46.0 (13.5)
<b>Male</b>	109 (69%)	167 (67%)	134 (64%)	410 (66%)
<b>Ethnicity - white</b>	135 (85%)	185 (74%)	179 (86%)	499 (81%)
<b>Never married/cohabited</b>	97 (61%)	195 (78%)	114 (55%)	406 (66%)
<b>Current employment</b>				
paid employment	2 (1%)	7 (3%)	7 (3%)	16 (3%)
training/education/voluntary work	0	5 (2%)	18 (9%)	23 (4%)
unemployed	115 (72%)	233 (93%)	161 (77%)	509 (82%)
retired	42 (26%)	6 (2%)	23 (11%)	71 (11%)
<b>Immediate previous accommodation</b>				
independent accommodation	49 (31%)	81 (32%)	132 (63%)	262 (42%)
supported housing	22 (14%)	84 (33%)	62 (30%)	168 (27%)
residential care home	39 (25%)	14 (6%)	8 (4%)	61 (10%)
hospital	45 (28%)	63 (25%)	3 (1%)	111 (18%)
no fixed abode	4 (3%)	9 (4%)	4 (2%)	17 (3%)
<b>Primary diagnosis</b>				
schizophrenia	102 (65%)	140 (56%)	82 (39%)	324 (53%)
schizoaffective disorder	11 (7%)	31 (12%)	15 (7%)	57 (9%)
bipolar affective disorder	17 (11%)	10 (4%)	12 (6%)	39 (6%)
depression/anxiety	16 (10%)	39 (16%)	75 (36%)	130 (21%)
other	12 (8%)	31 (13%)	24 (11%)	66 (11%)
<b>Problematic alcohol use</b>	19 (12%)	44 (18%)	33 (16%)	96 (16%)
<b>Problematic substance use</b>	9 (6%)	48 (19%)	19 (9%)	76 (12%)
<b>Median (IQR) years contact with mental health services</b>	23.5 (15.0-33.0)	11.0 (5.0-20.0)	16.0 (8.0-23.0)	15.0 (8.0-24.0)
<b>Median (IQR) previous admissions</b>	2.0 (1.0-5.0)	2.0 (1.0-5.0)	1.5 (0.0-4.0)	2.0 (1.0-4.0)
<b>Currently subject to Community Order</b>	24 (16%)	22 (9%)	6 (3%)	52 (8%)
<b>Previously been admitted to secure unit?</b>	39 (25%)	27 (11%)	30 (14%)	96 (16%)
<b>Ever committed an act of violence?</b>				
Yes, >2 years ago	54 (34%)	72 (29%)	55 (26%)	181 (29%)
Yes, within last 2 years	11 (7%)	39 (16%)	11 (5%)	61 (10%)
<b>Seriousness of violence in last 2 years</b>				
Victim did not need hospital treatment	9/11 (82%)	28/39 (93%)	10/11 (91%)	55/61 (90%)
<b>Self-harmed in last 2 years?</b>	6 (4%)	65 (26%)	41 (21%)	112 (19%)
<b>Seriousness of self-harm in last 2 years</b>				
Required inpatient medical treatment	3/6 (50%)	23/65 (35%)	14/41 (34%)	40/112 (36%)
<b>Serious self-neglect in last 2 years?</b>	113 (72%)	132 (53%)	103 (50%)	348 (57%)
<b>Seriously exploited in last 2 years?</b>	64 (41%)	91 (37%)	74 (36%)	229 (37%)
<b>Any serious risk to self or others past 2 years</b>	123 (78%)	175 (70%)	138 (67%)	436 (71%)
<b>Victim of crime last 12 months?</b>	12 (8%)	62 (25%)	46 (22%)	120 (19%)
<b>Victim of physical violence last 12 months?</b>	7/12 (58%)	35/62 (56%)	25/46 (54%)	67/120 (56%)

**Table 2. Service user characteristics (cont.)**

	<b>Residential Care N=159</b>	<b>Supported Housing N=251</b>	<b>Floating Outreach N=209</b>	<b>Total N=619</b>
<b>Median (IQR) challenging behaviours (Special Problems Rating Scale)</b>	0.0 (0.0, 1.0)	0.0 (0.0, 2.0)	0.0 (0.0, 2.0)	0.0 (0.0, 2.0)
<b>Median (IQR) total needs (Camberwell Assessment of Needs Short Appraisal Scale)</b>	12.0 (8.0-14.0)	5.0 (3.0-8.0)	9.0 (6.0-11.0)	8.0 (4.0-12.0)
<b>Median (IQR) unmet needs (Camberwell Assessment of Needs Short Appraisal Scale)</b>	0.0 (0.0-2.0)	1.0 (0.0-2.0)	1.0 (0.0-3.0)	1.0 (0.0-2.0)
<b>Median (IQR) social function (Life Skills Profile)</b>	127.0 (113.0-135.0)	135.0 (122.0-143.0)	128.0 (117.0-138.0)	129.0 (118.0-140.0)
<b>Median (IQR) quality of life (Manchester Short Assessment of Quality of Life)</b>	4.9 (4.6, 5.4)	4.8 (4.3, 5.2)	4.2 (3.6, 4.9)	4.7 (4.1, 5.1)
<b>Median (IQR) social inclusion (SIX)</b>	1.0 (0.0-1.0)	1.0 (1.0-2.0)	4.0 (3.0-4.0)	2.0 (1.0-3.0)
<b>Median (IQR) autonomy (Resident Choice Scale)</b>	3.2 (3.0-3.5)	3.5 (3.3-3.6)	3.5 (3.2-3.6)	3.4 (3.2-3.6)
<b>Median (IQR) satisfaction with support (Client Assessment of Treatment - Supported Accommodation version)</b>	8.1 (6.7-9.3)	8.1 (6.9-9.3)	8.6 (7.0-9.6)	8.3 (6.9-9.4)

**Table 3. Quality of life, autonomy and satisfaction with care: effect of service type**

[adjusted ICC for MANSA < 0.001, RCS = 0.111, CAT-SA <0.001]

Type of service	Quality of Life (MANSA) N = 617			Autonomy (RCS) N = 618			Satisfaction with Support (CAT-SA) N= 595		
	mean diff.	95% CI	P-value	mean diff.	95% CI	P-value	mean diff.	95% CI	P-value
<i>Unadjusted</i>									
SH vs. RC	-0.274	(-0.493 to -0.055)	<b>0.014</b>	0.260	(0.159 to 0.360)	<b>&lt; 0.001</b>	-0.060	(-0.473 to 0.353)	0.775
FO vs. RC	-0.722	(-0.933 to -0.511)	<b>&lt; 0.001</b>	0.176	(0.080 to 0.273)	<b>&lt; 0.001</b>	0.302	(-0.096 to 0.700)	0.137
<i>Adjusted*</i>									
SH vs. RC	-0.138	(-0.402 to 0.126)	0.306	0.145	(0.010 to 0.279)	<b>0.035</b>	-0.194	(-0.753 to 0.365)	0.496
FO vs. RC	-0.424	(-0.734 to -0.114)	<b>0.007</b>	0.011	(-0.122 to 0.144)	0.873	-0.095	(-0.705 to 0.516)	0.761

MANSA = Manchester Short Assessment of Quality of Life

RCS = Resident Choice Scale

CAT-SA = Client Assessment of Treatment- Supported Accommodation

RC = residential care

FO = floating outreach

SH = supported housing

\*Model adjusted for i) service characteristics: sampling index; number of places per service; QuIRC-SA domain scores (treatment and interventions, self-management and autonomy, social interface, human rights and recovery based practice); ii) service user characteristics: age (years); gender; ethnicity (white vs non-white); diagnosis (psychosis vs non-psychosis); social function (LSP score); challenging behaviours (SPRS score); unmet needs (CANSAS); problematic drug use; problematic alcohol use; any risk to self/others last 2 years.

NB - each model includes fixed effects for Local Authority area and a random effect for service

**Table 4. Mean (SD) contacts with specific services (those using these services only)**

Service	RC		SH		FO	
	Mean	(SD)	Mean	(SD)	Mean	(SD)
Care co-ordinator	3.3	2.7	4.8	3.9	4.5	4.3
Psychiatrist	1.3	0.7	1.5	1.4	1.5	1.4
Other doctor	2.6	2.3	3.0	3.3	3.2	2.5
Nurse	20.2	32.4	8.5	9.3	3.5	2.2
Psychologist	3.3	4.0	5.2	4.5	5.3	4.4
Occupational therapist	4.0	-	4.0	3.1	3.2	3.6
Social worker	3.3	6.0	1.6	0.8	4.8	5.2
Counsellor	3.5	3.5	7.2	5.3	4.9	3.7
Arts therapist	6.8	2.3	8.5	8.5	12.0	0.0
Face-to-face	24.4	31.5	15.8	15.6	17.6	16.4
Group sessions	4.7	4.6	5.9	6.5	5.0	5.3
Personal care	57.0	33.1	24.9	30.4	-	-
Inpatient days for physical health	11.9	17.9	9.2	12.4	11.0	21.0
Inpatient days for mental health	133.8	106.2	75.5	91.1	63.8	74.3

**Table 5. Mean (SD) cost of specific services per service user last 12 months (2013/14 £s)**

Service	RC		SH		FO	
	Mean	(SD)	Mean	(SD)	Mean	(SD)
Care co-ordinator	82	103	145	151	77	139
Psychiatrist	68	90	85	135	53	117
Other doctor	89	122	91	147	111	145
Nurse	54	340	32	137	15	48
Psychologist	19	142	53	250	73	291
Occupational therapist	1	7	6	26	3	23
Social worker	19	100	3	15	17	82
Counsellor	1	11	7	40	5	28
Arts therapist	36	174	43	306	10	118
Face-to-face	421	962	240	331	575	1123
Group sessions	21	32	30	47	3	26
Personal care	271	727	23	213	0	0
Total cost of services used (except inpatient care) last 3 months	1059	1525	744	692	942	1186
Inpatient for physical health	1221	5073	515	2702	1010	5333
Inpatient for mental health	5288	19188	6321	19145	2024	9970
Total cost of inpatient care last 12 months	6509	19783	6836	19172	3034	12568
<b>Total cost of all services last 12 months</b>	<b>10829</b>	<b>20669</b>	<b>10105</b>	<b>20054</b>	<b>6831</b>	<b>13823</b>