# Evaluation of the Drugs and Alcohol Recovery Payment by Results Pilot Programme
# Final Report


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## Preface

The Drugs and Alcohol Recovery Payment by Results Evaluation was a project commissioned by the National Institute of Health Research (NIHR), Policy Research Programme, which commenced in October 2011. We have sought to provide an integrated overview of this multi-strand project, each of which is led by different partners within the consortium. Findings in this report from the process evaluation have been subject to RAND Europe's interim quality assurance review. The report was completed in September 2015 and is based on data collected up to March 2014.


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### Disclaimer


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# Executive Summary

In April 2012, eight commissioning areas initiated a pilot scheme whereby a proportion of provider payments were linked to achievement of specified outcomes representing recovery from problems relating to drugs and alcohol misuse by service users. The purpose of the Payment by Results Pilots was to both develop and test this new approach to the commissioning and delivery of drugs and alcohol services. This report describes an evaluation of the scheme. The main findings are summarised, below.

**Co-design phase**

The co-design process was intended to support the PbR pilot areas for a six-month period in developing outcome domains and providing advice on cross-cutting issues. Stakeholders reported that the co-design phase was:

- Helpful in agreeing and defining the treatment outcomes that were sought and in establishing how these could best be measured
- Helpful in devising a system of incentives to encourage progress towards achieving these outcomes
- Resource-intensive and undertaken within a relatively short timeframe

**Funding Models**

- The funding models adopted by individual pilot sites varied markedly, in terms of
    - the proportion of the total contract value subject to PbR
    - the number of providers commissioned to deliver services
- Stakeholders credited these with incentivising those outcomes of greatest priority and relevance and improving joint working
- Stakeholders criticised these for
    - inherent uncertainty
    - difficulty in forecasting and planning operations
    - being risky, deterring some providers from entering the market
    - possibly stifling the innovation of existing services

**Local Area Single Assessment and Referral System (LASARS)**

The Local Area Single Assessment and Referral System (LASARS) was introduced within the PbR pilots with the aim of establishing independent assessment of all service users in treatment and new users referred to the treatment system and for setting payment tariffs for them.

- Approaches to LASAR operations varied across the eight sites and included
    - Fully independent services
    - Services operated by dedicated staff but within provider settings
    - Services operated by dedicated staff but managed by DAT

- In some cases LASARS were perceived as having contributed towards greater integration of treatment services and improved data collection
- In some cases LASARS were perceived as having restricted providers' ability to establish relationships with service users
- LASARS were broadly perceived as having prolonged the time it took service users to access treatment
- Duplication of work between LASARS and treatment providers was reported

**Impact of the introduction of PbR in the pilot sites**

Taking all sites together, compared to non-pilot sites, the performance of the pilot sites was:

- Worse in relation to the proportion of primary drug clients who were assessed but failed to start treatment (but better for primary alcohol clients)
- Worse in relation to the proportion of primary drug clients who waited over three weeks to start treatment (but better for primary alcohol clients)
- Worse in relation to the proportion of clients (both primary drug and primary alcohol) who successfully completed treatment (including completion without subsequent re-presentation to treatment)
- Worse in relation to the proportion of clients (both primary drug and alcohol) with an unplanned discharge from treatment
- Better in relation to the proportion of primary drug clients who reported becoming abstinent whilst in treatment
- Better in relation to the proportion of primary drug clients who injected whilst in treatment
- Better in relation to the proportion of those primary drug clients who had successfully completed treatment who did not subsequently re-present for treatment
- Better in relation to the proportion of primary drug clients who were recorded as committing acquisitive offences
- Treatment costs per client increased significantly in pilot compared to non-pilot sites
- Hospital admissions for substance-related behavioural problems increased in the pilot areas
- There was a decrease in the estimated costs associated with A&E attendances for poisonings

**Experiences of implementing and delivering a recovery-orientated treatment system under PbR**

- PbR was broadly acknowledged as having provided a clear framework for implementing a recovery-orientated treatment system
- The majority of sites reported, however, that focus on recovery pre-dated the introduction of PbR
- The increased recovery focus led to some services developing new approaches and improving areas of service delivery
- Greater emphasis was placed on reduction in prescription levels for opiate substitution, for both new and on-going service users
- This was often coupled with a desire to deliver more psychosocial support and holistic interventions, to encompass wider health and well-being needs
- Concerns were expressed about the potential for conflict between service users' treatment goals focus and the focus on abstinence and non-re-presentation as outcomes

- All sites were offering a greater range of services than before the introduction of the pilot
- Alcohol treatment stood out as an area of considerable change relative to pre-pilot provision

**Stakeholder Perceptions of Intended and unintended consequences of PbR**

Stakeholders reported that:

- Treatment throughputs increased following the implementation of PbR. This was partially substantiated in the quantitative analysis, but only for primary alcohol clients
- Collaboration between providers improved during the piloting process
- Challenges were associated with bringing general practitioners into the new PbR model of commissioning
- The impact of austerity measures and structural change to public health and criminal justice systems were underestimated
- The scale of administration, bureaucracy and related costs associated were underestimated
- Limited time to prepare for PbR had unintended, negative downstream consequences

**Exit strategies for the eight sites after the pilot programme**

- For practitioners the experience of the pilot had generally resulted in a preference not to take forward PbR
- Commissioners were more likely to express a desire to continue with the PbR approach, subject to adaptations
- All but one area stated an intention to continue using PbR as a feature of their local commissioning arrangements
- None were to continue using offending as a PbR outcome domain
- Only one area was to continue with a 100 per cent PbR funding model
- There was an intention to be more selective around measures to be incentivised, with a greater emphasis on process measures
- Re-presentations would be measured over six rather than twelve months
- The importance of effective joint working and communication between providers and commissioners was identified as being essential to delivering successful outcomes in any type of arrangement

# Introduction

In April 2011, the Department of Health (DH) announced that eight local areas had been selected to pilot a new approach to commissioning and delivering drug and alcohol misuse treatment. Under these 'payment by results drug and alcohol recovery pilots', a proportion of provider payments were linked to achievement of specified outcomes representing recovery from problems relating to drugs and alcohol misuse by service users. The pilots started in April 2012. The purpose of the PbR Pilots was to both develop and test out this new approach to the commissioning and delivery of drugs and alcohol services.

Alongside the pilots programme, the DH, in partnership with other government departments, commissioned an independent evaluation. This evaluation supports future policy-making by providing a rigorous and independent, formative and summative, evaluation of the pilots programme. The aims of the evaluation were to: robustly assess the effectiveness of the PbR pilots on the provision of treatment; undertake an economic evaluation of the PbR pilots programme; and disseminate lessons for ensuring the quality, effectiveness and efficiency of Drug and Alcohol Recovery PbR models in the future. To meet these aims, the evaluation included process, impact and economic components which were carried out in all eight pilot sites. The evaluation involved undertaking in-depth interviews with a range of stakeholders, and analysis of administrative data on costs, outcomes and impact.

The reporting arrangements for the evaluation included publication of a comprehensive Scoping and Feasibility Report in November 2012, which refined the scope of the evaluation and listed the extended set of agreed research questions to be addressed. They also included requirements for annual interim reports, which have been summarised on the project website.[1]

The project involved 201 interviews with 356 stakeholders involved in the development, implementation, delivery and receipt of treatment services under the drug and alcohol recovery payment by results (PbR) pilots. The interviewees included policy stakeholders (e.g. from the Department of Health, Ministry of Justice), commissioners, senior managers, service managers, practitioners, carers and services users from across the eight pilot sites. All interviews were conducted between April 2012 and October 2013 to capture views and experiences at different stages of the pilot programme. The findings were also triangulated with data collated and published by the Department of Health (DH) during the course of the piloting process (e.g. monthly, followed by quarterly, update reports provided by the pilot sites to the DH) and on data by the National Drug Treatment Monitoring System (NDTMS).

We estimated the impact of the pilot programme using a difference-in-differences methodology. Treatment outcomes were measured by comparing results for the two years prior to implementation (1st April 2010 to 31st March 2012) with the two years post-commencement of PbR piloting (1st April 2012 to 31st March 2014). Data were analysed separately for those presenting with primary drug problems and primary alcohol problems. The primary drug dataset also included information from the Treatment Outcome Profile (TOP) form recorded on initiation to treatment, at set review points and at treatment exit. Analyses of TOP data were restricted to drug cases since these were inconsistently returned for primary alcohol clients over the four-year period examined.

[1] http://www.population-health.manchester.ac.uk/epidemiology/NDEC/research/PbR/

The findings from this independent research have been structured according to the following substantive issues, which are aligned to the main research questions set for the evaluation. This includes a critical assessment of the:

- co-design phase;
- funding models developed;
- Local Area Single Assessment and Referral System (LASARS);
- experiences of implementing and delivering a recovery-orientated treatment system under PbR;
- impact of the introduction of PbR in the pilot sites;
- stakeholder perceptions of intended and unintended consequences of PbR; and
- exit strategies for the eight sites after the pilot programme

# Context and Literature

This chapter focuses on the background and policy context to the Drug and Alcohol Recovery Pilots in two sections. The first section reviews the relevant policy background to the development of the PbR pilots. This background includes the recovery focus in the 2010 Drug Strategy as well as the encouragement of locally-driven and outcome-focused approaches to commissioning public services.

The second section summarises findings from a Rapid Evidence Assessment (REA) of the literature on Payment by Results (PbR), conducted in 2012, with the aim of describing the contexts in which PbR was piloted and the evidence base available at that time. This section also reviews evidence available at the time as to the potential effects and impacts of PbR, and identifies any critiques of PbR by researchers and others working in relevant fields.

The research team note that further evidence has been published on the use of PbR since this review was conducted. However, despite some new publications, the conclusions from this evidence review regarding the effectiveness and critiques of the use of PbR remain accurate at the time of publication of this report in 2017.

**The recovery agenda**

The 2010 Drug Strategy aimed to change the way in which treatment for drug and alcohol misuse is delivered. Whilst the previous Drug Strategy included a stated intention for 'drug users to achieve abstinence from their drug … of dependency' (HM Government, 2008, p. 28; National Treatment Agency for Substance Misuse, 2010, p. 5), the 2010 Strategy claimed that the emphasis had been on harm reduction,[2] encouraging individuals to enter and stay in treatment. In particular, the 2010 Strategy acknowledged that substitute prescribing continues to have a role to play in the treatment of heroin dependence, both in stabilising drug use and supporting detoxification, but aimed to ensure that all those on a substitute prescription engage in recovery activities:

> *"We will create a recovery system that focuses not only on getting people into treatment and meeting process-driven targets, but getting them into full recovery and off drugs and alcohol for good. It is only through this permanent change that individuals will cease offending, stop harming themselves and their communities and successfully contribute to society"* (HM Government, 2010b, p. 18)

Of course, substitute prescribing and the goal of drug recovery are not mutually exclusive, but the relative focus on these goals has differed between Strategies. [3]

> *"We need to ensure OST is the best platform it can be, but focus equally on the quality, range and purposeful management of the broader care and support it sits within."* (NTA, 2012b)

[2] Harm reduction typically refers to interventions, programmes and policies that aim to 'reduce the health, social and economic harms of drug use to individuals, communities and societies' EMCDDA (2010).

[3]. For a discussion of the role of OST in recovery journeys and recent findings of the Recovery Orientated Drug Treatment Expert Group, chaired by John Strang, see National Treatment Agency for Substance Misuse. (2012).

'Recovery' and 'recovery capital' (Dennis, Foss, & Scott, 2007) are not new terms to the drugs and alcohol field. Whilst there remains some divergence of views about what exactly recovery entails and how it is measured (Daddow & Broom, 2010), the term is intended to represent a holistic approach to improving outcomes for those who go through treatment (Wise, 2010), typically including:

- A focus on the individual drug user, their family and community
- Meeting needs for housing, education, training and employment
- Support from peers and family
- Addressing labelling and stigmatisation (UKDPC, 2008)

A recovery focus was, therefore, part of the contemporary drug policy landscape in England and Wales. As far as possible, the evaluation of the PbR Pilots aimed to investigate the effect of the financial incentives provided by PbR, as compared to an outcomes-focused commissioning approach without financial incentives.

**Localism**

The PbR Pilots were part of the localism agenda, the 'key principles' of which were:

> *"To free up local authorities to enable them to be innovative in the delivery of services, rather than merely seeking to raise performance against centrally established criteria to achieve good inspection results. Local authorities will have the freedom to deliver services in ways that meet local needs, and will be accountable for those services to their electorates. These principles are key elements of localism"* (Department for Communities and Local Government, 2011, p. 7).

The Coalition Agreement set out a commitment to 'promote decentralisation', moving power from central government to 'local councils, communities, neighbourhoods and individuals' (HM Government, 2010a, p. 11). There followed a Localism Bill and similar commitments to decentralisation in the Open Public Services White Paper (HM Government, 2011, p. 11) and the 2010 Ministry of Justice White Paper, which noted a desire to 'free local managers, professionals and volunteers from central control' (Ministry of Justice, 2010, p. 5). A number of policy announcements - abolishing the Audit Commission, the introduction of GP (General Practitioner) commissioning, and proposals to replace police authorities with directly elected Police and Crime Commissioners (PCCs) – were all policies with stated aims of handing power to local-level decision makers (Lowndes & Pratchett, 2011).

Drug policy also had features of 'localism'. The Home Secretary's introduction to the 2010 Drug Strategy stated that it 'sets out a shift in power to local areas' (HM Government, 2010b, p. 2). Of course, commitments to devolve power locally were not necessarily new or exclusive to the 2010 Strategy. For example, the 2008 Drug Strategy stated that 'local areas will have more flexibility to determine their response to the drugs which are causing the greatest harm to their communities' (HM Government, 2008, p. 12).

The PbR Pilots 'fit' with localism to the extent that treatment services were commissioned locally, Drug (and Alcohol) Action Teams or local authorities selected the providers, and areas were accountable for delivery. At the same time, outcome measures for the pilots as well as the development of the models used by local pilot areas, were devised through a 'co-design' process, involving both government and local stakeholders. The process evaluation of the PbR pilots

investigated the balance of local and central leadership (and the impact of this balance) in the design and development of the pilots and, as relevant, in their implementation.

**Payment-for-performance in health care: international evidence**

One mechanism adopted in health and social care systems in which there is a separation of the purchaser and provider roles is the linkage of payment to aspects of performance. This mechanism is known by several labels including payment-for-performance (P4P) and payment by results (PbR). Under such systems providers are reimbursed on a conditional basis, usually based on their achievement of specific scores on process targets or outcome measures. The particular objectives and tariff structure has varied between schemes but generally schemes have conformed to the above definition. Such an approach has been identified as a means by which the purchaser can create conditions whereby the provider may not behave as though there is an absence of competition by explicitly linking payment to achievement of given targets (Cabinet Office, 2011)

The international evidence base in relation to P4P is mixed and inconclusive. Evidence from the United States and UK suggests that P4P improves particular process aspects of chronic disease management (Rosenthal et al. 2006; Doran et al. 2006), but these effects are often short-term only (Christianson et al. 2008; Campbell et al. 2008). Flodgren et al (2011) conducted a Cochrane review of the effects of P4P in health care, finding four previous literature reviews relating to 32 studies. Their review indicated that financial incentives may be an effective instrument for changing the behaviour of health care providers, but that the current evidence base is methodologically weak and limited in its generalisability and completeness. In general, studies have examined the impact of P4P on process measures of clinical quality and not the impact on health outcomes. An earlier systematic review, which included a wider range of studies, concluded that evaluations showed the full spectrum of possible effects, with the effects depending on design choices and the context in which P4P was introduced (van Herck et al, 2010).

The largest payment-for-performance scheme implemented in the UK was the Quality and Outcomes Framework (QOF), which was introduced for general practices in 2004. The QOF rewarded providers of primary care services for achievement on a large number of evidence-based quality indicators, particularly emphasising the management of common cardiovascular conditions. The introduction of this P4P scheme was intended to encourage: (i) greater plurality of provision of primary care services; (ii) greater access to care and patient choice; (iii) more flexible contractual arrangements; and (iv) increased focus on paying for 'performance' (Department of Health, 2000). There is a large volume of papers that have considered the effects of the QOF, with modest effects shown on the process aspects of quality that were incentivised and uncertain effects on costs, professional behaviour and patient experience (Gillam et al, 2012). The key lesson from this evidence base is that attribution is troublesome – a problem exacerbated by the lack of control sites as the QOF was adopted universally by all general practices at the same time.

## "Payment by Results" in the UK: a brief overview

The earliest use of PbR in the UK was by the Department for Work and Pensions in the New Deal initiative (Cumming, 2011), and in subsequent years PbR schemes were introduced in 'welfare to work' policies (Department for Work and Pensions, 2008). Under these arrangements, the Department for Work and Pensions held outcome-based contracts with private and voluntary providers of 'Pathways to Work' programmes. These providers were paid 30% of the contract value on taking on a client, and further payments to the provider are made if clients found and stayed in a job (Hudson et al, 2010).

PbR had also been central to the system through which hospital care, and increasingly other care, was financed in England. This financing system, in place since 2003, was termed 'Payment by Results', and ensured hospitals are paid according to the number and type of patients that they actually treat, rather than through up-front block grants. Below, we provide a simplified account of how this system worked, and identify any potentially relevant lessons for the Drug and Alcohol PbR Pilots.

The PbR system for healthcare was based on assigning each individual patient's stay in hospital into a payment category. This was done through the use of Healthcare Resource Groups (HRGs). These HRGs were groupings of clinically-similar treatments that use common levels of healthcare resources (Audit Commission, 2005; Farrar et al., 2007). Each HRG was assigned a national tariff, which determined the amount that NHS purchasers (currently, Primary Care Trusts) pay for a stay in hospital of a particular type. Hospitals were thus paid for both the volume of work they do and the complexity of the work they did.

The NHS financing system was described as 'payment by results'. However, it did not make payments conditional on achieving particular improvements or specified outcomes. Arguably such a system might be better called 'payment for activity' or 'activity-based financing' to ensure it is distinguished from current understandings of PbR used in the Drug and Alcohol Pilots. Nevertheless, the introduction of this payment system in health represented a departure from previous financing based on block grants, under which providers were paid a fixed amount regardless of activity undertaken or volume of outputs (Marini & Street, 2007).

The HRG-based tariff had some similarities to the 'Complexity Tool' in the Drug and Alcohol PbR Pilots, which assigns a payment tariff to each service user depending on their likelihood of achieving outcomes. Like the HRG-tariff more complex cases are assigned a higher tariff in recognition that their treatment will be more expensive, but the focus is on outcomes rather than costs.

## The aim of introducing payment by results for hospitals

A review of policy documents and academic literature highlighted four main aims of introducing PbR for hospitals:

- **To increase efficiency and volume of activity:** Under PbR providers had incentives to do more work (to increase their income) and reduce costs (to maximise 'profit') from their activity (Street & Maynard, 2007). One way in which they can increased the volume of work they were able to undertake was to reduce the length of individual stays in hospital, to free up capacity and accommodate more patients (Propper, Wilson, & Burgess, 2006).
- **To decrease overnight stays in hospital:** There was a financial incentive to decrease overnight stays. The National Tariff was the same whether or not a patient stays overnight, even though

overnight care is more expensive to deliver. Therefore a provider could make more 'profit' if a patient did not stay overnight (Farrar, et al., 2007; Street & Maynard, 2007).

- **To bring more transparency to the hospital funding system**. Compared to block-grants, the system linked activity to income and expenditure, making it clearer what hospitals were spending (Audit Commission, 2008; Farrar, et al., 2007).
- **To improve quality**. It was expected that PbR, through a nationally-set tariff, would improve quality as a result of competition between NHS providers (Department of Health, 2002). The hope was that in the absence of price competition, revenue would be indirectly linked to quality as hospitals would compete for Primary Care Trust-commissioned services and individual patients, both of which would be chosen in part on the basis of quality.

**Evaluation of the use of PbR for hospitals in England**

We reviewed studies of the implementation and effects of the NHS PbR system[4] in order to identify potentially relevant lessons for the Drug and Alcohol Recovery Pilots. In identifying lessons we note important differences between the incentive structure in NHS PbR and that in the Drug and Alcohol Recovery Pilots: in the NHS, providers are paid a fixed amount regardless of outcome, whereas in the Drug and Alcohol Recovery Pilots at least a proportion of the payments are linked to outcomes.

The 'National Evaluation of Payment by Results' commissioned by the Department of Health (Farrar, et al., 2007) used quantitative and qualitative methods (econometric analysis and semi-structured interviews with key stakeholders in the NHS) to examine the process and impact of PbR implementation.

As regards increasing efficiency in NHS hospitals, the national evaluation found that NHS PbR was associated with a reduction in provider unit costs. Nevertheless, a number of studies warned about the increase in administrative costs due to the recruitment of additional staff for management posts (Brereton & Vasoodaven, 2010; Marini & Street, 2007). Thus one lesson for the Drug and Alcohol Recovery Pilots was the possibility that, while the implementation of new funding mechanisms may encourage some savings, it may also incur other kinds of costs related to administration and data collection. It was therefore important that assessments of the Drug and Alcohol Recovery Pilots attend to the range of possible impacts. One way in which the evaluation intended to do this was to investigate the impact of implementation on the wider landscape of provision in each pilot area.

In terms of reducing overnight stays, PbR in the NHS seemed to have had the desired impact of increasing the proportion of elective spells dealt with as day cases. The national evaluation found evidence that day case rates were increasing more quickly in hospitals where PbR was implemented. This finding seemed to be supported by evidence collected by other studies (Audit Commission, 2008; Brereton & Vasoodaven, 2010). However, the Audit Commission argued that other policies also encouraged such trends, and that, at most, PbR contributed to these developments (Audit Commission, 2008). The national evaluation observed that while there were efficiency gains in the NHS following the introduction of PbR, savings were seen more as a result of already existing incentives (Farrar, et al., 2007). This had an important implication for the evaluation of the Drug and Alcohol Recovery Pilots, as it indicated the importance of isolating the effect of PbR from the effects of service redesign and/or the introduction of new models of drug and alcohol treatment. The

[4] 11 studies into NHS PbR conducted between 2003 and 2010 were identified through the REA.

evaluation sought to investigate whether any change in drug and alcohol treatment outcomes might have been achieved without the PbR incentives.

In relation to quality of care, the studies reviewed agreed on the lack of association between the introduction of NHS PbR and the quality of care (Audit Commission, 2008; Brereton & Vasoodaven, 2010; Farrar, et al., 2007; Farrar et al., 2009). This indicated that there was a reduction in unit costs without any apparent negative impact on the quality of care provided. This was interpreted as an indication that the fixed price system did not compromise the quality of care.

The concern with the emergence of 'gaming' or 'up-coding' phenomena was prevalent in the academic literature on 'payment for activities' in the NHS (Brereton & Vasoodaven, 2010; Farrar et al, 2007; Propper et al, 2006; Rogers et al, 2005; Sussex & Farrar, 2009). This means that there was a concern that the system could induce a re-classification of activities into higher priced HRGs in order to capture higher tariffs. However, the National Evaluation did not reveal any considerable change in the pattern of coding related to PbR. The evaluation of the Drug and Alcohol Recovery Pilots had as one of its key research questions investigating any opportunities for 'gaming' which might compromise the equity of drug and alcohol treatment provision, for example through providers 'cherry picking' service users who are perceived as easier to help and 'parking' or leaving to one side those with more complex needs.

**The growth in Payment by Results since 2010**

More recently, there was a greater interest in developing PbR more widely (NCVYS, 2011a). In December 2010, the Government's Commissioning Green Paper promised to look for "opportunities to expand the use of PbR" (Cabinet Office, 2010), and a similar statement of intention followed in the 2011 Open Public Services White Paper (HM Government, 2011). This called for open commissioning of public services and the implementation of PbR schemes with the aim of spurring innovation. It was thought that PbR could facilitate innovation because service providers would be incentivised to provide the most effective services and given scope to try out new approaches (HM Government, 2011).

The Ministry of Justice was one of the first departments to commit to the implementation of PbR schemes after 2010. The *Breaking the Cycle* Green Paper (Ministry of Justice, 2010) promised to pay providers working in the area of offender management according to the outcomes they delivered. The Competition Strategy for Offender Services (July 2011) envisaged relying on competition principles in commissioning and focusing on outcomes (Ministry of Justice, 2011a). In 2010 the Ministry of Justice launched its first PbR pilot at HMP Peterborough. This pilot was designed to be funded through what was called a Social Impact Bond (SIB), a form of PbR in which private, non-government investors pay for public services. As in other forms of PbR, government only pays if certain outcomes are achieved. However, under SIB rather than service providers funding those services at the outset and until outcomes are achieved, it is private investors who pay for the services up front as an investment. If those services achieve agreed outcomes investors receive a 'return' on their investment which the government then pays (Disley et al, 2011).

This SIB was soon followed by the implementation a Ministry of Justice PbR scheme (but one that was not funded through SIBs) at HMP Doncaster (Ministry of Justice, 2011d) and four pilot Youth Justice Reinvestment Pathfinders programmes. These pathfinder programmes aimed to develop a local approach to PbR which was designed to test the extent to which local partners can work together

more effectively to reduce crime and re-offending (Ministry of Justice, 2011c). Further PbR initiatives were to be implemented in HMP Leeds and HMP and YOI High Down (Ministry of Justice, 2011b). Each of the Ministry of Justice PbR pilots was subject to external evaluation.

Outside the area of criminal justice, the largest (in terms of the number of service users) outcome-based PbR programme introduced since 2010 was DWP's Work Programme, launched in June 2011 (Department for Work and Pensions, 2010). This invited voluntary and private sector organisations to tender to deliver interventions to help people into work. The remit of the Work Programme was broadened in March 2012 to automatically include ex-offenders claiming Jobseeker's Allowance (Department for Work and Pensions, 2012b).

Other recent and on-going PbR initiatives in the UK at the time of the pilots' launch in social and welfare policy included:

- A £200m scheme which was launched in January 2012 to help troubled families using funding from the European Social Fund which was launched in January 2012 (Department for Work and Pensions, 2012a).
- A trial of PbR for children's centres in nine local authorities that will reward providers for reaching the most vulnerable families, improving family health and wellbeing and raising attainment of children at age five (Department for Education, 2011).
- A second SIB, seeking to address problems of rough sleepers in London, was announced in March 2012 (Department for Communities and Local Government, 2012).

Therefore the Drug and Alcohol Recovery PbR Pilots programme was one of a number of PbR pilot programmes implemented. In current policy, the term PbR refers to two different approaches and models: outcome-based contracts and/or SIBs (NSPCC, 2011). With SIBs, private and non-governmental investors bear the risk of paying up-front for the provision of services by providers. Outcome-based contracts, by contrast, are funded directly by Government. One type of outcome-based contract is a 'prime provider model', under which a single provider holds a contract with the commissioner and thus bears the risk for outcome delivery. In these instances providers usually have subcontractors who might also bear some risk (ACEVO, 2011).

**Potential advantages and disadvantages of PbR**

A review of policy documents and other sources highlighted potential strengths and limitations of PbR. It should be emphasised however that there was little evidence as to whether or not the benefits hoped for PbR would be realised.

**Payment by results and 'cashable' savings**

PbR schemes may result in savings to public services budgets. The potential for this saving arises because commissioners should no longer pay for inefficient or failing services, programmes and interventions, instead only paying for "what works" (NCVYS, 2011b; NSPCC, 2011). PbR is an attractive option for commissioners of services because it transfers financial risk away from them, either towards providers (in traditional PbR models), or towards social entrepreneurs and other investors (in SIB

models). The NHS PbR was associated with reduced unit costs, but it is not yet clear whether other programmes could achieve such a dramatic improvement in outcomes or significant reduction in demand for government resources – for example, enabling a court or prison to close – in order to allow central or local government to actually spend less or divert resources to other spending priorities. Of course, PbR may eventually deliver large-scale savings, but at the introduction of the current pilot, had not yet been tested widely enough to know whether or not it can.

**A focus on outcomes**

PbR may lead to commissioners' goals being clearer to providers and the public, since commissioners need to state intended policy goals precisely and upfront, and must be clear about how those goals are going to be measured. Providers, in turn, are incentivised to maintain good and transparent recording practices in order to demonstrate the impact of their work. This focus on defining the outcomes desired, and on improved recording practices, arguably increases overall accountability in public commissioning (Dicker, 2011). Those implementing PbR hope to align the incentives for providers with those of commissioners and service users, to the extent that all parties derive financial benefits from increased efficiency and improved outcomes (Fox & Albertson, 2011).

**Payment by results, competition and innovation**

Competition between providers is often, although not always, part of PbR arrangements. At a minimum, providers usually compete in tendering exercises to win PbR contracts. Further, a commissioner might contract two or more providers on a PbR basis in an area, so the providers are in competition with each other for clients and outcome payments. These forms of competition might encourage providers to increase quality in order to win contracts in the first place, and to deliver results once they have been commissioned.

Some commentators hypothesised that increased competition among providers may boost innovation, as market mechanisms may encourage the identification of more effective and efficient ways of improving social outcomes (Audit Commission, 2012; NSPCC, 2011). Another route through which PbR might encourage innovation is through commissioners' focus on outcomes, rather than the mode of service delivery. This means providers are free to propose new ways of doing things which would not have been possible under service contracts which closely defined processes and outputs.

However, whether or not PbR will foster innovation is an open question. A counter-argument is that providers might equally choose to stick to existing methods and approaches that have worked in the past, rather than testing innovative approaches which carry new risks (Collins, 2011). One potential concern is that the introduction of market mechanisms could also inhibit dissemination of knowledge and exchange of good practice between providers. This is because individual providers could be driven to retain what could come to be seen as intellectual property about 'what works', thus prioritising maintaining their competitive edge and maximising their own profits over the sharing of effective approaches.

**Implications for smaller providers**

Some PbR schemes have little or no up-front funding for providers, as payments are only made after services have been delivered and agreed results have been achieved. In the Drug and Alcohol PbR Pilots the ratio of up-front funding to funding dependent on results varied between pilot areas; one area paid 100% of the contract value on results, another 30%, and another 5%.

In schemes which have little or no up-front funding, provider organisations need to have enough working capital to deliver their services before they are paid for results. Smaller providers, who do not have such funding or working capital, might therefore be prevented from competing for PbR contracts, whereas better funded, larger organisations are more likely to be able to operate on other capital until they are paid for any results achieved (Fox & Albertson, 2011; Frazer & Hayes, 2011). One model which aims to ensure providers do not need up-front capital was tested in one of the PbR sites. There, payments were made to providers up-front but commissioners had the ability to 'claw back' funding to correct for under performance.

Another solution is for smaller providers to act as subcontractors to large 'prime providers' who bear the financial risk. One possible disadvantage of this approach is that risk could still be transferred to smaller providers through subcontracting arrangements, either directly, through the inclusion of PbR in the sub contract, or indirectly, if they are required to meet demanding performance targets or to work with particularly hard-to-reach groups (ACEVO, 2011; NCVYS & Clinks, 2011; Nicholson, 2011).

**Perverse incentives, unintended consequences and cherry picking**

The risk of service providers "cherry-picking" clients that are perceived as easier to work with and "parking" harder-to-reach clients is a concern noted by many authors writing about PbR (Department of Health, 2012, p. 4; NSPCC, 2011). That is, there is a risk that PbR programmes may create certain perverse incentives for individual providers. For instance, providers may offer a bare minimum of services sufficient to satisfy the outcome measure without taking into account the wider scope of clients' needs. PbR might encourage a narrow focus on one problem, whereas available evidence indicates that re-offending, drug use, and unemployment are often linked to a number of issues in an individual's life. Providers could be incentivised, for example, to encourage individuals to take a job (or other measured outcome) when that individual is not ready to do so. If this were to occur, it could lead to achievement of short-term results that are unsustainable in the longer term, and may do more harm than good if service users eventually 'fail' to sustain the positive outcomes towards which they were working.

**Measurement issues in PbR design**

Numerous sources reviewed for the REA identified the setting of outcomes measures as one of the biggest challenges in designing successful PbR schemes (Audit Commission, 2012; Collins, 2011; Disley, et al., 2011; Fox & Albertson, 2011; Nicholson, 2011; Roberts, 2011). There are two key elements to measurement in PbR, which are, broadly:

- deciding how to be confident that it is possible to **attribute** changes (improvements or worsening) in outcomes to providers' efforts; and
- deciding what indicators or outcomes will be measured, and using which data.

In relation to the former, those designing PbR schemes want only to pay for outcomes which result from the providers' interventions, rather than those which would have happened anyway. For example if offending rates are reduced in a local area, it is important to know if there were significant changes in policing practice, economic conditions or other events that might have caused or contributed to that change. Being able, confidently, to say what caused a change is known as the attribution of causality – attributing the cause of the outcome to the intervention in question. For example, in one pilot area, a control group approach is used to help assess causality: comparing those offenders receiving the SIB-funded intervention to a similar group of offenders who are not receiving the intervention. If both groups achieve better outcomes then this would suggest that the outcomes may have improved anyway (for example, because of a change in the external environment, such as changes in the economic climate that may affect levels of crime). If the group receiving the intervention achieves better outcomes than the control group, then this improves confidence that it was the SIB-funded intervention that caused the change. Other PbR schemes may simply compare outcomes amongst the population before and after the intervention. Defining a methodology which will allow outcomes to be attributed may require specialist input and can be a labour-intensive and time-consuming process (Disley et al., 2011).

In relation to the latter, those designing PbR schemes need to select metrics and measures. For many of the Ministry of Justice PbR programmes the metric is the number of recorded offences, using data from the Police National Computer. The advantages of this metric are that it is already measured and centrally collected, and it is clear and readily understandable. Commissioners face trade-offs between the simplicity of measures and the comprehensiveness of such measures. For example, binary outcome measures such as 'convicted of a further offence or not convicted of a further offence', are relatively simple to understand, implement and monitor, and send a clear message regarding the harm caused by even a single conviction. However, there is concern that they may miss important aspects of changes or improvements. For example, if an offender continues to offend but does so less frequently or commits offences of lesser severity then this could be seen as an improvement in outcomes that would not be captured by the most simple binary 'reconviction or no reconviction' measure. Measures based on a client's "journey travelled" could better reflect the complex nature of service provision and individual change by capturing changes and improvements along the way to an ultimate goal of, for example, not being reconvicted (Dicker, 2011). Similarly, longer measurement periods may better capture any potential impact of interventions, but may not be acceptable to those who expect to see results quickly, or to providers or investors (in SIB models) who are waiting for outcomes to be achieved before receiving payment (DrugScope & UKDPC, 2011).

**Valuing outcomes**

As well as appropriate and robust metrics, a PbR programme must be based upon some estimation of the value of the outcome. The question to be addressed here is how much the government should pay for one extra person in employment, one person free from drugs or one person not re-offending. The accuracy of these estimates is central to the value for money of PbR schemes. This is because whoever will ultimately make the payments if the agreed outcomes are achieved needs to also agree what a fair price is for a particular improvement in outcomes. If this price is too high then the intervention does not represent good value for money. If the agreed price is too low then this may make providing the service unattractive or infeasible for providers.

**Risk of paying twice as PbR proliferates**

With the rising number of programmes, interventions and services provided through PbR, there is an increasing risk that programmes overlap in their provision. As PbR schemes expand and roll out, the same person may, for example, be provided with a PbR service to reduce their drug and alcohol misuse as well as a service to help reduce their likelihood of re-offending. Because these schemes may share some of the same aims and seek to improve similar behaviours, it becomes increasingly difficult to attribute any impact achieved to individual providers (Disley et al., 2011; DrugScope & UKDPC, 2011). Lastly, it is not clear how external factors (such as economic downturn leading to higher numbers of unemployed) or, in the case of nation-wide initiatives, local specificities, should be accounted for in the set-up of PbR programmes.

**Evaluation of payment by results**

Largely due to the fact that PbR schemes were a relatively recent development, there was a paucity of evaluations of such programmes and related social investment vehicles (Ministry of Justice, 2010; Mulgan et al, 2011; NAYJ, 2011). The few evaluations which had been conducted generally demonstrated the difficulties inherent in attempting to attribute effects to PbR implementation and offer a mixed picture regarding the advantages and disadvantages of PbR. For instance, the evaluation of the Daedalus Programme (which aims to support young people due to be released from custody in London) found an improvement in governance structures in place, but noted that there was a tension between meeting targets and meeting the complex needs of young clients (Ipsos MORI, 2011).

Similarly, a report on the Pathways to Work programme concluded that client support and stakeholder relationships worked well. However, the programme exhibited signs of the perverse incentives described above: concerns were raised about pressure to achieve targets at the cost of acceptable quality of service, providers were seen to make little effort to work with 'harder to help' clients, and clients with greater needs appeared to be referred on to partner agencies (Hudson, et al., 2010). Department for Work and Pensions payment by results contracts also demonstrated that concerns about barriers to market entry have some basis, as only very substantial organisations (mostly private, few voluntary of community sector providers), with large amounts of working capital at their disposal, have been able to take the risk of becoming prime contractors (Frazer & Hayes, 2011).

## Process Evaluation

### Data collection

The process evaluation drew on primary data from 201 interviews with 356 stakeholders involved in the development, implementation, delivery and receipt of treatment services under the drug and alcohol recovery payment by results (PbR) pilots. The interviews were conducted on both a one-to-one basis (*n*=141) and in focus group settings (*n*=60). The interviewees included key policy stakeholders (e.g. from the Department of Health, Public Health England, Ministry of Justice) (*n*=8), commissioners (*n*=33), senior managers (*n*=34), service managers (*n*=10), practitioners (*n*=108), carers (*n*=19) and services users (*n*=152) from across the eight pilot sites.

All interviews were conducted between April 2012 and October 2013. The fieldwork was organised into two phases. Interviews to inform Phase I were intended to capture stakeholders' perspectives and thoughts on the pilots during the earlier stages of implementation, and were completed up to May 2013[5]. Fifty-six follow-up interviews were conducted after this point with professional stakeholders across the eight sites as part of Phase II. These follow-up interviews were intended to offer informed critical reflections on both the piloting process itself, and indications of any emerging exit strategies being developed by the eight sites. The distribution of interviewees across individual pilot sites is presented in Table 1.

**Table 1: Distribution of interviewees across eight pilot sites (N=356)**

| Site | Commissioner | Senior/service manager | Practitioner | Service user | Carer | Total |
|---|---|---|---|---|---|---|
| A | 6 | 6 | 27 | 24 | 1 | 64 |
| B | 7 | 4 | 16 | 25 | 6 | 58 |
| C | 5 | 6 | 8 | 17 | 1 | 37 |
| D | 2 | 2 | 17 | 17 | 2 | 40 |
| E | 3 | 9 | 11 | 21 | 2 | 46 |
| F | 5 | 7 | 8 | 14 | 3 | 37 |
| G | 3 | 2 | 14 | 16 | 2 | 37 |
| H | 2 | 8 | 7 | 18 | 2 | 37 |
| **Total** | **33** | **44** | **108** | **152** | **19** | **356** |

[5] During this period, colleagues from User Voice engaged with 109 service users in 18 focus groups and 19 carers in one-to-one interviews across all eight PbR pilot sites.

**Sampling**

Interviewed stakeholders in each site were sampled purposively and included DAT representatives and other members of local commissioning boards, senior managers (including chief executives, service directors, regional/area managers and departmental leads), service managers, frontline practitioners, service users and their carers. In identifying suitable professional stakeholders for interview, the research team in the first instance asked the DAT representative in each area to provide contact details of, or to introduce the researchers to, key local stakeholders occupying a prominent role in local policy. Any additional stakeholders recommended by individual interviewees were also contacted directly by the research team and invited to contribute to the research.

With the exception of a small number of scoping interviews with service users completed by ICPR and RAND during Phase I of the research, the majority of service users (*n*=109) and all carers (*n*=19) were interviewed by User Voice (UV) between March and July 2013.

The sampling and recruitment process for these interviews is described in more detail below, while the distribution and type of interview completed is set out in Table 2.

**Table 2: Distribution of service user and carer interviewees across eight pilot sites (N=128)**

| Site | Type of interview | Number completed | Participants involved |
|---|---|---|---|
| A | User focus group | 3 | 20 |
| | User interview | 4 | 4 |
| | Carer interview | 1 | 1 |
| B | User focus group | 2 | 12 |
| | User interview | 13 | 13 |
| | Carer interview | 6 | 6 |
| C | User focus group | 2 | 12 |
| | User interview | 5 | 5 |
| | Carer interview | 1 | 1 |
| D | User focus group | 2 | 12 |
| | User interview | 5 | 5 |
| | Carer interview | 2 | 2 |
| E | User focus group | 3 | 16 |
| | User interview | 5 | 5 |
| | Carer interview | 2 | 2 |
| F | User focus group | 2 | 13 |
| | User interview | 1 | 1 |
| | Carer interview | 3 | 3 |
| G | User focus group | 2 | 11 |
| | User interview | 5 | 5 |
| | Carer interview | 2 | 2 |
| H | User focus group | 2 | 13 |
| | User interview | 5 | 5 |
| | Carer interview | 2 | 2 |
| **Total** | **Group *N*=18**<br>**Interview *N=43***<br>**Carer *N*=19** | **80** | **171** |

Service managers in each of the sites were emailed a recruitment poster by UV, to highlight the evaluation of PbR and the role of UV in it, with a request that the posters were prominently displayed

within their services. Any service users or carers interested in participating in and contributing to the research were invited to contact UV directly to arrange a meeting, and given the option of participating in an interview. For pragmatic reasons interviews with service users were undertaken in groups, facilitated by UV volunteers, and hosted by a local treatment agency. Carers were interviewed on a one-to-one basis. With respondent consent, all interviews were recorded for the purposes of transcription in order to aid data processing and analysis.

The UV Programme Manager also visited each of the eight sites and directly spoke with service users attending appointments and/or groups, raising awareness of the evaluation and inviting participation in it. Services were visited at different days and times of the week over this period in an effort to ensure a range of service users were engaged. The minimum expectation was that the Programme Manager would visit each site at least three times for recruitment purposes, with the view that each visit would fall on a different day.

Carers were identified via service users who had participated in the focus groups. This was typically prompted by the UV facilitator at the end of the group interviews, alerting participants to our interest in speaking with family or friends closely involved in the progress of their treatment or care. Though services in the eight areas were aware of our desire to speak with carers as part of the evaluation, only three referrals were generated using this approach. The remainder were identified and recruited through direct peer engagement with service users, and as a consequence of facilitating the focus groups.

The findings have also been triangulated with data collated or published by the Department of Health (DH) during the course of the piloting process (e.g. monthly, followed by quarterly, update reports provided by the pilot sites to the DH and on data recorded in NDTMS between April 2012 and March 2013).

**Data processing, coding and analysis**

Our approach to data analysis was broadly consistent with the framework for thematic analysis described by Braun and Clarke (2006). This approach in turn shared much with framework analysis (Ritchie and Spencer, 1994), which is considered by some to have considerable utility in the area of applied policy analysis (Srivastava and Thomson, 2009).

Our analysis followed several distinct steps, each of which is described in greater detail below. All interviews where stakeholders consented to being recorded were transcribed for the purposes of data processing and analysis by the research team, using NVivo (v10) software for qualitative analysis.

*Step 1: Familiarisation with the data*

The analysis of qualitative datasets – which, by their nature, tend to comprise diverse, largely unstructured data – demands a careful, highly systematic approach. The analytical process began with full transcripts of each interview being 'mined'. This involved manually looking for patterns and topics within the text of each transcript which were considered relevant in answering the 23 main research questions set for the evaluation. Initial ideas of interest - not just restricted to the research questions - were highlighted and noted. This process enabled the evaluators to acquaint themselves with the data in its entirety. This was particularly important since, while individual researchers had some prior knowledge of the collected material by virtue of having been involved in some of the interviews, no single researcher was fully familiar with the depth and the breadth of the entire dataset.

Also as part of this step, the research team assigned key attributes to each interviewee to classify them for further analytical and reporting purposes. These attributes included pilot site, role of the interviewee (e.g. commissioner, service manager, practitioner, service user), and phase during which the interview took place.

*Step 2: Generating initial codes and searching for themes*

In this step, electronic copies of each transcript were coded and referenced by identifying features of the data that seemed of interest (*codes*), and organising these segments in larger groupings (*themes*). In doing so, while themes were constructed primarily on the basis of the content of the collected data, researchers also gave consideration to how these themes would match the original research questions formulated for the project. In total, this process resulted in the identification of 6,048 codes.

In an effort to ensure consistency in the processing of qualitative data a small number of the transcripts processed by the research team were independently validated by a second coder. We sought to ensure that the processing of qualitative data was undertaken in a reflexive manner, so that further questions were posed for the impact and economic strands of the evaluation as answers began to emerge from the interview data. Interaction between the research team was a critical part of this process, to ensure consistency in approach but also to help generate, through exchanges of ideas, new perspectives on the data.

*Step 3: Creating nodes and sub-nodes*

Once codes and themes were identified, these were then searched and reviewed in order to further define and populate different folders to organise identified codes (*nodes*). Initially, 21 main nodes were established. Subsequent work led the research team to refine this organisational structure and create sub-nodes within existing nodes where desirable. In addition, 14 uncategorised sub-nodes were created to classify material that was deemed important, but not necessarily relevant to any of the already established main nodes.

*Step 4: Analysis and interpretation*

Once all codes were assigned to their respective nodes and sub-nodes, the interview data were compared and contrasted, with analysis related back to the main research questions using a pre-defined reporting structure. Typically, more than one node or sub-node were found to be pertinent to each research question. The analysis, interpretation and write-up of each section were divided between ICPR and RAND Europe researchers in a complementary fashion to ensure that both organisations' shares were roughly similar in size. Both organisations contributed to all subsequent analysis and report writing, however, in order to enhance the internal validity of the interpretation of the interview data assembled.

While seeking to represent a balance of the range and spread of views expressed by the sample, the aim was to use the most compelling and relevant data extracts to illustrate the points and arguments being made. We note that while service users and carers represent a sizable share of conducted interviews, reflecting the research team's aim to include their perspective in the analysis, these two groups were not always in the best position to provide information that would help answer the research questions. This may have been because both service users and carers are somewhat removed from the organisation of treatment delivery and so their ability to comment on related issues may have been limited.

**Limitations**

While the methods employed for the process evaluation represent a robust approach, three limitations should be noted. First and foremost, the way in which PbR pilots were designed and implemented in individual sites varied substantially. Coupled with pre-existing differences across the eight sites, this rendered the formulation of general overarching conclusions about PbR extremely challenging and, in some areas, impossible. As reported throughout the report, in numerous instances, collected evidence draws only on a subset of relevant sites and its applicability may be confined to very specific contexts and situations.

Second, the process of implementing the PbR pilots was complex and at times disruptive, involving a considerable degree of change and transformation in individual sites and requiring substantial effort on the part of involved parties. The research team conducted two waves of interviews to capture stakeholder views and their progression at various points of time. However, by the time stakeholder interviews were concluded, the implementation process could still be considered ongoing or barely completed. This placed inevitable limitations on interviewees' ability to reflect on the implementation of the pilot a whole and from a longer-term perspective. Furthermore, it may have made it difficult for interviewees to distinguish what observations stem primarily from the change associated with the process of introducing the pilots and what effects can be linked with PbR specifically.

Third, the evaluation team made every effort to include the perspective of a broad range of stakeholders, ranging from the central team and commissioners to service users. However, the extent to which individuals and individual groups were able to comment on particular aspects of the pilots varied substantially. As stressed above, this was particularly the case with service users and carers, whose perspective offered them only a limited ability to provide evidence for research questions pertaining to organisational, managerial and policy aspects underlying the pilots.

### Sampling

All data for the impact evaluation were taken from the National Drug Treatment Monitoring System (NDTMS) dataset. NDTMS provides detailed data on people receiving structured treatment for drug and alcohol misuse in England and is used to report on alcohol treatment activity, drug treatment activity and young people in specialist drug and alcohol services. NDTMS gives a record of the provider/commissioner at which an individual is treated, the type of interventions provided, the date of entry and exit into and from treatment; as well as a range of individual characteristics such as age and gender; and information relating to the complexity of the individuals substance misuse problem such as whether the individual is currently injecting, has stable housing, the number of years since first use of the primary drug of dependence, and so on. NDTMS is considered to provide near comprehensive coverage for structured services.

The cohort used in the impact analysis consisted of adult clients in contact with structured treatment services over four years, from 1st April 2010 to 31st March 2014. Details of the total numbers treated in each year are presented in Table 3.

**Table 3 Primary drug and alcohol clients treated 2010/11 to 2013/14**

| Year of treatment | Primary drug users (n) | Primary alcohol users (n) |
|---|---|---|
| 2010/2011 | 204,473 | 111,025 |
| 2011/2012 | 197,110 | 108,906 |
| 2012/2013 | 193,575 | 108,683 |
| 2013/2014 | 193,198 | 114,920 |

The PbR Recovery pilots became operational in April 2012 and, on this basis, the data are separated into two years before the start of the pilot programme and two years during its operation. The majority of analyses apply to treatment journeys that started in the respective years.

Table 4 shows that, for primary drug clients, a total of 303,116 new treatment journeys were available for analysis, with 154,175 occurring before the start of the pilot programme and 148,941 occurring afterwards. For primary alcohol clients (Table 5) a total of 324,986 new treatment journeys were available for analysis, with 159,153 occurring before the start of the pilot programme and 165,833 occurring afterwards.

**Table 4: Description of cohort: Treatment journeys starting within the analysis period - primary drug clients**

| | Pilot areas | Non-pilot areas | Total |
|---|---|---|---|
| Number of treatment journeys starting in each financial year | **n (%)** | **n (%)** | **n** |
| 2010/2011 | 5,295 (26) | 74,377 (26) | 79,672 |
| 2011/2012 | 5,421 (26) | 69,082 (24) | 74,503 |
| *Total pre-pilot start* | *10,716 (52)* | *143,459 (50)* | *154,175* |
| 2012/2013 | 5,170 (25) | 69,212 (25) | 74,382 |
| 2013/2014 | 4,842 (23) | 69,717 (25) | 74,559 |
| *Total post-pilot start* | *10,012 (48)* | *138,929 (50)* | *148,941* |
| Total | 20,728 (100) | 282,388 (100) | 303,116 |
| Gender of clients | | | |
| Male | 15,860 (77) | 216,237 (77) | 231,954 |
| Female | 4,868 (23) | 66,151 (23) | 70,938 |
| Mean age at journey start (±SD) | 32.9 (±8.8) | 33.9 (±8.9) | 33.8 (±8.9) |

**Table 5 Treatment journeys starting within the analysis period: Primary alcohol clients**

| | Pilot | Non-pilot | Total |
|---|---|---|---|
| Number of journeys starting in year | **n (%)** | **n (%)** | **n** |
| 2010/2011 | 4,845 (23) | 74,245 (24) | 78,547 |
| 2011/2012 | 5,222 (24) | 74,841 (25) | 79,503 |
| *Total pre-pilot start* | *10,067 (47)* | *149,086 (49)* | *159,153* |
| 2012/2013 | 5,497 (26) | 75,716 (25) | 81,213 |
| 2013/2014 | 5,872 (27) | 78,748 (26) | 84,620 |
| *Total post-pilot start* | *11,369 (53)* | *154,464 (51)* | *165,833* |
| Total | 21,436 (100) | 303,550 (100) | 324,986 |
| Gender of clients | | | |
| Male | 13,750 (64) | 197,548 (65) | 209,768 |
| Female | 7,686 (36) | 106,002 (35) | 112,790 |
| Mean age at journey start (±SD) | 42.0 (±11.4) | 42.5 (±11.4) | 42.5 (± 11.4) |

The impact evaluation considered a range of outcomes, including:

- process outcomes measured via NDTMS
- behavioural outcomes measured via the Treatment Outcomes Profile component of NDTMS
- recorded crimes[6], established via case-linkage to the Police National Computer
- mortality, established via case-linkage to mortality data from the Office for National Statistics

Outcomes in pilot and non-pilot areas, before and after the introduction of the pilot phase, were compared to establish whether the trends with respect to these outcomes in pilot areas were different

[6]Recorded crimes: crimes that resulted in a criminal charge and a subsequent conviction, caution, warning, or reprimand

to those in non-pilot areas. This analysis was designed to determine the effect of introducing PbR on local treatment systems, taking account of changes in the wider context of treatment.

**Table 6 Abbreviations**

| Term | Meaning |
|---|---|
| **DID** | Difference in Differences (the difference in rates of change between two samples) |
| **OR** | Odds Ratio (the **odds** that an outcome will occur given a particular exposure, compared to the **odds** of the outcome occurring in the absence of that exposure) |
| **aOR** | Adjusted Odds Ratio (the OR resulting from a model that adjusts for covariates) |
| **HR** | Hazard Ratio (the ratio of rates of occurrence of an outcome between two samples) |
| **aHR** | Adjusted Hazard Ratio (the HR resulting from a model that adjusts for covariates) |
| **TOP** | Treatment Outcomes Profile |

**Approach to analysis**

The analysis utilised two approaches, each requiring a separate data specification.

The first approach involved an analysis of outcomes over a fixed time period (six or 12 months from a defined baseline). Where the outcome was binary (e.g. completed treatment, did not re-present for treatment) it is described here as a proportion (i.e. the number of those who achieved the outcome divided by all those eligible to achieve that outcome). Where the outcome was a count over a given period (e.g. number of recorded crimes over one year), it is described here as a rate (i.e. the number per person year; the outcome count observed divided by the number of individuals eligible). Changes in proportions (between pre-pilot and pilot periods) are expressed using odds ratios.

The second approach used a time-to-event, survival analysis, framework. The primary measure was a rate, calculated as the total number of outcomes observed divided by the total length of time each subject was followed-up in the analysis. Necessarily, follow-up is defined differently for each of the outcomes considered (see 'data' section below) and is measured in person years. Time-to-event analysis allows follow-up time to be different for each subject included in the analysis and also allows variables to be defined dynamically (called 'time dependent variables'). This means that we can incorporate those who had longer treatment episodes into the analysis. Changes in rates are described using hazard ratios.

**Data linkage**

In addition to NDTMS, analysis utilised data extracted from the PNC (Police National Computer) dataset and from mortality records maintained by ONS (Office for National Statistics). These were used to establish rates of recorded crimes and mortality. Records were extracted from these sources for individuals in the NDTMS cohort. Case linkage was achieved on the basis of cohort members' initials date of birth, gender (minimal identifier) and region of residence. Where the minimal identifier recorded by NDTMS corresponded to multiple individuals within these external datasets, the individuals were excluded from subsequent analysis. Only NDTMS cases up to 31st March 2013 were available for linkage within the study timeframe, in order to accommodate a one year follow-up and to allow for the lag in data recording by source organisations. Minimal identifiers were anonymised (irreversibly encrypted) prior to linking cases and suitable permissions were obtained from the source organisations for access and linkage.

**Fatal drug related poisoning and acquisitive crime definitions.**

A fatal drug related poisoning (DRP) was identified from the underlying cause of death, using the following International Classification of Diseases, Tenth Revision codes: 'mental and behavioural disorders due to psychoactive substance use, excluding alcohol and tobacco' (F11-16, F18-19); 'accidental poisoning by drugs, medicaments and biological substances' (X40-44); 'intentional self-poisoning drugs, medicaments and biological substances' (X60-64); 'assault by drugs, medicaments and biological substances' (X85); and 'poisoning by drugs, medicaments and biological substances, undetermined intent' (Y10-14). External causes of death were defined using the ICD-10 category for external causes, consisting of the subcategories: accidents, suicide and homicide.

An acquisitive crime was identified using the recorded crime code, using the categories: theft from shop, theft from person, theft of vehicle, theft from vehicle, fraud and forgery, drug supply, burglary, robbery and prostitution.

## Data: analysis of outcomes over fixed time periods

For the analysis of outcomes over a fixed follow-up period, the core analysis cohort was identified (by NDTMS) from adults (aged 18-75 years) experiencing a treatment journey over the period 1st April 2010 to 31st March 2014. Data were analysed separately for those with primary drug problems and primary alcohol problems. The primary drug dataset also includes information from the Treatment Outcome Profile (TOP) form recorded on initiation to treatment, at set review points and at treatment exit.

Outcomes for the analysis were identified for each treatment journey for the relevant period. Treatment journeys were classified in the pre-pilot period if they commenced in the two years prior to initiation of the PbR recovery pilot (1st April 2012). Analyses was restricted to those who started treatment within a period so they had the maximum time possible for observing the outcome of interest in the pre/post period; i.e. for 12 month outcomes, the pre-pilot group was identified from those who began treatment in 1st April 2010 to 31st March 2011 and the post pilot group was identified from those who began treatment in 1st April 2012 to 31st March 2013. Analyses for some outcomes required different inclusion criteria so were performed on subsets of the core cohort. These are summarised in Table 7.

## Data: time to event analysis

A time to event framework was used to analyse the rates of occurrence of: death, 'treatment completed – free of dependence' and, among the latter group, the rate of representation to treatment. For these analyses, data was extracted from NDTMS for treatment journeys which overlap with the observation period and not just those which began over that period. Therefore somebody could be included in the analysis mid-way through their treatment episode.

For time to event analyses, it is necessary to define the follow-up time to reflect the time somebody could potential have experienced the outcome event and this may be different for the analysis of different outcomes. For analysis of mortality outcomes, clients' follow-up was calculated from the beginning of data collection (1st April 2010) if in treatment on this date or from the beginning of their first treatment episode over the observation period if not. Their follow-up lasted until the earliest date of: death, two years following discharge from treatment or the end of data collection (31st March 2013). If a subject was in treatment during the change from pilot phase to non-pilot phase, then subjects were defined as belonging to the pilot-phase from 1st April 2012. If a subject was not on treatment on this date then their pilot phase began at their next treatment journey after this date. The variable 'post-pilot' was thus a time dependent variable which could change value over a client's follow-up, i.e. could be zero at the beginning if their follow-up began prior to 1st April 2012 and one by the end, if it ended after this date.

For the analysis of completed discharges, each person's follow-up lasted until the earliest time of: the end of data collection (31st March 2014) or the end of their treatment. Subjects were defined as belonging to the pilot-phase from 1st April 2012. For this outcome, a subject could re-enter the analysis from the start their next treatment journey and have multiple follow-up periods. For the analysis of representations, clients were followed-up from their first discharge from treatment, until a maximum of 12 months, or until the next treatment journey or to the end of data collection (31 March 2014), whichever was the earlier.

**Table 7: Outcomes considered in the analysis and associated inclusion criteria.**

| Outcome | Inclusion criteria | N of journeys | |
|---|---|---|---|
| | | Drugs | Alcohol |
| **Receipt of treatment intervention** | All treatment journeys starting in the period 1st April 2012 to 31st March 2014. | 303,116 | 324,986 |
| **Waiting time over three weeks** | All clients who received structured treatment in the period 1st April 2012 to 31st March 2014 | 297,287 | 306,940 |
| **Outcomes at 6 months** | All clients triaged in the periods: 1st April 2010 to 30th September 2011 and 1st April 2012 to 30th September 2013, to allow for 6 month follow-up | 229,852 | 245,574 |
| **Completed at 6 months and not represented within 12 months** | All clients triaged in the periods: 1st April 2010 to 30th September 2010 and 1st April 2012 to 30th September 2012, to allow for 18 month follow-up | 79,543 | - |
| **Outcomes from TOP form: abstinence, injecting, housing** | As 6 month outcomes, plus excluding those without a valid follow-up TOP within 6 months, because of either: client discharged from treatment or no follow-up TOP recorded | 96,869 | - |
| **TOP outcomes at 12 months** | All clients triaged in the periods: 1st April 2010 to 31st March 2011 and 1st April 2012 to 31st March 2013, to allow for 12 month follow-up | 154,054 | 160,303 |
| **PNC outcomes at 12 months** | As other 12 month outcomes above but limited to those for whom PNC matching was possible | 145,457 | 156,224 |
| **Mortality outcomes time to event framework** | All treatment journeys which overlap with the analysis period 1st April 2010 to 31st March 2011 (allowing for one year delay in registration of deaths) for whom ONS matching was possible | 348,619 | 267,172 |

## Analysis

The proportion/rate for each outcome was calculated for pilot sites and non-pilot sites, in the pre-pilot period and in the post-pilot period. A negative binomial, logistic regression or Cox proportional hazard model was fitted, estimating the change in the rate/odds/hazard comparing the pre-pilot period to the post-pilot period, for both pilot sites and non-pilot sites. Within these models, the difference in differences (DID) rate ratio /odds ratio/hazard ratio was calculated, defined as the change (from pre to post) in the pilot sites to the odds change in the non-pilot sites. The resulting DID rate ratio/odds ratio/hazard ratio indicates whether the change in pilot sites is equivalent to that in the non-pilot sites. For example, if the DID odds ratio is less than 1, then we can conclude that the change in the pilot sites is lesser when compared to the change in the non-pilot sites. Adjusted odds ratios are provided for all changes between pre- and post-pilot periods. Where 95% confidence intervals span the value of one, this indicates results that are not statistically significant.

## Analytical issues: confounding and unobserved heterogeneity

Due to the absence of randomisation in the selection of pilot sites, one analytical issue to consider is the presence of confounding: that is a (set of) factor(s) may have changed with the introduction of the PBR pilot, which although not a direct consequence of the pilot's introduction may have an influence on the outcomes. One such factor would be client complexity, which may rise/fall in pilot sites compared to non-pilot sites and is likely to have an effect on the outcomes considered. To control for these potential confounders, covariates collected at triage assessment, assumed to be a proxy for client complexity, were adjusted for in each model. The variables used are listed in Table 8. Estimates of the odds/hazard ratio which adjust for potential confounders may be considerably different to the unadjusted equivalents, particularly if there has been a change between pilot and non-pilot sites in factors associated with the outcome.

A further analytical issue is that unobserved heterogeneity may be present which, if not accounted for, may result in underestimation of the error associated with an estimate and a biased estimate. One such source of unobserved heterogeneity may be present at the DAT-level due to the potential for different treatment approaches. To account for DAT-level clustering in the analysis a fixed effects parameter was fitted, representing the effect of each DAT. To account for such clustering in the time-to-event models, a stratified Cox model was fitted, where DAT was the stratified variable.

**Table 8: Covariates used in adjusted analyses**

| Variable | Description |
|---|---|
| **Age** | Age at start of treatment journey, categorised into age groups: <20, 20-24, 25-29, 30-34, 35-44, 45-54, 55+ |
| **Gender** | Male or female |
| **Opioid/crack/benzodiazepine/cocaine/ amphetamine/cannabis use** | Whether or not the client declared each drug as a problem at initial assessment |
| **Previously treated** | Whether or not the client had previously received treatment for drug use |
| **Dual diagnosis** | Whether the client reported mental health diagnosis |
| **Pregnancy** | Whether the client was pregnant |
| **Employment status** | Whether the client was employed (or a student) or they were unemployed |
| **Injecting status** | Categorised into: current, previous, and never |
| **Referral source** | Categorised into: Drug service, health service, self/family referred, CJS referred, and other |
| **Time since initiation** | Time (years) since self-reported first problematic use of problem substance, categorised into: <2 , 2-4, 5-9, 10-14, 15+ |
| **Children status** | Categorised into: lives with children, children live elsewhere, no children |
| **Accommodation problem** | Categorised into: acute problem, problem, and no problem |

## Sensitivity analysis

The standard analyses conducted compared all pilot site cases to non-pilot sites. We recognise that not all clients within pilot sites will necessarily have been treated under a PbR regime but have tested the operation of the pilot sites overall rather than according to individual client status. As a sensitivity analysis, we have repeated all statistical models with pilot site clients only being included if they are positively identified as a PbR client. The criteria selected for inclusion were (a) identification via the NDTMS PbR client flag or (b) evidence of a LASAR assessment where PbR flag was missing.[7]

Further to this, we conducted another set of analyses that only included pilot site clients from the 2013/14 treatment period. This was in recognition of the fact that the level of re-organisation and

[7] Both criteria were required for qualification as a PbR client in analyses undertaken by PHE.

service development within 2012/13 had the potential to moderate the effect of PbR models within this year. In this case the 2013/14 cohort may be considered a more robust sample on which to test the effects of PbR. Any substantive differences between standard and sensitivity analysis results are reported and discussed.

### Difference in differences approach: demonstration

The following section provides a guide to interpretation of an odds ratio produced by a difference in differences analysis. An essential element of this method is that it compares a change in one area with the *change* in another area, rather than a comparison of two areas at a single time point. This strengthens the analysis because we can ascertain whether there was a difference in pilot sites after the PBR introduction over and above any changes observed elsewhere (i.e. in non-pilot areas).

Figure 1 demonstrates a variety of scenarios in which a difference in differences analysis might identify a difference in an imaginary measure between areas A and B. If the y-axis in each graph measures a positive outcome, area A may be identified as performing 'worse' than area B in each scenario.

In Figure 1a, area A starts higher than area B but ends lower, representing a clear negative progression in relation to area B. In this scenario, area A would have an odds ratio less than one, comparing time 2 with time 1, and area B would have an odds ratio greater than one. The resulting difference in differences odds ratio (DID OR), comparing area A to area B would be less than one.

In Figure 1b, areas A and B appear identical in Time 2, but area B has improved noticeably since Time 1, compared to no change in area A. In this scenario, comparing time 2 with time 1, an odds ratio of one would be observed for area A, and an odds ratio greater than one for area B. The resulting DID OR, comparing area A to area B would be less than one.

In Figure 1c, area B scores higher than area A in Time 2, but there is a greater increase since Time 1 that might identify area B as doing better. In this scenario, comparing time 2 to time 1, an odds ratio of greater than one would be identified for both areas, but would be lower in area A. The resulting DID OR, comparing area A to area B would be less than one.

In Figure 1d, area B scores lower than area A in both time points. However, the rate of increase is greater in area B. In this scenario, a pre-post odds ratio of greater than one would be identified for both areas, but would be lower in area A. The resulting DID OR, comparing area A to area B, would be less than one.

**Figure 1 Illustrative difference-in-differences scenarios**

Figure 1a

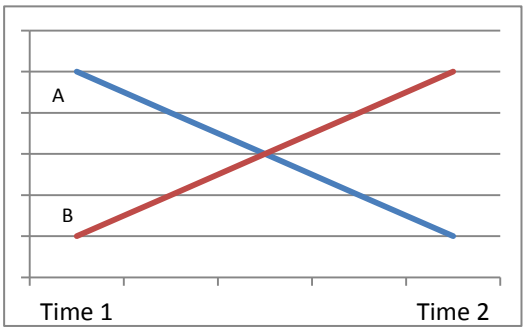



Figure 1c

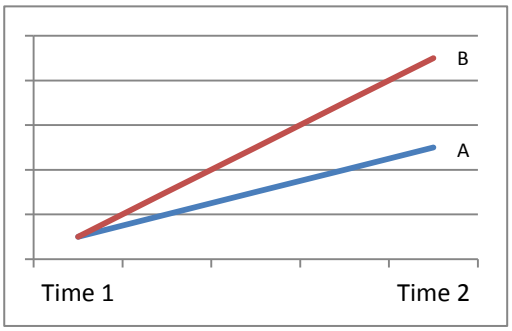



Figure 1b

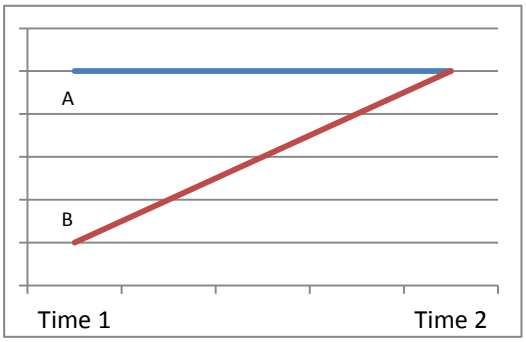
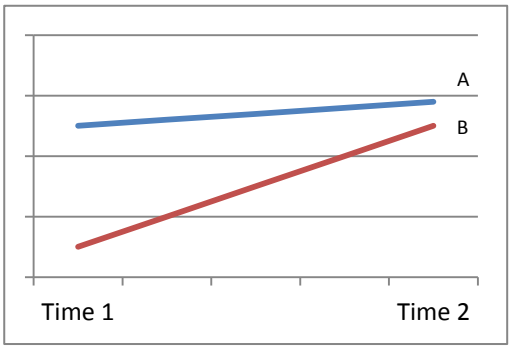



Figure 1d




**Limitations**

There were clear differences in the way the intervention was implemented between the pilot sites. However the cohort collected over the analysis period lacked statistical power to investigate each site individually. It is possible, within this group analysis, that extreme measurements in one or more sites may have influence on overall results. Similarly, the primary analysis compared the two years of the pilot phase to the two previous years. We lacked the appropriate data to investigate organisational changes and changes to the nature of the PbR system that occurred within this period re not reflected. However, we did isolate the second year of the pilot phase in order to test PbR systems that could more readily be considered established as opposed to developing.

We set out to consider the impact of participation in the pilot on:

- the volume of individuals treated in structured treatment for substance misuse; and the associated treatment costs for these individuals;
- the volume of recorded crimes committed by individuals in structured treatment for substance misuse; and their associated costs.
- the volume of drug-related A&E attendances and hospital admissions; and the associated costs for these attendances and admissions.

We also set out to explore the set-up costs incurred in different pilot areas, and how the provider market changed in the pilot areas after the introduction of PbR.

**Volume of individuals in substance misuse treatment and their associated costs**

To examine the impact of PbR on the volume and cost of treatment, we used data from NDTMS for the financial years 2010-11, 2011-12 and 2013-14. 2013-14 data from NDTMS incorporate a notable change compared with previous years: the coding of treatment interventions changed from a classification system with eight possibilities to a system with three types of 'higher-level' intervention: psychosocial; pharmacological and recovery support. It is possible to align the classification systems such that the previous eight interventions collapse into the new classification system using a variable in NDTMS (the 'intervention setting' field). Unfortunately, this record is less than 50% complete for 2012-13 data, meaning that inclusion of the 2012-13 NDTMS data is not possible. We therefore omitted the 2012-13 data and compared the data for 2010-11 and 2011-12 with the data from 2013-14.

Figures on the average day costs for each structured drug and alcohol treatment intervention provided to individuals were obtained from Public Health England (PHE), based on a survey of treatment agencies in 2008/09 (to which inflationary uplifts were applied by PHE). Total costs per treatment episode were calculated by multiplying the average day cost by the number of days provided for each intervention. These data were then collapsed to give the total cost across all interventions for an individual for each financial year.

**Volume and costs of recorded crimes**

For the analysis of the volume and costs of recorded crimes, we used data from Police National Computer (PNC) database linked to NDTMS for the financial years 2010-11, 2011-12, and 2012-13. The PNC database contains a large amount of information relating to individuals who have been convicted, cautioned, reprimanded or warned for an offence.

We created seventeen groups of crimes recorded in the PNC: violent crimes; sex offences; prostitution; burglary; robbery; non-vehicle theft; theft of a vehicle; theft from a vehicle; shoplifting; fraud/forgery; criminal damage; drugs misuse; drugs supply; other offence; summary offence; breach offence.

We structured the data such that, for each treatment journey for an individual, a row of data contained the following: person characteristics; the number of recorded crimes in each of the above categories one year since the start of the treatment journey; and the number of crimes committed in each category more than five years prior to the start of the treatment journey.

We then obtained available data relating to the economic and social costs for each of the crime classifications. We use the revisions made to the multipliers and unit costs of crime used in the Integrated Offender Management (IOM) Value for Money Toolkit (HM Government 2011). These data apply multipliers that update estimates of the economic and social costs of crime produced in a report for the Home Office (Duborg et al. 2005). The estimates comprise three elements: costs incurred in anticipation of crime (such as security expenditure); as a consequence of crime (such as property stolen and emotional/physical impacts); and in response to crime (costs to the criminal justice system) (HM Government 2011). These unit costs are outlined in Table 9.

Separate cost estimates are not available for all of the seventeen groups of crimes. For those crimes for which there is no estimate in the IOM Toolkit, we applied the average cost for the crimes that were costed, weighted by their relative incidence). For other crimes, we created an aggregate classification which contains more than one of the Home Office classifications. For example, we created a category 'violence against a person' which comprises 'murder', 'serious wounding', 'other wounding', and 'common assault'.

**Table 9: Unit Costs by Crime Type**

| Crime Classification | IOM Cost Categories | IOM Classification | Unit Cost (£) | Volume of Crimes | Relative Weights | Weighted Average (£) | Notes |
|---|---|---|---|---|---|---|---|
| Violence Against Person | i | Murder | 1,825,259 | 775 | 0.001 | 9,401 | *(weights based on 2007/8 data)* |
| | ii | Serious Wounding | 26,481 | 15,118 | 0.021 | | |
| | iii | Other Wounding | 10,069 | 435,648 | 0.614 | | |
| | iv | Common Assault | 1,800 | 257,431 | 0.363 | | |
| Sexual Offences | i | Sexual Offences | 38,005 | *Not required* | | | |
| Burglary | i | Burglary (dwelling) | 4,037 | 204,136 | 0.479 | 4,403 | *(based on 2013/14 figures)* |
| | ii | Burglary (not dwelling) | 4,739 | 222,187 | 0.521 | | |
| Robbery | i | Robbery (personal) | 9,061 | 47,302 | 0.891 | 9,124 | |
| | ii | Robbery (commercial) | 9,639 | 5,778 | 0.109 | | |
| Theft from a person<br>Theft (other) / handling stolen goods | i | Theft - not vehicle | 785 | *Not required* | | | |
| Theft of a vehicle | i | Personal | 5,112 | 69,194 | *Assumption required (no breakdown in national statistics)* | | |
| | ii | Commercial | 10,329 | | | | |
| Stealing from vehicles | i | Personal | 1,063 | 255,976 | | | |
| | ii | Commercial | 1,284 | | | | |
| Shoplifting | i | Shoplifting | 128 | *Not required* | | | |
| Criminal Damage | i | Personal | 1,083 | *Assumption required (no breakdown in national statistics)* | | | |
| | ii | Commercial | 1,890 | | | | |

**Volume of drug-related A&E attendances and hospital admissions and associated costs**

We use anonymised patient-level data from the Hospital Episode Statistics (HES) for both hospital admissions and A&E attendances for the financial years 2009-10 to 2013-14. HES data contain details of all admissions and A&E attendances at NHS hospitals in England. The data are collected during a patient's stay at hospital and submitted for payment purposes. HES data cover all providers of NHS services in England including acute hospitals, primary care trusts and mental health trusts.

It was not possible to link records from HES with those from NDTMS. We therefore sought to focus on types of hospital utilisation which would be directly linked to problematic drug use.

*A&E Attendances*

We included attendances to A&E departments for diagnoses of either "poisonings (including overdoses)" or "social problems (including chronic alcoholism and homelessness)". These attendances were matched to tariff information based on the combination of HRG code and type of A&E department attended, to reflect the separate tariff for non-24 hour A&E departments since 2011-12.

*Hospital Admissions*

For each admission we obtained information on age, local authority of residence, the date and method of admission, the ICD-10 diagnosis codes, and the healthcare resource group (HRG) code assigned to each spell.

For hospital admissions, we only considered episodes with any ICD-10 diagnosis code contained in two lists. These codes may appear in any of up to twenty diagnosis fields that can be recorded for a HES episode. The first list includes diagnoses of mental and behavioural disorders due to illicit drug use: F11.0-F16.9 and F19.0-F19.9; excluding codes in ".2" to avoid double counting with the drug misuse treatment services contained in NDTMS, and excluding F13.6, F14.7, F15.6, F16.6. The second list of codes refers to poisonings and overdoses due to illicit drug use: T40.1-T40.7, T40.9 and T43.6.

HRGs are standardized groupings of clinically comparable treatments which use similar levels of healthcare resource(s). HRGs are used as the means for determining reimbursement for services delivered by healthcare providers. We obtained the HRG tariffs for each of the five financial years we considered. These data provide the national tariff prices for elective and non-elective care for each HRG. For each of the five years of HES we considered, we assigned the relevant HRG prices based on the admission method for each episode (elective/non-elective). For each hospital stay, we retained the episode with the highest HRG cost – leaving a dataset consisting of one observation for each unique hospital stay per patient.

Several HRG codes in the national tariff have no price: WD11Z; WD22Z and WD33Z are codes that refer to patients with a mental health primary diagnosis that are treated by a non-specialist mental health provider, and prices for these three HRGs are locally negotiated. For each patient whose episodes only contained these three 'locally-negotiated' HRG tariffs, we applied the average HRG cost for a hospital stay for diagnoses of mental and behavioural disorders. For four remaining HRGs (LA08E; SB97Z; SC972; and UZ01Z) with no national pricing data, we applied the average HRG cost for a hospital stay for all diagnoses (both diagnoses of mental/behavioural problems and overdoses).

**Analysis**

In common with the impact evaluation, we used a difference-in-differences (DiD) estimator to identify the effect of participation in the pilot scheme. The DiD models were estimated separately for alcohol and drugs.

For the analysis of volumes and costs of treatment, we compared baseline data from 2010-11 and 2011-12 to pilot data from 2013-14. For the recorded crime analysis, we compared baseline data from 2010-11 and 2011-12 to pilot data from 2012-13. For the hospital utilisation analysis, we considered the period 1st April 2009 to 31st March 2014. We restricted this latter analysis to the population aged 16-65 years.

We undertook the analyses at a variety of levels. Some analyses were undertaken at individual level. We also estimated models of total costs or events at DAT level, in order to capture the combined effect of changes in per-individual costs and changes in the volumes of individuals in treatment.

The hospital utilisation analyses were undertaken at a level representing combinations of year of age (between 16 and 65) and quarter for each DAT. In these models we included binary variables for quarter, year of age (16-65) and DAT. We also included counts of the population in substance misuse treatment from NDTMS at the same level of aggregation. In addition, we included measures of total population size from the 2011 Census. These Census populations are available for years of age but do not change over time. We therefore also included a measure of overall population change for each DAT in each year constructed from ONS data. As PbR could have affected the size of the treatment population, we compared models with and without the inclusion of the size of the substance misuse treatment population by DAT, year of age and quarter. We used our (static) estimate of the size of the general population for each DAT and year of age as the 'exposure term' in the analyses of volume and total costs.

The distributions of several of the outcomes were highly skewed. We dealt with this skewness in two ways. First, use used negative binomial regression, which is a technique that allows for unbiased and efficient estimation of an over-dispersed variable without prior transformation of the outcome variable. Second, we applied the inverse hyperbolic sine transformation to the values prior to estimation. This transformation is similar to the commonly used log-transformation but is defined when the original value equals zero. We included fixed effects for individual DATs in all estimations.

We adjusted the regression models for a range of characteristics that were known to be relevant. The treatment population are typically male, white individuals who are unemployed and in receipt of welfare benefits, have previous drug treatment episodes, report crime within the past twelve months, and may be in poor mental and physical health or have unstable accommodation, (Jones et al. 2007; Gossop et al. 1998). Providers are paid differentially based on the complexity of an individual's substance misuse problem. We included the following variables which are intended to reflect differential complexity at the start of a treatment journey in each year: whether an individual is injecting; whether an individual has an acute housing problem; the number of years since an individual first used their primary drug of dependence; whether the individual uses benzodiazepines, opiates, crack and/or both opiates and crack; age and age-squared; and gender. These variables have been shown the have a significant impact on outcomes such as treatment completion (Mason et al. 2015).

In the main analysis, we compared the eight DATs that participated in the pilot programme with all other DATs. As secondary analyses, we examined the robustness of the results by means of:

i. comparison with a subset of DATs which were similar in terms of two characteristics of the local population, specifically (a), the percentage of the local population who are users of opiates or crack; and (b) the 2010 Index of Multiple Deprivation score. We only included 42 control DATs which were ranked within ten places of at least one of the pilot DATs on both variables.
ii. comparison with DATs located in geographical regions in which there was at least one pilot DAT. On this basis, 90 DATs in four regions (the East of England, the North East of England, the South West of England, and the West Midlands) were excluded from the comparators.

The secondary analyses were included to ensure that the results obtained in the primary analyses are maintained when comparing only similar areas. We supplemented the regression analyses with descriptive analysis of trends over time in the pilot and non-pilot areas.

**Limitations**

We sought to collect set-up costs from each of the eight pilot sites, but reporting of these costs relied of voluntary provision by commissioners in each of the pilot areas. Reporting and classification of these costs may have been pilot-specific making cross-comparison difficult. Furthermore, differences in the design of the PbR model in operation in each area meant that whilst implementation of PbR may have incurred particular costs, it would not be possible to incorporate them into a consistent framework for comparison. For example, some commissioners required providers to adapt their systems and practices internally whereas others added these functions externally and so the valuation of particular costs would vary depending on the economic perspective taken. These factors, inherent in the design of policy (which allowed for local flexibility), limits the comparability of these costs.

# Substantive Themes

## 1. The co-design phase

The co-design process was intended to support the PbR pilot areas for a six-month period (April to September 2011) in developing outcome domains and providing advice on cross-cutting issues. One of the first major activities undertaken was the formation in January 2011 of a National Expert Group. Membership for the group was invited from a number of Government Departments, clinical, academic and employment experts, and representatives from the provider membership body DrugScope, and the independent UK Drug Policy Commission (UKDPC).

Following the announcement of the selection of the eight pilot sites in early April 2011, the National Expert Group was reconstituted and re-named the Co-Design Group to also include representatives from the eight sites. Sub-groups were formed to examine the initial outcomes of interest e.g. the UKDPC chaired a sub-group on employment outcomes while DrugScope presided over discussions focused on health and well-being outcomes.

PbR was widely acknowledged by commissioner and provider interviewees in five sites as a continuation of policies within the pilot sites which sought to promote a greater emphasis on the attainment of 'recovery-orientated' outcomes through innovation, enhancing aspects of local service provision and improving overall quality of care. Commissioners (in sites A through G) commented upon how they were keen to become involved in the PbR pilots in an effort to reinvigorate aspects of local service provision. Areas of concern essentially centred around a desire to improve overall quality of care amid anxiety that local treatment systems had become 'stagnant' and lacking in 'aspiration' for the client group. Furthermore, this provision was too often seen to be routinely failing to integrate psycho-social and throughcare support as an integral part of opioid substitution treatment.

> *"I think some things had changed, but actually the crux of it was that – and I'm being very, very honest here – that the system was stagnant. The place was stuck; we've got a massive shared care scheme in [the area] with [a large number of] GP practices. Now that is great for accessibility, but it is terrible for developmental services. We were just stuck, we had people retiring on methadone scripts, and we had people that have been in treatment for substantial amounts of time…It was a bit much of a 'script and go' culture. Really the staff didn't have any other aspiration for them, apart from, 'Well, you're on a script now'. That seemed to be the end of people's aspirations for them"* (Commissioner #1, Site F, Phase 1)[8].

The main achievements of the co-design phase reported by commissioners, senior managers (in four sites) and policy stakeholders were: (i) agreeing and defining what outcomes were being sought; (ii) establishing how these could best be measured; and (iii) devising a system of incentives to encourage progress towards achieving these outcomes.

The inclusion of interim outcomes was considered important by a range of senior stakeholders (from sites A, C, F and G) in order to ensure the financial viability of providers and to acknowledge the incremental steps and progress towards achieving the outcomes sought via PbR. The development of

[8] For the purposes of this report, interviewees' accounts were anonymised and pilot sites were assigned letters A to H.

the non re-presentation outcome, for instance, was viewed as an important safeguard against any risk of premature discharge of patients from services in order to trigger payments for providers.

*Challenges encountered during co-design*

The PbR pilot sought to avoid a prescriptive top-down model of implementation. In practice however, there were numerous challenges encountered in attempting to balance central policy preferences against local concerns. As highlighted by a range of interviewees (e.g. in sites A, E, F, G and H), co-design was hugely resource-intensive, both at a local-level and centrally, and presented a steep learning curve for all involved. These challenges were exacerbated by the complexities, upheaval and uncertainty of the re-tendering and/or restructuring process which occurred as a consequence of involvement in PbR for some sites – either initially, or at some stage during the piloting process.

> *"I was frustrated and disappointed because…it was clear from the very first meeting that the [government department] representative was guiding design in a way that would be to their satisfaction. To the extent that there was a debate about one particular issue and [s/he] said, blatantly, 'the ministers will not accept that'"* (Senior manager #3, Site E, Phase 1).
>
> *"It has been an immense, immense amount of work. Because we have made so many changes"* (Commissioner #1, Site F, Phase 1).

Although PbR sought to encourage a diverse marketplace of providers, accounts from commissioners and senior managers in five sites noted that there tended to have been fewer expressions of initial interest from provider organisations in becoming involved in the pilots than anticipated. The main reasons proposed for this included risk aversion on the part of providers, uncertainties about the financial implications for them of delayed payments, and a lack of detail around the outcomes being sought and the funding models that would be used. There was also a perceived failure to articulate from the outset a shared theory of change underpinning the incentivisation of the provider market, which would ensure delivery of improved recovery and desistance outcomes.

Related to this there was some anxiety expressed (e.g. by policy stakeholders, commissioners (site C) and senior managers (site E)) that the PbR regimes developed might unintentionally stifle innovation by discouraging providers from investing in specialist skills and provision in order to deliver these outcomes within budget. As summarised in the 'Context and Literature' chapter, this is contrary to expectations voiced in some, albeit not all, theoretical literature on PbR. Frustrations were aired (by senior stakeholders in sites A, B and E) about a perceived lack of emphasis placed on addressing external factors which might promote recovery, most notably in relation to employment and housing needs, and tackling entrenched patterns of crime. And though articulated by commissioners (sites C and G), senior managers (sites A, B, C and E) and service managers (site A), concerns were more commonly raised by practitioners (sites A, B. F and H) that the abstinence outcomes agreed following the co-design process were not universally sought by all service users, or considered achievable in the short-term for others.

Other concerns raised (by commissioners, senior managers and practitioners from sites A, B, E and F, and one policy stakeholder) during the co-design phase included:

- a perceived lack of evidence informing the development of PbR as an approach to the commissioning of drug and alcohol treatment services;

- how features of it were seen as being inconsistent with aspects of the existing public health literature around recovery; and
- anxieties about whether the emerging models being developed by the pilots risked inadvertently penalising rather than incentivising performance of treatment providers.[9]

In addition, there were some reservations about the extent to which any outcomes observed via PbR could be reliably attributed to the interventions delivered as part of the pilot, or to individual services where multiple agencies were involved in providing support.

In contrast to the development of PbR models in other policy areas, the timescales for establishing the drug and alcohol recovery pilots were comparatively short. The speed with which PbR was implemented during co-design was experienced as problematic by interviewees from four sites (A, C, E and H) and three policy stakeholders, which in turn greatly influenced the nature and extent of the outputs and outcomes produced during the remainder of the piloting process. Interviewees from each site and stakeholder group felt there had been extensive and lengthy consultations around agreeing outcomes and complexity tools, which in turn delayed implementation and hampered delivery. These delays were attributed to problems related to data access, modelling of those data identified as accessible and appropriate, and securing ministerial sign-off for decisions.

> *"The speed of implementation was incredibly fast...If you look at other PbR processes, for example… alcohol treatment...they have been developing the clinical groupings and the understanding of complexity over years. So to develop an entire PbR model and process in one year is very fast, and the issues around defining the outcomes, understanding them, seeing how you can measure them, was almost inevitable in that respect…The speed at which it is being implemented is far too fast and there is not enough consideration of other processes for incentivising recovery"* (Policy stakeholder#3, Phase 1).
>
> *"I think the thing was politically motivated, clearly; it was rushed, and that was one manifestation of its political motivation…everybody was rushing hell for leather to get it ready. I don't think that it was really that well thought through"* (Senior manager #4, Site E, Phase 2).

*Implications for future PbR models*

Participants' experiences of the co-design process provided a number of important pointers for developing future commissioning models based around PbR. The main lessons relate to timescales for implementation and acknowledging the resource intensive nature of the early stages of this process (particularly if it involves re-tendering services). The experiences from the pilot also illustrate the importance of agreeing outcomes, relevant tools and funding models in a timely manner. The inclusion of interim outcomes appears important, especially as these relate to goals around abstinence from drugs of dependence. Providers should be encouraged (or required by commissioners) to articulate a theory of change outlining how they will deliver the recovery and other outcomes sought via PbR, while maintaining appropriate investments in specialist skills and provision in order to deliver employment, housing and related outcomes.

[9] This observation is related to another conceptual issue with PbR raised in 'Context and Literature', i.e. what the appropriate valuation of individual marginal positive outcomes should be.

## 2. Funding models

The eight sites implemented markedly different funding and delivery models, as described in Table 10, below. At the start of the process (in April 2012) two areas operated with a single prime provider. A further four had contracted with two providers and the remaining two areas had three or more service providers commissioned as part of their PbR models.

During year one, three of the areas had commissioned at least some aspect of provision on the basis of 100 per cent of the contract value being paid on the achievement of successful outcomes. However, one of the three areas (site G) allocated 30 per cent of the overall tariff as an attachment fee at the point an individual was taken onto the treatment caseload. In the remaining five pilot areas the share of the contract price paid on the achievement of pre-defined outcomes during the first year of operation were set at 10, 20 (*n*=2), 25 and 30 per cent. In site A, the share of PbR was increased by 10 percentage points for year two. Two of these five sites had also incorporated an attachment fee (of four and 22 per cent respectively). The share of the payment across outcomes - such as abstinence, planned discharges, re-presentation, crime, or some other locally agreed measures – varied between the areas, however.

**Table 10: Overview of the pilots' initial approaches to funding and commissioning**

| Pilot site | % of contract paid on outcomes | Commissioning model |
|---|---|---|
| Site A | 10%[10] | 2 providers |
| Site B | 30% (4% attachment) | 4 providers |
| Site C | 20% | 2 providers |
| Site D | 20% (22% attachment) | 3 providers |
| Site E | 100% | 2 providers (one acting as main provider) |
| Site F | 100% | 2 providers[11] |
| Site G | 100% | 1 prime provider |
| Site H | 25% | 1 prime provider |

[10] Of this, five per cent of the contract value available via PbR in each year was conditional upon meeting a range of local process outcomes, such as timely completion of review forms. The share of the contract value available under PbR increased to 20 per cent in year two (of which five per cent was again awarded upon meeting process targets).

[11] Site F also originally operated aspects of its LASARS provision under PbR arrangements.

The accounts of practitioners and commissioners in two of the areas suggested there was little appetite for embracing approaches which involved 100 per cent of contract values being awarded exclusively on the basis of PbR. Commissioners in particular were keen to stress how they sought to be pragmatic when developing their funding models in order to minimise any destabilising effects to local treatment systems during the early stages of PbR implementation. An intention to increase the share of the PbR component in later years reflected a desire to introduce PbR to the treatment system in an incremental way, thereby minimising any initial disruption.

> *"I think we were being cautious in terms of this first year of the Payment by Results pilot. Knowing that we could scale it up in future years. Because we were changing so much else in this first year we wouldn't try and run before we walk, because there was a certain amount of settling down of the new services to do. To be honest we didn't want to put ourselves in a position of failing, because so much else was changing"* (Commissioner #3, Site A, Phase 1).

Commissioners, managers and practitioners from four areas described how the use of attachment fees was seen as one potentially useful and important way of ensuring a degree of stability, and maintaining some minimum standards around process and delivery issues (such as waiting times) amid the focus on achieving outcomes.

Some of the outcomes adopted locally were variations on the nationally agreed ones, using indicators which were very similar, but which had been redefined slightly to take into account local factors or other considerations. There were several reasons mentioned by local commissioners for designing and adopting these indicators, not included as part of the nationally agreed outcomes. These were:

- To create indicators within the domains covered by the national outcomes framework which tied activity measures to income, and thus reduce the proportion of provider income that was uncertain, but maintain the link with performance.
- To ensure that some of the payments to providers were 'front-loaded' to mitigate cash-flow shortages i.e. so they could be achieved at or near the onset of clients' treatment journeys.
- To reflect factors specific to certain local areas (e.g. characteristics of the treatment population).
- To tie the incomes of providers to domains outside of the nationally agreed outcomes, such as engagement with education, training and employment, which respective DATs had decided were important for recovery, and for which metrics existed that were deemed practical, appropriate and could be linked to providers' incomes.

The proportion of PbR income attached to each indicator and domain varied. The eight pilot sites dealt with the potential cash-flow problems associated with their funding models in different ways too. Generally, sites either chose to:

- pay some or all of the PbR income up-front (with the potential to 'claw back' payments later);
- use attachment fees which were paid up-front;

- attach some income to locally designed activity measures which could be achieved at the start, or over the course of, treatment; or
- ensure that an element of up-front core funding was retained within providers' contracts.

> *"That unless you were paying out for some in-treatment changes, you would have providers who would have some very difficult cashflow problems. Because some people stay in treatment for two years and if you get paid nothing for people who are in treatment that long. Then it's going to be very difficult to stay afloat, especially if you're a small local voluntary sector agency, who might be doing fantastic work with people. So that was one of the ways in which we were saying, although the achievement of abstinence is important, you should also recognise, particularly with alcohol, where people may well come in to treatment saying, 'I don't want to be abstinent I just want to get my drinking under control'. That's a valid treatment goal. So you should be able to measure it and pay for it, under a PbR system"* (Policy stakeholder #8, Phase 2).

All of these options sought to ensure that payments to providers were not entirely 'back-loaded' and helped mitigate any potential cash-flow problems (although other factors determined the overall design as well).

A further difference across the eight sites was that some had designed models under which PbR constituted only a small share of total income in the first year, with this share increasing in each year thereafter. Others adopted an approach under which the contract value attributable to PbR remained static and stable throughout the life of the pilot.

Respondents from the eight PbR pilot sites described a range of considerations which they felt were important to account for when developing their funding models: a desire to focus attention on enhancing and developing areas of provision which may historically have been viewed as weak; improving recovery outcomes for their treatment caseloads; appropriately incentivising the achievement of both short and long-term recovery outcomes; minimising opportunities for 'gaming' or cherry-picking 'safe bets' to work with; bringing new providers and services into the market; and minimising any destabilising effects on local treatment systems brought about by the introduction of PbR.

*Views on the most effective aspects of the funding models developed*

When reflecting on the most effective aspects of the funding models they had developed, commissioners and senior and service managers in three sites commented upon how the piloting process had afforded their areas the opportunity to focus on developing funding models which incentivised those outputs and outcomes that were considered of greatest interest and relevance to them. The scope to incorporate interim payments within the funding models, in recognition of incremental progress being made towards achieving longer-term recovery goals, was seen by some as key to maintaining the viability and credibility of PbR in the eyes of treatment providers. The funding models developed, and the need to evidence progress towards achieving the recovery goals set out in

these, had necessitated a greater focus on monitoring and reviewing of client progress in a much more consistent manner than had previously been the case.

There was some evidence that the recovery goals articulated and incentivised within the funding models which emerged under PbR had contributed towards improving aspects of joint working within and between providers, or encouraged innovation by prompting a greater emphasis to be placed on the provision of recovery support for those discharged from structured treatment 'free from drugs of dependence'. Here the focus was on sustaining the benefits gained through treatment and minimising the chances of a subsequent re-presentation to treatment.

> *"So what we've done in this year is any client that we know is successful as in – I don't know, drink free, drug free or whatever, we are closing them on that modality but opening them on recovery support. So they are coming in on a different modality to enable me to be paid. So they are still in treatment but they've finished structured treatment, but they are still getting the ongoing support from us. Still getting maybe their recovery facilitators, still attend groups and we encourage peer-support groups because we have NA, AA. So that is what I've looked at. In all honesty I wish I had looked at doing that before Payment by Results because it is working"* (Service manager #1, Site G, Phase 2).

As discussed in Section 5, however, the impact of pilots on re-presentation rates appears mixed. Successful completion without re-presentation was significantly worse for both drug and alcohol clients in pilot sites compared to non-pilot sites. However, , non-re-presentation among those who successfully completed treatment was relatively improved in pilot sites for drug clients, though not for alcohol clients.

*Problems encountered in relation to the funding models developed*

When describing some of the problems encountered in developing and implementing their funding models, commissioners, senior managers, service managers and practitioners from across the eight sites raised a number of concerns about the levels of uncertainty they had encountered. This uncertainty tended to emerge as a consequence of:

- the limited evidence base which was perceived to underpin an approach to commissioning that had largely been untested in the substance misuse field;
- local misconceptions of central government preferences for what funding models should look like (e.g. what proportion of the contract value should be awarded under PbR);
- difficulties accurately budgeting and forecasting under a PbR regime; and
- (among service managers and frontline practitioners in particular) anxiety about the impact of these arrangements on job security.

This sense of uncertainty could be compounded by a perceived lack of awareness and knowledge about what other pilots were doing in terms of developing their funding models, and the issues and challenges they may have been encountering. (We note, however, that the online PbR Pilot Forum was in operation from April 2011, where information could be shared between pilot areas.)

Accounts from commissioners and practitioners from five of the eight sites indicated that as a consequence of this uncertainty there may have been greater risk aversion on the part of providers, which may in turn have inadvertently stifled some of the innovation being sought via PbR. The lack of additional earning potential for providers under PbR, above and beyond that stipulated within the

agreed funding models, was also perceived as a potential barrier to innovation by some commissioners, senior managers and service managers, as it failed to appropriately incentivise providers.

> *"I would say that I think PbR actually has some value, but not as a penalty based model but one which incentivises performance. Rather than penalise providers for not delivering, I think they should be paid a bonus for delivering over and above…People use the language of incentivisation in the pilots; the Home Office used it, the NTA used it. There is no incentive in the PbR pilot right now, it's all about penalty"* (Senior manager #4, Site E, Phase 2).
>
> *"The notion of Payment by Results: the only thing that I can do, as an organisation, is lose or come out even. The payments are adjusted to make sure that I can't earn over what my allocated budget should be…Any extra there's no reward for it, so we're waiting for twelve months to get the payment, and then when we get it, it's what we had before. We've jumped through so many hoops to get it, so many hoops that have required an industry in themselves"* (Senior manager #4, Site A, Phase 2).

There were concerns aired too (among commissioners, senior managers and practitioners in four sites) that the funding models developed often failed to reflect the level of resources and investment providers would devote to the client group when delivering services (or the sheer volume of data that need to be generated and processed in order to evidence outcomes), for which a commensurate 'reward' would not be available under PbR. This was raised, for example, as a particular issue with regards the intensity and duration of support provided to some criminal justice referrals (which had increased in sites C, D and H).

Components of the funding models that had been developed under PbR were viewed by a number of interviewees (encompassing service user, practitioner and policy stakeholder perspectives in two sites) to be inconsistent with notions of dependency as a 'chronic, relapsing condition', where motivation plays a key role in determining the nature and extent of progress made, and a constellation of external factors affect the ability of providers to contribute towards achieving some of the main outcome targets set for them and sought by commissioners. In this context, the pilots appear to have seen mixed results with respect to re-presentation rates. The sites fared worse than non-pilot sites when examining a combined indicator of people who successfully completed treatment and did not re-present but recorded lower re-presentation rates among drug clients when looking only at people who completed treatment.

There was clearly some unease (articulated by commissioners, senior managers, service managers and practitioners from five areas) about the perceived emphasis which these funding models placed on the 'bottom line' and the attainment of targets, at the expense of a focus on service users' experience of the treatment process.

> *"Personally, I just feel very uncomfortable about treating people who are in the worst place in their life as a commodity actually…The more you use Payment by Results through justice and drug treatment and anything like that when we're having people at their lowest ebb and somebody sees them as a pound coin rather than a person, I'm massively uncomfortable about that"* (Practitioner focus group #2, Site F, Phase 1).

PbR sought to impact upon commissioner and provider behaviours in a range of ways: the agreed recovery focus was intended to lead to the pooling of budgets,[12] reducing duplication, increasing innovation, and stimulating the provider market. However, concerns were raised about some features of the funding models which might serve as a deterrent to smaller, third sector organisations keen to become involved in future iterations of the policy in other areas. Providers operating at a national level were considered to have greater resources and resilience to absorb some of the inherent risks and potential losses associated with operating under a PbR funding regime. Views were expressed that larger organisations were likely to be less risk averse when it comes to engaging with PbR initiatives, given the potential rewards available via future contracts.

There were also problems for providers associated with addressing unexpected costs incurred following the establishment of the pilot, and operating for the first time under a PbR funding regime. This included having to absorb expenditure that had not been envisaged before the launch of the pilot (e.g. due to unforeseen implementation problems), incurring higher-than-anticipated clinical, managerial and data monitoring expenses as a consequence of involvement in the pilot, and accounting for set-up and transitional costs. Set-up costs associated with the pilots are further discussed in greater detail later.

> *"We went down a couple of blind alleys that were expensive and really took away from delivering anything. Those were learning points. I would not repeat those"* (Service manager #4, Site C, Phase 2).

*Changes made to the funding models over the life of the pilot*

There were a number of important changes made by at least half of the sites during piloting which had significant direct or indirect implications for the funding models which had been proposed and developed at the start of the process. These were:

- one area suspending PbR arrangements within a year of the pilot commencing, reverting back to block contracts and beginning the process of re-tendering services;
- another proceeding with a pre-planned re-commissioning process during the life of the pilot;
- changes being made to complexity tariffs elsewhere (after this site felt it had incentivised outcomes for more complex cases too heavily to begin with); and
- one site re-tendering its LASARS provision (at the start of the pilot and then having to do so again at a later stage in the pilot).

Arguably the most significant change occurred following a dispute between the commissioners and providers in one area about the causes of a significant drop in the number of service users engaged in effective treatment, and a marked decline in successful completions. This resulted in PbR contracts

[12] As stated in the invitation to participate in the pilots (Department of Health, 2010). A pre-qualification questionnaire included in the document listed the following as budgets that might potentially be brought into the PbR pilots: Pooled Treatment Budget; IDTS; CARATS funding; DIP Main Grant; DIP Police allocation; PCT mainstream budget and; Local Authority Community Care budget. The pilots were launched at a time when funding for drug treatment was increasingly pooled and, as stated in the 2010 Drug Strategy (HM Government, 2010), PbR was supposed to further encourage the process. Correspondingly, the use of pooled budgets was explicitly mentioned in some of the pilots' descriptions of their models.

being suspended and block contracts re-instated, while steps to re-tender provision were initiated locally.

> *"It went for ages, and ages, and ages denying that there were any problems…Rather than dealing with the real problems of the model, and the constraints that were placed upon everybody by the process of setting it up and the tight timetable, it was in a state of denial…At one point – this is early spring this year [2013] – [we] were looking to lose at least half of the potential income, and there was absolutely no evidence in the database to justify it. When the DAT realised I think it was prepared to admit what was wrong, it decided to suspend the PbR element, the penalty element and to redesign the model…The existing model is we're being paid in full"* (Senior manager, Phase 2).[13]

While there was certainly evidence of continuity in the delivery of the funding models developed as part of the pilot process (e.g. as expressed by commissioners in two areas), inevitably there was an element of trial and error with some re-modelling of finances attached to PbR payments apparent in three sites. Some of the main changes to funding models reported over the life of the pilot were linked to a re-adjustment of budget allocations for alcohol provision, and the re-weighting of tariffs around complexity and different outcomes (such as occasional use of illicit drugs or alcohol).

*Implications for developing future PbR funding models*

A key message to emerge from the interview data involving commissioners, senior and service managers in three sites was that PbR funding models should in future be implemented incrementally and afforded a sufficient period of time for these mechanisms to establish themselves, and for problems to be appropriately identified and resolved. The quality of relationship between providers and commissioners was considered to be an essential factor in ensuring the successful implementation of future PbR models.

Practitioners, service and senior managers (from three sites) cautioned against future PbR models being awarded on the basis of 100 per cent of contract values. These reservations arguably gained greater traction towards the end of the piloting process amid uncertainties relating to the degree of random variation (or 'noise') within the outcomes being measured, and the extent to which the changes observed within caseloads could reliably be attributed to the intervention of providers locally.

Both commissioners and policy stakeholders acknowledged that a number of the outcome measures pursued during the pilots – such as re-offending, housing, injecting and reliable change – were perhaps unlikely to feature in PbR funding models going forward. A more selective choice of domains was instead endorsed for measuring the outcomes achieved across treatment cohorts.

> *"There wasn't time given to the way that the drug and alcohol PbR was introduced. Normally, you would see in a PbR introduction a shadow year, so people could set a baseline. As we had no shadow year because it was pushed through at a rate which was unprecedented within PbR…it was originally set that we were going to only have a low tariff because they wouldn't agree a shadow tariff"* (Senior manager #4, Site A, Phase 2).
>
> *"My view is it has to be phased. I think you work towards an outcome focused approach, but you do it incrementally, year on year. You don't go for the big bang. You can't go completely from activity counting… I think you need two or three years to do it. So the model that you*

[13] Given the contentious nature of this quote, the site attributor has been omitted in the interest of preserving the anonymity of the interviewee.

*start with: 10 or 15 per cent and you put it up 10 per cent every year, is what I think would help"* (Service manager #5, Site F, Phase 1).

*"So if it had been done six months in advance and we'd been able to test everything, try everything, find out what the problems were and all those kind of things...I think that a lot of the outcomes and the activities are actually sensible and fine and I think they will be of real benefit to our service users. But the whole planning and the implementation of it has been, just, really poor"* (Senior manager #1, Site E, Phase 1).

The changing policy landscape created additional uncertainty around selecting suitable outcomes for future PbR models. One example related to the extent to which Police and Crime Commissioners (PCCs) might insist on some measure of re-offending being retained within PbR funding models in order to justify continued investment in treatment as an effective form of crime reduction.

In light of some of the changes that were made to interim payment allocations during the life of the pilots (and referred to above), commissioners in particular stressed the importance of providers being able to appropriately and accurately cost their work under an outcomes-based commissioning regime. During the pilots this problem was often compounded by difficulties estimating likely throughputs and the staff compliment and resources required to manage those. (In at least one area it seemed this degree of uncertainty resulted in consideration being given to the use of zero-hours contracts with frontline staff.)

# 3. Local Area Single Assessment and Referral System (LASARS)

The Local Area Single Assessment and Referral System (LASARS) was introduced as a feature of the PbR pilots with the aim of establishing an independent function responsible for the assessment of all users in and referred to the treatment system, and their subsequent tariffing, thereby reducing the potential for 'gaming' and 'cherry-picking' by providers[14]. LASARS were intended to become a single point of entry into the treatment system in each pilot area. The need for the independent setting of tariffs attached to individual users, or at least an audit thereof, was nearly universally acknowledged by interviewees.

> *"I suppose that the financial management and monitoring side would need to be done by someone independent. Because I know that particularly the recovery provider, but also us to some extent, are reliant on financial incentives. There has to be a third party involved with monitoring that and coming through whilst the agencies could cook the books. But to me that seemed the main point of the LASARS"* (Practitioner #1, Site F, Phase 1).

There were notable differences among the pilot sites in how the LASARS function had been set up and incentivised. Table 11 presents an overview of the LASARS function in the eight areas at the start of the pilot in April 2012. The table also presents information, where applicable, on how the system changed following its introduction.

The performance of, and stakeholders' satisfaction with, the LASARS differed markedly across the pilot sites. Some areas were able to mitigate the potentially adverse effects of the LASARS very well, while others reported difficulty in implementing and delivering this new process within their local treatment system.

In order to assess the complexity (i.e. likelihood of a successful outcome) of referrals to structured treatment, and to attach a corresponding payment tariff, a national complexity tool was developed for use by the pilot sites. Three areas adopted the national tool as originally designed, but others either developed their own or made modifications to the national one. Examples of the deviations from the national complexity tool were:

- Site C developed a complementary tool that would band service users into four clusters to keep practitioners informed of service users' needs. This tool was later abandoned due to the resources expended using two tools in parallel.
- Site D used a tool with three rather than five complexity levels, developed with support from the central policy team. This tool was a condensed version of the original national one.
- Site F incorporated some features of the tool initially developed by site G.
- Site G initially developed a tool that was exceptionally complex in terms of data collection and which necessitated a large amount of work. The site decided to drop the initial tool and adopt the national one.
- Site H developed their own tool to accommodate locally agreed complexity levels.

**Table 11: Overview of pilots' approaches to LASARS**

[14] We note that in some areas LASARS also had responsibility for reviewing progress during the treatment process, and at the point of discharge. These additional roles, while not the primary objective of the LASARS, are discussed below.

| Pilot site | LASAR function provided by | Changes since introduction |
|---|---|---|
| Site A | Assessment and tariffing done by providers. Sample auditing procured by commissioners | None |
| Site B | Drug Action Team (DAT) | None |
| Site C | Similar to Site A | None |
| Site D | Similar to Site A | None |
| Site E | DAT | Review function transferred back to providers in late 2012 |
| Site F | External provider commissioned on a PbR contract | Re-commissioned LASARS function to be managed by Probation Trust and staffed by two treatment providers on a flat-fee contract[15] |
| Site G | DAT | None |
| Site H | DAT | None |

There could be significant additional costs associated with the provision of the LASARS, particularly in a sense that it carried considerable opportunity costs and diverted resources away from actual treatment provision. The cost of LASARS provision is one of the reasons behind sites A, C and D's decision not to have an independent LASARS function, but to instead incorporate initial assessment and tariffing into the portfolios of treatment providers.

> *"We felt that if we had commissioned an independent LASARS that the money spent on commissioning that service and making sure people went to their LASARS and then got referred on to the providers would be too big really; and too big an amount of money just spent on an assessment service"* (Commissioner #1, Site A, Phase 1).
>
> *"One of the things that I really do want to put across is that the LASARS team in year one cost approximately half a million pounds. In year two, I can't say, but it was not much less than that. There were no LASARS prior to obviously the implementation of the PbR. So you had two providers, total contract value maybe about £1.8m or £2m, something like that. We're spending half a million to save peanuts"* (Senior manager #2, Site E, Phase 2).

However, none of the three pilots (sites A, C and D) managed to completely eliminate the costs associated with the need for independent review of tariffing. Site A commissioned an Independent Governance Service (IGS) to audit providers' assessments and providers may have had to bear compliance costs, although the evidence obtained from interviewees was mixed in that respect[16]. Similarly, sites C and D also built in provision for auditing the assessments and tariffs conducted and assigned by providers.

[15] With the introduction of 'Transforming Rehabilitation', the Probation Trust concerned informed commissioners in site F it would no longer be able to provide the LASARS function when the new arrangements were in place. At the time of our last interview conducted for this evaluation in this site (in September 2013), commissioners were in the process of considering their options as to the future of the LASARS provision in the area.

[16] Interviewees from this area expressed different views on the cost of cooperation and compliance with the IGS.

*Perceived benefits associated with having a LASARS*

There were a number of perceived benefits associated with having a LASARS. All sites noted that the quality of data being collected had improved substantially since the introduction of the pilots. Data on the size and composition of the population in treatment was reported to have become much more reliable. Improvements in the quality of data were reported in pilots which opted not to establish independent LASARS as well as those that did. It is unclear to what extent the existence of a LASARS encouraged better data collection and monitoring, rather than the need to evidence outcomes for PbR contracts in general. However, the fact that every user's needs were assessed by LASARS will undoubtedly contribute towards improving aspects of data quality.

One of the main reported benefits to have emerged from the pilots, expressed by both by commissioners and treatment providers in all areas, was improved integration of drug and alcohol treatment provision. The LASARS was considered to have provided a platform where both drug and alcohol dependencies could be routinely assessed and dual diagnoses identified.

> *"I suppose one of the positives about having an independent assessment team is it really highlighted to them the lack of provision there was for alcohol in this area. You had your low level stuff, and then your dependent drinker stuff, and then that big chunk in the middle where there was nothing. We were able to be flexible and take on those at the request of the commissioners"* (Practitioner focus group #2, Site B, Phase 1).

Accounts from two areas noted that LASARS assessors were in a position to act as independent user advocates. For instance, in situations where service users might be dissatisfied with the treatment they receive and contemplate or benefit from a switch to a different provider, LASARS staff may act as users' representatives and facilitate a resolution to such a situation.

> *"Because the other thing we offer is a bit of advocacy work if a client is not getting their needs met as they see them. We're saying to them "You can come back to us and we can do a bit of liaising work for you and see if there's missing communication, what's going on, how can we get you a better service?"* (Senior manager #1, Site B, Phase 1).

*Problems encountered arising from the use of LASARS*

A range of problems were reportedly encountered arising from the use of LASARS. Along with costs, a frequently cited problem was that the LASARS represented an additional hurdle for service users to clear on their journey through the treatment system[17], as the process could prolong the time it took to access structured treatment. Since every referral needed to be seen, screened and tariffed by a LASARS assessor, it created an extra hurdle to negotiate before accessing structured treatment.

> *"I think that what it's done is it's prolonged the time that it's taking for patients to get into treatment. Because they've had to jump through more hoops in order to get into treatment. The consequences of that are mixed. One consequence could be that people who are genuinely*

[17] Findings are primarily drawn from (and applicable to) pilots that set up independent LASARS as originally envisaged by the Department of Health. However, interviewees from sites A, C and D also shared their thoughts on the topic, either as a theoretical reflection, or based on their familiarity with other pilots.

*keen to come into treatment, it could be a difficulty for them or there may be some risks arising while they're waiting to go into treatment"* (Practitioner #1, Site F, Phase 1).

Interviewees were often unable to offer concrete information on attrition rates either between referral and assessment, or between assessment and treatment take-up; however, they offered anecdotal evidence to suggest that rates of drop-out were a serious concern in some areas. Analysis of NDTMS data (Table 12) confirmed that when compared against performance during the two years immediately prior to PbR implementation in April 2012, PbR sites recorded a significant increase in the proportion of primary drug users assessed who did not go on to receive structured drug treatment over the life of the pilot (from 2% to 8%; aOR 2.45, 95% CI 1.67, 3.61, N=20,728). No changes were identified in non-pilot sites over the equivalent period (from 2% to 1%; aOR 0.94, 95% CI 0.78, 1.12, N=282,388). This represents a significant change in non-initiation of treatment, comparing pilot sites to non-pilot sites (DID aOR 2.62, 95% CI 1.80, 3.82, p<0.001). This association is strengthened within the sensitivity analysis that only included pilot site clients if identified via the PbR flag (DID aOR 4.43, CI 2.85, 6.89, p<0.001). However, this effect seems to exist because of activity within one of the eight pilot sites, whereby LASARS may have been used to assess clients for interventions other than structured treatment. With this site excluded from analysis, no significant change was observed among the pilots or between pilots and non-pilots.

**Table 12: Proportion commencing structured treatment post-assessment: Primary drug clients**

| | Pilot | | | Non-pilot | | |
|---|---|---|---|---|---|---|
| **Started treatment intervention?** | Pre n (%) | Post n (%) | aOR pre vs. post [95% CI] | Pre n (%) | Post n (%) | aOR pre vs. post [95% CI] |
| **Yes** | 10,508 (98) | 9,209 (92) | Ref | 140,637 (98) | 136,933 (99) | Ref |
| **No** | 208 (2) | 803 (8) | 2.45 [1.67, 3.61] | 2,822 (2) | 1,996 (1) | 0.94 [0.78, 1.12] |
| **DID aOR** | **2.62 [1.80, 3.82]** | | **p < 0.001** | | | |

For primary alcohol clients, the proportion of individuals assessed for treatment who did not then start a treatment intervention was reduced (Table 13) in both pilot (from 8% to 6%; aOR 0.44, 95% CI 0.37, 0.52, N=21,436) and non-pilot sites (from 6% to 5%; aOR 0.56, 95% CI 0.51, 0.61, N=303,550), with pilot sites doing relatively better (DID aOR 0.78, 95% CI 0.66, 0.93, p=0.004). By contrast, sensitivity analysis (based on PbR flag) also identified a reduction within both the pilot and non-pilot sites, but did not identify a significant difference between them (DID aOR 1.10, 95% CI 0.91, 1.34, p=0.33).

**Table 13: Proportion commencing structured treatment post-assessment: Primary alcohol clients**

| | Pilot | | | Non-pilot | | |
|---|---|---|---|---|---|---|
| **Started treatment?** | Pre n (%) | Post n (%) | aOR pre vs. post | Pre n (%) | Post n (%) | aOR pre vs. post |
| **Yes** | 9,272 (92) | 10,667 (94) | Ref | 139,623 (94) | 147,378 (95) | Ref |
| **No** | 795 (8) | 702 (6) | 0.44 [0.37, 0.52] | 9,463 (6) | 7,086 (5) | 0.56 [0.51, 0.61] |
| **DID aOR** | **0.78 [0.66, 0.93]** | | **p = 0.004** | | | |

Where a treatment intervention was known to have been received, waiting time was measured as the time between initial assessment and start of earliest treatment intervention in the treatment journey.

Table 14 shows that the proportion waiting over three weeks for drug treatment increased within pilot sites from 4% to 7% (aOR 1.17, 95% CI 0.97, 1.41), whereas a corresponding decrease from 7% to 6% (aOR 0.57, 95% CI 0.51, 0.62) was observed in non-pilot sites. Overall, a significant change towards waits of over three weeks was observed in pilot sites in comparison to non-pilot sites (DID aOR 2.06, 95% CI 1.71, 2.48, p<0.001).

**Table 14: Proportion of treatment starters waiting more than three weeks to start treatment: Primary drug clients**

| | Pilot | | | Non-pilot | | |
|---|---|---|---|---|---|---|
| **Waiting time over three weeks?** | Pre n (%) | Post n (%) | aOR pre vs. post [95% CI] | Pre n (%) | Post n (%) | aOR pre vs. post [95% CI] |
| **Yes** | 447 (4) | 659 (7) | 1.17 [0.97, 1.41] | 8,814 (6) | 7,026 (5) | 0.57 [0.51, 0.62] |
| **No** | 10,061 (96) | 8,550 (93) | Ref | 131,823 (94) | 129,907 (95) | Ref |
| **DID aOR** | **2.06 [1.71, 2.48]** | | **p < 0.001** | | | |

Among those who started a primary alcohol treatment intervention (Table 15), the proportion waiting over three weeks between initial assessment and start of treatment decreased significantly in both pilot (aOR 0.52, 95% CI 0.46, 0.59) and non-pilot sites (aOR 0.65, 95% CI 0.62, 0.68). This reduction was identified as associated more with pilot sites than non-pilot sites (DID aOR 0.81, CI 0.72, 0.91, p=0.001).

**Table 15: Proportion of treatment starters waiting more than three weeks to start treatment: Primary alcohol clients**

| | Pilot | | | Non-pilot | | |
|---|---|---|---|---|---|---|
| **Waited over three weeks?** | Pre n (%) | Post n (%) | aOR pre vs. post | Pre n (%) | Post n (%) | aOR pre vs. post |
| **Yes** | 1,014 (11) | 894 (8) | 0.52 [0.46, 0.59] | 19,897 (14) | 18,093 (12) | 0.65 [0.62, 0.68] |
| **No** | 8,258 (89) | 9,773 (92) | Ref | 119,726 (86) | 129,285 (88) | Ref |
| **DID aOR** | **0.81 [0.72, 0.91]** | | **p = 0.001** | | | |

Nevertheless, evidence from interviews with stakeholders suggests that some areas were successful in mitigating LASARS-related risks. Indeed in one area, the LASARS was credited as being a key factor in the success of the entire pilot, primarily through the downward pressure it was considered to have placed on waiting times and attrition rates locally. Faced with the challenges described above, some pilot sites implemented strategies to mitigate the extent to which a LASARS assessment was experienced as an additional step for service users in their treatment journeys. All interviewees who commented on this topic felt that the most promising approach was to co-locate the LASARS assessors and treatment providers so that service users could be seen by a treatment worker immediately after an assessment.

In some areas, successful co-location was achieved by having adjacent premises. In others an arrangement was made that the LASARS assessors would hold surgeries at treatment providers'

premises. Another mitigation strategy consisted of having the LASARS assessors mobile and able to visit service users where it is most convenient for them. Overall, some form of co-location arrangements were reported by interviewees in five sites.

> *"My main concern was when this rolled out we had 800 people, for example, that were assessed as needing harm reduction. When we opened on 1st April we saw two or three clients. My concern was, 'Where are these clients?' So we soon identified even the short distance between the two offices people were going missing. So straightaway we formed a partnership and we moved the LASAR team into our drop-in. So anybody that was deemed suitable after point of assessment for harm reduction were actually picked up straightaway by one of our workers. Show them around the service and introduce them to the open access site"* (Senior manager #2, Site F, Phase 1).

Service managers and practitioners from five sites stressed that an initial assessment meeting represents a valuable opportunity to build a relationship between a practitioner and a service user which could be used to encourage and motivate engagement in treatment; however, under a LASARS this opportunity was taken away.

Data from interviews with practitioners in five sites attributed the introduction of LASARS to deterioration in the quality and timeliness with which information about service users was transferred between various stakeholders. However, the transfer of information reportedly improved as the pilot progressed and there were examples of providers working together with LASARS assessors to identify and resolve issues.

Commissioners, service managers and practitioners from five areas commented on the usefulness of LASARS assessments and the extent to which their work was being replicated by providers. All but one pointed out that even though the LASARS assessors conducted the initial assessment, assigned a tariff and passed on information to the service in question, services almost always followed up by conducting some sort of additional assessment, irrespective of the LASARS assessors' work (albeit to a varying degree).

> *"As a registered manager with the CQC [Care Quality Commission], I have to…be sure that…the…quality and clinical governance framework is in place to ensure that my staff have assessed the clients' needs appropriately, done an appropriate treatment and care plan and then carried out the interventions appropriately. So we can't just pick up the [LASARS] assessments for example and go with it"* (Senior manager #3, Site B, Phase 1).

In addition, service managers and practitioners in seven areas stressed that the information obtained through the LASARS assessment may not always be considered reliable. This was occasionally attributed to the skills of the assessor but, more importantly, it was felt that service users may not provide assessors with accurate or complete information initially, and may only reveal more information once they had established a relationship with a practitioner[18].

[18] It is worth noting that in instances where service users divulged additional information when already in treatment, it was generally not possible to retrospectively amend the initial assessment and update the tariff accordingly.

Commissioners and practitioners in three sites expressed concern that important questions were not included in the complexity tool. The most commonly mentioned missing component were questions and considerations around mental health and social care indicators. The complexity tool was considered to have been developed with primarily opiate users in mind, and was less suited to users of other drugs or alcohol. As a consequence, there was some uncertainty about the extent to which the complexity levels of non-opiate users were assessed correctly, thus hampering the ability of providers to achieve outcomes.

Service managers and practitioners from six pilot areas noted that there was a discrepancy between levels of complexity assigned using the tool and how complex service users were in terms of their needs and levels of resources required to intervene with them. In other words, interviewees observed that service users who might have might have scored 'low' on the complexity tool required a comparable amount of work as service users who might have scored higher in their initial assessment. This observation was made by the vast majority of interviewees who commented on this issue.

> *"The tool that they've given us which is purely based on opiate users. Purely and absolutely based on opiate users, down to the fact that you score minus five for cocaine. So if you're a cannabis user who uses cocaine at the weekends, you actually score a minus score and don't get a tariff, because your actual treatment outcome prognosis is that good that you're better than somebody who doesn't use cannabis at all. Then if you're a pregnant cannabis user, you get minus ten!"* (Service manager #4, Site A, Phase 1).[19]

While the core duties of the LASARS assessors – assessing, tariffing and allocating service users to individual services – were defined consistently across the pilot sites, there appeared to have been some variation with respect to whether, and to what extent, they performed additional duties. This included delivering brief harm minimisation interventions and case management functions. With respect to harm minimisation, all interviewed LASARS assessors and managers confirmed that their teams would provide some basic harm minimisation intervention, such as provision of information, as necessary. It was noted too that assessors themselves occasionally struggled with the limited scope of their role to undertake more in-depth work with service users.

There was also disagreement about the skills and qualifications required of LASARS staff. When asked what would be the ideal skill set to have to work as an assessor, none of the interviewed commissioners stated that a clinical background was a prerequisite. By contrast service managers and practitioners from four sites commented that the absence of a clinical background on the part of LASARS staff was a cause for concern, as assessors were effectively making clinical judgments.

*Implications for future LASARS models*

There appeared to be a consensus that under PbR arrangements, there had to be some mechanism in place to assess the complexity of referrals to treatment and allocate a corresponding financial tariff in a manner that would in some way ensure a degree of independence. To the extent it is possible to categorise the pilots' approach to LASARS, two broad distinctions emerged: the institutional location

[19] The development of the complexity tool was in fact based on the analysis of several years of NDTMS data, including both opiate and non-opiate users. It was intended for use with all (opiate and non-opiate) clients to enable commissioners (in negotiation with the provider) to determine the tariffs paid for the achievement of outcomes in each complexity band. One important limitation was that inevitably not all factors determining a client's complexity could be adequately captured e.g. issues such as dual diagnosis, involvement in sex work, or experience of domestic violence. Some commissioners modified the complexity tool however in an effort to ensure these issues were better accounted for.

of the LASARS assessors and the nature and extent of their clinical input. After the decommissioning of the original LASARS provider in site F, which terminated the only model with a LASARS independent of both commissioners and treatment service providers, two broad models remained. In some areas, LASARS assessors were housed within the commissioning authorities. In the other pilot sites, the LASARS assessment was undertaken by staff belonging to the treatment providers. In the latter instances, commissioners invariably introduced some sort of auditing function to verify the appropriateness of service users' complexity and tariffs.

The second division between the LASARS models was related to the degree of clinical judgement LASARS were expected to exercise when assessing service users. In some settings, LASARS staff were reportedly highly trained clinicians with considerable experience in substance misuse and/or psychosocial interventions. In other areas, the remit of the LASARS team was much more narrowly conceived, and revolved mainly around the administrative requirements of tariffing and signposting people to treatment services, if applicable.

Each model had its perceived advantages and disadvantages. Commissioner-led LASARS staffed with highly trained people often encountered difficulties retaining staff, who may have experienced frustration as a consequence of the lack of in-depth case management work which the role allowed. In addition, their work was often duplicated by treatment services who followed up with their own assessment work. Overall, however, commissioner-led approaches were perceived as representing an additional step in the treatment journey, and one further appointment that had to be negotiated before accessing structured treatment. This arrangement was often credited with increasing waiting times and leading to higher attrition rates.

Provider-led LASARS, by contrast, did not appear to require this additional step in the process, or generate some of the negative impacts associated with commissioner-led approaches. However, since the tariffing was undertaken by the recipients of future outcome payments, some sort of audit function performed by commissioners needed to be incorporated.

There appeared to be agreement that the main source of initial reservation towards having a provider-led LASARS – fear of gaming – was not borne out in reality. This observation was echoed by commissioners and service managers in the sites with provider-led LASARS, none of whom reported any issues with gaming.

The optimal design of the LASARS function will be dependent on local context and the structure of local treatment systems. The importance of relationships between commissioners and providers was highlighted during the evaluation, as were concerns about the extent to which these could be effectively managed in models involving multiple providers delivering treatment.

> *"You've got the LASARs that have got highly qualified, medically trained people, doing very intense assessments. Then you've got less qualified people doing more of a paper process of assessment. They seem to be the ones that are more successful...Yes, they seem to be more successful at retaining staff and less problematic, less costly"* (Policy stakeholder #1, Phase 2).

*Set-up costs for pilot areas*

We contacted local commissioners at each of the pilot sites. Commissioners at six sites provided information on the funding they allocated towards the set-up of PbR. The costs reported by the

commissioners show considerable variation and are determined by local factors such as whether LASARs could be established within the current configuration of services.

In most cases, the costs incurred by commissioners were one-off and related to the establishment of databases, LASARs and transfer of undertakings (TUPE) costs. However, in one case, the commissioner incurred annual data monitoring and management costs over and above pre-PbR spending.

Out of the six areas that responded, five commissioners reported that substantial costs were incurred in setting up and implementing PbR, although, as discussed in the limitations section, it is inherently difficult to distinguish which costs stemmed directly from PbR and which were associated with changes such as retendering and restructuring, some of which may have been planned independently of PbR. The highest additional costs were reported in Site E. Site E established an independent LASARs team and reported that costs of £569,412 were incurred. Site E is an interesting pilot area, as the design of the payment model is the most unique for any pilot areas. Several areas have simply adopted the national outcomes and implemented their own locally determined weightings for these indicators. However, Site E operates a 100% PbR model, but within this model there are twenty-two locally designed indicators, which comprise nearly 50% of total revenue. The majority of these indicators measure processes and represent a more stable source of income for the local provider than some of the nationally agreed indicators such as non re-presentation. Site E has the third smallest treatment population of the eight pilot areas, and the second lowest percentage of crack/opiate users in its population. It may be surprising therefore that it reported the highest set up costs – but these costs likely reflect local practical factors relating to the establishment of LASARs.

Set-up costs were also relatively high in Site H at £454,812. Site H has undergone considerable changes in implementing PbR. First, the provider landscape has altered drastically, reducing from five providers to one. Second, as in Site E, Site H has created many (18) local indicators. These costs were awarded to the prime provider in 2012-13 to assist with TUPE and premises costs. However, the commissioner pointed out that set-up costs have been awarded in the past in this area. LASARs were not established in Site H – their functions were simply absorbed into existing service configurations. Site H has a large treatment population – the largest of any pilot area (2,931 in 2012-13) and just over 75% of its treatment population are opiate/crack users.

One pilot area, Site G, responded to confirm that it did not incur any set-up costs (either within the DAT or awarded externally). Services were recommissioned on 100% PbR, with all costs absorbed into existing arrangements. This was perhaps easier in Site G compared with other pilot areas, as it has a small treatment population: 230 users in treatment in 2012-13 – compared with nearly 2,931 in Site H in the same year. It also has the smallest proportion of its population using opiates/crack.

**Table 16: Characteristics of PbR Pilot Sites**

| Site | % PbR (12-13) | % Att. Fee | Local Indicators | | No of Providers | | Competition | LASAR | Set Up Costs | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | N | % of PbR | Pre-PbR | Post-PbR | | | Systems | LASAR | Misc. | Total |
| **A** | 10 | 0 | 5 | 50 | 2 | 2 | Yes | Provider | - | - | - | - |
| **B** | 30 | 4 | 0 | 0 | 4 | 4 | No | Commissioner | 35,000 | 219, 765 | 1,119 | 36,119 |
| **C** | 20 | 0 | 2 | 6 | 2 | 2 | No | Provider | - | - | - | - |
| **D** | 20 | 18 | 2 | 9 | 2 | 2 | No | Provider | 0 | 233,513 | 0 | 233,513 |
| **E** | 100 | 0 | 22 | 47.5 | 2 | 1 | No | Commissioner | 0 | 569,412 | 0 | 569,412 |
| **F** | 100 | 0 | 0 | 0 | 3 | 2 | No | Commissioner | 70,000 | 0 | 0 | 70,000 |
| **G** | 100 | 28 | 0 | 0 | 3 | 1 | No | DAT | 0 | 0 | 0 | 0 |
| **H** | 25 | 0 | 18 | >5% | 5 | 1 | No | Commissioner | 0 | 0 | 454,812 | 454,812 |

# 4. Implementing and delivering a recovery-orientated treatment system under PbR

The aim of the drug and alcohol recovery PbR pilot was to develop and test new approaches for the commissioning and delivery of drug and alcohol treatment systems which incentivised the achievement of – and rewarded progress towards meeting - designated recovery-orientated outcomes linked to freedom from drug(s) of dependence, reduced offending, and improved health and well-being.

Here we consider the views of stakeholders regarding the approaches taken to implement and deliver a recovery-orientated treatment system under PbR. We also critically assess what were considered to be most effective aspects of the approaches adopted by the pilots and discuss the main challenges encountered in attempting to deliver a recovery-orientated treatment system.

Finally, we draw on analyses of administrative NDTMS and TOP data, together with external datasets in order to assess the impact of the eight pilots on rates of: unplanned discharge from structured treatment; retention; successful completion; abstinence; cessation of injecting; re-presentation; recorded crime; and death.

*Approaches taken to implement and deliver a recovery-orientated treatment system*

In terms of the approaches taken by the pilots to implement and deliver a recovery-orientated treatment system, it is important to note that in at least three sites commissioners, managers and practitioners reported that the focus on delivering recovery-orientated outcomes predated the emphasis placed on this by both the 2010 Drug Strategy and the introduction of PbR. A feature of provision highlighted by commissioner, service manager, practitioner and service user perspectives in five sites was the greater emphasis placed on promoting reduction in opiate substitution treatment (OST) prescription levels to both new and existing service users under PbR.

> *"It was something that our senior leadership team started to talk about quite some time ago…Probably about a year to 18 months before the Drug Strategy came out, we were talking about recovery champions, and the need to identify people's social recovery capital and getting families involved"* (Service manager #3, Site A, Phase 1).
>
> *"But I personally, and this is a personal view, I don't think it's made any difference whatsoever to the way that I work…But then I've always been working to try to get people as far as they could towards abstinence. It's [PbR] made very little difference to me, per se"* (Practitioner focus group #1, Site G, Phase 1).

The greater focus on options like methadone reduction treatment (MRT) was often coupled with a desire to deliver more holistic interventions which addressed broader issues extending beyond substance use and misuse, to encompass broader health and well-being needs too. Service managers and practitioners from all eight sites offered examples of new services that were being offered. Some were related to clinical and psychosocial interventions, for instance in the form of increased emphasis

and greater choice of group work. Other cases involved activities such as creative classes and art sessions.

> *"[Providers have] now been told, 'Actually, all that matters is recovery and reintegration. We're not telling you how to do anything anymore. You've got to achieve the outcomes in here. How you do it is up to you'"* (Commissioner #1, Site E, Phase 1).
>
> *"Any clients that come in they know that they're not going to just be parked on a script. So as soon as they've been titrated they'll know that they'll be on a reduction script. So we're always constantly working towards the goal, working towards reduction and abstinence"* (Service manager #1, Site G, Phase 1).

Attracting and retaining service users was mentioned by interviewees as a key consideration surrounding the expansion of existing provision and introduction of new services. Service managers and commissioners from four sites stated that services had enhanced their efforts to reach out to potential client groups, with the aim of increasing the odds of engaging clients with different forms of support. This is in line with some, but not all, results from the impact evaluation (see Chapter 5), which showed some increases in the rate of treatment retention but also of unplanned discharges compared to non-pilot sites.

Throughcare, aftercare and peer support were seen as particularly important for promoting and sustaining recovery achievements. For sites B and G in particular the provision of ongoing throughcare and aftercare support, post-discharge from structured treatment (via recovery support), was seen by respondents from these sites as being a particularly effective strategy for sustaining progress and minimising chances of re-presentation within 12 months. This observation was echoed by service managers and practitioners who offered examples of a renewed emphasis under PbR on continued provision of support to recently exited clients in site A. Conversely, this kind of support was highlighted by practitioners as being a gap in provision in site E. Similarly, while a focus on approaches such as peer support was identified in some sites as being an enhanced feature of provision under PbR, in others (such as sites A and D) developing effective peer support networks and structures had proven more difficult.

> *"Since the PbR started, providers are laying on more aftercare and recovery support, so when somebody has come out of treatment, actually it's not just treatment's stopped and they are at a loss now. It's actually they can stay, almost on a tier 2 level or peer support level, to actually still have somewhere to go, which will hopefully help them not having to come back to treatment"* (Senior manager #1, Site B, Phase 2).

Some results from the impact evaluation (see Section 5) are consistent with these observations as they indicated an increase in the rate of non-re-presentations among primary drug users in pilot sites who successfully completed treatment relative to non-pilot sites. No significant difference was observed for primary alcohol clients

*Effective aspects of the approaches adopted by the pilots*

Interviewees were asked to reflect on what they considered to be the most effective aspects of the approaches they had adopted when attempting to implement and deliver a recovery-orientated

treatment system under PbR. Interviewees in all pilot sites acknowledged that the introduction of PbR provided a clearer framework which encouraged both service users and providers to consider recovery-orientated goals. This was an opinion expressed by representatives of all interviewed groups (commissioners, senior and service managers, practitioners and service users) alike, though it was not shared universally. This is further borne out by the results of the impact evaluation (see Section 5), which observed a significant increase in abstinence rates among drug users in pilot sites, relative to non-pilot sites. At the same time, pilot sites also recorded a significant decrease in the rate of service users who successfully completed treatment *and* did not re-present relative to non-pilot sites.

> *"We are more motivated by the target to actually get them drug free rather than maintaining them, so we encourage them more. The worker's mind set has changed"* (Practitioner focus group #1, Site E, Phase 1).

Interviewees from sites B, F, G and H remarked upon the greater flexibility they now enjoyed with respect to deciding on the content of the service they provided. According to them, they felt less bound by contractual obligations and commissioners' preferences, and were more empowered to introduce interventions that, in their opinion, worked (or were at least considered worth trialling).

This sentiment was matched by the perspective of commissioners (in sites A, B, C, E, F and G) who stressed that they considered conferring greater freedom onto providers as an integral part of PbR, thereby reducing the need for close day-to-day monitoring and management on their part.

> *"[in the past I was not] able to deliver necessarily what the clients want. Because I have to deliver what my contract says. Now my contract doesn't say anything. I can really deliver what the service users want and that's the difference"* (Service manager #1, Site G, Phase 1).

Alcohol treatment stood out as an area of considerable change relative to pre-pilot provision. Commissioners, service managers and practitioners from sites A, B, D and F perceived the provision of alcohol services as having improved over the course of the pilot, partly as a result of greater emphasis and availability of funding for this support under PbR (nationally the number of primary alcohol clients treated increased by six per cent between 2012/13 to 2013/14: from 108,683 to 114,920).

Five of the eight pilots incorporated alcohol services in the design of their approaches using the national set of outcomes. However, three sites chose a different approach. Site C decided not to include alcohol in their pilot as local circumstances would have necessitated the preparation of a custom-built modelling tool for one year only, which was deemed by the site's representatives to be too big a demand on the central policy team. Site D opted not to include abstinence in the outcome suite of the alcohol part of the pilot because in some cases it was not considered to be an appropriate outcome for this group. And finally, site F employed a locally-designed suite of alcohol outcomes, which was necessitated by the delay in the publication of the national outcomes.

Practitioner interviewees also commented that provision under PbR had tended to communicate clearer expectations of service users around issues like continued use of illicit substances whilst in

receipt of OST. There was reportedly a stronger emphasis on engaging with psycho-social forms of support to enhance the benefits of OST and aid recovery, which were directly attributed to PbR[20].

The increased recovery focus had led to some services developing new approaches and improving areas that were historically considered weak. Evidence collected through interviews with practitioners and service managers suggested that treatment providers had expanded the range of services they offered and had sharpened their focus in areas of previously inadequate provision. For instance, interviewees from site A underlined the importance of supporting and re-assuring people through the transition towards recovery; a focus which had tended to be lacking within services historically. There was some evidence too of a greater willingness among practitioners to explore and discuss any service user anxiety about reducing OST scripting levels.

> *"Even when you went to get your script, it was just like the doctor, 'yes, script, there you go'. If you wanted to stay on the same amount of methadone, didn't want to go down, that was fine. Whereas here, they want to talk to you about it: 'what are your worries about dropping down?' They're more interested"* (Service user focus group #2, Site G).

Commissioners, managers and practitioners from across all eight sites reported that providers were offering more types of services than before the introduction of the pilot. However, it was not always immediately clear whether the introduction of PbR was the driver behind the reported expansion of services. In fact, in several instances, service managers and practitioners stressed that the increased range of provision was a consequence of a previous service redesign which pre-dated or occurred simultaneously with the introduction of PbR.

*Challenges encountered in attempting to deliver a recovery-orientated treatment system*

In contrast to the perceived benefits of PbR discussed above, some interviewed practitioners in half of the eight sites stressed that the pilots had changed little or nothing about the way they worked with service users.

Respondents from across the eight sites were also able to identify a range of challenges they had encountered when attempting to implement and deliver a recovery-orientated treatment system under PbR. Service managers and practitioners frequently offered their criticism of abstinence as a final outcome to which payments were attached. Interviewees pointed out that this was not always an achievable goal for all of their treatment caseloads, nor was it always consistent with service user preferences. This discrepancy was felt to be particularly applicable to alcohol users who were often interested in achieving moderation or controlled drinking, rather than complete abstinence.

[20] Though this renewed focus was attributed to PbR by some respondents, it seems reasonable to assume that the broader policy emphasis on recovery-orientated drug treatment occurring at this time will have influenced this change in approach to some degree.

> *"I think for the older clients who have been in the system a long time, they don't see abstinence as an option. They just argue that they need their script, and it is ridiculous and it is unfair. The new people that are coming in who want recovery, who are very clear in the start that that is what we provide, they have no problem with it. We almost have a two-tier system, although we don't run it as a two-tier system, but there are two extremes of aspiration"* (Practitioner #1, Site G, Phase 2).

In addition, the relapsing nature of dependency was felt by some to be at odds with the notion of a PbR outcome focused on re-presentation. Evidence from retrospective and prospective treatment studies suggest that those who do achieve abstinence or other recovery-orientated outcomes, typically do so after multiple treatment episodes received over many years (Bell, 2012; Strang et al., 2012). Several interviewees who were prescribed OST also reported feeling under pressure to reduce their dosage levels. This was perceived as being a direct consequence of the change in focus of treatment systems following the introduction of PbR in the pilot areas.

> *Q: You feel under pressure now?*
>
> *Male 1: "Yes".*
>
> *Male 2: "They're making you reduce, reduce, reduce and get you out, get you out. You feel like you're…It's not their fault, now you get the feeling that the government's leaning on them, there is money involved, or something like that"* (Service user focus group #3, Site G).

Views were expressed by commissioners, managers and practitioners that the outcomes sought via PbR should have focused more explicitly on those domains which were within the remit of service providers to influence. Examples of issues highlighted during fieldwork as being outside the control of service providers to influence included access to housing, funding for residential rehabilitation and offending behaviour. Among those primary drug clients reporting a housing problem at treatment start (N=16,650), Treatment Outcomes Profile (TOP) data provided no evidence of any significant change in the proportion still experiencing housing problems, comparing the two-year period before and after PbR implementation, in either pilot (from 69% to 65%) or non-pilot sites (from 65% to 64%), and no evidence of any difference between pilot and non-pilot sites (DID aOR 0.77, 95% CI 0.56, 1.07, p=0.12). This was also the case when considering all (new) clients (N=95,586) and controlling for baseline housing problems (DID aOR 0.93, 95% CI 0.77, 1.12, p=0.45).

Practitioners in four pilot areas (B, E, F and H) reported experiencing increased levels of stress and anxiety as a consequence of working within a PbR context and the pressure they felt to deliver these outcomes. This was thought to have impacted negatively on staff retention, and thus the ability of providers to deliver recovery-orientated outcomes.

In addition, concerns were raised by interviewees about how incentivising an abstinence-orientated focus risked fragmenting the treatment system (between those treatment seekers aspiring for abstinence and those not); could increase the risk of drop-out and relapse for the most complex cases; and result in less flexible and responsive forms of provision. In some sites it was evident that a range of established barriers which hamper access to treatment, experienced before the introduction of the pilots, persisted post-PbR implementation. In sites A and F, for example, commissioners, service

managers, practitioners and carers highlighted a range of problems related to: the inaccessibility of support for those living in rural areas; restrictive opening times; the appropriateness of provision/support for women; and the challenges posed by the needs of substance misusers from migrant populations.

> *"Also that was bought up at a meeting last week, that the ethnic diversity of site A as well now. I don't know whether that's specifically the Payment by Result bit, but just looking at the complexity...if the person you're talking to doesn't understand English as their first language...Cultural differences as well. Where we are there are 56 different ethnic minorities...There is a range of cultural factors that services just haven't caught up with yet. We're dealing with people from very different backgrounds from very different areas, and it is very complicated"* (Practitioner focus group #1, Site A, Phase 1).

## 5. Impact of PbR on treatment outcomes

PbR pilot outcome measures included those recorded within treatment via TOP forms. Cases were included in analysis where both a treatment start TOP (within 14 days of treatment start) and a subsequent review TOP (1-6 months following treatment start) were recorded, in order to assess changes in behaviour recorded between these two time points. These data were available within the study period for primary drug clients only.

*Impact of PbR on abstinence rates*lients in non-pilot sites.

Table 17 shows that measured levels of achievement of abstinence between start and review TOP increased from 22% pre-April 2012 to 27% in the pilot period (OR 1.53, 95% CI 1.32, 1.77). The CIs for this change do not bridge the value of 1.0, indicating that the difference is statistically "significant". No significant change was identified within non-pilot sites. Overall, a positive change was observed in pilot sites compared to non-pilot sites (aOR 1.58, 95% CI 1.37, 1.84, p<0.001). Thus, clients in pilot sites were more likely to achieve abstinence (as recorded by TOP) in the pilot phase compared to previously, than clients in non-pilot sites.

**Table 17 Achievement of abstinence recorded at review TOP: Primary drug clients**

| | Pilot | | | Non-pilot | | |
|---|---|---|---|---|---|---|
| Abstinent from all drugs? | Pre n (%) | Post n (%) | aOR pre vs. post [95% CI] | Pre n (%) | Post n (%) | aOR pre vs. post [95% CI] |
| **Yes** | 694 (22) | 892 (27) | 1.53 [1.32, 1.77] | 10,261 (23) | 9,796 (22) | 0.96 [0.91, 1.02] |
| **No** | 2,475 (78) | 2,370 (73) | Ref | 35,095 (77) | 34,606 (78) | Ref |
| **DID aOR** | **1.58 [1.37, 1.84]** | | **p < 0.001** | | | |

*Impact of PbR on injecting behaviour*

Table 18 shows levels of cessation of injecting among those clients identified as injectors at the start of treatment (via TOP form). Cessation of injecting did not change significantly in the pilot phase compared to prior to April 2012 and there was only marginal evidence of a difference in the level of change identified between pilot and non-pilot sites (DID aOR 0.79, 95% CI 0.61, 1.02, p = 0.07).

Table 19 shows the results of a more refined and statistically powerful analysis, which takes account of injecting status at baseline and allows for the possibility that clients shifted their injecting status (from positive to negative or vice versa) during treatment. This suggests a greater difference between pilot and non-pilot sites than the analysis in Table 18: it identified no definitive change in injecting outcomes at follow-up in pilot sites but increased injecting at follow-up in non-pilot sites (aOR 1.17, 95% CI 1.10, 1.25). Overall, whilst injecting outcomes became worse in non-pilot sites they remained relatively stable in pilot sites (DID aOR 0.71, 95% CI 0.60, 0.85, p < 0.001). Note: in this analysis, changes in the numbers of baseline injectors, or in the number who inject at review but not start TOP,

can result in significant differences that are not apparent based on simple comparison of changes in the proportions who inject at review TOP.

**Table 18: Cessation of injecting among baseline injectors recorded at review TOP: Primary drug clients**

| Outcome | Pilot | | | Non-pilot | | |
|---|---|---|---|---|---|---|
| Injector at follow-up? | Pre n (%) | Post n (%) | aOR pre vs. post [95% CI] | Pre n (%) | Post n (%) | aOR pre vs. post [95% CI] |
| **Yes** | 329 (42) | 376 (43) | 0.88 [0.69, 1.14] | 3,814 (41) | 3,982 (44) | 1.12 [1.02, 1.22] |
| **No** | 448 (58) | 507 (57) | Ref | 5,602 (59) | 5,161 (56) | Ref |
| **DID aOR** | **0.79 [0.61, 1.02]** | | **p = 0.07** | | | |

**Table 19: Injecting recorded at review TOP, controlling for injecting at start TOP: Primary drug clients**

| | Pilot | | | Non-pilot | | |
|---|---|---|---|---|---|---|
| Injector at follow-up? | Pre n (%) | Post n (%) | aOR pre vs. post [95% CI] | Pre n (%) | Post n (%) | aOR pre vs. post [95% CI] |
| **Yes** | 479 (15) | 515 (16) | 0.84 [0.70, 1.00] | 5,874 (13) | 6,427 (14) | 1.17 [1.10, 1.25] |
| **No** | 2,692 (85) | 2,750 (84) | Ref | 39,864 (87) | 38,264 (86) | Ref |
| **DID aOR** | **0.71 [0.60, 0.85]** | | **p < 0.001** | | | |

*Impact of PbR on housing problems*

Table 20 shows an assessment of housing problems at TOP review in relation to treatment start, including only on those clients who reported a housing problem at treatment start: thus it reflects resolution of housing problems. The analysis data provides no evidence of any significant change between the reporting periods in either pilot or non-pilot sites, and no evidence of any difference between pilot and non-pilot sites. Although the resolution of housing problems seemed to increase in pilot sites, this was not identified as significant within the adjusted models. An additional analysis (not shown) included all clients, regardless of whether they reported a housing problem at baseline, and so took account of changes (positive *or* negative) in housing between baseline and follow-up: the results of this analysis did not suggest any differences in inference from the main analysis shown in Table 20.

**Table 20: Improvement of housing situation (among those with housing problem at baseline) recorded at TOP review: Primary drug clients**

| | Pilot | | | Non-pilot | | |
|---|---|---|---|---|---|---|
| **Housing problem at follow-up?** | Pre n (%) | Post n (%) | aOR pre vs. post [95% CI] | Pre n (%) | Post n (%) | aOR pre vs. post [95% CI] |
| **Yes** | 336 (69) | 398 (65) | 0.84 [0.62, 1.16] | 5,091 (65) | 5,001 (64) | 1.09 [0.98, 1.21] |
| **No** | 154 (31) | 214 (35) | Ref | 2,699 (35) | 2,757 (36) | Ref |
| **DID aOR** | **0.77 [0.56, 1.07]** | | **p = 0.12** | | | |

*Impact of PbR on treatment completion rates*

*Primary Drug Clients*

Tables 21 and 22 show the levels of successful treatment completion, by new clients within 6 months and 12 months of treatment start respectively. These both show a negative association with completion rates within pilot sites compared to non-pilot sites, the association being comparable at 6 months (DID aOR 0.67, 95% CI 0.60, 0.74, p<0.001) and 12 months (DID aOR 0.70, 95% CI 0.63, 0.79, p<0.001). Figure 1 provides contextual information for this association, whereby non-pilot sites experienced a rise and stabilisation of completion rates over the four years of observation whereas pilot sites saw an exaggeration of an existing decline in completions within the year of pilot initiation. This decline was followed by a slight increase in the second pilot year, but levels of completion in pilot areas remained below those in non-pilot sites and during pre-pilot years. Table 21 shows a significant decrease in completions within pilot sites (aOR 0.68, 95% CI 0.61, 0.75) from 24% to 17% against no identified change in non-pilot sites.

**Table 21: Successful completion of treatment within 6 months of journey start: Primary drug clients**

| Outcome | Pilot | | | Non-pilot | | |
|---|---|---|---|---|---|---|
| **Successful completion** | Pre n (%) | Post n (%) | aOR pre vs. post [95% CI] | Pre n (%) | Post n (%) | aOR pre vs. post [95% CI] |
| **Yes** | 1,960 (24) | 1,283 (17) | 0.68 [0.61, 0.75] | 21,161 (19) | 21,519 (20) | 1.01 [0.96, 1.06] |
| **No** | 6,248 (76) | 6,346 (83) | Ref | 87,689 (81) | 83,646 (80) | Ref |
| **DID aOR** | **0.67 [0.60, 0.74]** | | **p < 0.001** | | | |

**Figure 1: Successful completions within 6 months of treatment start: Primary drug clients**

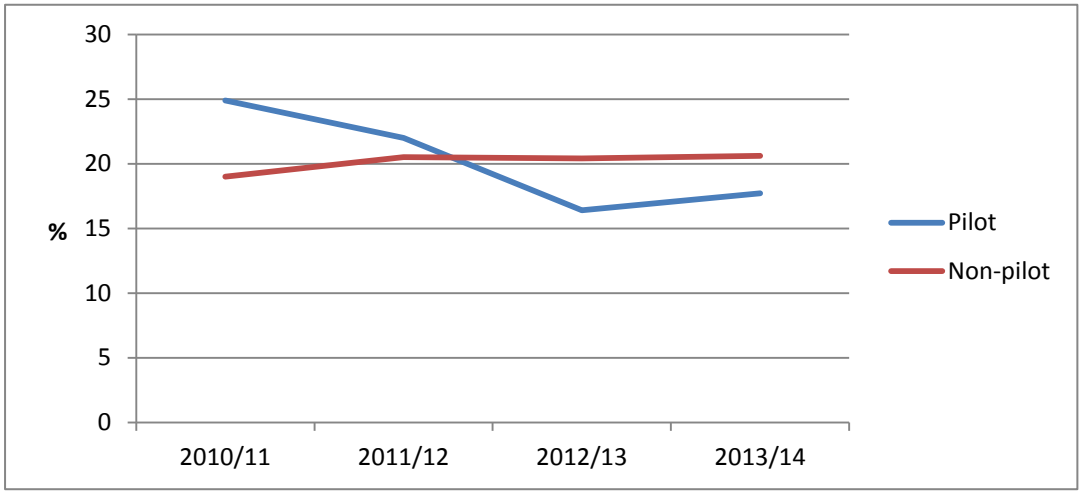



**Table 22: Successful completion of treatment within 12 months of journey start: Primary drug clients**

| Outcome | Pilot | | | Non-pilot | | |
|---|---|---|---|---|---|---|
| **Successful completion** | Pre n (%) | Post n (%) | aOR pre vs. post [95% CI] | Pre n (%) | Post n (%) | aOR pre vs. post [95% CI] |
| **Yes** | 1,800 (34) | 1,265 (24) | 0.69 [0.62, 0.78] | 20,444 (27) | 20,023 (29) | 0.99 [0.94, 1.04] |
| **No** | 3,495 (66) | 3,905 (76) | Ref | 53,933 (73) | 49,189 (71) | Ref |
| **DID aOR** | **0.70 [0.63, 0.79]** | | **p < 0.001** | | | |

Table 23 provides an alternative view of successful completions, based on the time taken to achieve treatment completion rather than completion within a set timeframe. All clients in treatment are included in this analysis, with completions measured in relation to the associated number of person years in treatment within the completed treatment journey. An adjusted Hazard Ratio of 0.78 (95% CI 0.74, 0.82, p<0.001) confirms the negative effect on successful completions within pilot sites compared to non-pilot sites. This is characterised by a reduction in the rate of completions, per year spent in treatment, in pilot sites from 0.32 to 0.25 (aHR 0.80, 95% CI 0.76, 0.85) compared to no proportional change in non-pilot sites, which nevertheless is identified as an increase within the adjusted model (aHR 1.04, 95% CI 1.02, 1.05).

**Table 23: Rate of completions, per person year spent in treatment: Primary drug clients**

| | Pilot | | Non-pilot | |
|---|---|---|---|---|
| | Pre | Post | Pre | Post |
| **Person years in treatment (1000's)** | 15 | 15 | 210 | 210 |
| **Number of successful completions** | 4,616 | 3,815 | 57,880 | 57,735 |
| **Rate of successful completions [95% CI]** | 0.32 [0.31, 0.33] | 0.25 [0.25, 0.26] | 0.27 [0.27, 0.28] | 0.27 [0.27, 0.28] |

| | | | | |
|---|---|---|---|---|
| **aHR (stratified)** | Ref | 0.80 | Ref | 1.04 |
| **[95% CI]** | | [0.76, 0.85] | | [1.02, 1.05] |

**DID aHR (stratified) [95% CI] 0.78 [0.74, 0.82] p<0.001**

Stratified = Pooled analysis after stratifying on DAT, to account for homogeneity

Table 24 develops the analysis presented in Table 23 and provides some evidence that associations with successful completion varied according to time spent in treatment. In non-pilot sites, completions were more likely after April 2012, for those in treatment for two or more years, as indicated by adjusted Hazard Ratios below one and 95% confidence intervals all greater than one. Completions in pilot sites were less likely after April 2012 than previously for those in treatment for less than six months (aHR 0.70 95% CI 0.66, 0.75) or between six months and 12 months (aHR 0.84 95% CI 0.75, 0.93), whereas no association was identified for those in treatment for more than one year. The difference in differences analysis confirmed the negative effect on completions in pilot sites compared to non-pilot sites for those treated less than six months (aHR 0.69, 95% CI 0.64, 0.74) or six months to one year (aHR 0.83, 95% CI 0.74, 0.92). No association was identified for any other time periods.

**Table 24: Rate of completions by time spent in treatment: Primary drug clients**

| | < 6 months | 6 – 12 months | 1-2 years | 2-5 years | 5+ years |
|---|---|---|---|---|---|
| **All** | | | | | |
| Person years | 110 | 60 | 78 | 140 | 59 |
| Successful completions (n) | 60,613 | 26,425 | 16,512 | 15,912 | 4,584 |
| Successful completions (%) | 0.55 | 0.44 | 0.21 | 0.11 | 0.08 |
| | | | | | |
| **Pilot sites pre-April '12** | | | | | |
| Person years | 4 | 2 | 3 | 5 | 1 |
| Successful completions (n) | 2,520 | 943 | 518 | 547 | 88 |
| Successful completions (%) | 0.66 | 0.48 | 0.21 | 0.11 | 0.07 |
| | | | | | |
| **Pilot sites post-April '12** | | | | | |
| Person years | 4 | 2 | 3 | 4 | 3 |
| Successful completions (n) | 1,680 | 830 | 584 | 527 | 194 |
| Successful completions (%) | 0.48 | 0.43 | 0.24 | 0.13 | 0.06 |
| pilot: post vs. pre | | | | | |
| **aHR** | 0.70 | 0.84 | 0.96 | 1.17 | 1.11 |
| **[95% CI]** | [0.66, 0.75] | [0.75, 0.93] | [0.83, 1.11] | [0.99, 1.38] | [0.71, 1.74] |
| | | | | | |
| **Non-pilot sites pre-April '12** | | | | | |
| Person years | 53 | 30 | 41 | 72 | 15 |
| Successful completions (n) | 27,993 | 12,538 | 8,367 | 7,775 | 1,207 |
| Successful completions (%) | 0.53 | 0.42 | 0.21 | 0.11 | 0.08 |
| | | | | | |
| **Non-pilot sites post-April '12** | | | | | |
| Person years | 51 | 27 | 33 | 62 | 39 |

| | | | | | |
|---|---|---|---|---|---|
| Successful completions (n) | 28,420 | 12,114 | 7,043 | 7,063 | 3,095 |
| Successful completions (%) | 0.56 | 0.45 | 0.22 | 0.11 | 0.08 |
| non-pilot: post vs. pre | | | | | |
| **aHR** | 1.02 | 1.01 | 1.04 | 1.15 | 1.19 |
| **[95% CI]** | [1.00, 1.04] | [0.98, 1.04] | [1.00, 1.08] | [1.10, 1.20] | [1.04, 1.36] |
| | | | | | |
| **DID aHR** | 0.69 | 0.83 | 0.92 | 1.02 | 0.93 |
| **[95% CI]** | [0.64, 0.74] | [0.74, 0.92] | [0.79, 1.07] | [0.86, 1.21] | [0.59, 1.49] |

*Primary Alcohol Clients*

Tables 25 and 26 show levels of successful treatment completion for primary alcohol clients, considering completions by new clients within 6 months and within 12 months of treatment start respectively. Rates of completion within 6 months appeared to fall in pilot sites (34% to 31%) whilst rising in non-pilot sites (35% to 36%). However, after adjusting for client characteristics, no significant change was identified in either pilot or non-pilot sites, and no difference in change was identified between them. Table 26 shows a similar reduction in completions within 12 months in pilot sites (from 48% to 44%) against an increase in non-pilot sites (47%to 50%), each of which was identified as significant (aOR 0.81, CI 0.74, 0.89 and aOR 1.10, CI 1.07, 1.14). Overall this is reflected in completions within 12 months becoming less likely in pilot than in non-pilot sites (DID aOR, 95% CI 0.67, 0.81, p < 0.001).

The sensitivity analysis for primary alcohol clients compared the subset of clients within pilot sites who were identified as being involved in the pilots to all clients within non-pilot sites, and identifies a negative effect on completions within 6 months (DID aOR 0.59, 95% CI 0.49, 0.72, p <0.001) within pilot sites. This reflects a rate of completion of 25% among clients identified as PbR cases compared to 31% among all clients in the pilot sites).

**Table 25: Successful completion of treatment within 6 months of journey start – pilot vs non-pilot: Primary alcohol clients**

| | Pilot | | | Non-pilot | | |
|---|---|---|---|---|---|---|
| **Successful completion** | Pre n (%) | Post n (%) | aOR pre vs. post | Pre n (%) | Post n (%) | aOR pre vs. post |
| **Yes** | 2,542 (34) | 2,673 (31) | 0.94 [0.86, 1.03] | 38,665 (35) | 42,583 (36) | 1.00 [0.97, 1.03] |
| **No** | 4,868 (66) | 5,886 (69) | Ref | 73,065 (65) | 75,292 (64) | Ref |
| **DID aOR** | **0.94 [0.87, 1.03]** | | **p =0.18** | | | |

**Table 26: Successful completion of treatment within 12 months of journey start: Primary alcohol clients**

| | Pilot | | | Non-pilot | | |
|---|---|---|---|---|---|---|
| **Successful completion** | Pre n (%) | Post n (%) | aOR pre vs. post | Pre n (%) | Post n (%) | aOR pre vs. post |
| **Yes** | 2,306 (48) | 2,413 (44) | 0.81 [0.73, 0.89] | 35,168 (47) | 38,135 (50) | 1.10 [1.07, 1.14] |
| **No** | 2,539 (52) | 3,084 (56) | Ref | 39,077 (53) | 37,581 (50) | Ref |
| **DID aOR** | **0.73 [0.67, 0.81]** | | **p < 0.001** | | | |

Table 27 provides an alternative view of successful completions for primary alcohol clients, based on the time taken to achieve treatment completion rather than completion within a set timeframe. All clients in treatment are included in this analysis, with completions measured in relation to the associated number of person years in treatment within the completed treatment journey. An adjusted Hazard Ratio of 0.81 (95% CI 0.78, 0.85, p<0.001) confirms the negative effect on successful completions within pilot sites compared to non-pilot sites. This is characterised by a reduction in the

completion rate in pilot sites from 1.17 to 1.02 (aHR 0.84, 95% CI 0.81, 0.88) compared to an increase in the completion rate in non-pilot sites from 1.14 to 1.17 (aHR 1.03, 95% CI 1.02, 1.05).

**Table 27: Rate of completions, per person year spent in treatment: Primary alcohol clients**

| | Pilot | | Non-pilot | |
|---|---|---|---|---|
| | Pre | Post | Pre | Post |
| **Person years in treatment (1000's)** | 4 | 6 | 70 | 75 |
| **Number of successful completions** | 5,054 | 5,690 | 79,936 | 87,626 |
| **Rate of successful completions [95% CI]** | 1.17 [1.14, 1.20] | 1.02 [0.99, 1.04] | 1.14 [1.14, 1.15] | 1.17 [1.16, 1.18] |
| **aHR [95% CI]** | Ref | 0.84 [0.81, 0.88] | Ref | 1.03 [1.02, 1.05] |

DID aHR [95% CI]: 0.81 [0.78, 0.85] **p < 0.001**

Table 28 develops the analysis presented in Table 27 and provides some evidence that successful treatment completion varied according to time spent in treatment. Following the introduction of the PbR pilot phase; clients in non-pilot sites who had been in treatment for less than five years were more likely to complete treatment than were clients prior to the PbR pilot (as indicated by adjusted Hazard Ratios greater than 1.0 with 95% confidence intervals all greater than one). In comparison, clients treated for less than 12 months in pilot sites became less likely to complete their treatment (treated <6 months; aHR 0.84 95% CI 0.80, 0.89: treated 6 – 12 months; aHR 0.78 95% CI 0.72, 0.84), whilst there was no change for those treated for more than one year. The difference in differences analysis confirmed the negative effect on completions in pilot sites compared to non-pilot sites for those treated less than six months (aHR 0.82, 95% CI 0.78, 0.86) or six months to 12 months (aHR 0.75, 95% CI 0.69, 0.81). No association was identified for any other time periods, although the person-years of observation for longer periods are relatively small resulting in a relatively high degree of statistical uncertainty around these estimates.

**Table 28: Rate of completions by time spent in treatment: Primary alcohol clients**

| | < 6 months | 6 months - 1 year | 1-2 years | 2-5 years | 5+ years |
|---|---|---|---|---|---|
| **All** | | | | | |
| **Person years (1000's)** | 100 | 30 | 16 | 8 | 1 |
| **Successful completions** | 112,886 | 44,298 | 16,410 | 4,458 | 254 |
| **Successful completions per person year** | 1.13 | 1.50 | 1.00 | 0.57 | 0.26 |
| **Pilot sites pre-April '12** | | | | | |
| **Person years (1000's)** | 3 | 1 | 0.3 | 0.2 | 0.03 |
| **Successful completions** | 3,249 | 1,333 | 376 | 93 | 3 |
| **Successful completions per person year** | 1.07 | 1.88 | 1.09 | 0.44 | 0.10 |
| **Pilot sites post- April '12** | | | | | |
| **Person years (1000's)** | 4 | 1 | 0.5 | 0.2 | 0.1 |
| **Successful completions** | 3,487 | 1,584 | 530 | 86 | 3 |
| **Successful completions per person year** | 0.92 | 1.43 | 1.13 | 0.56 | 0.04 |
| **aHR pilot sites (post vs. pre) [95% CI]** | 0.84 [0.80, 0.89] | 0.78 [0.72, 0.84] | 1.06 [0.91, 1.24] | 1.23 [0.80, 1.90] | 0.80 [0.04,16.08] |
| **Non-pilot sites pre- April '12** | | | | | |
| **Person years (1000's)** | 45 | 13 | 8 | 4 | 0.3 |
| **Successful completions** | 50,598 | 19,444 | 7,499 | 2,301 | 94 |
| **Successful completions per person year** | 1.13 | 1.48 | 0.98 | 0.58 | 0.36 |
| **Non-pilot sites post-April '12** | | | | | |
| **Person years (1000's)** | 48 | 15 | 8 | 4 | 0.6 |
| **Successful completions** | 55,552 | 21,937 | 8,005 | 1,978 | 154 |
| **Successful completions per person year** | 1.15 | 1.50 | 1.00 | 0.56 | 0.26 |
| **aHR non-pilot sites (post vs. pre) [95% CI]** | 1.03 [1.02, 1.04] | 1.04 [1.02, 1.06] | 1.05 [1.02, 1.09] | 1.08 [1.01, 1.16] | 1.13 [0.72, 1.78] |
| **DID aHR [95% CI]** | 0.82 [0.78, 0.86] | 0.75 [0.69, 0.81] | 1.01 [0.86, 1.18] | 1.14 [0.73, 1.76] | 0.71 [0.03,14.74] |

*Impact of PbR on rates of re-presentation to treatment*

*Primary Drug Clients*

Although successful completion of treatment can be an important measure of treatment success, Public Health Outcomes Framework (PHOF) indicator 2.15 relates to completions and non re-presentations as a stronger indication of recovery, that is, absence of treatment demand following treatment completion is used as a proxy for the absence of relapse. The data available for this report allow limited analysis of this measure as summarised in Table 29. Cases are restricted to clients starting their treatment up to the end of September 2012 to allow for 6 months in treatment and 12 months of follow-up for representations. This cohort may not be representative of the larger, two year cohort, or of all clients in treatment during this period.

As with completions, a negative effect was observed in pilot sites in comparison with non-pilot sites. Among new clients in pilot sites, rates at which treatment was successfully completed and did not result in a re-presentation within 12 months fell significantly (OR 0.77, 95% CI 0.64, 0.93) from 20% pre April 2012 to 14% post April 2012. Levels within non-pilot sites remained relatively stable (16 to 17%). The overall effect in pilot sites compared to non-pilots was identified as significant (DID aHR 0.73, 95% CI 0.61, 0.88, p=0.001). This effect was exaggerated within the sensitivity analysis that required client level identification of PbR status (DID aOR, 0.46, CI 0.36, 0.58, p <0.001).

**Table 29**: **Completion of treatment within six months and non re-presentation to services within twelve 12 months: Primary drug clients**

| Outcome | Pilot | | | Non-pilot | | |
|---|---|---|---|---|---|---|
| Successfully completed and not represented | Pre n (%) | Post n (%) | aOR pre vs. post [95% CI] | Pre n (%) | Post n (%) | aOR pre vs. post [95% CI] |
| **Yes** | 535 (20) | 394 (14) | 0.77 [0.64, 0.93] | 6,163 (16) | 6,054 (17) | 1.06 [0.98, 1.14] |
| **No** | 2,187 (80) | 2,419 (86) | Ref | 33,150 (84) | 28,641 (83) | Ref |
| **DID aOR** | **0.73 [0.61, 0.88]** | | **p = 0.001** | | | |

Table 30 examines the rates of re-presentation among those known to have completed treatment, indicative of relapse. In pilot sites, significantly reduced rates of re-presentation (OR 0.44, 95% CI 0.28-0.69), from 18% to 10%, were observed post April 2012 compared to before. No significant change was identified in non-pilot sites. A significant difference was identified between pilot and non-pilot sites (DID aOR, 0.45, 95% CI 0.28, 0.71, p=0.001) indicating a greater move toward non re-presentation. Pilot sites performed worse in achievement of 'completions with non re-presentation' but, among the subsample of those who completed treatment, performed better in achievement of non re-presentation.

**Table 30: Re-presentations, within 12 months of leaving treatment among those who completed treatment within 6 months: Primary drug clients**

| | Pilot | | | Non-pilot | | |
|---|---|---|---|---|---|---|
| Re-presentations following completion | Pre n (%) | Post n (%) | aOR pre vs. post [95% CI] | Pre n (%) | Post n (%) | aOR pre vs. post [95% CI] |
| **Yes** | 118 (18) | 44 (10) | 0.44 [0.28, 0.69] | 1,081 (15) | 991 (14) | 0.98 [0.87, 1.11] |
| **No** | 535 (82) | 394 (90) | Ref | 6,163 (85) | 6,054 (86) | Ref |
| **DID aOR** | **0.45 [0.28, 0.71]** | | **p = 0.001** | | | |

Table 31 shows rates of re-presentation within 12 months among those who successfully completed treatment, in relation to person years out of treatment. This rate decreased in pilot sites from 0.23 to 0.18 (aOR 0.71, 95% CI 0.62, 0.81), and to a lesser extent (0.21 to 0.20) in non-pilot sites (aOR 0.93, 95% CI 0.90, 0.97). The pilot sites therefore appeared to perform better on this relative to non-pilot sites (DID aOR 0.76, 95% CI 0.66, 0.87, p<0.001).

**Table 31: Rate of representations, for 12 months following treatment completion: Primary drug clients**

| | Pilot | | Non-pilot | |
|---|---|---|---|---|
| | Pre | Post | Pre | Post |
| **Person years (1000's)** | 5 | 3 | 62 | 40 |
| **Number of representations** | 1,100 | 461 | 13,005 | 7,907 |
| **Rate of representations** | 0.23 | 0.18 | 0.21 | 0.20 |
| **[95% CI]** | [0.21, 0.24] | [0.16, 0.19] | [0.21, 0.21] | [0.19, 0.20] |
| **aHR** | Ref | 0.71 | Ref | 0.93 |
| **[95% CI]** | | [0.62, 0.81] | | [0.90, 0.97] |
| **DID aHR [95% CI]** | **0.76 [0.66, 0.87]** | **p < 0.001** | | |

*Primary Alcohol Clients*

Unlike for completions, there were no significant differences observed in pilot sites in relation to non-pilot sites for 'completion and non re-presentation' (Table 32). Among new clients, the proportion that completed treatment within six months and did not re-present to services within twelve months decreased from 26% to 23% in pilot sites, and increased from 27% to 29% in non-pilot sites. After adjustment for client characteristics, the increase in non-pilot sites was identified as statistically significant (aOR, 1.10, 95% CI 1.04, 1.16) but the decrease in pilot sites was not. There was only marginal evidence of a difference in rate of change between pilot and non-pilot sites (DID aOR 0.86, 95% CI 0.74, 1.01, p=0.06). However, selection of pilot site clients based on PbR flag identification resulted in a decrease in pilot sites from 26% to 18% (aOR 0.65, 95% CI 0.53, 0.78) and a significantly worse rate of change in pilot sites compared to non-pilot sites (DID aOR 0.59, 95% 0.49, 0.72, p < 0.001).

**Table 32: Completion of treatment within six months with no re-presentation to services within 12 months: Primary alcohol clients**

| Outcome | Pilot | | | Non-pilot | | |
|---|---|---|---|---|---|---|
| Successfully completed and not represented | Pre n (%) | Post n (%) | aOR pre vs. post [95% CI] | Pre n (%) | Post n (%) | aOR pre vs. post [95% CI] |
| **Yes** | 671 (26) | 695 (23) | 0.95 [0.81, 1.11] | 10,460 (27) | 11,291 (29) | 1.10 [1.04, 1.16] |
| **No** | 1,863 (74) | 2,324 (77) | Ref | 27,876 (73) | 27,888 (71) | Ref |
| **DID aOR** | 0.86 [0.74, 1.01] | | p = 0.06 | | | |

Table 33 shows rates of re-presentation within 12 months among primary alcohol clients who successfully completed treatment, in relation to person years in treatment. No substantive or significant change between pre-and post-pilot periods in either pilot or non-pilot sites. Similarly, no difference between pilot and non-pilot sites was identified (DID aOR 0.93, 95% CI 0.83, 1.03, p=0.18).

**Table 33: Rate of representations, for 12 months following treatment completion: Primary alcohol clients**

| | Pilot | | Non-pilot | |
|---|---|---|---|---|
| | Pre | Post | Pre | Post |
| **Person years (1000's)** | 5 | 4 | 72 | 60 |
| **Number of representations** | 911 | 737 | 14,598 | 12,576 |
| **Rate of representations[95% CI]** | 0.20 [0.19, 0.21] | 0.20 [0.19, 0.21] | 0.20 [0.20, 0.21] | 0.21 [0.21, 0.21] |
| **aHR [95% CI]** | Ref | 0.94 [0.84, 1.04] | Ref | 1.01 [0.99, 1.04] |

DID aHR [95% CI]: 0.93 [0.83, 1.03] p = 0.18

Table 34 examines the rates of re-presentation among those known to have completed treatment, indicative of relapse. No change in rates was identified in pilot sites, whereas a reduction was identified in non-pilot sites (aOR 0.89, 95% CI 0.82, 0.96). Note that this is based on an adjusted analysis that takes account of variability in the composition of the client group, thus the apparent increase from 18% to 20% is not reflected in the aHR. No difference was identified between pilot and non-pilot sites (DID aOR, 1.28, 95% CI 0.94, 1.74, p=0.12). However, selection of pilot site clients based on PbR flag identification offered marginal evidence of a worsening in re-presentation rates in pilot sites compared to non-pilot sites (DID aOR 1.50, 95% 1.01, 2.24, p = 0.05).

**Table 34: Re-presentations, within 12 months of leaving treatment among those who completed treatment within 6 months: Primary alcohol clients**

| Outcome | Pilot | | | Non-pilot | | |
|---|---|---|---|---|---|---|
| Representations following completion | Pre n (%) | Post n (%) | aOR pre vs. post [95% CI] | Pre n (%) | Post n (%) | aOR pre vs. post [95% CI] |

| | | | | | | |
|---|---|---|---|---|---|---|
| **Yes** | 138 (17) | 135 (16) | 1.14 [0.84, 1.54] | 2,298 (18) | 2,806 (20) | 0.89 [0.82, 0.96] |
| **No** | 671 (83) | 695 (84) | Ref | 10,460 (82) | 11,291 (80) | Ref |
| **DID aOR** | 1.28 [0.94, 1.74] | | p = 0.12 | | | |

*Impact of PbR on rates of unplanned discharge from treatment*

*Primary Drug Clients*

Tables 35 and 36 show levels of unplanned discharge from treatment, within six and twelve months of treatment start, respectively. This analysis shows a significant increase in unplanned discharges in pilot sites (aOR 1.18, 95% CI 1.08, 1.29) from 29% to 36% compared to no identifiable change in non-pilot sites. The difference in the change between pilot and non-pilot sites was also identified as significant (DID aOR 1.15, 95% CI 1.05, 1.26, p=0.003).

**Table 35: Unplanned discharges within 6 months of journey start: Primary drug clients**

| | Pilot | | | Non-pilot | | |
|---|---|---|---|---|---|---|
| **Unplanned discharge?** | Pre n (%) | Post n (%) | aOR pre vs. post [95% CI] | Pre n (%) | Post n (%) | aOR pre vs. post [95% CI] |
| **Yes** | 2,403 (29) | 2,728 (36) | 1.18 [1.08, 1.29] | 33,683 (31) | 32,341 (31) | 1.02 [0.98, 1.07] |
| **No** | 5,805 (71) | 4,901 (64) | Ref | 75,167 (69) | 72,824 (69) | Ref |
| **DID aOR** | **1.15 [1.05, 1.26]** | | **p = 0.003** | | | |

Table 36 shows a significant increase in unplanned discharges in pilot sites (aOR 1.18, 95% CI 1.06, 1.30) within 12 months, from 39% to 47%, compared to no identifiable change in non-pilot sites. The difference in the change between pilot and non-pilot sites was also identified as significant (DID aOR 1.17, 95% CI 1.05, 1.30, p=0.004).

**Table 36: Unplanned discharge within 12 months of journey start: Primary drug clients**

| | Pilot | | | Non-pilot | | |
|---|---|---|---|---|---|---|
| **Unplanned discharge?** | Pre n (%) | Post n (%) | aOR pre vs. post [95% CI] | Pre n (%) | Post n (%) | aOR pre vs. post [95% CI] |
| **Yes** | 2,057 (39) | 2,407 (47) | 1.18 [1.06, 1.30] | 30,694 (41) | 28,310 (41) | 1.01 [0.96, 1.06] |
| **No** | 3,238 (61) | 2,763 (53) | Ref | 43,683 (59) | 40,902 (59) | Ref |
| **DID aOR** | **1.17 [1.05, 1.30]** | | **p = 0.004** | | | |

*Primary Alcohol Clients*

Table 37 shows unplanned discharges from treatment for primary alcohol clients. These show that the levels of unplanned discharges within six months fell in both pilot (aOR 0.88, 95% CI 0.81, 0.86) and non-pilot sites (aOR 0.87, 95% CI 0.84, 0.90), with no difference identified between them (DID aOR

0.94, 95% CI 0.87, 1.03, p =0.18**).** The sensitivity analysis gave a clearer indication of a greater increase in retentions in pilot sites (DID aOR 1.39, 95% CI 1.25, 1.53, p < 0.001).

Table 38 shows that levels of unplanned discharges within 12 months fell in non-pilot sites (aOR 0.87, 95% CI 0.84, 0.91) but not in pilot sites (aOR: 1.07, 95% CI 0.97, 1.18). Comparing the change from pre to post pilot initiation, pilot sites did worse relative to non-pilot sites (DID aOR 1.22, 95% CI 1.11, 1.35, p <0.001).

**Table 37: Unplanned discharge within 6 months of journey start: Primary alcohol clients**

| | Pilot | | | Non-pilot | | |
|---|---|---|---|---|---|---|
| **Unplanned discharge?** | Pre n (%) | Post n (%) | aOR pre vs. post [95% CI] | Pre n (%) | Post n (%) | aOR pre vs. post [95% CI] |
| **Yes** | 2,679 (36) | 2,748 (32) | 0.88 [0.81, 0.96] | 38,988 (35) | 37,437 (32) | 0.87 [0.84, 0.90] |
| **No** | 4,731 (64) | 5,811 (68) | Ref | 72,742 (65) | 80,438 (68) | Ref |
| **DID aOR** | **1.01 [0.93, 1.09]** | | **p = 0.84** | | | |

**Table 38: Unplanned discharges within 12 months of journey start: Primary alcohol clients**

| | Pilot | | | Non-pilot | | |
|---|---|---|---|---|---|---|
| **Unplanned discharge** | Pre n (%) | Post n (%) | aOR pre vs. post | Pre n (%) | Post n (%) | aOR pre vs. post |
| **Yes** | 2,181 (45) | 2,443 (44) | 1.07 [0.97, 1.18] | 31,629 (43) | 29,344 (39) | 0.87 [0.84, 0.91] |
| **No** | 2,664 (55) | 3,054 (56) | Ref | 42,616 (57) | 46,372 (61) | Ref |
| **DID aOR** | **1.22 [1.11, 1.35]** | | **p < 0.001** | | | |

*Impact of PbR on treatment retention rates*

*Primary Drug Clients*

A greater increase in those retained in treatment (Table 39) within six months of treatment start in pilot sites compared to non-pilot sites was identified (DID aOR 1.15, 95% CI 1.05, 1.25, p=0.002). No clear changes in levels of treatment retention at 12 months were identified (Table 40).

**Table 39: Retention within 6 months of journey start: Primary drug clients**

| | Pilot | | | Non-pilot | | |
|---|---|---|---|---|---|---|
| **Retained in treatment?** | Pre n (%) | Post n (%) | aOR pre vs. post [95% CI] | Pre n (%) | Post n (%) | aOR pre vs. post [95% CI] |

| | | | | | | |
|---|---|---|---|---|---|---|
| **Yes** | 3,845 (47) | 3,618 (47) | 1.11 [1.02, 1.21] | 54,006 (50) | 51,305 (49) | 0.97 [0.93, 1.01] |
| **No** | 4,363 (53) | 4,011 (53) | Ref | 54,844 (50) | 53,860 (51) | Ref |
| **DID aOR** | **1.15 [1.05, 1.25]** | | **p = 0.002** | | | |

**Table 40: Retention in treatment within 12 months of journey start: Primary drug clients**

| | Pilot | | | Non-pilot | | |
|---|---|---|---|---|---|---|
| **Retained in treatment?** | Pre n (%) | Post n (%) | aOR pre vs. post [95% CI] | Pre n (%) | Post n (%) | aOR pre vs. post [95% CI] |
| **Yes** | 1,438 (27) | 1,498 (29) | 1.11 [0.98, 1.26] | 23,239 (31) | 20,879 (30) | 0.99 [0.94, 1.04] |
| **No** | 3,857 (73) | 3,672 (71) | Ref | 51,138 (69) | 48,333 (70) | Ref |
| **DID aOR** | **1.12 [0.99, 1.28]** | | **p = 0.08** | | | |

*Primary Alcohol Clients*

Levels of treatment retention within six months increased in both pilot (aOR 1.26, 95% CI 1.15, 1.37) and non-pilot sites (aOR 1.16, 1.12, 1.21), with no difference identified between them (DID aOR 1.08, 95% CI 0.99, 1.18, p = 0.07). At 12 months, levels of treatment retention increased in pilot (aOR 1.74, 95% CI 1.47, 2.06) and non-pilot sites (aOR 1.21, 95% CI 1.13, 1.29), with increased retention being identified as greater within pilot sites (DID aOR 1.44, 95% CI 1.22, 1.70, p < 0.001).

**Table 41: Retention in treatment within 6 months of journey start: Primary alcohol clients**

| | Pilot | | | Non-pilot | | |
|---|---|---|---|---|---|---|
| **Retained in treatment** | Pre n (%) | Post n (%) | aOR pre vs. post [95% CI] | Pre n (%) | Post n (%) | aOR pre vs. post [95% CI] |
| **Yes** | 2,189 (30) | 3,138 (37) | 1.26 [1.15, 1.37] | 34,077 (30) | 37,855 (32) | 1.16 [1.12, 1.21] |
| **No** | 5,221 (70) | 5,421 (63) | Ref | 77,653 (70) | 80,020 (68) | Ref |
| **DID aOR** | **1.08 [0.99, 1.18]** | | **p = 0.07** | | | |

**Table 42: Retentions in treatment within 12 months of journey start: Primary alcohol clients**

| | Pilot | | | Non-pilot | | |
|---|---|---|---|---|---|---|
| **Retained in treatment** | Pre n (%) | Post n (%) | aOR pre vs. post | Pre n (%) | Post n (%) | aOR pre vs. post |

| | | | | | | |
|---|---|---|---|---|---|---|
| **Yes** | 358 (7) | 641 (12) | 1.74 [1.47, 2.06] | 7,448 (10) | 8,237 (11) | 1.21 [1.13, 1.29] |
| **No** | 4,487 (93) | 4,856 (88) | Ref | 66,797 (90) | 67,479 (89) | Ref |
| **DID aOR** | **1.44 [1.22, 1.70]** | | **p < 0.001** | | | |

*Effects of PbR on the volume of individuals in substance misuse treatment and their associated costs*

*Effect on per-client costs*

Table 43 shows three models for annual per client costs for drugs and alcohol. For drugs, the estimate on the difference-in-differences term in each of the three models indicates that average client costs are between 13 and 14 percentage points higher in pilot areas as a result of the introduction of the pilot scheme ($p < 0.001$). The estimate on the pilot dummy variable indicates that the pilots, on average, have lower per client costs by between 11 and 12 percentage points ($p < 0.001$). The estimate on the year dummies indicates that costs in 2011-12 were not significantly different from 2010-11, and that costs in 2013-14 were between 10 and 14 percentage points higher than in 2010-11 ($p < 0.001$).

**Table 43: Regression analyses - client costs: all pilot and non-pilot areas**

| | Drugs | | | Alcohol | | |
|---|---|---|---|---|---|---|
| | **1** | **2** | **3** | **1** | **2** | **3** |
| DiD | 0.135*** | 0.133*** | 0.140*** | 0.0554** | 0.0420* | 0.0777** |
| | [9.37] | [9.55] | [13.64] | [2.59] | [1.97] | [2.62] |
| Year=2011/2 | -0.000965 | -0.000626 | -0.00393 | 0.000952 | 0.00877 | -0.0545*** |
| | [-0.24] | [-0.16] | [-1.16] | [0.13] | [1.23] | [-4.90] |
| Year=2013/4 | 0.105*** | 0.106*** | 0.142*** | -0.121*** | -0.111*** | -0.230*** |
| | [25.31] | [25.90] | [43.85] | [-17.10] | [-15.64] | [-21.09] |
| Pilot | -0.116*** | | -0.108*** | -0.0418** | | -0.194*** |
| | [-14.13] | | [-14.85] | [-3.07] | | [-9.56] |
| Currently injecting | 0.208*** | 0.186*** | 0.135*** | - | - | - |
| | [54.38] | [48.76] | [46.90] | - | - | - |
| NFA | -0.0281*** | -0.0206*** | 0.0111*** | 0.264*** | 0.256*** | 0.401*** |
| | [-6.99] | [-5.17] | [3.36] | [33.76] | [33.12] | [35.62] |
| Length of problem | 0.00902*** | 0.00948*** | 0.00732*** | 0.0147*** | 0.0159*** | 0.0173*** |
| | [34.26] | [36.41] | [36.88] | [29.28] | [31.85] | [17.44] |
| Use of benzos | 0.301*** | 0.267** | 0.229*** | -0.0394 | -0.0688 | 0.391 |
| | [3.29] | [2.96] | [4.61] | [-0.14] | [-0.24] | [1.27] |
| Use of opiates | 1.535*** | 1.514*** | 1.269*** | - | - | - |
| | [279.64] | [268.06] | [195.16] | - | - | - |
| Use of crack | 0.384*** | 0.461*** | 0.479*** | - | - | - |
| | [31.10] | [36.74] | [26.53] | - | - | - |
| Use of opiates & crack | -0.383*** | -0.391*** | -0.447*** | - | - | - |
| | [-29.72] | [-29.98] | [-24.43] | - | - | - |
| Age | 0.0414*** | 0.0403*** | 0.0348*** | 0.0353*** | 0.0332*** | 0.0380*** |
| | [33.26] | [32.66] | [33.87] | [22.82] | [21.73] | [14.42] |
| Age squared | - | - | - | - | - | - |
| | [-32.97] | [-31.58] | [-34.09] | [-29.42] | [-29.38] | [-19.58] |

| | | | | | | |
|---|---|---|---|---|---|---|
| Female | 0.129*** | 0.127*** | 0.0894*** | 0.135*** | 0.132*** | 0.0884*** |
| | [34.62] | [34.76] | [30.76] | [23.02] | [22.92] | [9.79] |
| Observations | 505163 | 505162 | 505163 | 258435 | 258252 | 258435 |
| Adj. R-squared | 0.247 | 0.279 | | 0.016 | 0.055 | |

Notes: t-ratios in [brackets]. ]. * indicates $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$ Models 1, 2, 4 and 5 are OLS estimates for the inverse hyperbolic sine transformation of client costs. Models 2 and 5 contain DAT fixed effects. Models 3 and 6 are estimated using negative binomial regression.

Each of these findings reflect the trends described in the Appendix – costs per client were lower in pilot areas in 2010-11, costs increased across all areas in 2013-14 compared with 2010-11, but the increase in costs was much greater in the pilot areas. These changes take the pilots from being lower than the non-pilots on average in both 2010-11 and 2011-12, to higher than the non-pilots in 2013-14. These changes are not explained by changes over time in confounding variables. This again reflects the picture shown in the descriptive figures, which showed no indication of significant differential changes in confounding factors over time.

The other explanatory variables contained in the analysis show that those currently injecting have costs that are between 14 and 21 percentage points higher. This is consistent with injecting being indicative of more problematic drug misuse. For each additional year passed since an individual's first use of their problem drug, costs are between 0.7 and 0.9 percentage points higher ($p < 0.001$). This shows that the number of years since first use (as shown in Figure 22) captures more than just correlation with age – it also contains information relating to complexity associated with having a more longstanding addiction problem.

In terms of primary drug(s) of dependence, mean costs for users of benzodiazepines are between 23 and 30 percentage points higher than for non-users ($p < 0.001$). Mean costs for users of opiates are between 127 and 154 percentage points higher than for those using 'other' drugs ($p < 0.001$). Mean costs for users of crack are between 38 and 48 percentage points higher than for those using 'other' drugs ($p < 0.001$), but use of both opiates and crack does not combine to the sum of these effects – and this is reflected in a negative estimate (between -0.383 and 0.447) which shows that use of opiates and crack costs a similar amount to use of opiates only ($p < 0.001$).

The estimates on both the age and age-squared term confirm that the relationship between age and mean costs is described by an inverse U-shape, with treatment costs increasing with each year of age at between 3.5 and 4.1 percentage points, until a maximum at around age 36 – with small decreases for each year thereafter ($p < 0.001$).

Females have considerably higher mean costs compared with males: between 8.9 and 12.9 percentage points higher ($p < 0.001$). This reflects the higher complexity associated with females with addiction problems: whilst there tend to be lower numbers of females with addiction problems, they tend to have higher treatment costs.

The relationship between mean costs and having no fixed abode is unclear – the two OLS models (models 1 and 2) suggest that having no fixed abode implies that mean treatment costs are between 2.8 and 2.1 percentage points lower than for those without an acute need for housing ($p < 0.001$). However, the negative binomial model implies that mean treatment costs are around 1.1 percentage points higher than for those without an acute need for housing ($p < 0.001$). This reflects the unclear picture shown in the Appendix. There are small differences in mean treatment costs by housing need. These differences did not vary systematically by pilot status or over years.

*Alcohol*

For individuals in treatment for alcohol misuse, the OLS model implies that mean treatment costs are 5.5 percentage points higher for pilot areas as a result of the introduction of PbR ($p < 0.01$). However, inclusion of DAT fixed effects dilutes the effect to 4.2 percentage points ($p < 0.05$). These OLS models compare with the negative binomial regression, which yielded an effect size of 7.8 percentage points ($p < 0.01$).

The estimates on the pilot dummy variables in the three models indicate that the pilots, on average, have lower mean costs by between 4.2 ($p < 0.01$) and 19.4 ($p < 0.001$) percentage points. The estimates on the dummy variables for 2013-14 in the three models indicate that mean costs were between 11.1 and 23 percentage points lower in 2013-14 compared with 2010-11. The estimate on the dummy variable for the year 2011-12 in the negative binomial model suggests that costs were around 5.5 percentage points lower in 2011-12 compared with 2010-11 ($p < 0.001$), although this effect is not found for the two OLS models.

These findings in the alcohol models are less stable than is the case for the drugs models, and this is reflected in a much lower adjusted r-squared value (0.016 and 0.055 for alcohol compared with 0.247 and 0.279 for drugs). This is in part explained by two factors – firstly, the lower number of observations (roughly half the amount) and, second, the smaller number of explanatory variables included in the model.

Nonetheless, the broad results are reflective of the trends described in Figure D9 – mean costs are generally lower in pilot areas, costs are decreasing over time, but the decrease in costs is greater in the non–pilot areas in the intervention year compared with the pilot areas.

As was the case for the drugs misuse models, these changes are not explained by changes over time in confounding variables; reflecting the broad story detailed in the descriptive figures, which showed no indication of significant differential changes in confounding factors over time.

The other explanatory variables contained in the analysis show that those reporting an acute housing problem have mean costs that are between 25.6 and 40 percentage points higher ($p < 0.001$).

For each additional year passed since an individual's first use of alcohol, mean costs are between 1.5 and 1.7 percentage points higher ($p < 0.001$). This again shows that the number of years since first use (as shown in Figure 21) captures more than just correlation with age, i.e. the complexity associated with having a more longstanding addiction problem.

The estimates on both the age and age-squared term confirm previous findings (Figure D1that implied that the relationship between age and mean costs is described by an inverse U-shape, with treatment costs increasing with each year of age at between 3.3 and 3.8 percentage points, until a maximum at around age 50 – with very small decreases for each year thereafter ($p < 0.001$).

Females are again shown to have considerably higher mean costs compared with males: between 8.8 and 13.5 percentage points higher ($p < 0.001$). This again reflects the higher complexity associated with females with addiction problems, as previously discussed.

*Robustness Analyses*

We repeated the above analyses for two different comparisons. First, we compared the pilot DATs with a subset of DATs that were similar both in terms of deprivation, and the proportion of the treatment population using opiates/crack; and second, we compared to DATs located in geographical regions in which there was at least one pilot DAT.

**Table 44 Robustness analysis for mean costs**

| | Drugs | | | Alcohol | | |
|---|---|---|---|---|---|---|
| **Comparator** | **1** | **2** | **3** | **1** | **2** | **3** |
| Matched areas | 0.158*** | 0.149*** | 0.188*** | -0.039 | -0.0424 | 0.00584 |
| | [9.89] | [9.63] | [17.23] | [-1.65] | [-1.80] | [0.18] |
| Same region | 0.139*** | 0.141*** | 0.142*** | 0.0745*** | 0.0524* | 0.0869** |
| | [9.42] | [9.94] | [13.52] | [3.39] | [2.39] | [2.84] |

Notes: t-ratios in [brackets]. * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$. Models 1, 2, 4 and 5 are OLS estimates for the inverse hyperbolic sine transformation of mean costs. Models 2 and 5 contain DAT fixed effects. Models 3 and 6 are estimated using negative binomial regression.

When compared with areas matched based on deprivation and the proportion of the treatment population using opiates/crack; we found that for drugs, the estimate on the difference-in-differences term in each of the three models indicates that mean costs were between 14.9 and 15.8 percentage points higher in pilot areas following the introduction of the pilot scheme ($p < 0.001$). When compared with areas within pilot containing regions, we found that for drugs, the estimate on the difference-in-differences term in each of the three models indicates that mean costs are between 13.9 and 14.2 percentage points higher in pilot areas as a result of the introduction of the pilot scheme ($p < 0.001$). These results are similar to the full model.

For alcohol, we did not obtain a statistically significant estimate on the difference-in-differences terms when we compare to matched areas. This may reflect the lower explanatory power and stability of the alcohol model, which is exacerbated by smaller samples (N=93,584) in the matched analysis and reflected in a lower goodness-of-fit compared with the full model (0.013 and 0.053). When compared to areas in the same region, the OLS model shows that mean treatment costs were 7.5 percentage points higher for pilot areas as a result of the introduction of PbR ($p < 0.001$). However, inclusion of DAT fixed effects dilutes the effect to 5.2 percentage points ($p < 0.05$). These OLS models compare with the negative binomial regression, which yielded an effect size of 8.7 percentage points ($p < 0.01$). The goodness-of-fit is higher for the alcohol models matched on region than for the full model, even though the sample size is smaller (167,119 compared with 258,252).

The results for primary drugs were consistent for the robustness analyses compared with the full model. The results for alcohol provided a more mixed picture – one set of models showed no effect whilst the other yielded a significant effect.

*Total costs*

We did not find that participation in the pilot scheme impacted on DATs' total costs (Table 45). Total costs reflect the combined effect of changes in volume and change in mean costs. Whilst we found differential changes in mean costs as a result of the pilot scheme, there were no equivalent changes in volume.

**Table 45: Regression analyses – total DAT costs: all pilot and non-pilot areas**

| | Drugs | | | Alcohol | | |
|---|---|---|---|---|---|---|
| | **1** | **2** | **3** | **1** | **2** | **3** |
| DiD | 0.179 | 0.0104 | -0.0197 | 0.105 | 0.145 | 0.121 |
| | [0.69] | [0.22] | [-0.08] | [0.28] | [1.83] | [0.42] |
| Year=2013/4 | -0.0192 | 0.0227 | -0.0163 | 0.425** | -0.0214 | 0.103 |
| | [-0.13] | [1.49] | [-0.18] | [2.71] | [-0.63] | [1.09] |
| Pilot | 0.372 | - | 0.347 | 0.52 | - | 0.251 |
| | [1.71] | - | [1.86] | [1.82] | - | [1.16] |
| % injecting | -0.742 | -0.6 | -1.056 | - | - | - |
| | [-0.57] | [-1.52] | [-0.94] | - | - | - |
| % NFA | -0.874 | 0.0356 | 0.125 | 1.313 | -1.337* | 0.136 |
| | [-0.65] | [0.10] | [0.12] | [0.56] | [-1.99] | [0.24] |
| Mean length of problem | -0.108 | 0.00464 | -0.0177 | -0.447*** | 0.108** | -0.0794** |
| | [-1.52] | [0.53] | [-0.51] | [-5.46] | [2.62] | [-2.71] |
| % Using benzos | 121.6 | 24.11 | 27.58 | 348.3*** | 36.77 | 109.6 |
| | [1.55] | [1.43] | [0.54] | [3.48] | [0.96] | [1.86] |
| % Using opiates | 5.016*** | -0.758* | 2.774*** | - | - | - |
| | [4.05] | [-2.09] | [4.45] | - | - | - |
| % Using crack | -0.245 | 0.650* | -0.187 | - | - | - |
| | [-0.34] | [2.41] | [-0.39] | - | - | - |
| Mean age | 0.169 | -0.0637*** | 0.0703 | 0.330** | -0.0656 | 0.0552 |
| | [1.90] | [-4.09] | [1.81] | [2.73] | [-1.49] | [1.68] |
| % Female | -0.579 | -1.412* | 0.0201 | -0.0784 | 0.732 | 0.145 |
| | [-0.13] | [-2.09] | [0.01] | [-0.05] | [1.72] | [0.28] |
| Constant | 0.969 | 10.72*** | 3.487** | 1.826 | 7.102*** | 5.667*** |
| | [0.38] | [17.78] | [2.82] | [0.56] | [6.47] | [6.54] |
| Observations | 301 | 300 | 301 | 329 | 327 | 329 |
| Adj. R-squared | 0.261 | 0.993 | - | 0.306 | 0.978 | - |

Notes: t-ratios in [brackets]. ]. * indicates p < 0.05; ** p < 0.01; *** p < 0.001 Models 1, 2, 4 and 5 are OLS estimates for the inverse hyperbolic sine transformation of mean costs. Models 2 and 5 contain DAT fixed effects. Models 3 and 6 are estimated using negative binomial regression.

*Impact of PbR on mortality*

*Primary Drug Clients*

Within pilot sites, a drug related poisoning rate of 1.41 (per 1,000 person years) was observed in the pilot phase compared to 1.71 in the previous two years. In non-pilot sites the rate increased from 1.35 to 1.50. None of these changes in rates of drug related poisoning were identified as statistically significant and no difference was detected between pilot sites and non-pilot sites (Table 46). Similarly no statistically significant change in rates of mortality from causes other than drug related poisoning was observed (Table 47).

**Table 46: Time to drug-related poisoning deaths: Primary drug clients**

| | Pilot | | Non-pilot | |
|---|---|---|---|---|
| | Pre | Post | Pre | Post |
| **Person years in treatment (1000's)** | 31 | 11 | 448 | 154 |
| **Number of DRP's** | 53 | 15 | 603 | 230 |
| **DRP rate per 1,000 person years** | 1.71 | 1.41 | 1.35 | 1.50 |
| **[95% CI]** | [1.31, 2.24] | [0.85, 2.34] | [1.24, 1.46] | [1.32, 1.70] |
| **aHR** | Ref | 0.52 | Ref | 0.84 |
| **[95% CI]** | | [0.25, 1.12] | | [0.69, 1.03] |
| **DID aHR [95% CI]:** | **0.62 [0.28, 1.36] p = 0.24** | | | |

**Table 47: Time to non-drug-related poisoning deaths: Primary drug clients**

| | Pilot | | Non-pilot | |
|---|---|---|---|---|
| | Pre | Post | Pre | Post |
| **Person years in treatment (1000's)** | 31 | 11 | 448 | 154 |
| **Number of non-DRP's** | 107 | 42 | 1,185 | 507 |
| **Non-DRP rate per 1,000 person years** | 3.46 | 3.95 | 2.64 | 3.30 |
| **[95% CI]** | [2.86, 4.18] | [2.92, 5.34] | [2.50, 2.80] | [3.03, 3.60] |
| **aHR** | Ref | 1.05 | Ref | 0.88 |
| **[95% CI]** | | [0.65, 1.69] | | [0.76, 1.01] |
| **DID aHR [95% CI]:** | **1.20 [0.73, 1.96] p = 0.48** | | | |

*Primary Alcohol Clients*

A reduction in mortality rates among primary alcohol clients (Table 48) was observed in pilot (13.5 to 11.5) and non-pilot (12.6 to10.3) sites. This was identified as statistically significant in non-pilot sites only. No difference between pilot and non-pilot sites was identified. Similarly, no difference between pilot and non-pilot sites was identified for external deaths, that is, deaths not attributable to disease, such as accidents or assault.

**Table 48: Time to any death: Primary alcohol clients**

| | Pilot | | Non-pilot | |
|---|---|---|---|---|
| | Pre | Post | Pre | Post |
| **Person years (1000's)** | 18 | 5 | 279 | 70 |
| **Number of deaths** | 243 | 55 | 3,505 | 724 |
| **Rate of deaths per 1,000** | 13.5 | 11.5 | 12.6 | 10.3 |
| **person years [95% CI]** | [11.9, 15.3] | [8.8, 14.9] | [12.2, 13.0] | [9.6, 11.1] |
| **aHR [95% CI]** | Ref | 0.88 | Ref | 0.82 |
| | | [0.65, 1.19] | | [0.76, 0.89] |
| **DID aHR [95% CI]:** | **1.07 [0.78, 1.46] p = 0.67** | | | |

**Table 49: Time to an external (non-disease) cause of death: Primary alcohol clients**

| | Pilot | | Non-pilot | |
|---|---|---|---|---|
| | Pre | Post | Pre | Post |
| **Person years (1000's)** | 18 | 5 | 279 | 70 |
| **Number of deaths** | 57 | 14 | 759 | 184 |
| **Rate of deaths per 1,000** | 3.16 | 2.91 | 2.72 | 2.61 |
| **person years [95% CI]** | [2.44, 4.09] | [1.73, 4.92] | [2.54, 2.92] | [2.26, 3.02] |
| **aHR [95% CI]** | Ref | 0.99 | Ref | 0.99 |
| | | [0.54, 1.79] | | [0.83, 1.16] |
| **DID aHR [95% CI]:** | **1.00 [0.54, 1.86] p = 1.00** | | | |

*Impact of PbR on recorded crime*

*Primary drug clients*

The crude, unadjusted, rate of recorded crime per client (Table 50) increased in the post pilot period compared to the pre-pilot period. However, the adjusted rate ratio shows a decrease in the rate of recorded crimes in pilot sites associated with the post-PbR period (0.89, 95% CI 0.81, 0.97); indicating that pilot sites admitted clients with a greater underlying risk of recorded crimes after the introduction of PbR. The adjusted model identified a significant decrease in pilot sites compared to non-pilot sites (0.89, 95% CI 0.82, 0.98, p=0.02). Similarly, greater reductions were separately identified for acquisitive crimes (0.89, 95% CI 0.80, 1.00, p=0.05) and non-acquisitive crimes (-0.90, 95% CI 0.81, 0.99, p=0.03). Sensitivity analyses provided observations that were reasonably consistent with the main analysis, but at a lower level of statistical significance; the latter is likely to reflect poorer statistical power.

**Table 50: Rate of recorded crimes per person year**: **Primary drug clients**

| Outcome | Pilot | | | Non-pilot | | |
|---|---|---|---|---|---|---|
| | Pre | Post | Adjusted change in rate pre vs. post | Pre | Post | Adjusted change in rate pre vs. post |
| **Rate, crimes [95% CI]** | 1.50 | 1.57 | 0.89 [0.81, 0.97] | 1.63 | 1.68 | 1.00 [0.97, 1.02] |
| **Standard error** | 0.055 | 0.067 | Ref | 0.016 | 0.018 | Ref |
| | | **DID rate ratio** | **0.89 [0.82, -0.98]** | **p=0.02** | | |
| **Rate, acquisitive crimes [95% CI]** | 0.67 | 0.89 | 0.98 [0.87, 1.09] | 0.73 | 0.84 | 1.09 1.06, 1.13] |
| **Standard error** | 0.033 | 0.049 | Ref | 0.010 | 0.012 | Ref |
| | | **DID rate ratio** | **0.89 [0.80, 1.00]** | **p=0.05** | | |
| **Rate non-acquisitive crimes [95% CI]** | 0.82 | 0.67 | 0.85 [0.77, 0.93] | 0.89 | 0.83 | 0.95 [0.92, 0.97] |
| **Standard error** | 0.030 | 0.026 | Ref | 0.009 | 0.009 | Ref |
| | | **DID rate ratio** | **0.**90 [**0.**81, **0.**99] | **p=0.03** | | |

*Primary Alcohol clients*

For primary alcohol clients, no significant change in the rate of crimes per person year was identified (Table 51). The adjusted analysis identified slight evidence of an increase in acquisitive crimes within pilot sites with limited evidence that this was greater than in non-pilot sites (DID rate ratio 1.28, 95% CI 0.99, 1.67, p=0.06). The sensitivity analysis (requiring a PbR flag for inclusion in the pilot cohort) confirmed this result (DID rate ratio 1.63, 95% CI 1.19, 2.23, p=0.002).

**Table 51: Rate of recorded crimes per person year: Primary alcohol clients**

| Outcome | Pilot | | | Non-pilot | | |
|---|---|---|---|---|---|---|
| | Pre | Post | Adjusted change in rate pre vs. post | Pre | Post | Adjusted change in rate pre vs. post |
| **Rate crimes [95% CI]** | 0.47 | 0.51 | 1.03 [0.89, 1.18] | 0.51 | 0.47 | 0.96 [0.92, 1.00] |
| **Standard error** | 0.025 | 0.031 | Ref | 0.008 | 0.008 | Ref |
| | | **DID rate ratio** | **1.07 [0.93, 1.23]** | **p=0.37** | | |
| **Rate acquisitive crimes [95% CI]** | 0.07 | 0.12 | 1.30 [1.01, 1.67] | 0.10 | 0.11 | 1.01 [0.94, 1.07] |
| **Standard error** | 0.007 | 0.015 | Ref | 0.003 | 0.003 | Ref |
| | | **DID rate ratio** | **1.28 [0.99, 1.67]** | **p =0.06** | | |
| **Rate non-acquisitive crimes [95% CI]** | 0.39 | 0.39 | 0.89 [0.78, 1.01] | 0.40 | 0.35 | 0.92 [0.89, 0.95] |
| **Standard error** | 0.022 | 0.023 | Ref | 0.006 | 0.006 | Ref |
| | | **DID rate ratio** | **0.97 [0.85, 1.11]** | **p =0.65** | | |

*Restriction of pilot sample to 2013/14 cohort*

The 2012/13 cohort may not relate to full PbR implementation, but rather reflect a period of development. Consequently, the above analyses were re-run, where possible, with only the 2013/14 treatment cohort contributing to the pilot site sample. This was not possible for any analysis of re-presentation. For primary drug clients, it was notable that, within these analyses, the association between pilot site status and achieving abstinence strengthened (DID aOR 1.70, 95% CI 1.39, 2.07, P<0.001). Additionally, the apparent improvement in injecting outcomes (cessation of injecting at review TOP) in pilot versus non-pilot sites became statistically significant (DID aOR 0.68, 95% CI 0.48, 0.97, p=0.04). All other results closely reflected those of the two year cohort.

For primary alcohol clients, it is of note that the increase in receipt of treatment was lower in pilot sites (DID 1.23, 95% CI 1.01,1.50, p=0.04) despite being greater in the two year cohort. This suggests that the improvement observed related to the 2012/13 cohort rather than to 2013/14. Also, the decrease in unplanned discharges (within six months) was significantly greater in pilot sites (DID aOR, 0.86, 95% CI 0.76, 0.96, p=0.008), an association that was not identified in the two year cohort.

*Effects of PbR on the volume of recorded crime and its associated costs*

The complexity-adjusted differential effect on the number of recorded crimes per client for pilots compared with non-pilots was not significant at the 5% level (-0.114; p=0.051).

Recorded crime was 29.1% higher for males compared to females ($p < 0.001$); and use of opiates and crack increased the likelihood of recorded crime by 42.3% and 26.6% respectively ($p < 0.001$). Previous recorded crime was a very precise predictor of current recorded crime; and previous known offenders were found to be 6.5% more likely to have a crime recorded compared with those without a known offending history ($p < 0.001$).

Recorded crime decreased with age: compared with those aged between 30 and 34 ($p < 0.001$); recorded crime was 49.6% higher for those aged under 20 ($p < 0.001$); 31.2% higher for those aged between 20 and 24 ($p < 0.001$); 16.7% higher for those aged between 25 and 29 ($p < 0.001$); 17.7% lower for those aged between 35 and 39 ($p < 0.001$); 51.9% lower for those aged between 40 and 49; and 103.4% lower for those aged 50 and over ($p < 0.001$).

Recorded crime was 33.4% higher for those currently injecting (at treatment start) compared with those who had previously injected but not in the previous four weeks ($p < 0.001$). For those referred into treatment via the CJS, recorded crimewas 46.1% higher compared to self-referrals ($p < 0.001$). For those referred through the health services, recorded crimewas 20.1% lower compared to self-referrals ($p < 0.001$); and for those referred via drugs services, recorded crime was 10.6% lower than for self-referrals ($p < 0.001$).

Compared with those whose first use of their primary substance was between five and nine years previous: recorded crime was 18.3% higher for those whose first use was less than two years prior; and 7.4% higher for those whose first use was between two and four years prior ($p < 0.001$).

Compared with individuals who reported having no housing problem: recorded crime was 26.2% higher for those reporting an acute housing problem ($p < 0.001$); and 17.8% higher for those with a non-acute housing problem ($p < 0.001$).

*Costs of recorded crime*

There was no change in costs of recorded crime per client following the introduction of PbR.

Previous recorded crime increased current costs of recorded crime by 6.5% ($p < 0.001$). Costs were 60.5% higher for males compared with females ($p < 0.001$). Costs were 14.4% higher for those using opiates and 26.3% higher for those using crack ($p < 0.001$). The same pattern across age groups was found for costs of recorded crime as for number of recorded crimes, with costs decreasing with age across all age groups ($p < 0.001$).

Current injectors incurred 24.8% higher costs compared with previous injectors ($p < 0.001$). Those referred via drug misuse services had 13.1% lower costs compared with self-referrals ($p < 0.001$); and those referred via health services had 20.4% lower costs compared with self-referrals ($p < 0.001$). Individuals referred through the CJS have 46% higher costs compared with self-referrals ($p < 0.001$). Reporting either an acute or less severe housing problem results in higher costs compared with those reporting no problem. Those with an acute problem incur 27.9% higher costs ($p < 0.001$); and those with a less severe problem incur 19.8% higher costs ($p < 0.001$).

**Table 52: Negative Binomial Regression - number of recorded crimes**

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| **DiD** | -0.114<br>[-1.95] | **Mental Health Diagnosis** | -0.00017<br>[-0.54] | **Never** | -0.00822<br>[-0.44] | **5-9yrs** | 0<br>[.] |
| | | **Pregnant** | 0.000331<br>[0.38] | **Previous** | 0<br>[.] | **10-14yrs** | -0.00736<br>[-0.34] |
| **Pre. Vs Post** | -0.00438<br>[-0.30] | **Unemployment** | 0.000589*<br>[2.09] | **Unknown** | 0.166**<br>[3.28] | **15+yrs** | -0.00684<br>[-0.30] |
| **Previous recorded crime** | 0.0649***<br>[100.23] | *Age* | | *Referral Source* | | **Unknown** | 0.0225<br>[0.61] |
| **Gender** | 0.291***<br>[15.68] | **Age < 20** | 0.496***<br>[12.82] | **Drug service** | -0.106***<br>[-4.20] | *Status re children* | |
| **Opiate Use** | 0.423***<br>[19.05] | **Age 20-24** | 0.312***<br>[12.12] | **Health service** | -0.201***<br>[-6.49] | **Lives with children** | -0.0223<br>[-0.94] |
| **Crack Use** | 0.266***<br>[15.91] | **Age 25-29** | 0.167***<br>[7.69] | **Self/family** | 0<br>[.] | **Children live elsewhere** | 0.194***<br>[12.47] |
| **Benzos Use** | 0.0837***<br>[3.33] | **Age 30-34** | 0<br>[.] | **CJS** | 0.461***<br>[27.45] | **No children** | 0<br>[.] |
| **Amphetamine Use** | 0.129***<br>[6.37] | **Age 35-39** | -0.177***<br>[-8.83] | **Other** | 0.0401<br>[1.25] | **Unknown** | 0.157**<br>[3.15] |
| **Cannabis Use** | -0.0103<br>[-0.59] | **Age 40-49** | -0.519***<br>[-17.79] | **Unknown** | 0.580***<br>[6.31] | *Need for housing* | |
| **Previously treated** | -0.000668<br>[-1.68] | **Age 50+** | -1.034***<br>[-12.79] | *Years of dependence* | | **Acute problem** | 0.262***<br>[11.77] |
| | | *Injecting Status* | | **<2 yrs** | 0.183***<br>[6.04] | **Problem** | 0.178***<br>[9.03] |
| **Constant** | -1.223***<br>[-11.11] | **Current** | 0.334***<br>[15.92] | **2-4yrs** | 0.0738**<br>[2.98] | **No Problem** | 0<br>[.] |
| **lnalpha constant** | 1.224***<br>[146.70] | | | | | **Unknown** | -0.0373<br>[-0.70] |
| **No. of observations** | 145457 | | | | | | |

**Table 53: Negative Binomial Regression - offending cost per capita**

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| **DiD** | -0.087<br>[-1.12] | **Mental Health Diagnosis** | 0.000146<br>[0.31] | **Never** | -0.00779<br>[-0.29] | **5-9yrs** | 0<br>[.] |
| | | **Pregnant** | 0.00207<br>[1.64] | **Previous** | 0<br>[.] | **10-14yrs** | -0.0046<br>[-0.15] |
| **Pre. Vs Post** | -0.0744***<br>[-3.54] | **Employment** | 0.000363<br>[0.93] | **Unknown** | 0.0835<br>[1.42] | **15+yrs** | 0.0173<br>[0.50] |
| **Previous recorded crime** | 0.0654***<br>[67.66] | *Age* | | *Referral Source* | | **Unknown** | 0.0735<br>[1.43] |
| **Gender** | 0.605***<br>[23.61] | **Age < 20** | 0.572***<br>[10.94] | **Drug service** | -0.131***<br>[-3.83] | *Status re children* | |
| **Opiate Use** | 0.144***<br>[4.52] | **Age 20-24** | 0.365***<br>[9.76] | **Health service** | -0.204***<br>[-4.62] | **Lives with children** | 0.0187<br>[0.58] |
| **Crack Use** | 0.263***<br>[11.33] | **Age 25-29** | 0.187***<br>[6.08] | **Self/family** | 0<br>[.] | **Children live elsewhere** | 0.298***<br>[13.09] |
| **Benzos Use** | 0.110**<br>[2.96] | **Age 30-34** | 0<br>[.] | **CJS** | 0.422***<br>[17.82] | **No children** | 0<br>[.] |
| **Amphetamine Use** | 0.167***<br>[5.68] | **Age 35-39** | -0.211***<br>[-7.70] | **Other** | 0.105*<br>[2.22] | **Unknown** | 0.183**<br>[2.65] |
| **Cannabis Use** | 0.00898<br>[0.36] | **Age 40-49** | -0.539***<br>[-11.60] | **99** | 0.532***<br>[4.85] | *Need for housing* | |
| **Previously treated** | -0.00139**<br>[-2.79] | **Age 50+** | -1.260***<br>[-10.03] | *Years of dependence* | | **Acute Problem** | 0.279***<br>[8.99] |
| | | *Injecting Status* | | **<2 yrs** | 0.108**<br>[2.71] | **Problem** | 0.198***<br>[7.36] |
| **Constant** | 6.453***<br>[43.17] | **Current** | 0.248***<br>[8.62] | **2-4yrs** | 0.00664<br>[0.19] | **No problem** | 0<br>[.] |
| **lnalpha constant** | 3.240***<br>[606.51] | | | | | **Unknown** | 0.0201<br>[0.29] |
| **No. of observations** | 145457 | | | | | | |

*Effects of PbR on volume of drug-related A&E attendances and hospital admissions and associated costs*

Table 54 sets out the results from regression analyses in which: the volume of admissions is the dependent variable in models estimated using negative binomial regression; and the size of the general population is used as the exposure term. We found that the population rate of hospital admissions for drug-related mental and behavioral problems increased 14.9% more for pilot DATs compared with non-pilot DATs after the introduction of PbR ($p < 0.001$). This finding holds for models both including and excluding a measure of the size of the (NDTMS) treatment population. This measure was positively related to the population rate of hospital admissions for both types of diagnosis – potentially capturing prevalence.

The results from regression analyses of cost per admission are presented in Table 55. We found no significant differential change comparing pilot DATs and non-pilot DATs after the introduction of PbR. We then performed analyses of total admission costs to show the combined effects of changes in cost per admission and volume(s) of admissions (Table 56). We found that the cost of hospital admissions for drug-related mental and behavioral problems per head of the general population increased 9.73% more for pilot DATs compared with non-pilot DATs after the introduction of PbR ($p < 0.05$). This reflects the changes in volume shown in Table 56. The finding holds for models both including and excluding a measure of the size of the (NDTMS) treatment population.

**Table 54: Regression analyses of volumes of hospital admissions**

| | Behavioural Problems | | Overdoses | |
|---|---|---|---|---|
| | **1** | **2** | **1** | **2** |
| Difference-in-differences | 0.149*** | 0.149*** | 0.0377 | 0.039 |
| | [0.0209] | [0.0207] | [0.0227] | [0.0227] |
| Population Change/1,000 | -0.000731 | -0.00365 | 0.00644* | 0.00569 |
| | [0.00282] | [0.00280] | [0.00326] | [0.00326] |
| Treatment Population/1,000 | | 9.026*** | | 2.287*** |
| | | [0.160] | | [0.147] |
| Constant | -6.674*** | -6.980*** | -7.841*** | -7.936*** |
| | [0.0475] | [0.0480] | [0.0543] | [0.0547] |
| Dispersion parameter | -1.238*** | -1.385*** | -1.952*** | -1.967*** |
| | [0.0188] | [0.0214] | [0.0349] | [0.0352] |
| Observations | 146,020 | 146,020 | 146,020 | 146,020 |

Notes: Age, Quarter and DAT dummy variables included (not shown); *** $p < 0.001$; ** $p < 0.01$; *$p < 0.05$.

**Table 55: Regression analyses of cost per admission**

| | Behavioural Problems | | Overdoses | |
|---|---|---|---|---|
| | **1** | **2** | **1** | **2** |
| Difference-in-differences | 0.00743<br>[0.0429] | 0.00734<br>[0.0429] | -0.0212<br>[0.0530] | -0.0211<br>[0.0530] |
| Population Change/1,000 | -0.00392<br>[0.00437] | -0.0039<br>[0.00437] | -0.0000392<br>[0.00739] | 0.0000284<br>[0.00739] |
| Treatment Population/1,000 | -<br>- | -0.231<br>[0.239] | -<br>- | -0.318<br>[0.340] |
| Constant | 7.207***<br>[0.0986] | 7.215***<br>[0.0986] | 5.428***<br>[0.131] | 5.438***<br>[0.132] |
| Dispersion parameter | 2.020***<br>[0.00490] | 2.020***<br>[0.00490] | 2.404***<br>[0.00510] | 2.404***<br>[0.00510] |
| Observations | 146,020 | 146,020 | 146,020 | 146,020 |

Notes: Age, Quarter and DAT dummy variables included (not shown); *** p < 0.001; ** p < 0.01; *p < 0.05.

**Table 56: Regression analyses total costs of hospital admissions**

| | Behavioural Problems | | Overdoses | |
|---|---|---|---|---|
| | **1** | **2** | **1** | **2** |
| Difference-in-differences | 0.0973*<br>[0.0483] | 0.0942*<br>[0.0467] | -0.0426<br>[0.0572] | -0.0436<br>[0.0567] |
| Population Change/1,000 | -0.0086<br>[0.00541] | -0.00995<br>[0.00540] | -0.0066<br>[0.00855] | -0.00706<br>[0.00854] |
| Treatment Population/1,000 | -<br>- | 11.95***<br>[0.312] | -<br>- | 3.441***<br>[0.353] |
| Constant | 0.915***<br>[0.0996] | 0.506***<br>[0.0921] | -1.486***<br>[0.127] | -1.604***<br>[0.128] |
| Dispersion parameter | 2.102***<br>[0.00480] | 2.098***<br>[0.00479] | 2.455***<br>[0.00506] | 2.455***<br>[0.00505] |
| Observations | 146,020 | 146,020 | 146,020 | 146,020 |

Notes: Age, Quarter and DAT dummy variables included (not shown); *** p < 0.001; ** p < 0.01; *p < 0.05.

*A&E Attendances*

Table 57 sets out the results from regression analyses in which: the volume of attendances is the dependent variable in models estimated using negative binomial regression; and the size of the general population is used as the exposure term. We found that the population rate of A&E attendances for social problems increased between 7.5% and 7.7% more for pilot DATs compared with non-pilot DATs after the introduction of PbR ($p < 0.05$). This finding holds for models both including and excluding a measure of the size of the (NDTMS) treatment population. This measure was shown

to be positively related to the population rate of hospital admissions for both types of diagnosis – potentially capturing prevalence.

Results from regression analyses of cost per attendance are presented in Table 58. We found no significant differential change comparing pilot DATs and non-pilot DATs after the introduction of PbR. We then performed analyses of total attendance costs to show the combined effects of changes in cost per admission and volume(s) of admissions (Table 59); and included the size of the general population as the exposure term. We found that the cost of hospital admissions for drug-related mental and behavioral problems per head of the general population increased between 8.62% and 8.56% less for pilot DATs compared with non-pilot DATs after the introduction of PbR ($p < 0.01$). The finding holds for models both including and excluding a measure of the size of the (NDTMS) treatment population.

**Table 57: Regression analyses of volume(s) of A&E attendances**

| | Poisonings | | Social Problems | |
|---|---|---|---|---|
| | **1** | **2** | **1** | **2** |
| Difference-in-differences | 0.0166<br>[0.0158] | 0.0182<br>[0.0157] | 0.0750*<br>[0.0342] | 0.0769*<br>[0.0341] |
| Population Change/1,000 | -0.00191<br>[0.00199] | -0.0025<br>[0.00198] | -0.0172***<br>[0.00421] | -0.0173***<br>[0.00420] |
| Treatment Population/1,000 | -<br>- | 2.440***<br>[0.105] | -<br>- | 2.920***<br>[0.244] |
| Constant | -9.264***<br>[0.131] | -9.359***<br>[0.131] | -10.53***<br>[0.178] | -10.65***<br>[0.178] |
| Dispersion parameter | -1.692***<br>[0.0141] | -1.708***<br>[0.0142] | -0.726***<br>[0.0211] | -0.737***<br>[0.0212] |
| Observations | 146,020 | 146,020 | 146,020 | 146,020 |

Notes: Age, Quarter and DAT dummy variables included (not shown); *** $p < 0.001$; ** $p < 0.01$; *$p < 0.05$.

**Table 58: Regression analyses of cost per A&E attendance**

| | Poisonings | | Social Problems | |
|---|---|---|---|---|
| | **1** | **2** | **1** | **2** |
| Difference-in-differences | -0.0232<br>[0.0250] | -0.0235<br>[0.0250] | 0.0755<br>[0.0722] | 0.0745<br>[0.0722] |
| Population Change/1,000 | 0.00709*<br>[0.00285] | 0.00730*<br>[0.00285] | 0.0211**<br>[0.00766] | 0.0212**<br>[0.00766] |
| Treatment Population/1,000 | | -1.201***<br>[0.140] | | -0.701<br>[0.447] |
| Constant | 2.164***<br>[0.107] | 2.202***<br>[0.107] | 1.007***<br>[0.198] | 1.031***<br>[0.199] |
| Dispersion parameter | 0.923***<br>[0.00580] | 0.923***<br>[0.00580] | 2.577***<br>[0.00615] | 2.577***<br>[0.00615] |
| Observations | 146,020 | 146,020 | 146,020 | 146,020 |

Notes: Age, Quarter and DAT dummy variables included (not shown); *** $p < 0.001$; ** $p < 0.01$; *$p < 0.05$.

**Table 59: Regression analyses total costs of A&E attendances**

| | Poisonings | | Social Problems | |
|---|---|---|---|---|
| | **1** | **2** | **1** | **2** |
| Difference-in-differences | -0.0862** | -0.0856** | 0.12 | 0.122 |
| | [0.0313] | [0.0311] | [0.0789] | [0.0788] |
| Population Change/1,000 | 0.00266 | 0.00237 | 0.0123 | 0.0124 |
| | [0.00422] | [0.00421] | [0.00829] | [0.00829] |
| Treatment Population/1,000 | | 2.784*** | | 1.842*** |
| | | [0.196] | | [0.502] |
| Constant | -4.917*** | -5.009*** | -6.109*** | -6.169*** |
| | [0.122] | [0.121] | [0.206] | [0.208] |
| Dispersion parameter | 1.129*** | 1.128*** | 2.646*** | 2.646*** |
| | [0.00541] | [0.00541] | [0.00607] | [0.00607] |
| Observations | 146,020 | 146,020 | 146,020 | 146,020 |

Notes: Age, Quarter and DAT dummy variables included (not shown); *** p < 0.001; ** p < 0.01; *p < 0.05.

## *Discussion of findings on impact*

### *Primary Drug Clients*

One of the features that distinguishes pilot site recovery schemes from others is the adoption of LASAR assessments. The role of LASARS was to undertake an initial assessment and assign a complexity tariff that would help determine future outcome payments. Where LASARS were set up independently of providers, this approach confers a level of transparency in that decisions on users' complexity are devolved from service providers. However, concerns have been raised that this has added an additional layer to the process of treatment access. The results presented here indicate that prospective clients may be more likely to not start a treatment intervention following initial assessment within the pilot sites, compared to non-pilot sites or pre-pilot years. This could indicate a greater streamlining of those considered appropriate for treatment but could also indicate greater pre-treatment drop out. Waiting time between initial contact and treatment start was more likely to exceed three weeks within pilot sites and it is possible that these longer waits have contributed to greater drop out. It should also be noted that the effect within the pilots overall appears to be due to the nature of assessment and referral within one particular site.

A key indicator of treatment success is the rate at which clients receive a planned discharge from treatment, having been assessed as drug free or free from drugs of dependence. This indicator is particularly apt within a recovery framework as the first step towards achieving long term abstinence and non-reliance on structured treatment. The overriding finding from the analyses presented here is that clients in pilot sites were less likely to achieve successful treatment completion following the introduction of the PbR pilot. In pilot sites there was a decrease in completion rates in the first pilot year that was not observed in non-pilot sites. Potential improvements were observed in the second year of the PbR pilot but levels of treatment completion remained lower than during the pre-pilot period and lower than those in non-pilot areas. This result was confirmed for new clients within both six and twelve months of treatment start, for all treated clients within a time to event analysis and

among the sensitivity analyses that either identified PbR status at the client rather than DAT level, or concentrated on the 2013/14 cohort.

Clients who do not achieve successful completion within a set timeframe will either have been subject to an unplanned discharge or been retained in treatment. Mirroring the negative association with completions, positive associations with unplanned discharges and retentions within treatment were identified for pilot sites. At twelve months, the association with unplanned discharges remained but that with retention did not.

The combined indicator of 'completed and not re-presented' was significantly poorer in pilot sites, albeit that this finding relates to a limited sample of treatment clients (taken from the first six months of the pilot). Because of the length of follow-up (12 months) required for this measure, it was not possible to examine the 2013/14 treatment cohort. Anecdotal evidence has suggested that the importance attached to non-re-presentations within payment tariffs could have the effect of agencies being less likely than usual to discharge a client unless they were confident that the probability of that client re-presenting was considered low. The data offer some evidence in support of this in that, whilst completing treatment was less likely within pilot sites, subsequent re-presentation was also less likely during the pilot phase. However, this is somewhat countered by the lack of association with treatment retention at twelve months.

Some evidence was identified to suggest a more positive association with in-treatment outcomes within pilot sites compared to non-pilot. Achievement of abstinence from all drugs improved within the pilot phase, and this association was strengthened within the 2013/14 cohort. Additionally, injecting at review TOP decreased at pilot sites relative to non-pilot sites and cessation of injecting increased among the 2013/14 cohort. These analyses are only possible among those who remain in treatment long enough to receive a review TOP but suggest some positive outcomes of the recovery pilots among this sub-sample.

The analysis also identified a relative improvement in the rate of recorded crimes for treatment clients in pilot sites compared to non-pilot sites. It should be noted that the actual rate of recorded crime increased in pilot and non-pilot areas, but in a model which adjusted for client complexity, pilot sites appeared to perform slightly better than non-pilot sites. However, for acquisitive crime, which is the primary target for change among drug using clients, the evidence for a between-sites difference in change was weak, with the 95% confidence interval including zero. The analysis cannot establish a causal link here and, although statistically significant at the conventional 95% level, it is possible that these results are due to chance given no adjustment for multiple hypothesis testing.

No difference in change in mortality rates was detected between pilot and non-pilot sites. As a relatively rare event, the mortality analyses are likely underpowered to identify any difference compared to other outcomes reported here.

*Primary Alcohol Clients*

The effects observed in pilot sites differed between primary drug and alcohol clients. For primary alcohol clients, the proportion of assessed individuals who did not start a treatment intervention

decreased in pilot sites and to a greater extent than in non-pilot sites. At the same time, the proportion waiting more than three weeks to start a treatment intervention decreased in both pilot and non-pilot sites, but to a greater extent in pilot sites. The net result therefore appeared positive for pilot sites in relation to treatment engagement, although the association was less clear in the later (2013/14) pilot cohort.

As with primary drug clients a negative association with successful completions was identified in pilot sites compared to non-pilot. This is supported by a relative movement toward unplanned discharges and retentions within pilot sites compared to no-pilot sites. Within the six month timeframe, these results were only observed in the sample individually identified as PbR clients rather than all clients in one of the pilot sites. The negative association with completions was only identified for those who were in treatment for less than 12 months. Analysis based on clients who were positively identified as PbR clients also identified a negative association with 'completions and non re-presentations' and a potential association with increased re-presentations following treatment completion.

No difference in change in rates of either mortality or recorded crime was identified for primary alcohol clients.

# 6. Stakeholder perceptions of intended and unintended consequences of PbR

Here we present findings from fieldwork across the eight sites about views and experiences of any unintended as well as intended consequences arising from involvement in PbR. The focus was on understanding and exploring stakeholders' perceptions of the extent to which aspects of PbR implementation and delivery had proceeded as anticipated, and any consequences (intended or otherwise) of this. In line with the research questions established for this independent evaluation, the focus was also on identifying – from the perspective of the stakeholders interviewed – any particular sections of the treatment population for whom PbR had had a detrimental effect (e.g. in terms of reduced rates of engagement with services or inferior outcomes achieved), and better understanding some of the reasons for this.

*Intended or anticipated consequences*

When describing the main intended or anticipated consequences experienced during the PbR piloting process, interviewees identified three main themes. These were: impacts on treatment referral and commencement rates; joint working, collaboration and communication; and the challenges of commissioning GP prescribing provision.

Overall, interviewees felt that treatment throughputs had increased following the implementation of PbR. (In fact, there had been a fall in the number of treatment commencements – in both PbR (-6.6%) and non-PbR (-3.2%) areas, comparing the two years pre and post-implementation.) This was attributed in large part to a rise in primary alcohol referrals and the enhanced levels of support in this particular area, as an important intended consequence of the pilot process. This may also be reflected in the fact that the proportion of alcohol clients who engaged with services following an initial assessment increased significantly in the pilot sites relative to non-pilot sites. There was though some uncertainty expressed about the extent to which such increases were a consequence of systems restructuring, rather than any enhanced performance under the pilots. It was also acknowledged that changes in levels of activity could be as much a reflection of more robust data collection, rather than actual changes in throughput, which may have contributed to the above mentioned gap between perception and reality.

> *"Our turnover of alcohol users has significantly increased. It has nearly doubled"* (Senior manager #4, Site A, Phase 2).
>
> *"I think the numbers of people coming into treatment has continued to increase. So we're very, very busy. It's significantly higher than previous years, particularly in terms of people coming in for alcohol problems"* (Commissioner #1, Site G, Phase 2)

Commissioners and senior managers from three sites commented upon how increased activity and engagement were considered an intended and anticipated part of the PbR piloting process since it had contributed towards:

- developing a more rounded and nuanced sense of the treatment population,
- better enabling providers to match appropriate interventions to meet client needs;
- emphasised the importance of data quality and accurate recording of client information, including via review processes; and
- improved joint working between local partners by refining assessments of suitability for treatment.

Accounts from commissioners, service manager and practitioners from six sites spoke of changes in the relationships among providers in their respective pilot areas. Respondents in the main reported improved joint working and collaboration between providers during the piloting process as they sought shared goals and outcomes. Conversely, there was evidence that working relationships, which had historically been strong prior to the introduction of PbR, continued to be so during the life of the pilot, while any enduring problems linked to facilitating effective partnership working simply persisted under payment by results elsewhere.

> *"At the moment we are trying to work out a way of joint working, to make the whole process tie up. That is the good thing about payment by results, it has helped two providers work very closely together. I think that is important to say, the relationship…has always been really good, but it has really made us…It is kind of like, as we are the only two providers, we are the only two that are financially penalised by PbR. Both of us are kind of in the same deep hole, trying to fight together. So it has helped us work a lot closer together to achieve the same outcomes. That has been a positive thing"* (Service manager #1, Site E, Phase 1).

Respondents from Site A, for instance, reported a marked deterioration in the working relationship between providers, at least in the initial phases of the pilot, following a re-commissioning process whereby existing providers who had previously worked in partnership with each other, were now in direct competition for cases under the PbR model which had been developed. This sense of relationship fragmentation following the introduction of the pilots was also expressed by practitioners in sites D and F. Site F's choice of model, with an independently commissioned LASARS, may have strained relationships between providers, while site D underwent a re-commissioning exercise half-way through the pilot period.

In light of the systems change which PbR required across the pilot sites, a common theme to emerge from the interview data was the importance of maintaining open lines of communication between various stakeholders as being a key factor in facilitating successful implementation and delivery. Commissioner, service manager and practitioner perspectives from five areas (B, C, D, F and G) referred to the existence of various platforms which had enabled stakeholders to communicate about issues of importance and relevance. These usually took the form of (inter)agency meetings and were considered to be instrumental in facilitating cooperation between providers, commissioners and other relevant parties. There were also accounts from sites A and B which described forms of communication which were not limited to reaching out to other treatment providers, but extended to engaging with external actors and the wider community.

Commissioners, (both senior and service) managers and practitioners sampled from pilot sites A, B, C, F and H commented upon their experiences and some of the anticipated challenges they had encountered in attempting to bring general practitioners (GPs) into the framework of a PbR-based treatment system. In two areas (A and C) there had initially been some uncertainties as to what the role of GPs would be and where their work would fit within the system. Interviewees also highlighted challenges their organisations had faced when setting up cooperation with GPs. In site F, for instance, initial opposition to the introduction of the pilots had significant implications for the delivery of care in rural parts of this area.

Commissioners in site A reported how, during the initial stages of the pilot, some GPs were reluctant to work with a non-statutory provider. This observation was echoed by a senior manager from the same area. A similar experience was reported by practitioners in site B, who observed how some GPs were unwilling to engage with a particular treatment service. While in site F there were notable differences reported between individual GP surgeries in the extent to which they engaged with substance misusers, with some seemingly reluctant to do so.

> *"Sourcing the right people, like doctors, to provide clinics and developing a prescribing service, which is really challenging and difficult...You are being pitched against the NHS, basically, which is a monster of a business. They are all challenges, but I think we knew that. We knew that that would be the case"* (Senior manager #3, Site A, Phase 2).

In response, treatment services had devised ways to address this uncertainty. In one area (site F), GP contracts stipulated that an addiction worker would visit surgeries to complement GPs' work. In another (site A), a recovery-focused provider made an effort to establish a network of GPs who were willing and able to deliver care in line with the model proposed and developed for PbR.

*Unintended consequences*

In considering some of the main unintended consequences encountered, interviewees raised a number of issues. Prominent among these were:

- the impact of broader austerity measures and structural change to public health and criminal justice systems and their affect in the context of attempts to implement and deliver PbR models;
- the scale of administration, bureaucracy and related costs associated with PbR implementation
- the lack of time to prepare for the transition to PbR pilot status (as discussed above under 'funding models')
- adverse impacts on waiting times, client-practitioner relationships, staff morale and retention, and commissioner-provider relationships; and

- implications of the 'noise' issue for cohort sizes and the share of contract values allocated to outcomes in future PbR models.

These points are discussed in more detail below.

One important unintended consequence associated with the timing of the PbR piloting process, highlighted by commissioners, senior managers and practitioners in sites A, C, E and F, related to the impact of broader austerity measures which had been taking effect during the period of implementation. These measures were considered to have had the effect of reducing both the capacity and willingness of partner agencies to engage with drug and alcohol issues generally, and the PbR agenda around recovery and reintegration more specifically. The launch of the pilots also coincided with a period of considerable structural change to public health and criminal justice systems in England (with the creation of Public Health England and Police and Crime Commissioners).

> *"I think austerity, at the same time, actually pulled all the drawbridges up for engagement within the wider community...I don't think that is necessarily a PbR thing or a restructuring thing, but it's a national agenda thing...Actually, what we have seen is less people engaging within the wider agenda of drugs and alcohol, not more, during this period of time. That actually impacts on our ability within recovery and reintegration"* (Senior manager #4, Site A, Phase 2).
>
> *"I think it has been a challenge that has been done during the complete destabilisation of the NHS and the public sector. It, perhaps, is another thing we didn't anticipate at the beginning: doing this level of change at a time when Clinical Commissioning Groups were being developed and flexing their muscles locally; and we didn't know at the time, obviously, when we were going to move to a different part of the PCT, and then PCTs were going to go altogether and we would move to the County Council"* (Commissioner #2, Site F, Phase 2).

Senior managers in site E, for example, expressed concern that some of the structural and operational implications of introducing PbR (i.e. for pre-existing drug interventions programme provision) were not anticipated or communicated effectively to relevant partners and stakeholders locally.

One prominent unanticipated consequence associated with involvement in the piloting process related to the scale of administration, bureaucracy and related costs arising from maintaining a PbR system (see a discussion of costs under Theme 3). Commissioners, managers and practitioners from all eight pilot sites, as well as policy stakeholders, were asked to compare levels of data administration before and after the launch of the pilot. The consensus was that administrative requirements had increased considerably following the introduction of PbR, far exceeding stakeholders' expectations and placing substantial demands on their time and resources. This observation applied both to the process of setting up the necessary administrative infrastructure for the PbR pilots, and of using this infrastructure while the pilots were in progress. Views were expressed by stakeholders across the board (and corroborated by commissioners) to suggest that this administrative burden was

disproportionately borne by providers (e.g. in terms of the considerable effort and resources devoted to quality assuring data returns), with practitioners commenting upon how the emphasis on data collection had detracted from the time they could spend delivering support and intervening with service users. Higher costs per user were also observed in the economic analysis, which found that following the launch of the pilots average client costs in pilot sites were 13-14% higher for drug clients and 4-7% higher for alcohol users (see Chapter 5).

The link between increased administrative demands and PbR was also acknowledged by representatives from those organisations operating in other areas where drug and alcohol treatment was not commissioned on a PbR basis.

> *"I think that was one of the things we were worried about; how much time the commissioners and providers spend on setting up a new administrative system to deal with making the payments for PbR. I think that's something that was even a bigger job than we anticipated"* (Commissioner #1, Site C, Phase 2).
>
> *"I think it is time consuming in terms of data management. For a commissioner point of view, with the help of the central team, it's doable - definitely doable. We think, probably locally, it's worthwhile. From a local provider perspective, I think it is still a huge burden"* (Commissioner #1, Site B, Phase 2).
>
> *"But yes I think if there was one thing we do know which we never thought would be the case was the insane bureaucracy that's associated with PbR is crazy. We're wasting a whole load of time evidencing and that sort of stuff when we could be doing much more positive things I guess with regards to delivery mechanisms like that. But yes that is a real concern I suppose the amount of bureaucracy it's generated"* (Senior manager #2, Site H, Phase 1).

Commissioners from sites C and F recalled how, at the beginning of the pilots, they had anticipated that the level of their involvement with and oversight of providers would reduce as services were afforded greater flexibility and freedom in how they delivered their outcomes (often referred to as 'commissioning-lite'). In practice this had not happen.

Managers from three sites (A, E and F) commented that there was insufficient time to prepare for the transition to PbR pilot status. As a result, during the initial period following roll-out providers in these areas were not considered to be fully prepared to deliver treatment as planned. The fact that LASARS were not in place before April 1st was highlighted as a contributing factor to a number of the unintended consequences which subsequently unfolded. These related to difficulties encountered in some areas in ensuring that personnel, systems and processes were in place and sufficiently embedded during the early stages of the pilot. Such issues exacerbated concerns about the LASARS function prolonging the time it took to access structured treatment, increasing rates of drop-out, and leading to a deterioration in the quality and timeliness with which information was transferred between various stakeholders. Other factors which hampered effective implementation were linked to unanticipated problems and delays in modelling data to inform the development of the national complexity tools (highlighted by policy stakeholders and senior managers in site C, for example).

Based on accounts from senior managers, practitioners and service users in sites D, E, F and H, in combination these unintended consequences reportedly had the effect of increasing waiting times;[21] fundamentally altering the nature of the interaction between practitioner and service user; reducing the scope to generate recovery capital;[22] and in some instances increasing risk. Upheaval and systems change on this scale had reportedly impacted negatively on staff morale and retention of more experienced staff in at least three areas (as acknowledged from policy stakeholder and practitioner perspectives in sites E and F).

> *"The system change, the things that were involved in getting these things up and running, and the pressures that were put on them in terms of the targets and the payment process, knocked everything in terms of treatment off course. It put the DAT under enormous pressure, it put the providers under enormous pressure, and the consequence of all that is that clients lost out"* (Senior manager #4, Site E, Phase 2).
>
> *"That's the reality. The sad thing is, what PbR does, is it makes me think of the financing side of the treatment. We are doing everything we can to maximize the income potential instead of just focusing on the service users and what they need"* (Senior manager #1, Site D, Phase 2).
>
> *Q: So have you been topping up [on opioid substitution medication] because of that?*
>
> *"I am using in between, yes, on and off sort of thing. I don't feel that I can go down there and have my methadone increased or whatever because I worry they'll end up stopping it. That's how I feel about it now"* (Service user #3, Site H).
>
> *"I've been stable and just doing my prescribed medication for over ten years now. After a couple of false starts of actually getting clean; I've devised a different strategy. I had their word that they weren't going to touch my prescription until certain things had been done. Basically, I went in a fortnight later and they just cut me down and didn't even offer me anything to replace it with. They've totally turned my life upside at a time when I was actually seeing light at the end of the tunnel. My worker has been straight with me and said, 'It's down to money'"* (Service user focus group #1, Site D).

Despite the pilots being by definition a learning process, senior managers from one area in particular (site E) described how the level of scrutiny they were under as participants in PbR had created some considerable (and unanticipated) pressures, which had strained and undermined the working relationship between commissioners and providers. These in turn raised provider fears about any lasting reputational damage for their organisations (an anxiety shared by managers in other areas too).

[21] As reported in Chapter 5, this has been confirmed in the impact analysis (covering all eight sites combined) for drug users but not for alcohol users.

[22] This appears to have been borne out by observed significantly decreased rates of users who have completed treatment *and* did not represent (see Chapter 5) relative to non-pilot sites. However, the rates of non-re-presentation when analyzing only those who completed treatment actually increased relative to non-pilot sites.

Responding to the increased emphasis on new or enhanced forms of intervention, such as alcohol provision and support, was experienced as a steep learning curve for some areas, while a focus on health and well-being meant practitioners skills had to be developed in this area too (e.g. on issues such as sexual health and smoking cessation).

In the treatment models adopted by sites B and E the requirement to place all referrals into structured treatment was considered by senior managers there to have impacted negatively on retention rates, while at the same time PbR programme targets were acknowledged from a policy perspective to have unintentionally created barriers for re-entry to the treatment system for those experiencing relapse. However, as discussed above, this risk did not appear to materialise across the eight pilot sites since rates of re-presentation to services within twelve 12 months of completion of drug treatment increased over the course of the two-year pilot.

Finally, identifying the extent of random variation in local-level datasets was a further unexpected consequence of the piloting process from a policy perspective. This nevertheless helped identify a number of important implications for future iterations of PbR in relation to appropriate cohort sizes and the share of contract values which should be allocated to outcomes. There was also recognition of the potential value of operating PbR systems for a 'shadow period', so that these unintended consequences could better be identified and potentially resolved.

> *"[If] it's a smaller cohort, therefore that increases the amount of noise in it...So there is a direct impact to the providers as to whether or not they get funding based on the data. Therefore, if you are saying that the data actually isn't as robust as you previously thought, in terms of knowing whether or not their performance is good, that's an issue...in terms of, being able to use local level data to pay a provider, based on whether or not they are doing a good job, it would appear is not possible, using the data. Because the noise is so significant that you don't actually know whether they are doing a good job or not...Yes, so our recommendations are that you would not go for 100% PbR...Reducing the percentage doesn't reduce the risk of noise. It doesn't reduce the risk of noise being present, it just reduces the impact of that noise on the providers funding"* (Policy stakeholder #1, Phase 2).

## 7. Exit strategies

While for practitioner interviewees it seemed that the pilot experience generally resulted in a preference not to take PbR forward, commissioners expressed a desire to continue with the approach, subject to some adaptations, drawing upon the lessons learned prior to and since April 2012. By the end of the pilot period (31st March 2014), all but one of the areas (site C) had stated an intention to continue using PbR as a feature of their local commissioning arrangements.

> *"One of the questions I ask when I go to visit is, 'Do you think this is to do with PbR or do you think this is to do with the systems change and focusing people's attention?' Mostly they say it's to do with system change and focusing people's attention. But, having said that, they don't want to drop PbR"* (Policy stakeholder #1, Phase 2).
>
> *"All partners are committed to staying there for the long-term, even though there might be a question about how onerous the PbR risk becomes and whether people are willing to shoulder that...Will we see this kind of PbR pilot again? I'm not sure we will"* (Senior manager #5, Site H, Phase 2).

However, every pilot site that intended to continue with PbR considered making modifications to their respective model used. Below follows a discussion of the most notable developments that had either occurred or had been decided upon by the time the process evaluation fieldwork was finished.

With the exception of site H (which planned to reduce crime outcome payments from 5 per cent to 2.5 per cent of the overall contract value, and restrict this to a small number of locally identified prolific and priority offenders), none of the remaining areas were to continue using recorded crime as a PbR outcome domain.

> *"The crime one, we've agreed that the national is a no-go. The national model does not work full stop. It's not one we're interested in pursuing"* (Commissioner #1, Site E, Phase 2).

With regards to treatment re-presentations, the consensus among pilot sites intending to continue with PbR was to reduce the length of the follow-up period over which this would be measured: from 12 to six months. In addition, site H planned to allocate 30 per cent of the overall contract value to outcome payments, beyond the piloting phase, as opposed to increasing the proportion paid on achievement of outcomes, which had been their original intention.

During 2014-15, by comparison, contracts in site B were extended; essentially meaning that PbR would run as a three-year pilot. The single point of access to the treatment system via LASARS would remain in place, and effectively extend beyond PbR to encompass the entire treatment system. Overall, there was some uncertainty with respect to the extent to which gaming within the treatment system might necessitate the need for a LASARS function independent of treatment providers – with its associated costs and bureaucracy - to continue as a feature of future PbR models.

> *"Well one of the lessons that I think you could learn from it is, is that actually, the fear of gaming isn't necessarily reality. There was a massive fear that gaming was going to be a big issue, which is why they didn't like the idea of putting the LASAR in the provider arm...see the*

*trouble with the LASAR sitting in the provider is you still have to have quite a big audit function in the commissioning arm. So the one that I find more comfortable...the idea of having the light touch LASAR in the commissioners, that seems like quite a nice model"* (Policy stakeholder #1, Phase 2).

Although no changes to existing providers were planned in site B, some service re-configurations were envisaged, and it was anticipated that core funding and tariffs would be reduced. There were some important changes to performance outcomes with both the reliable change indicator and, as noted above, recorded crime being dropped in site B.

*"The only other thing I would say is, under the reliable change indicator, we were expecting that to generate a lot of payments, and it simply hasn't. So that was a bit unexpected, because it's something which we really wanted to be included in the outcome definition set. To be honest with you, it wouldn't have made any difference if it hadn't been included. But I think that's because more are applying to actually moving towards abstinence and successful completion. So it's good, but it was unexpected"* (Commissioner #1, Site B, Phase 2).

New provider contracts were awarded in site E which came into effect from 1st July 2014. Two of the three contracts were based on 100 per cent PbR, including a mixture of outcome and output targets for the recovery and criminal justice providers respectively. Site E was the only area to continue with a 100 per cent PbR model. The remaining sites increasingly questioned the feasibility of continuing with this particular approach beyond the life of the pilot programme. Others also described how they intended to be more selective around the outcomes that would be sought and incentivised in future, with more of an emphasis on process measures which could be more readily quantified using existing systems.

*"I think the newer models for the new tenders that are coming out are much better. I don't know, you get say 50% up front and then you earn the rest. Because from day one there was no money. So it's constantly been a worry"* (Service manager #1, Site G, Phase 2).

*"We're actually really pro it. The model going forward is for…PbR contracts…[but] we are not got hung up at all about outcomes, outputs. We're going very much along the line of performance"* (Commissioner #1, Site E, Phase 2).

*"Successful completions is really the main one that people are paying out on. So the noise is understandably a bit greater for the offending outcome than it is for the successful completion outcome...Yes, so our recommendations are that you would not go for 100% PbR"* (Policy stakeholder #1, Phase 2).

Sixty per cent of the recovery provider's income in site E would be achieved by meeting targets set for first Hepatitis B vaccination (15%), HIV testing (15%), Hepatitis C testing for injecting drug users (15%) and fast track prescribing (15%). Achievement of the recovery provider's tender submission for numbers in treatment and successfully completing treatment accounted for 30 per cent of the

contract value (but this accounted for 50 per cent of the PbR contract for the criminal justice provider). The remaining 10 per cent of the tariff was payable on achievement of the recovery provider's tender submission target for retention in effective treatment (or 50 per cent of the contract value for the criminal justice provider). These targets were to be measured using NDTMS monthly reports in order to determine release of payments. The intention was for there to be a block payment for the first 12 months of the contract for the NDTMS measures.

An interest in persisting with a PbR-based approach to commissioning services continued despite concerns being raised in the latter stages of the pilot about the degree of random variation (or 'noise') apparent within some of the treatment and recorded crime outcomes. One proposed option for minimising the impact or risks associated with this phenomenon was for small areas to combine their PbR initiatives in order to increase the size of the samples they can generate. An alternative, to extend the period over which outcomes were measured to achieve larger cohorts, was considered unfeasible. Another option for future models could be to pay more for process measures, rather than outcomes (as proposed by site E, for example). Such an approach would reduce both the time providers had to wait to be paid and minimise the extent to which 'noise' influenced the relevant data.

> *"Obviously with the noise issue, small amounts of money and probably fewer outcomes...that's one of the things we've said. One of the things you can do is not pay 100% for outcomes"* (Policy stakeholder #1, Phase 2).
>
> *"Well, all you can do really is to make your cohort sizes larger…You either do that by joining together with other local authority areas, to do cross local authority commissioning. But given the sizes, it depends on whether you're Birmingham or Bracknell Forest. But it could mean that you need to get together with five or six other local authority areas, if you're small. Or you can make your cohort larger by doing it over a longer period of years. But again, you know, that is not a very practical suggestion, given that we know that one of the difficulties within payment by results is that providers have to wait a long time to be paid and that's if you do it on an annual basis. So if you do it over more than a year then you're talking about waiting five years for some of your payment or something"* (Policy stakeholder #8, Phase 2).

Ultimately, irrespective of the model of PbR taken forward beyond the period of the pilot, the importance of effective joint working and communication between providers and commissioners was identified as being essential to delivering successful outcomes in any type of arrangement.

> *"Things work best generally, including PbR, where you have this very good, collaborative relationship between your commissioners and providers...So do not use PbR in place of good commissioning. I think some people think that you can use PbR if your commissioners aren't very good, you can use it as a kind of quick fix, and that is certainly not the case. PbR is really complicated and you need good commissioners who understand what they're doing and can spot nuances and look at data and pick up problems, and it's actually quite a full on method of commissioning"* (Policy stakeholder #8, Phase 2).
>
> *"I think where it's working, it's working because of the relationship between commissioners and providers"* (Policy stakeholder #1, Phase 2).

# Discussion

**Statement of the principal findings**

Overall, the evaluation found that the introduction of PbR did not seem to be associated with the desired effects of outcome-based commissioning of drug and alcohol treatment services. Table 60 below summarises outcomes of interest from the impact analysis and shows that while some outcomes (such as abstinence rates) showed improvements relative to non-pilot sites, others, such as unplanned discharges and successful treatment completion, did not.

In interpreting this finding, the limitations of this evaluation – primarily the necessity of aggregating data from all the pilot sites in the impact analysis – should be born in mind. The findings from the interviews and qualitative fieldwork indicated that there were considerable differences in implementation between sites (in particular in relation to funding models). This suggests caution should be exercised in interpreting the results of the quantitative analysis of treatment outcomes, which looks at service users in all sites.

The **funding models** chosen by individual pilot sites varied markedly, both in terms of the proportion of the total contract value subject to PbR and the number of providers commissioned to deliver services. Some interviewees credited the funding models with incentivising outcomes of greatest interest and relevance to various stakeholders, and with improving joint working in their areas. However, PbR funding models were also criticised because of their inherent uncertainty, which made it challenging for providers to forecast and plan their operations. In addition, PbR funding models, particularly those with a large PbR component, were frequently seen as risky, deterring some providers from entering the market and possibly stifling the innovation of existing ones.

The way individual areas operationalised their Local Area Single Assessment and Referral System **(LASARS)** provision varied across the eight sites. While in some cases LASARS assessors were seen to have contributed towards greater integration of treatment services and improved data collection, several criticisms of their work were identified. LASARS were broadly seen as having prolonged the time it took service users to access treatment, thereby increasing the potential for dropouts. The quantitative analysis confirmed an increase in the proportion of primary drug clients waiting more than three weeks to start treatment but a decrease for primary alcohol clients.

Taking all sites together, analysis of NDTMS data (Table 60) identified a significant increase in the proportion of ***those assessed who did not go on to receive structured drug treatment*** in the pilot sites (compared to the two years immediately prior to PbR implementation). There were no changes observed in non-pilot areas. The difference between pilot and non-pilot sites was significant. However, this result appears to be driven by activity within one of the eight pilot sites. The proportion ***waiting over three weeks*** before commencing drug treatment also fell in non-pilot sites but not within pilot sites. Overall, there was a significant change towards waits of over three weeks found across the pilot sites in comparison to non-pilot areas.

For primary alcohol clients, by contrast, there was a significant increase in the proportion of assessed individuals who started a treatment intervention in both pilot and non-pilot sites, with the difference being greater in the pilot sites. Among those who started a structured alcohol treatment intervention,

the proportion waiting over three weeks between initial assessment and start of treatment decreased significantly in both pilot and non-pilot sites. However, this reduction was greater in pilot sites than non-pilot areas.

Table 60: Summary of outcomes

| **Comparison of differences between pre- and post-pilot outcomes between pilot and non-pilot sites** | | |
|---|---|---|
| **Outcome** | **Drugs** | **Alcohol** |
| Process outcomes | | |
| Proportion of people who commence treatment after assessment | Relatively worse change in pilot sites | Relatively better change in pilot sites[1] |
| Proportion of clients waiting more than three weeks | Relatively worse change in pilot sites | Relatively better change in pilot sites |
| Treatment outcomes | | |
| Abstinence rates | Relatively better change in pilot sites | N/A |
| Injecting rates | Relatively better change in pilot sites[2] | N/A |
| Treatment completion rates | Relatively worse change in pilot sites | Relatively worse change in pilot sites[3] |
| Proportion of all clients who both successfully completed AND did not re-present | Relatively worse change in pilot sites | Relatively worse change in pilot sites[4] |
| Proportion of clients known to have successfully completed treatment that did not re-present | Relatively better change in pilot sites | No significant difference[5] |
| Unplanned discharge from treatment | Relatively worse change in pilot sites | Relatively worse change in pilot sites[6] |
| Treatment retention | Relatively larger increase in pilot sites[7] | Relatively larger increase in pilot sites[6] |
| Wider outcomes | | |
| Housing problems | No significant difference | N/A |
| Acquisitive offending | Relatively better change in pilot sites[23] | No significant difference |
| Mortality | No significant difference | No significant difference |
| Costs | | |
| Per-client costs | Relatively worse change in pilot sites | Relatively worse change in pilot sites |
| Total cost | No significant difference | No significant difference |

[1] Not significant on PbR flag identification.
[2] Based on a more refined and statistically powerful analysis, which takes account of injecting status at baseline and allows for the possibility that clients shifted their injecting status (from positive to negative or vice versa) during treatment
[3] When measured after 12 months. No significant difference at 6 months.
[4] Based on PbR flag identification
[5] Marginal evidence of a worse change in pilot sites based on PbR flag identification
[6] When measured after 12 months. No significant difference at 6 months.
[7] When measured after 6 months. No significant difference at 12 months.

According to some practitioners, the introduction of the LASARS made it more challenging for providers to establish relationships with service users, and failed to prevent duplication of work between LASARS and treatment providers. Provider-led LASARS were considered much more effective in mitigating these risks than their commissioner-led counterparts.

The introduction of PbR was broadly acknowledged as having provided a clearer framework for implementing a **recovery-orientated treatment system**, though interviewees in five of the areas pointed out that this focus pre-dated the introduction of PbR. The increased recovery focus had led to some services developing new approaches and improving areas that were historically considered weak, in an effort to reinvigorate aspects of local provision. A feature of provision frequently highlighted was a greater emphasis placed on promoting reduction in prescription levels for opiate substitution treatment to both new and existing service users under PbR. While such steps to reduce prescription levels were pursued as part of an emphasis on achieving absence from all drugs of dependence, concern has been expressed that under-dosing may be a common problem in England and it has been emphasised that receipt of an optimal dose is critical to successful outcomes, including eventual abstinence (ACMD, 2015)

The emphasis on reducing prescribing levels was often coupled with a desire to deliver more psychosocial support and holistic interventions which addressed broader issues extending beyond substance use and misuse, to encompass wider health and well-being needs. However, there was no evidence from TOP data of any differences between pilot and non-pilot sites in the extent to which issues like clients' housing problems had been improved, for example. Interviewees from across all eight sites reported that providers were offering more types of services than before the introduction of the pilot. In particular, alcohol treatment stood out as an area of considerable change relative to pre-pilot provision. At the same time, concerns were expressed about the appropriateness of abstinence and non-re-presentation as outcomes, notably for alcohol treatment, incentivised under PbR, given the chronic, relapsing nature of dependency and the potential for conflict with service users' treatment goals.

Drug treatment ***completion rates*** fell within pilot sites compared to other areas, at both six and 12 months. There was also a negative effect on successful completions within pilot sites compared to non-pilot sites, after controlling for the length of time taken to complete treatment. The effect on completion rates varied according to time spent in treatment. In non-pilot sites, completions were more likely after April 2012 for those in treatment for two or more years. By contrast, completions in pilot sites were less likely after April 2012, but with no association being identified for those in treatment for more than one year.

Rates of structured alcohol treatment completions within six months fell in pilot sites whilst rising elsewhere. However, after adjusting for client characteristics, no significant changes were identified within either group, and no differences detected between them. Similar falls were observed in structured alcohol treatment completion rates within 12 months in pilot sites against an increase in non-pilot sites, reflecting a significant negative association with alcohol treatment completions within 12 months in pilot sites compared to other areas nationally.

Analysis of NDTMS data, looking at the change in performance from the two years prior to PbR implementation to the two years of the pilot, showed that there had been a significant increase in the rate of ***unplanned discharges*** from drug treatment at six months in pilot sites compared to no identifiable change elsewhere. This was also true for rates of unplanned discharge at 12 months. For structured alcohol interventions, levels of unplanned discharges within six months fell in both pilot

and non-pilot sites, with no difference identified between them. By contrast, levels of unplanned discharges from structured alcohol treatment within 12 months fell in non-pilot sites only.

Retention at six months was relatively better for primary drug clients in pilot sites. However, while the ***rate of retention*** in drug treatment at 12 months increased across the pilot sites post-PbR implementation, but fell elsewhere, this difference was not found to be statistically significant. Six-month alcohol treatment retention rates increased in both pilot and non-pilot sites, with no difference identified between them. Conversely, while alcohol treatment retention rates at 12 months had increased in both pilot and non-pilot sites, the scale of change was significantly greater within pilot sites.

Measuring completion of structured alcohol interventions in relation to the associated number of person years in treatment (rather than completion within a set timeframe) confirmed the negative effect on successful completions within pilot sites. As was the case with drug treatment, associations with successful alcohol treatment completion also varied according to time spent in treatment. In non-pilot sites, completions were more likely after April 2012, for those in treatment for up to five years. Alcohol treatment completions in pilot sites were less likely after April 2012 than previously for those in treatment for less than six months or between six months and 12 months.

Reported rates of ***abstinence*** *(from illicit substances and alcohol)*, as measured between start of treatment and review, increased within pilot sites. By contrast, there was no significant change in reported abstinence rates within non-pilot sites. Therefore primary drug clients in pilot sites were more likely to achieve abstinence within treatment following implementation of PbR compared to previously, and relative to clients in non-pilot sites. This is consistent with testimonies from service providers from several areas who reported an increase in the emphasis on abstinence.

Among new clients in pilot sites, rates at which structured drug treatment was successfully completed (free of dependence from any substance) within six months and did not result in a ***re-presentation*** within 12 months fell significantly post-PbR implementation. Levels within non-pilot areas remained stable. The overall (negative) effect in pilot sites on rates of non re-presentation compared to elsewhere was significant.

Conversely, rates of re-presentation among those known to have completed structured drug treatment reduced significantly within pilot areas, with no significant change identified in non-pilot sites. This translated into a significant difference between pilot and non-pilot areas, indicating a relative improvement in pilot sites. This was also true when rates of re-presentation within 12 months among those who successfully completed drug treatment within six months were adjusted for person years out of treatment. This rate decreased in pilot sites, and to a lesser extent elsewhere. The decrease in pilot sites was identified as significant.

The proportion of new primary alcohol clients completing treatment within six months and not re-presenting to services within 12 months also fell in pilot areas, but increased elsewhere. After adjusting for client characteristics, the increase in non-pilot sites was identified as statistically significant, but the fall in pilot sites was not. The difference in the rate of change between pilot and non-pilot sites was however significant. There was no significant change within pilot and non-pilot sites in the rate of re- presentation at 12 months among those who successfully completed structured

alcohol treatment, as measured in terms of person years in treatment. Similarly, no difference between pilot and non-pilot sites was identified using this approach.

Among those clients identified as injectors at the start of treatment, reported ***cessation of injecting*** did not change significantly in the pilot sites compared to the two years prior to pilot initiation, although there was some evidence that pilot sites had a comparatively better trend in injecting cessation. This was also true when examining injecting at review among all clients (injectors or not), whilst controlling for injecting at baseline, with the likelihood of injecting at review reducing in pilot compared to non-pilot sites.

Overall, we found that ***treatment costs per client*** increased significantly following the introduction of PbR. Treatment costs for primary drug users were initially lower in the pilot areas. They had increased in non-pilot areas by 2013-14, but increased by 11% more in the pilot areas. There were similar increases in treatment costs for primary alcohol users, but the results were less stable.

There was marginal evidence of a relative improvement in ***rates of recorded offending*** among primary drug clients in pilot sites compared to non-pilot sites. This change became apparent after allowing for the fact that pilot sites admitted more people with higher risks of offending following the introduction of PbR. The possible reduction in rates of offending was also reflected in the analysis of the ***costs of offending.*** These reduced by 11% in the pilot areas, but the effect was not statistically significant.

The effects of the pilot programme on ***hospital costs*** were mixed. We found a 15% increase in hospital admissions for substance-related behavioural problems in the pilot areas but no effect on hospital admissions for overdoses. There was a decrease in the costs associated with A&E attendances for poisonings and an increase in the costs of attendances for social problems, though the latter was not statistically significant.

The study interviewees perceived three **consequences** of the introduction of the PbR pilots. First, they felt that treatment throughputs had generally increased following the implementation of PbR, although analysis of NDTMS data indicates that there was a decrease in treatment commencements in both pilot and non-pilot sites following the introduction of PbR. Treatment statistics showed no increase in primary drug clients but an increase in primary alcohol clients, which did not appear to be representative of an ongoing trend, in four of the eight pilot sites. Second, respondents in the main reported improved joint working and collaboration between providers during the piloting process, as they sought shared goals and outcomes. Finally, interviewees confirmed that some expected challenges associated with bringing general practitioners into the new PbR model of commissioning had materialised.

By contrast, interviewees acknowledged having underestimated the impact of broader austerity measures and structural change to public health and criminal justice systems during the period of PbR implementation, and the scale of administration, bureaucracy and related costs associated with the introduction of PbR. Furthermore, they noted how the (limited) time available to prepare for the transition to PbR pilot status had unintended consequences further downstream: in some cases impacting negatively on waiting times for treatment, client-practitioner relationships, staff morale and retention, and commissioner-provider relationships.

Finally, with respect to **exit strategies**, for practitioners the experience of the piloting process had generally resulted in a preference not to take PbR forward. This contrasted with commissioners, who expressed a desire to continue with the approach, subject to some adaptations based on the lessons learned prior to and since April 2012. By the end of the pilot period (31st March 2014), all but one of the areas had stated an intention to continue using PbR as a feature of their local commissioning arrangements. An interest in persisting with a PbR-based approach to commissioning services continued despite concerns being raised in the latter stages of the pilot about the ability to robustly measure outcomes to which payments were attached, due to the degree of random variation (or 'noise') apparent within some of the treatment and offending outcomes.

However, the seven areas continuing with PbR anticipated making a number of modifications to their respective models. With the exception of one site, none were to continue using offending as a PbR outcome domain. Only one area was to continue with a funding model where 100 per cent of the contract value was awarded under PbR. The remaining sites increasingly questioned the feasibility of continuing with a 100 per cent PbR funding model beyond the life of the pilot programme.

There was also an intention to be more selective around the measures that would be sought and incentivised in future, with a greater emphasis on process measures. With regards treatment re-presentations, the consensus among pilot sites intending to continue with PbR was to reduce the length of the follow-up period over which these would be measured: from 12 to six months.

Ultimately, irrespective of the model of PbR taken forward beyond the period of the pilot, the importance of effective joint working and communication between providers and commissioners was identified as being essential to delivering successful outcomes in any type of arrangement.

**Strengths and weaknesses of the study**

A key strength was the use of national data covering all substance misuse treatment clients across England. The data have been collected consistently over many years. They were not used explicitly to measure the success of the pilot sites to determine their funding and so are not prone to bias from the reporting requirements of the scheme.

The available data allowed us to examine a wide range of outcomes, some of which were incentivised and some of which were not incentivised. This provides a comprehensive assessment of the impact of the scheme. We were able to examine whether targeting of some indicators had unintended consequences in reducing performance on other metrics.

We were also able to make use of a wide range of variables that predict individual level outcomes and could have confounded estimation of the effect of the scheme on outcomes. We could therefore use these variables to examine whether providers responded to PbR by changing the mix of clients that they accepted into treatment.

Interviews with stakeholders across all sites allowed the research team to collect evidence on the implementation of eight diverse pilot models, all of which adopted different funding models and underwent a different degree and form of (re)structuring their treatment systems in the run-up to the

pilots. This enabled us to complement and provide context for findings from the impact evaluation. In addition, we were able to conduct follow-up interviews with key stakeholders to examine how their experience and perspective evolved over the course of the pilots' implementation.

The stakeholders and key informants interviewed for this study were recruited from several distinct groups, including commissioners, service managers, practitioners etc. This approach ensured that all relevant insights and points of view were taken into consideration by the research team. However, while we conducted a substantial number of interviews with service users and carers, representatives of these two groups were not always in a position to offer evidence pertaining to some research questions.

We were able to examine outcomes in the first year of the scheme and in the second year of the scheme. Impact in the first year may have been muted because of partial implementation. By the second year, the impact of the scheme should have been apparent.

Although only eight sites were part of the formal pilot programme, a number of other areas also adopted payment by results financing schemes. Thus, the comparison of the pilots to the non-pilot sites was contaminated by the voluntary adoption of similar payment schemes in other sites.

We used a robust non-experimental design (difference-in-differences) to estimate the impact of the PbR pilots. This uses data from control sites to net-out the effects of factors that generate a general trend over time. It also allows for time-invariant differences between sites that affect the levels of the outcomes but are not influenced by the adoption of PbR. However, there remains the possibility that the results are biased by non-random selection of sites to participate in the pilot programme. Sites were selected to give reasonable representation of geographical diversity, but it remains possible that the volunteers were on a different trajectory or were more likely to perform better under the proposed scheme. We did not have the statistical power to reliably estimate the impact of individual pilot sites.

**Strengths and weaknesses in relation to other studies**

There are few studies that have examined the impact of introducing payment based on outcomes for drug and alcohol services. None of these was based in the UK.

While there is a substantial literature on pay-for-performance schemes in health settings, the vast majority of these involved payment for process measures of quality rather than outcome. Where outcome indicators are included, these tend to be intermediate measures and accompanied by process measures in linked areas. All of the systematic reviews of pay-for-performance schemes are critical of the strength of the evidence base, primarily because of the non-experimental manner in which these schemes are introduced. The most recent review (Mendleson et al, 2017) concludes that, while many studies find positive effects, findings are inconsistent across studies, generally show effects of a small magnitude that quickly dissipate over time, and are unreliable because of their observational nature.

**The meaning of the study: possible explanations and implications for clinicians and policymakers**

Participants' experiences of the co-design process provided a number of important pointers for developing future commissioning models. The main lessons relate to timescales for implementation and acknowledging the resource intensive nature of the early stages of this process (particularly if it involves re-tendering services). The experiences from the pilot also illustrate the importance of agreeing outcomes, relevant tools and funding models in a timely manner before roll-out. The inclusion of interim outcomes appears important as success in achieving goals such as freedom from substances of dependence only becomes apparent in the long term. The evaluation also suggests that providers should be encouraged (or required by commissioners) to articulate a theory of change outlining how they will deliver the outcomes stipulated in the contract, while maintaining appropriate investments in specialist skills and provision in order to continue to deliver other outcomes , to which payments may not be attached.

The pilot programme enabled commissioners and policy stakeholders to identify outcomes measures – such as re-offending, housing, injecting and reliable change – which were not appropriate for future PbR funding models in terms of triggering payments. Thus, the willingness to experiment and evaluate has allowed time and space to develop a more selective choice of domains for measuring the outcomes achieved across treatment cohorts.

Another implication of our work is that funding models should in future be implemented incrementally and a sufficient period of time should be afforded for these mechanisms to establish themselves, and for problems to be appropriately identified and resolved. Caution should also be exercised in future PbR models as to the proportion of the contract value tied to performance because there may be substantial random variation in the outcomes being rewarded and only a loose link to the activities of providers.

The emphasis on avoiding re-presentation was viewed as an important safeguard against the risk of premature discharge of patients from services in order to trigger payments. We are not able to tell within the study timeframe if the increased retention of patients in services that we observed in the pilot sites was better or worse for them in the long-run.

There was a concern that the PbR funding model would inadvertently penalise providers who took risks rather than incentivise improved performance. Although providers in the pilot programme continued to receive substantial block and interim payments to ensure financial viability, the best that providers could achieve was to maintain the level of payment they were previously receiving under their pre-PbR contracts. In order to stimulate investments to improve performance, it is likely that future experiments should offer providers the opportunity to earn additional resources to fund the costs they need to incur to improve their performance.

**Unanswered questions and future research**

Within the study timeframe it was not possible to re-visit stakeholders to undertake further qualitative work on reaction to our findings. This would be a valuable exercise for providing further interpretation of our findings and the implications for future initiatives.

It was also not possible to examine the longer-term effects of the new payment models. This is important given the finding in the wider PbR literature that paying based on performance produces on transitory improvements in performance in the relatively short-term. It would also allow examination of the effect of this payment system on market entry and exit and the long-term structure of the market.

Future work should seek to provide an overall assessment of the cost-effectiveness of payment by results approaches to funding drug and alcohol services. Frameworks for estimating the cost-effectiveness of financial incentive schemes have been developed (Meacock et al, 2014), but this requires a composite measure of benefit which is more challenging in the context of the wide range of outcomes affected by drugs and alcohol services.

If the programme is extended to additional sites, it would then be possible to evaluate the effects of variations in the design of the payment scheme, such as larger and smaller proportions of total budget linked to performance.

Finally, it was a distinct feature of this pilot programme to base the performance-related element of payment predominantly to outcomes. Future work should seek to identify whether there are interim measures and quality of service measures that are more clearly in the control of providers on which payments could be based.

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## Appendix A: Project Research Questions

Q. 1 What funding model is used in each of the pilot schemes, what services do they provide and how effectively have these been implemented?
Q. 2 What do these services cost to set up and run?
Q. 3 What are the direct and knock-on cost consequences of the schemes, in terms of treatment services and related health and criminal justice services?
SQ*.4 What are the costs of the drug recovery services and other health, social and criminal justice services used by participants?
SQ.5 What is the health status and associated quality of life of participants?
SQ.6 What are the net effects of PbR on costs and benefits?
Q. 7 What other services are provided that may impact on the PbR service provision and outcomes?
Q. 8 Has the introduction of PbR funding resulted in new or additional services, or otherwise changed the landscape of provision (including the effect on smaller providers)?
Q. 9 What is the level and nature of referral to, take up of and engagement with the appropriate services? Does this vary across different types of service users, and has the introduction of PbR had any impacts on treatment accessibility?
Q. 10 What are participants' and stakeholders' perceptions of the services and their impact, and are users satisfied with the services?
Q. 11 How do changes in recovery based outcomes, achieved by the PbR pilot sites, compare to non-PbR services within the study timeframe?
Q. 12 Is there a significant difference in the time taken to achieve these outcomes?
Q. 13 To what extent can the differences between the two groups be attributed to PbR?
Q. 14 What is the impact of PbR on commissioner and provider behaviours? Does an agreed recovery focus lead to pooling of budgets, reduced duplication, more innovation, and stimulation of the provider market?
Q. 15 Are there unintended as well as intended consequences of adopting PbR? Are any spillovers positive or negative and, on balance, are the consequences beneficial?
SQ. 16 Are particular groups/types of service users refusing to utilise the treatments available under the PbR schemes? If this is the case, what are the numbers and characteristics of the relevant parties?
SQ. 17 Have waiting times for treatments been impacted by the introduction of the PbR models?
SQ. 18 Has the time spent in treatment changed? For example, are providers reducing consultation / treatment lengths to drive down costs?
SQ. 19 Has the type and content of consultations changed as a result of PbR?
SQ. 20 How has PbR impacted on the budgets and cash flow of providers?
SQ. 21 Has 'volume' for a given period changed since the adoption of PbR?
SQ. 22 What is the performance of LASARs as regards the appropriate setting of tariffs? What are the consequences of adoption of inappropriate tariffs and how frequently does this happen?
SQ. 23 How are providers resolving cases of individuals whose costs exceed the revenue yielded by the tariff? Are they requesting additional funding or simply not treating these clients?

* SQ=supplementary question

## Appendix B: Descriptions of pilot sites

Standardised summaries of each of the pilot sites are provided below using the most up-to-date information available in November 2012. These descriptions were informed using a combination of interview data, submissions by the pilot sites themselves (e.g. via the dedicated PbR discussion forum) and published documentary data. As pilots it is inevitable some that changes will have been made to service delivery. As such the models described may not necessarily be reflective of practice throughout the pilot period. Identifying details have been removed.

**Table B1: Site A Description**

| Location of PBR pilot | Phase 1 interviews | Description of PbR model/tariff | Stage in commissioning cycle | Outgoing/Incoming providers | LASAR model |
|---|---|---|---|---|---|
| Public Health (previously DAAT). | Interviews conducted:<br><br>PbR co-ordinators (Public Health, CC) (x3).<br><br>Probation lead (member of DAT JGC).<br><br>Provider service managers (x4).<br><br>Representative from Public Health, CC (Chair of local PBR Project Board). | In the first year 90% of payment is up-front to providers, 5% is on outputs (e.g. Hep C test/ Heb B vac / TOPS completion/ waiting times), 5% is for national outcomes.<br><br>In second year will be 80% outcomes 20% interim/process.<br><br>Two providers compete with each other – provide same range of services. | Commissioners kept existing providers rather than opting for an open procurement process.<br><br>Providers are now on a one-year contract but there is an assumption that a second year will be commissioned. The reason for a one-year contract related to the impending abolition of PCTs. | No change | No LASARs for two reasons: 1) providers are the experts in position to assess the needs of a presenting client; 2) LASARs would be too large a budget item and as such would likely act as a barrier to service accessibility.<br><br>An Independent Governance Service will be set up, auditing both providers, tariffs, treatment plans, and outcome achievements. |

**Table B2: Site B Description**

| Location of PBR pilot | Phase 1 interviews | Description of PbR model /tariff | Stage in commissioning cycle | Outgoing/Incoming providers | LASAR model |
|---|---|---|---|---|---|
| DAT | Interview conducted:<br><br>Strategic Manager, DAT.<br>Police lead (Chair of JCG).<br>Probation lead (Assistant Chief Executive).<br>PCT lead (Chair JCG).<br>START Team (LASAR) manager.<br>Council representatives: (Public Health alcohol lead, Commissioning Manager Adult Social Care, Supporting People lead).<br>Provider service managers (x2) | For tier 3: 70% core payment and 30% payment on outcomes.<br><br>There are no interim payments, but the core 70% is payable up-front. Furthermore, an array of fees are applicable (e.g. attachment fee of £25 when a client joins, £25 Hep B vaccination)<br><br>Tier 4: interim payments during first 24 weeks in treatment, outcome payment (approx. 15%) at 25 weeks for successful completion; final payment (approx 10%) at 25 weeks plus 12 months for sustained outcomes. | Site B kept existing providers.<br><br>The pilot applies to Tiers 3 and 4 only.<br><br>PbR contracts are for 2 years, with the option to extend for further 2 years. The Joint Commissioning Group intends to re-tender everything once the pilot is over. | No change | LASAR operates as START (Site B Treatment –Access to Recovery Team).<br><br>Provides an independent assessment and referral service located within the local authority contact centre, criminal justice settings and community buildings. Modelled on pre-existing CJS and DIP assessment and referral functions. Staff are experienced in assessments and motivational work, and are employed by the local authority, and line managed by the Drug Action Team.<br>LASAR provides assessment of needs, makes a client aware of his/her options and allocates an appropriate tariff. Their primary role is to motivate. Offers pre-booked appointments, drop-in and general group sessions, and has a role around facilitating entry into tier 4 provision. |

**Table B3: Site C Description**

| Location of PBR pilot | Phase 1 interviews | Description of PbR model/tariff | Stage in commissioning cycle | Outgoing/Incoming Providers | LASAR model |
|---|---|---|---|---|---|
| NHS Site C District, PCT,<br><br>Police, probation, Job Centre Plus, Housing, Site C Council Social Services, prisons | PbR co-ordinators (x 2), lead commissioner on behalf of PCT and community safety, and DAAT coordinator. | Used to be 100% of outcome payments were PBR. Now changed so that 20% of tier 3 contract value to be paid on outcomes. Retaining 80% payment to avoid "destabilising treatment system".<br><br>All existing service users clustered prior to 31st March, new users clustered upon entry. 4 clusters: Low Complexity and High Capital, Low Complexity and Moderate Capital, High Complexity and Moderate Capital, High Complexity and Low Capital. | Site C did not re-commission for PBR pilot.<br><br>Current contracts for specialist treatment services expire 31 March 2014. Procurement process with the new providers to begin 2013.<br><br>PBR pilot will end on 31 March 2013. New contracts starting on 1st April. | No change | Did not commission new LASAR service. LASAR function within existing two PbR service providers, with a view to providing integrated service.<br><br>LASAR Audit Tool commissioned to ensure independence. |

**Table B4: Site D Description**

| Location of PBR pilot | Phase 1 interviews | Description of PbR model/ tariff | Stage in commissioning cycle | Outgoing/Incoming Providers | LASAR model |
|---|---|---|---|---|---|
| DAAT located within the Community Safety Team | Commissioners x2<br>Mental Health trust staff x4<br>Employment project managers x2<br>Assistant Chief exec Probation Trust | Cohort model with three outcome measures: abstinence; successful completions; and non-re-presentations within 6 months of successful discharge.<br>Three levels of complexity. The main provider gets paid quarterly depending on the performance in the previous nine months. Responsibility for achieving offending, education and training outcomes devolved to providers. Probation has a contract for £12,500, 10 per cent of which is based on performance (reduction of offences by 5% over 12 months).<br>A second provider focuses on job/training outcomes, getting a client into work, sustaining in employment at 13 and 26 weeks. 20% income apportioned in terms of results, with 80% assured. | Site D has not re-commissioned and continues with its main provider. | Main provider for prescribing and psychosocial care retained.<br>Re-modelling of service took place in 2008/9 with recovery focus.<br>Probation leads on Drug Intervention Programme and Integrated Offender Management.<br>Provider Delivery model:<br>Main provider operates in three sites in Site D.<br>Co-location of DIP programme in drug and alcohol treatment service. | LASARs not independently set up.<br>LASAR filled out by dedicated staff in the course of the comprehensive assessment.<br>Nine domains covering social/economic/physical health. |

**Table B5: Site E Description**

| Location of PBR pilot | Phase 1 interviews | Description of PbR model/tariff | Stage in commissioning cycle | Outgoing/Incoming providers | LASAR model |
|---|---|---|---|---|---|
| Site E borough DAAT<br><br>DAAT board reporting to Safe and Strong Communities Board, Health and Wellbeing Board, Health Improvement Board<br><br>Posts jointly funded by LA and PCT | DAAT strategy manager;<br><br>Performance manager for Westminster Drug project; and representative from provider of drug and alcohol treatment. | Two tariffs, one for prime provider, one for Integrated Offender Managers (IOM).<br><br>WDP and Compass both paid under same model. If Compass do not give someone a Hep B vaccination, WDP won't get paid that money either. If WDP don't achieve the crime reduction they need to achieve, Compass won't get paid. This is intended to maximise quality assurance and full collaboration to maximise outcome achievement.<br><br>Focus is on achieving 100% outcomes against the four outcome domains: improved health and well-being; reduced crime; free from drugs of dependency; and sustained ETE. | New provider started in January 2010, previously CNWL and Foundation 66. | Formerly NHS Trust responsible for prescribing and non-NHS agency providing tier 2 and psycho- social support.<br><br>Now One non-NHS agency operating out of two sites with another providing DIP and IOM to substance misusing offenders. | Assessment and Care Review Assessment and Care Review Team (ACRT), a DAAT officer function that would assess all patients coming through the system, went out to tender with a part activity/part outcome based contract; year 1 it was 15 % outcome and year 2 rising to 25%). This was a form of PbR that was then put on hold when Site E decided to bid for PbR pilot status.<br><br>Interim arrangement in place, stock clients are being reassessed face-to-face,<br><br>Team verifies outcomes achieved by prime provider and is responsible for triggering interim and final payments. Team made up of team leader, 5 senior practitioners (band 7 Nursing equivalent) and one administrator. |

**Table B6: Site F Description**

| Location of PBR pilot | Phase 1 interviews | Description of PbR model/tariff | Stage in commissioning cycle | Outgoing/Incoming providers | LASAR model |
|---|---|---|---|---|---|
| DAAT | Interviews conducted:<br><br>PbR co-ordinator (DAAT Director).<br><br>Director of Adult Social Care (Chair DAAT Board).<br><br>Probation lead (member of DAAT Board).<br><br>Representative of District Councils in Site F on DAAT Board.<br><br>Provider service managers (x3).<br>Consultant<br>Psychiatrist, Site F Health. | The model as two parts: 1) Harm Minimisation service<br>2) Recovery service<br><br>Harm min: 70% up-front, 30% on performance against locally defined outputs (e.g. motivating and moving people through to the Recovery Service).<br><br>Recovery: 100% PbR.<br><br>For drugs using the national outcomes. For alcohol, payments for: attachment (local outcome), completion of structured treatment and non re-presentation (both national outcomes). | Site F completely re-redesigned and retendered all services<br><br>Transition between old and new providers in April 2012.<br><br>LASARS started operating in February (but since re-commissioned). | New provider partnership commissioned.<br>'Recovery' services third party. | LASARS commissioned by tender. Now operates as a partnership model with management and administration provided by probation and Assessment and Engagement Practitioners provided by Site F Health and third party.<br><br>LASARs incentivised to fill in forms, carry out referrals and TOPs forms in a timely manner. Compensation will be 75% contract value and 25% local incentive scheme.<br>Unusually LASAR function will be mobile and assertive, conducted in service users' homes, clinics etc. |

**Table B7: Site G Description**

| Location of PBR pilot | Phase 1 interviews | Description of PbR model/tariff | Stage in commissioning cycle | Outgoing/Incoming provider | LASAR model |
|---|---|---|---|---|---|
| DAAT overseen by Crime and Disorder Reduction Partnership and the Health and Social Care Partnership Board. | DAAT coordinator<br><br>LASAR manager | Individual tariffs set for each client based on<br><br>Initial screening and risk assessment in six domains (Substance Misuse; Risk to self; Risk to others; Risk to children; Risk from others; and Offending)<br><br>Site G is 100% PBR and pays 30 % attachment fee paid up-front; 39% payable on interim performance measures; and 31% on final outcomes. | Re-commissioning tier three services 2010/2011 (specialist prescribing, psychosocial interventions & shared care) | Previously three providers. One re-contracted as prime provider<br><br>Will operate out of New Day/DAT/LASAR officesin town centre. They have a mobile unit where appointments can take place in rural areas. Their staff will be called Recovery Facilitators<br><br>They will subcontract prescribing to GP surgeries. | LASARs independent of the provider and based within the Drug and Alcohol Team. LASAR will retain responsibility for TOP co-ordination so that progress can be tracked.<br><br>For new clients initial screening and tariff setting will be followed by risk assessment via LASAR, recovery plan put into place and referral made into prime provider.<br><br>All stock clients re-assessed in person using LASAR initial screening tool. |

**Table B8: Site H Description**

| Location of PBR pilot | Phase 1 interviews | Description of PbR model/tariff | Stage in commissioning cycle | Outgoing/Incoming providers | LASAR model |
|---|---|---|---|---|---|
| County Council DAAT.<br><br>DAAT board probation, prison service, PCT, public health. Police. | PbR co-ordinators (x 2)<br><br>LASAR manager<br><br>Probation lead for substance misuse<br><br>Representatives from providers and Trusts | Described as an integrated service model. 25% PbR.<br><br>Service users placed in one of four bands in terms of substance misuse: low, moderate, substantial, critical; banded in terms of subcategories of health and wellbeing. Social-driven tariff. Provider paid on evidence of improvements in outcomes in all domains. A service user in the highest tariff ("critical") must reduce their needs by two bands (i.e. to "moderate") to merit an interim payment. Based on what's described as a 'fair access to care' model. Incentives to work with more complex clients and not to hold onto less complex clients. | Re-commissioned for the PbR pilot.<br><br>Re-commissioning now taking place for prison drug treatment services | Five providers reduced to one, which won the contract as part of a competitive tendering process. A two-year contract with option for extension to four years.<br><br>They have the contract for all four tiers of drug and alcohol treatment services, ATR and DRRs.<br><br>System of Delivery:<br><br>'Hub and spoke' system of delivery with hubs in three areas and satellite provision across all districts | Use of existing local authority care management team comprising nurses and social workers. LASARS is independent of the provider.<br><br>Nine LASARS operate in three satellite sites, located within treatment services across pilot area.<br><br>LASARs to carry out comprehensive assessment.<br><br>Re-tariffing of stock clients as paper exercise |

## Appendix C: Distributions of economic variables

**Figure C1: Distributions of raw and transformed per capita costs**

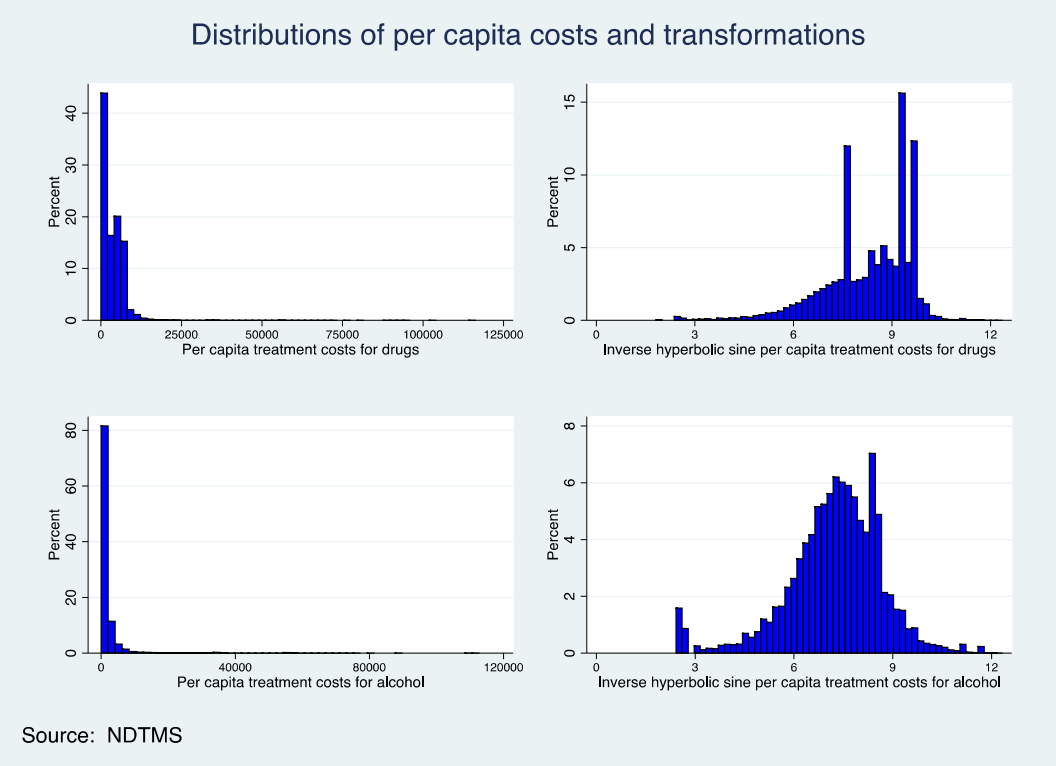



**Figure C2: Volume of individuals in treatment and total costs for DATs**

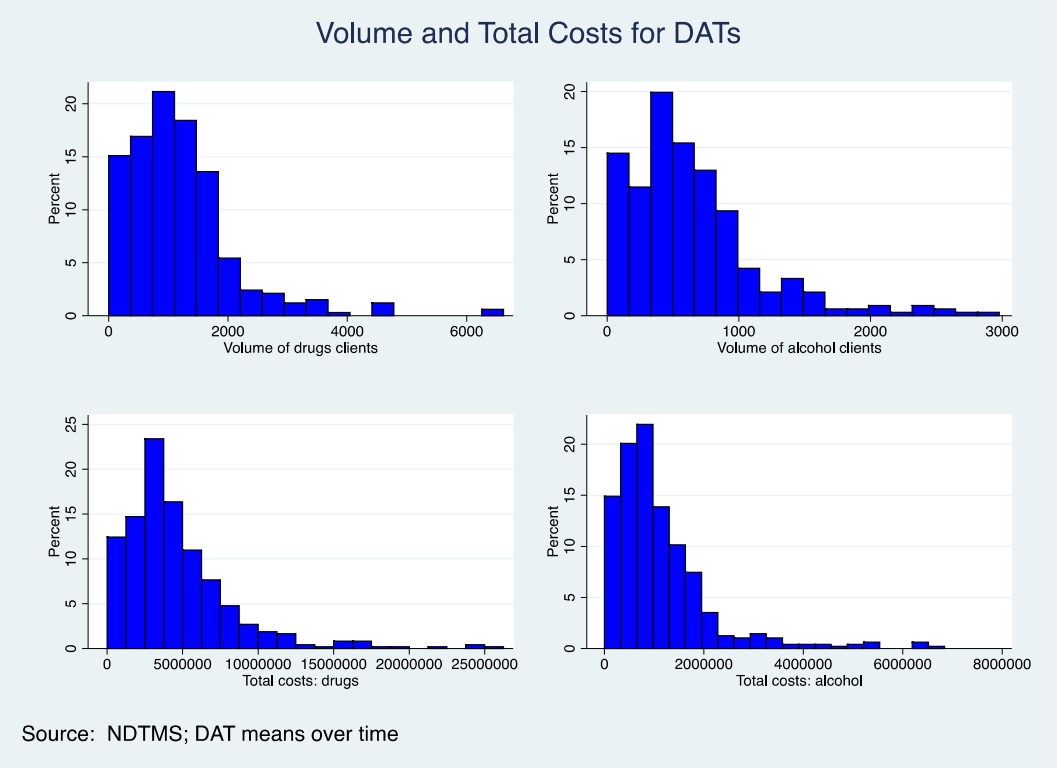



**Figure C3: Transformations of volume and total costs for DATs**

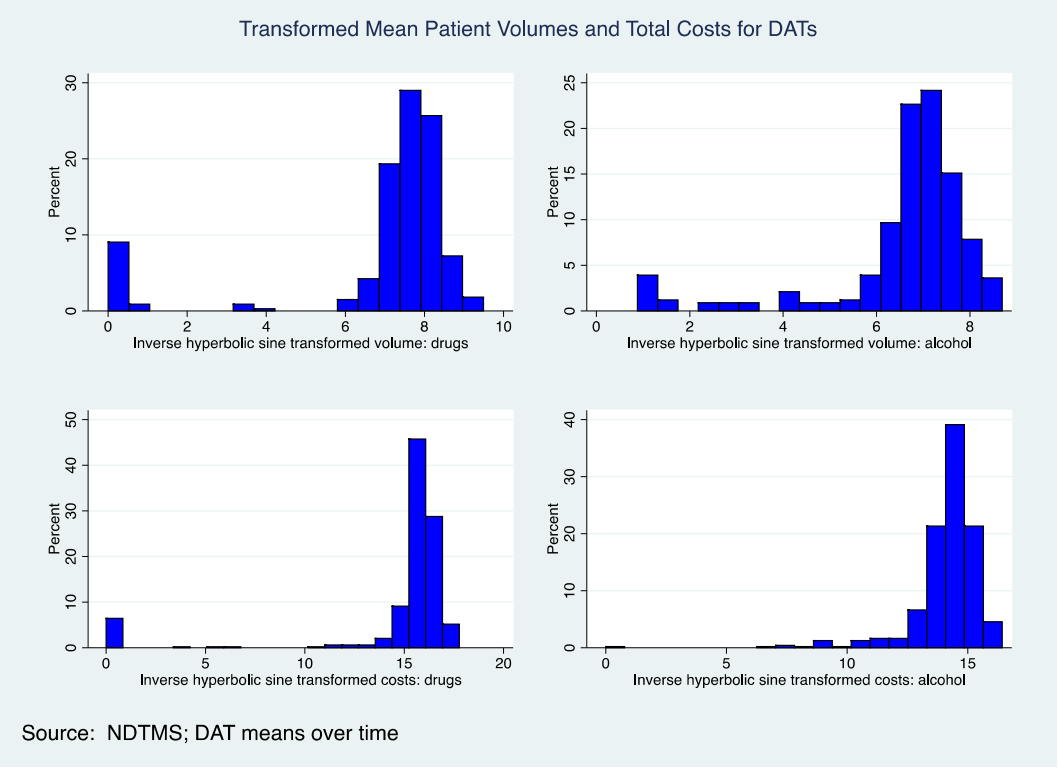



**Figure C4: Distributions number and total costs of recorded crimes and transformations of the distributions**

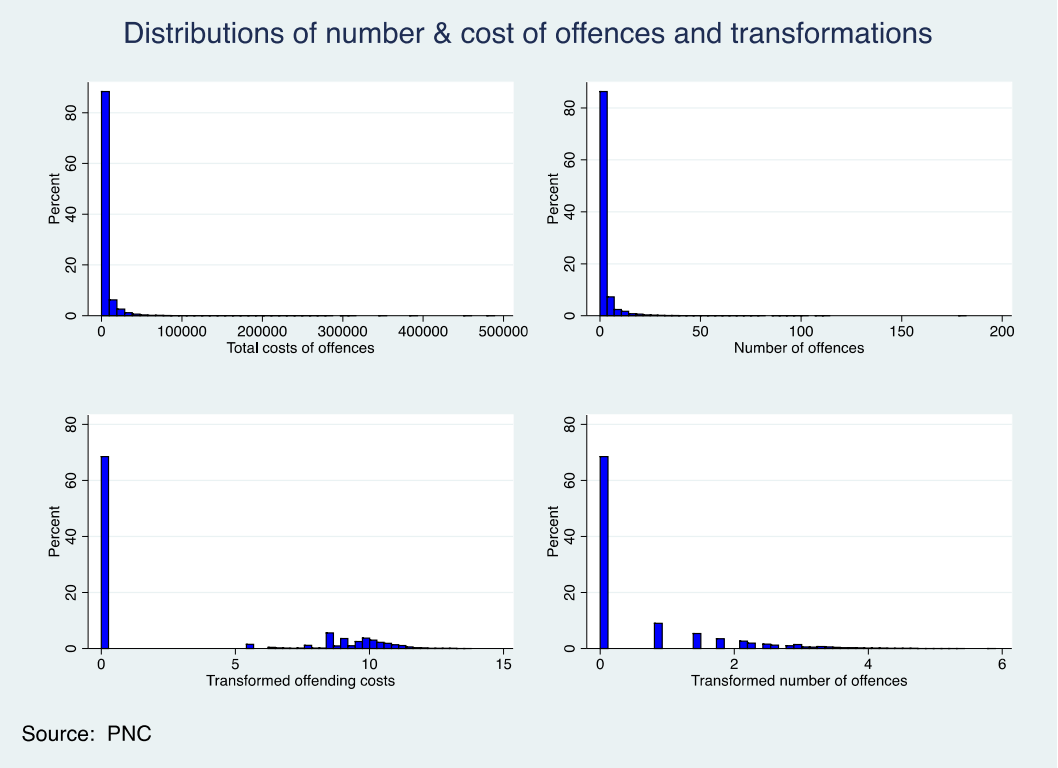



**Figure C5: Distribution of volume(s)/population rates of hospital admissions**

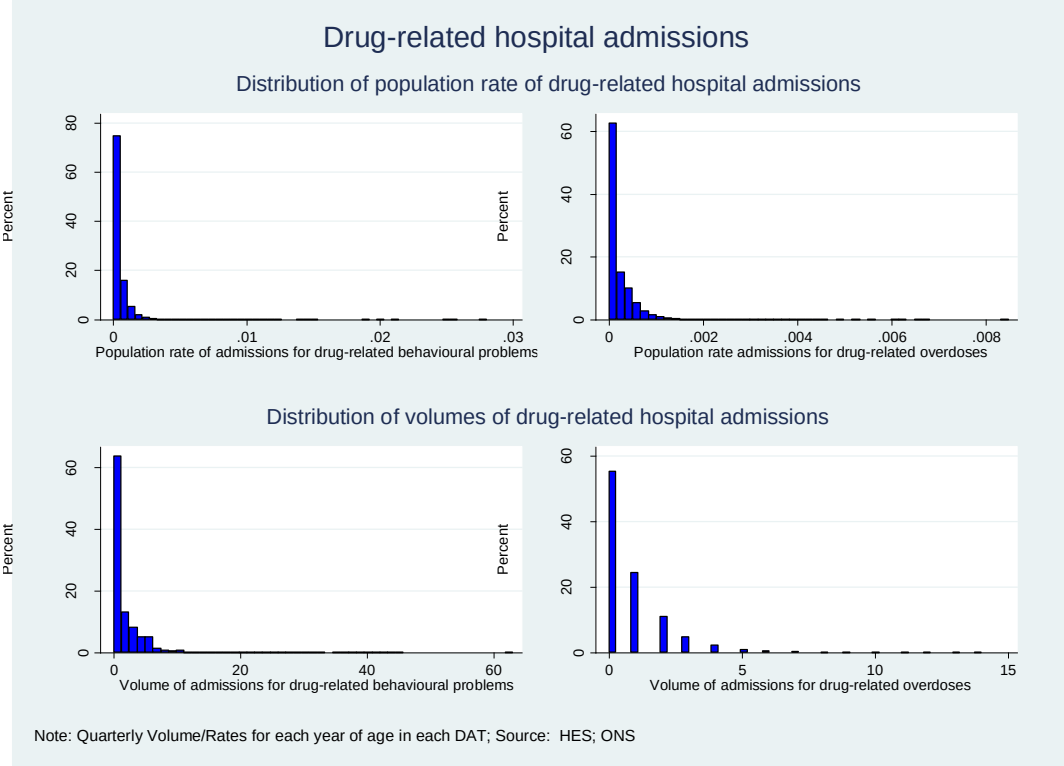
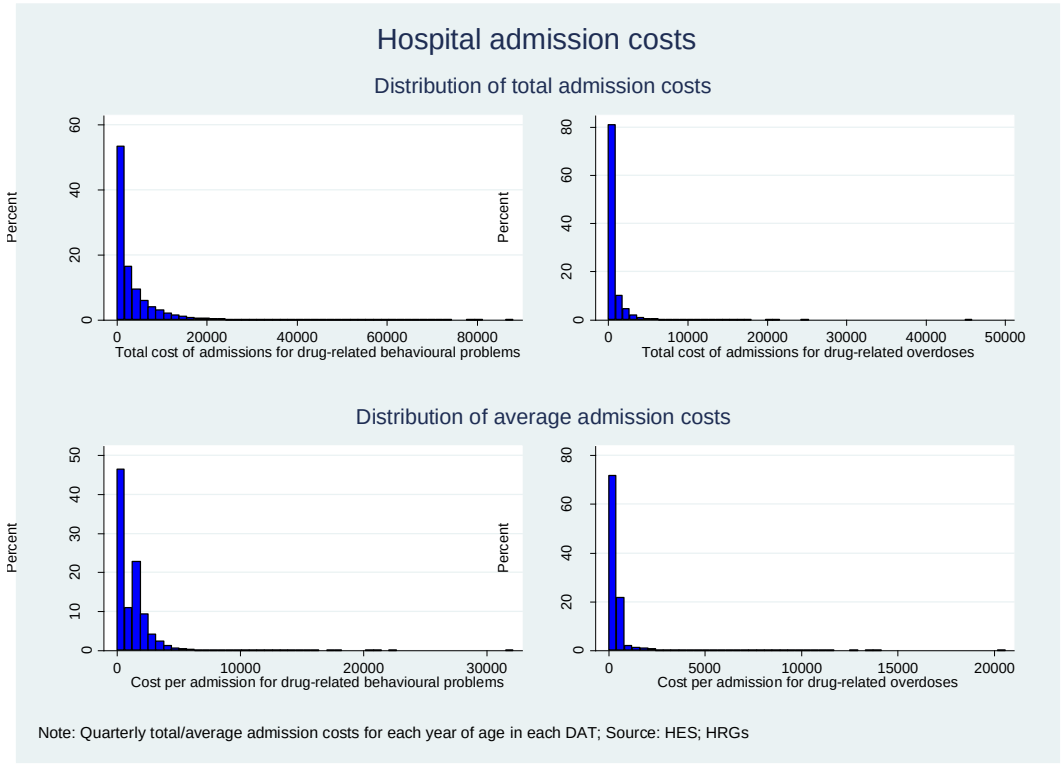
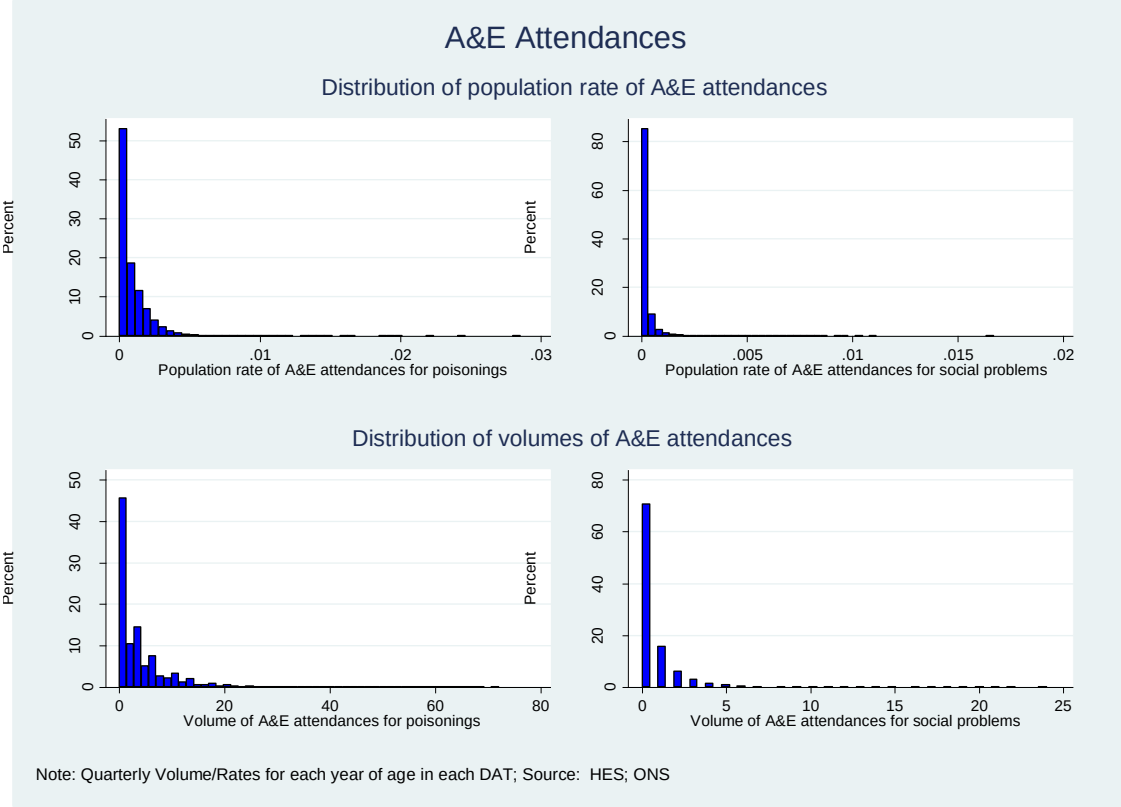



**Figure C6: Distribution of total costs/cost per hospital admission**



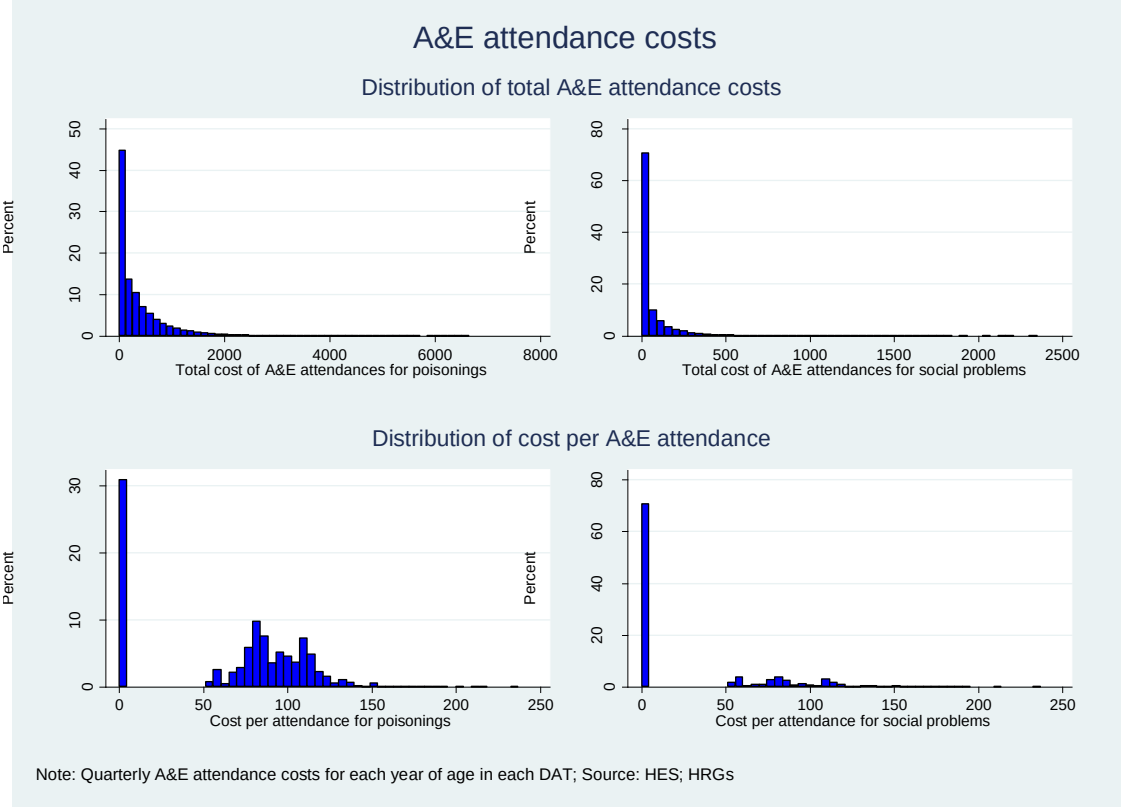

Note: Quarterly total/average admission costs for each year of age in each DAT; Source: HES; HRGs

**Figure C7: Distribution of volumes/population rates of A&E attendances**




Note: Quarterly Volume/Rates for each year of age in each DAT; Source: HES; ONS

**Figure C8: Distribution of total costs/cost per A&E attendance**



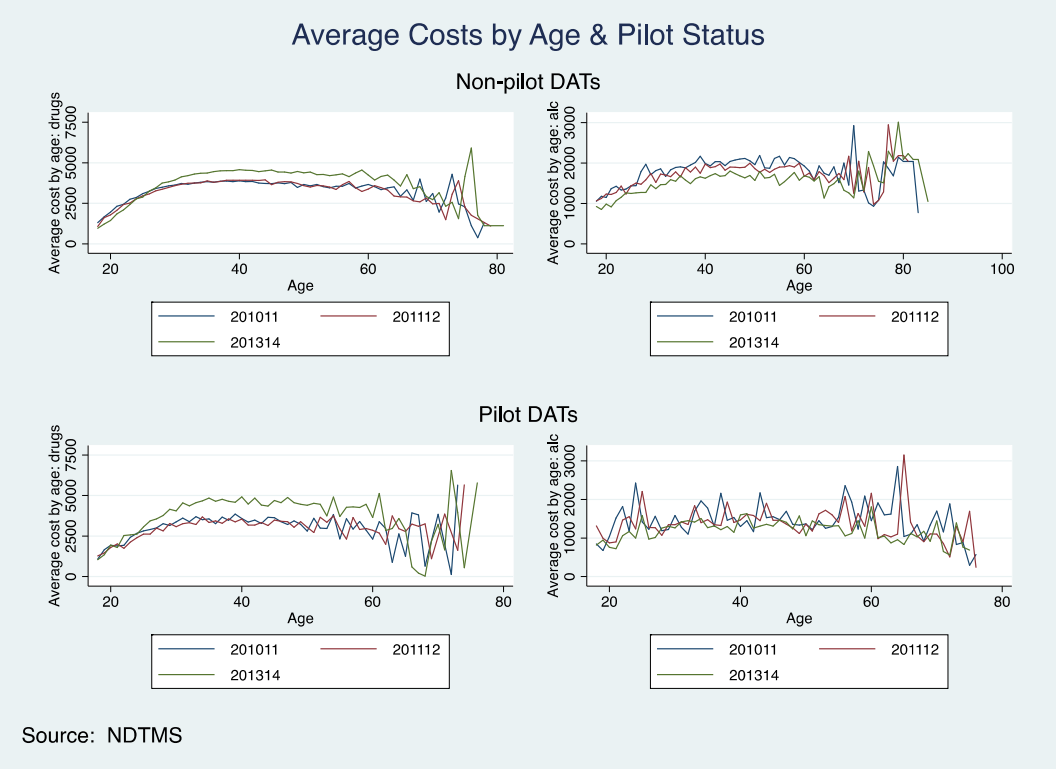

Note: Quarterly A&E attendance costs for each year of age in each DAT; Source: HES; HRGs

## Appendix D: Supplementary information on economic outcomes

*Effects of PbR on the volume and costs of substance misuse treatment*

There are no obvious differential changes in the age distribution of per capita costs between the pilot and non-pilot areas (Figure D1). For drugs misuse treatment, the age profile of per capita costs is an inverse U-shape - albeit a fairly flat one: the average 40-year-old individual in treatment incurs almost double the cost for an individual aged 20. The average cost decreases slightly for individuals in drugs misuse treatment between the ages of 40 and 80; whereas these reductions do not occur for those in treatment for alcohol. There is some indication that costs increase fairly steadily across all ages for alcohol, but at higher ages the lower numbers in treatment are reflected in a noisier profile. The profiles for individuals treated in pilot areas are noisier, reflecting the smaller sample used in creating the average values.

**Figure D1: Average costs by age and pilot status over time**




The median age for those in drugs misuse treatment is higher than for those in treatment for alcohol: around 29 years compared with around 43 years (Figure D2). There are no significant differential changes over time in the age profile of the treatment population – the only notable finding is that, for drugs misuse, the area under the graph is larger for pilots compared to non-pilots, reflecting the fact that the pilots serve larger treatment populations on average.

**Figure D2: Average volume in treatment by age and pilot status over time**

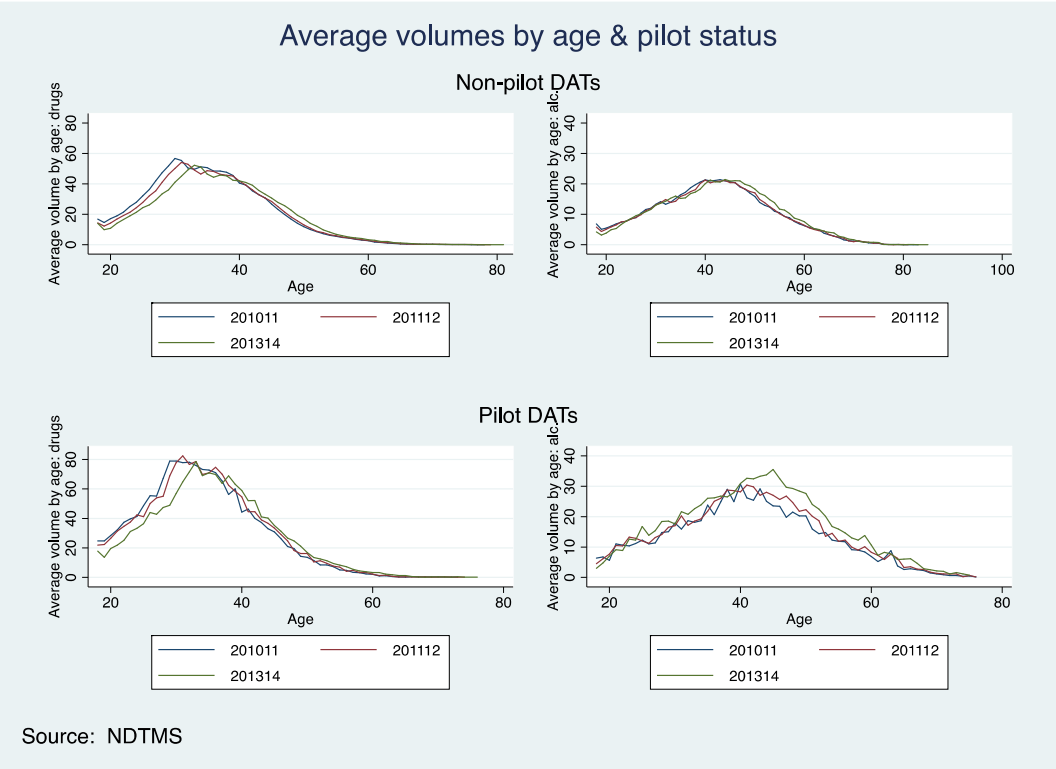



Figure D3 shows how average per capita costs vary depending on individuals' primary drug(s) of dependence; and the average size of the treatment population split by primary drug(s) of dependence. The average per capita cost of an individual whose primary drug(s) of use are benzodiazepines varies considerably years (particularly for those located in pilot areas). This reflects the very small number of individuals in treatment with this family of drugs as their primary drug(s) of misuse.

Across the remaining drugs, the findings are stable. Costs are similar in the pilot and non-pilot areas, and there are no significant differential changes over time, with pilot and non-pilot areas seeing modest increases in per capita costs over time. For an individual whose primary drug(s) are opiates, costs are over double that for an individual contained in 'other' – which primarily consists of cannabis use. The numbers in treatment by presenting drug follow a very similar profile for both the pilot and non-pilot areas - a profile that is unchanged over time, with the majority of those in treatment composed of individuals presenting with opiate or opiate and crack use. Again, the bars are proportionally larger for pilot areas reflecting their larger treatment populations – although there are particularly large differences in the numbers in treatment presenting with opiate use.

**Figure D3: Average costs and numbers in treatment by primary drug(s) of presentation**

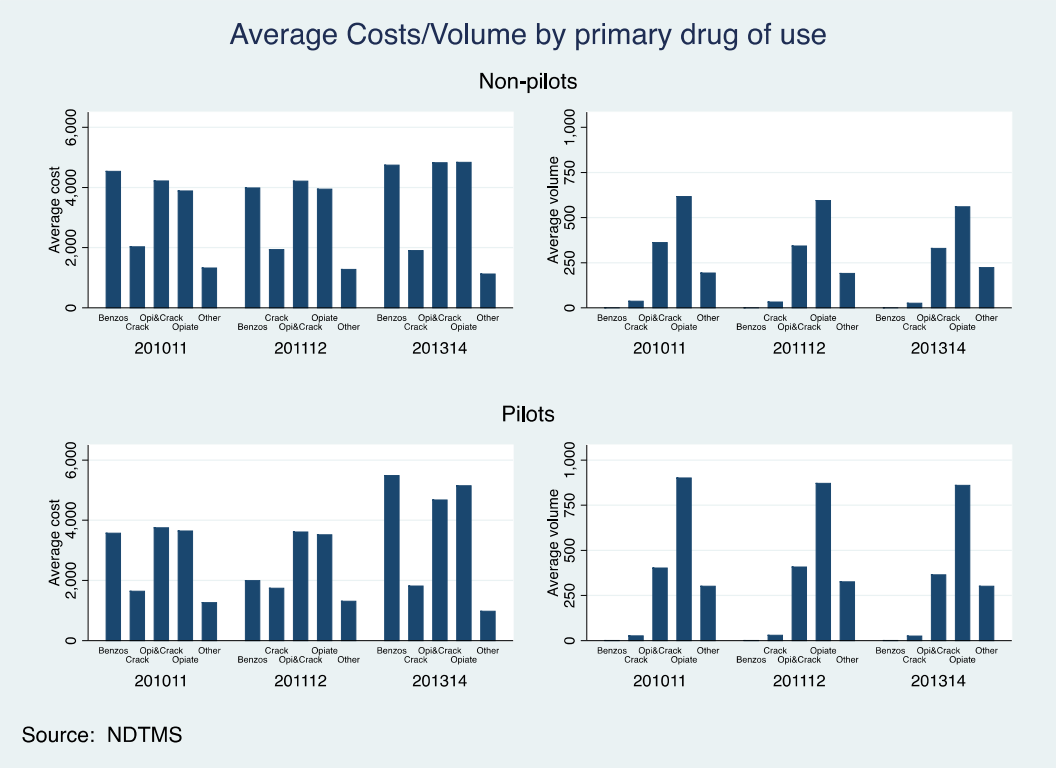



Figure D4 illustrates how costs vary depending on whether an individual has reported injecting in a particular treatment year, as well as how numerous these individuals are. For both pilot and non-pilot areas, the average per capita treatment costs are higher for an individual reporting injecting compared with those that do not report injecting. This finding is stable over time for both pilots and non-pilots and there are no significant differential changes. The majority of individuals do not report injecting for all areas in all years.

Figure D5 depicts both the average per capita costs of individuals depending on whether they have an acute housing problem, and the average number of individuals with acute housing needs. Generally, there are slightly higher average costs for those with no fixed abode compared with those who do not report and acute need for housing. However, in 2013-14, average costs are actually very slightly higher for those that do not report having no fixed abode in the pilot areas. These findings might possibly reflect the fact that the costs for resolving the particular problem an individual might have are, for the most part, not borne by the treatment provider who typically refers these individuals on to the relevant housing agencies. It may be possible that the variable reflects some component of differential complexity of drug use. There are no differential changes in the numbers in treatment with and without acute housing needs comparing pilot and non-pilot areas.

**Figure D4: Average cost and numbers in treatment by injecting status**

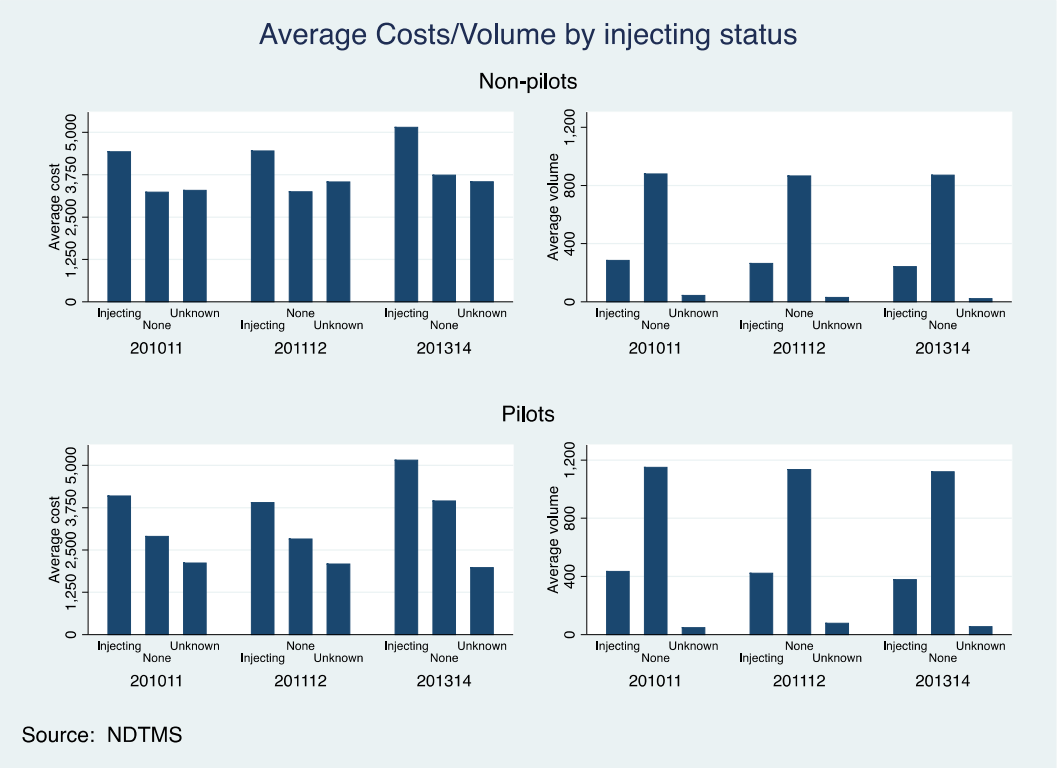



**Figure D5: Average cost and numbers in treatment by accommodation need (drugs only)**

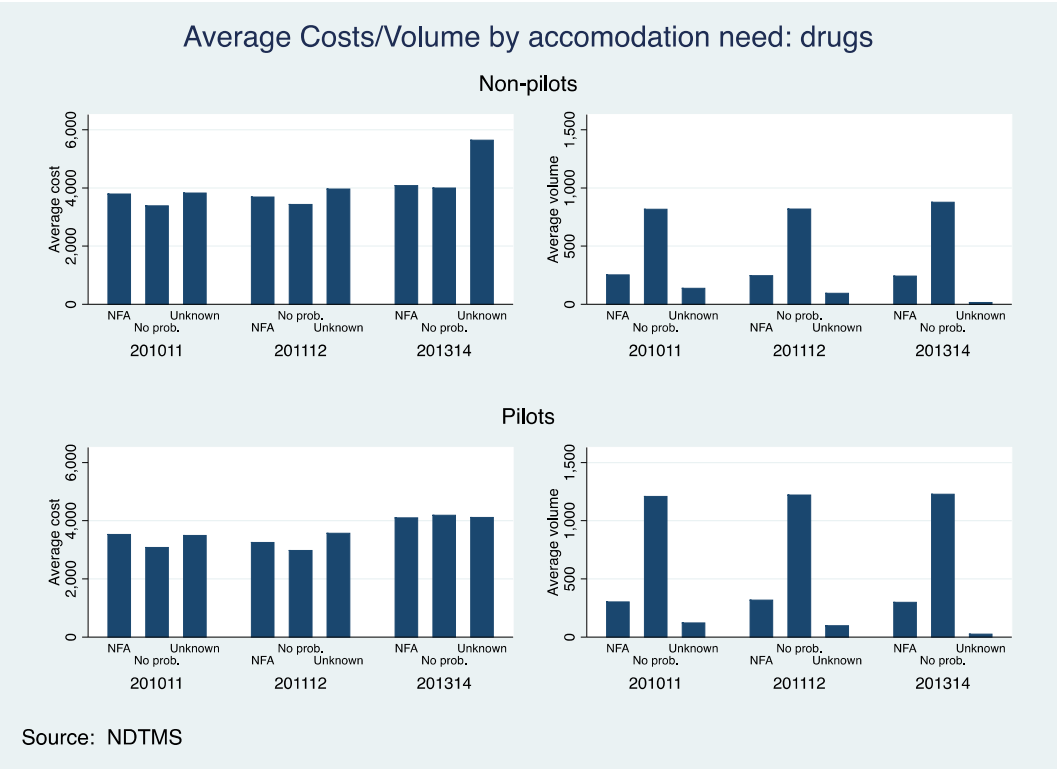



Figure D6 provides the same details as Figure D5 for clients seeking help for alcohol misuse. There are clear differences in average costs for those reporting having no fixed abode compared with those that

do not report this. This might reflect the fact that the complexity of an individual's addiction problem is predicted more accurately by acute housing needs for alcohol compared with drugs. The cost differential for alcohol is stable both in comparing pilots with non-pilots, and over time.

**Figure D6: Average cost and numbers in treatment by accommodation need (alcohol only)**

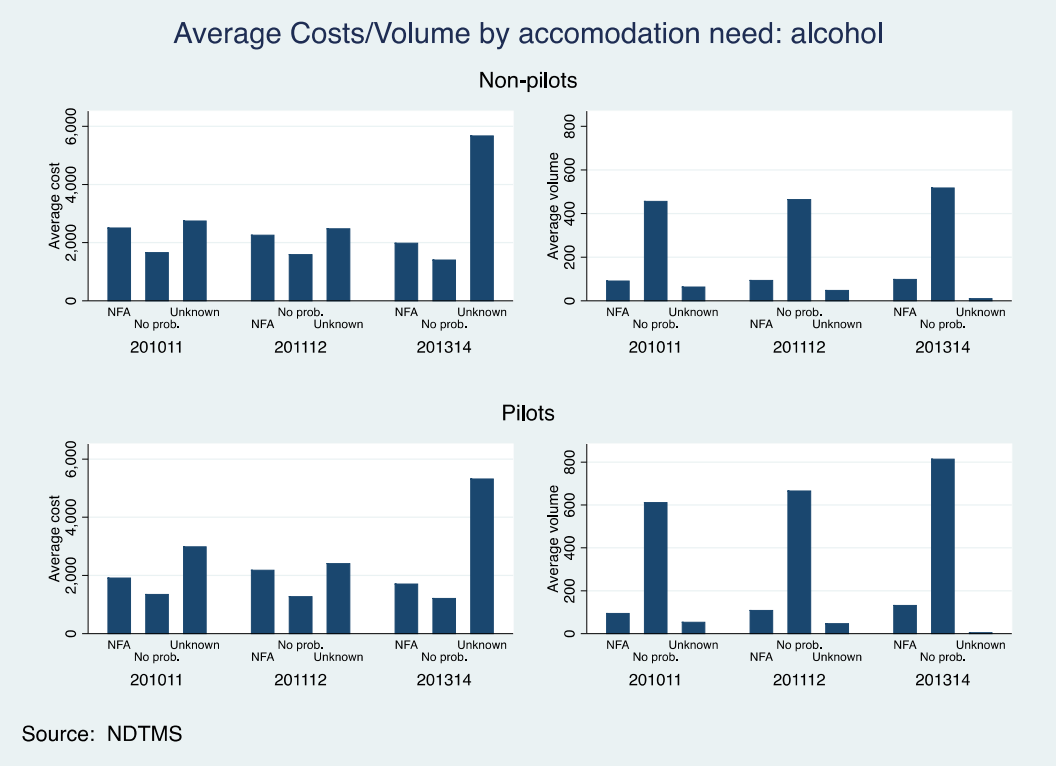



Figure D7 illustrates how average per capita costs vary depending on the years elapsed from an individual's first use of their primary drug(s) of dependence, as well as how the numbers in treatment vary across this measure. Costs do not vary substantially by this measure, which is intended to reflect the complexity associated with having a longstanding addiction problem. However, in this case, it is likely to be highly correlated with age – which might be confounding other patterns. In fact, the profile is similar to the age profile of average per capita costs.

**Figure D7: Average costs since use of primary drug(s) of dependence by pilot status over time**

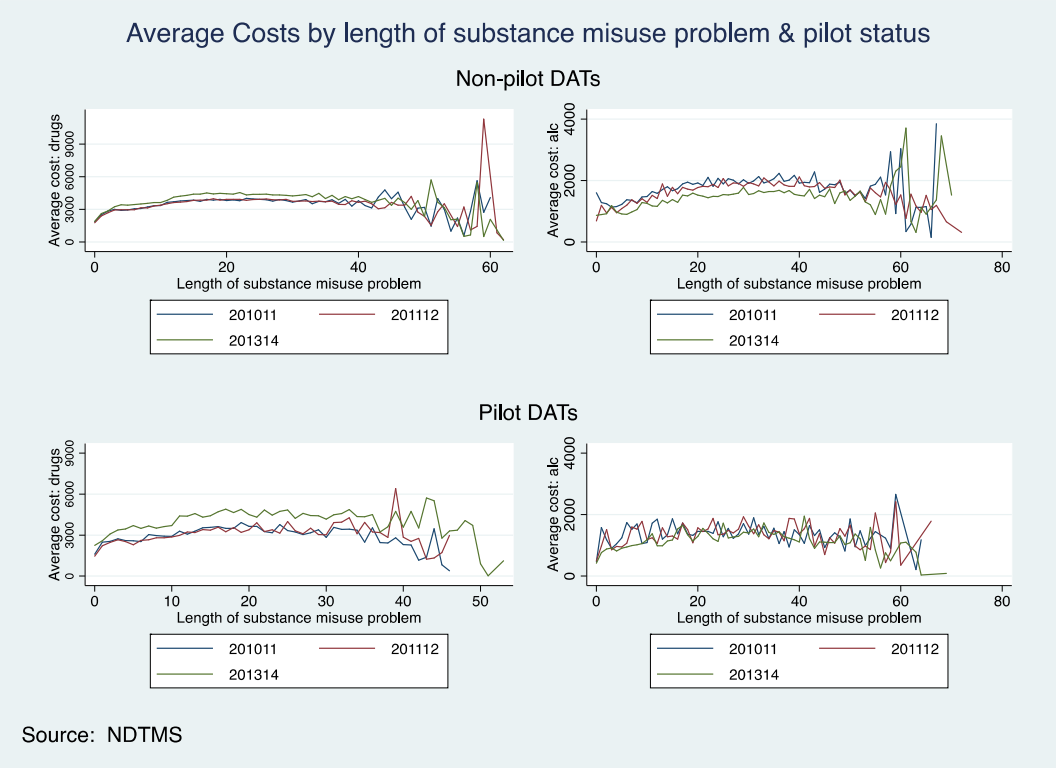



Figure D8 illustrates how the size treatment population varies in terms of time passed since first use of drug(s) of dependence. It is notable that, for drugs only, there are virtually no individuals in treatment for whom between 40 and 60 years have elapsed since their first contact with the particular addictive substance of concern; compared with alcohol where there are considerable numbers in treatment for between 40 and 60 years. This may reflect a higher rate of survival for longstanding addiction problems with alcohol compared with longstanding drug addiction problems.

**Figure D8: Average numbers in treatment by length of misuse problem and pilot status over time**

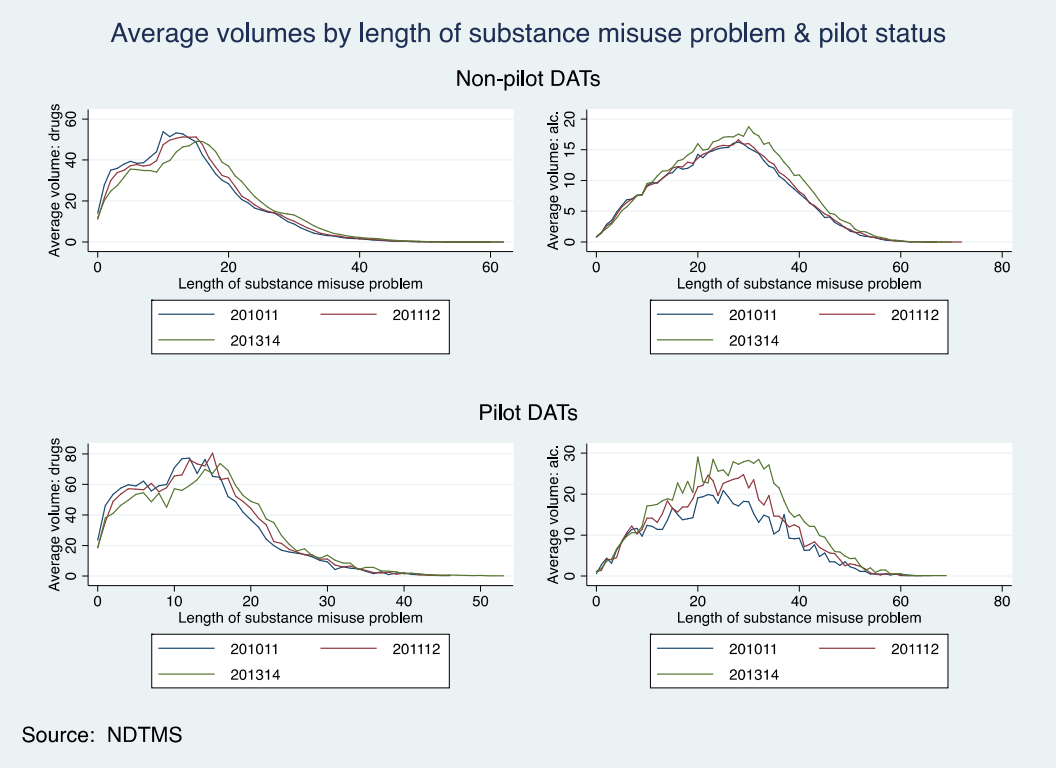
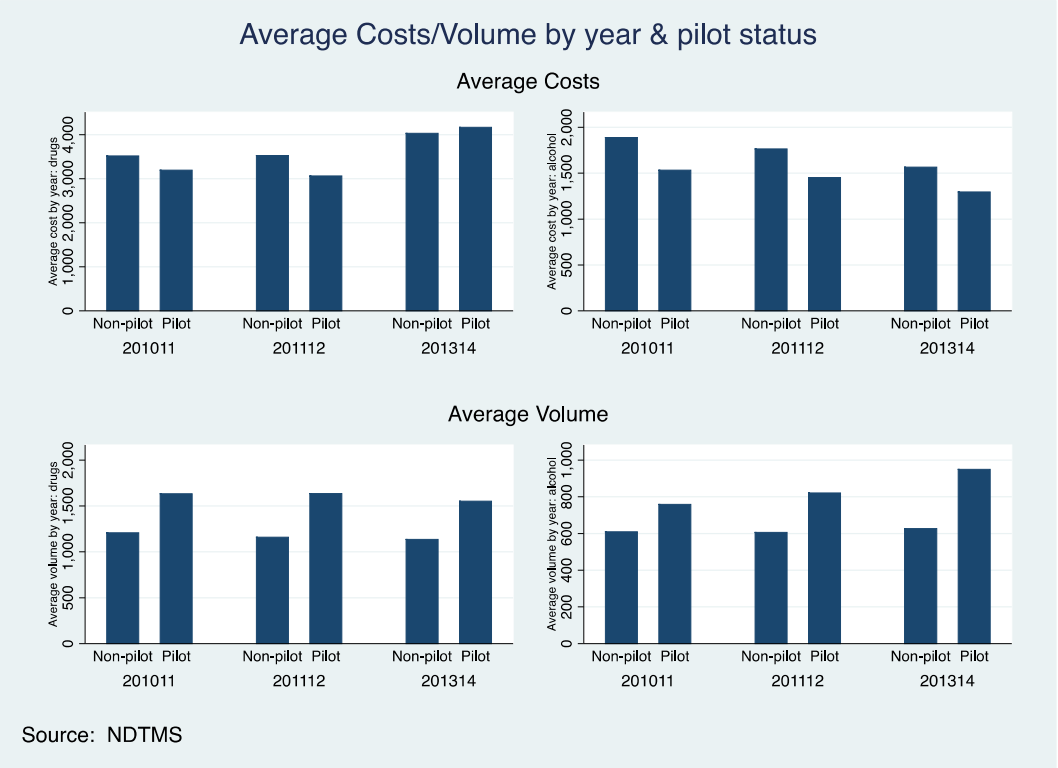



Figure D9 shows the trends in average costs and numbers in treatment for pilot and non-pilot areas. For drugs only, individuals treated in non-pilot areas had higher average per capita treatment costs in 2010-11 and 2011-12. This changed in 2013-14 when the average per capita treatment costs were higher for individuals located in pilot areas. The average number of individuals in treatment in DATs located in pilot areas is between 400 and 500 higher in each year for drugs only.

For alcohol only, average per capita treatment costs are higher individuals located in non-pilot areas compared with pilot areas. Average per capita treatment costs have actually decreased over time for alcohol, in contrast to drugs for which increases have been observed over time. For alcohol, the average number of individuals in treatment has been relatively stable over time with DATs in pilot areas treating larger numbers of individuals compared with non-pilot areas. However, in 2013-14 there has actually been an increase in the average number of individuals treated in DATs located in pilot areas whilst the average has remained relatively unchanged for DATs located in non-pilot areas.

**Figure D9: Average per capita costs and numbers in treatment by pilot status over time**



*Effects of PbR on the volume of recorded crime and its associated costs*

In Figure D10, we illustrate the average costs of recorded crime and number of recorded crime per treatment journey in both the pilot and non-pilot areas before and after the introduction of PbR. Costs of recorded crime have reduced in both the pilot and non-pilot areas, although the reduction would appear to be more pronounced in the pilot areas. This is despite the fact that the number of recorded crimes has actually increased for all areas. These patterns are not repeated for a non-linear transformation which illustrates the extent to which high volume and high cost offenders' impact on the raw averages.

**Figure D10: Cost/Number of recorded crimes per treatment journey**

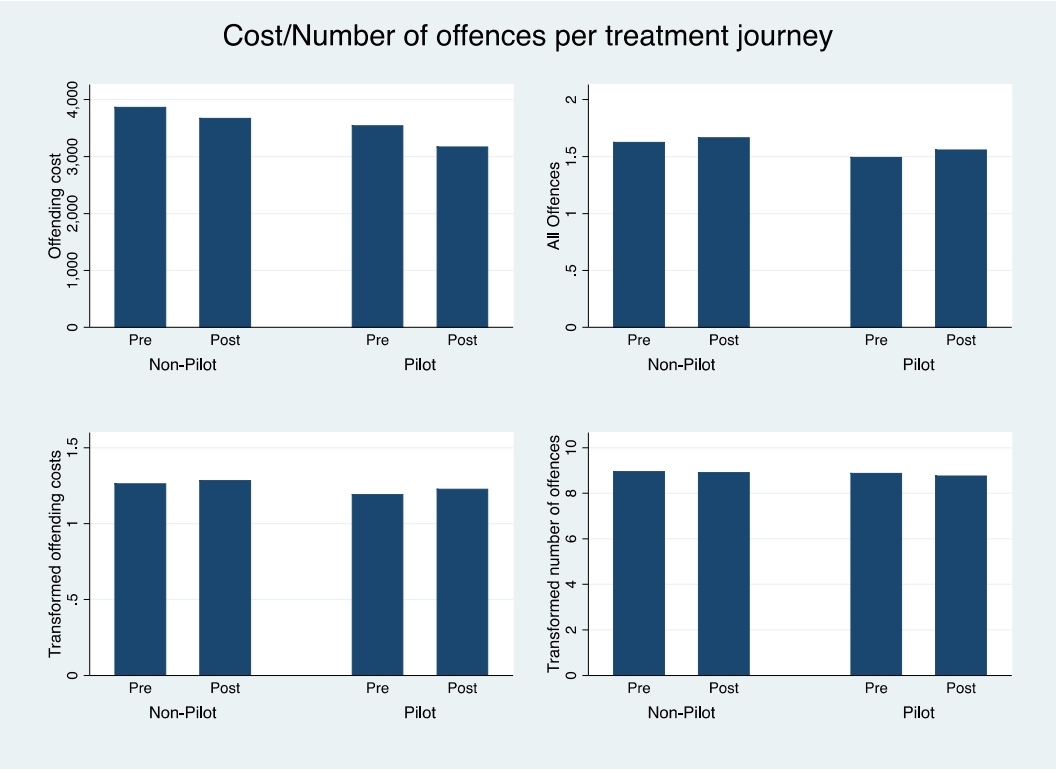
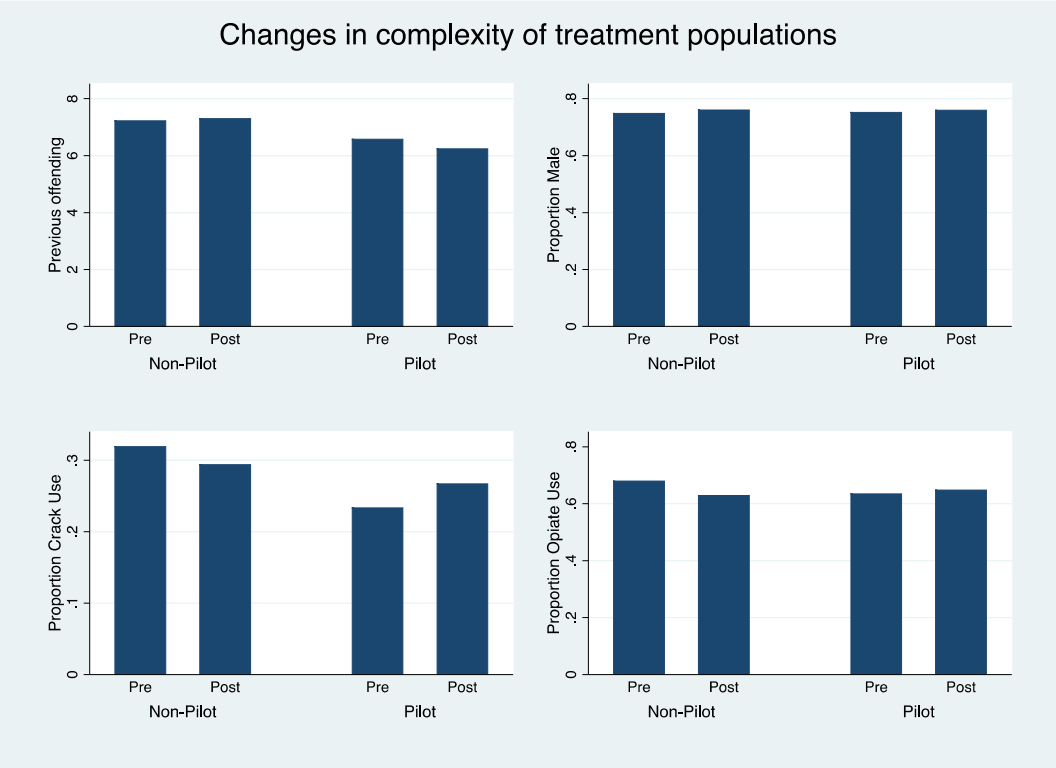



Figure D11 illustrates that there have been differential changes for pilots compared with non-pilots in terms of the complexity of their populations. The average number of recorded crimes one year prior to the start of treatment increased slightly for non-pilot areas and reduced for pilot areas after the introduction of PbR. The proportion of males in the treatment populations increased very slightly for both pilot and non-pilot areas. The proportions using crack were reduced for non-pilot areas and increased for pilot areas, whereas for opiates the proportions remained relatively similar for both.

**Figure D11: Changes in complexity of treatment populations**




We show the patterns for average costs of recorded crime in the pilot and non-pilot areas by types of crime to consider whether reductions or increases might be concentrated for particular types of crimes. We previously showed that whilst the number of recorded crimes was slightly increased for all areas, the average costs of recorded crime were reduced – which could indicate reductions in the number of more costly crimes, and increases for relatively less costly (but more common) crimes.

Figure D12 shows that the average cost per treatment journey for violent crimes have reduced for all areas since the introduction of PbR, although the reduction is slightly larger for pilot areas. In contrast, the average cost per treatment journey has increased for all areas for sex offences; and the increase in more pronounced in pilot areas. The average cost per treatment journey for prostitution is fractional for all areas. Whilst the average cost per treatment journey for burglary has remained relatively flat in the non-pilot areas, it has reduced for pilot areas since the introduction of PbR.

Figure D13 illustrates that, for all areas, the average cost per treatment journey is reduced for robberies; although this reduction is more pronounced for pilot areas. The average cost per treatment journey for non-vehicle theft has remained relatively flat for all areas. For theft of and from a vehicle, the average cost is slightly reduced for all areas.

**Figure D12: Average costs per treatment journey by crime type**

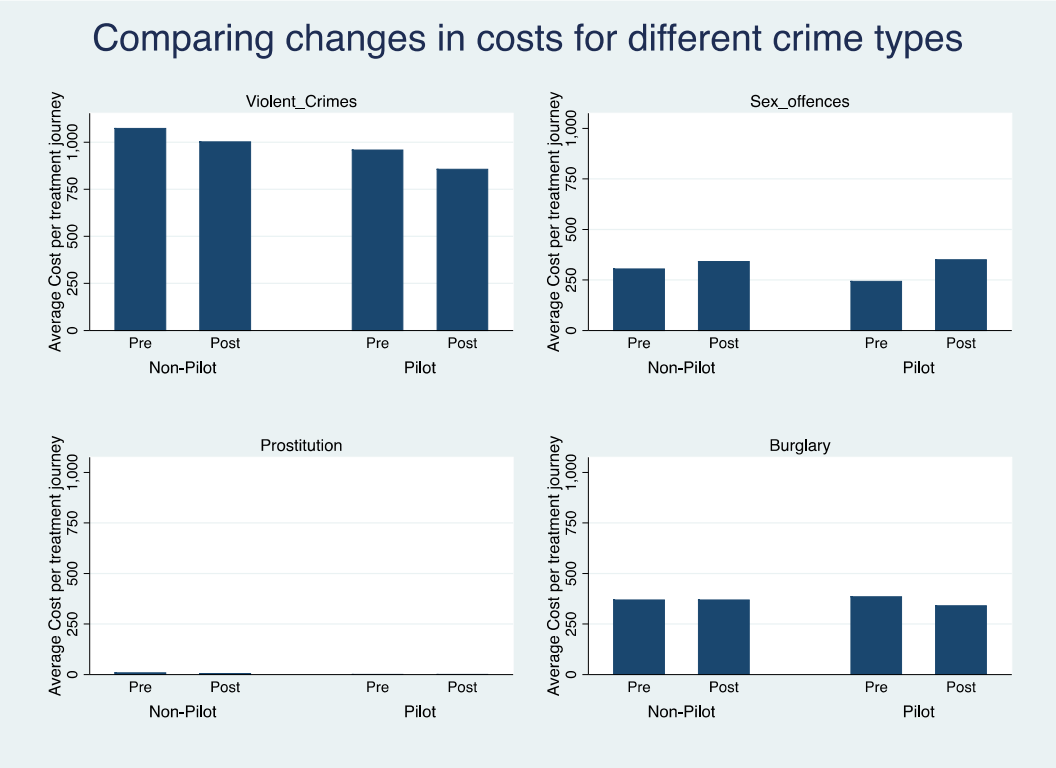



**Figure D13: Average costs per treatment journey by crime type**

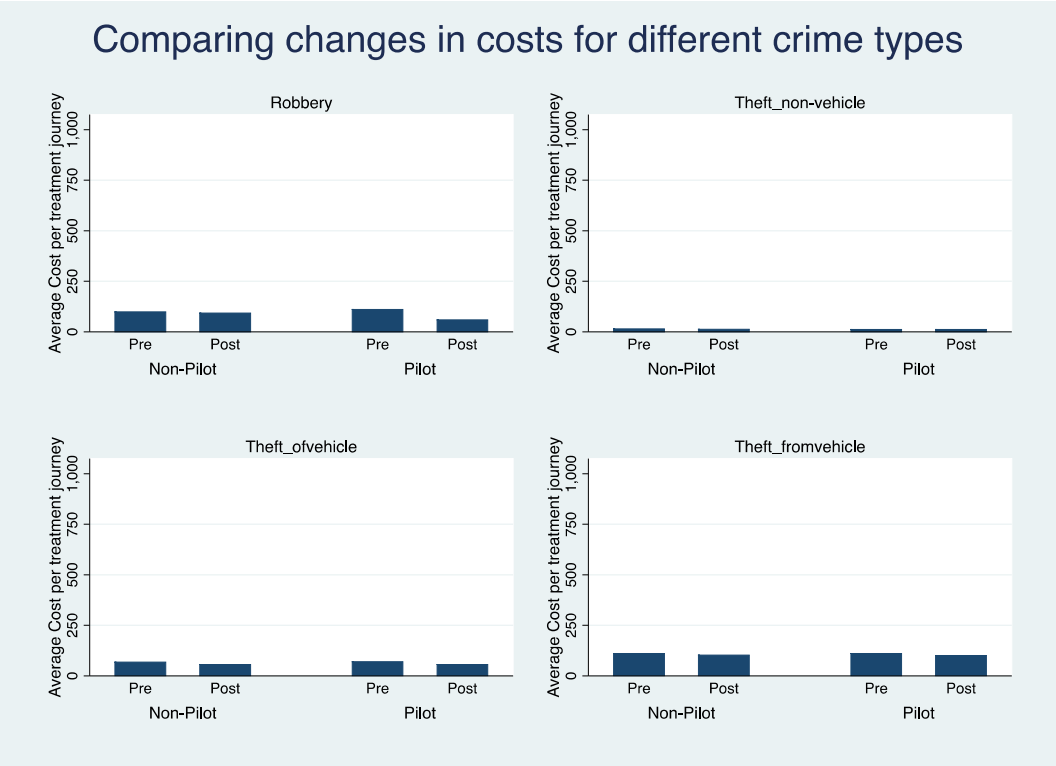
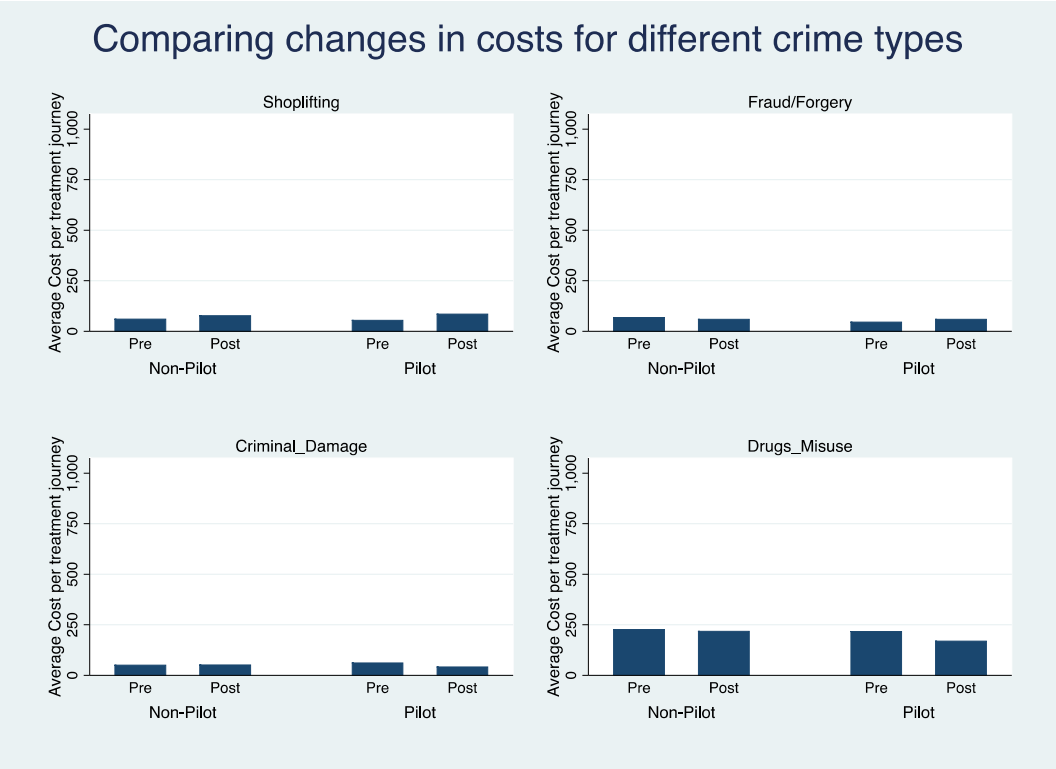



Figure D14 shows how the average cost per treatment journey for shoplifting is significantly increased for both pilot and non-pilot areas. The combined findings explain how we can find both that the number of recorded crimes per treatment journey has increased, and the average cost per treatment

journey has decreased. Increased levels for acquisitive crime such as shoplifting which has a relatively high incidence but relatively small unit cost (Table 9); combined with reduced levels for non-acquisitive crime such as murder (contained in violent crimes) which has a relatively low incidence but high unit cost combines to produce a net increase in the number of recorded crimesbut reduction in the average cost of recorded crime.

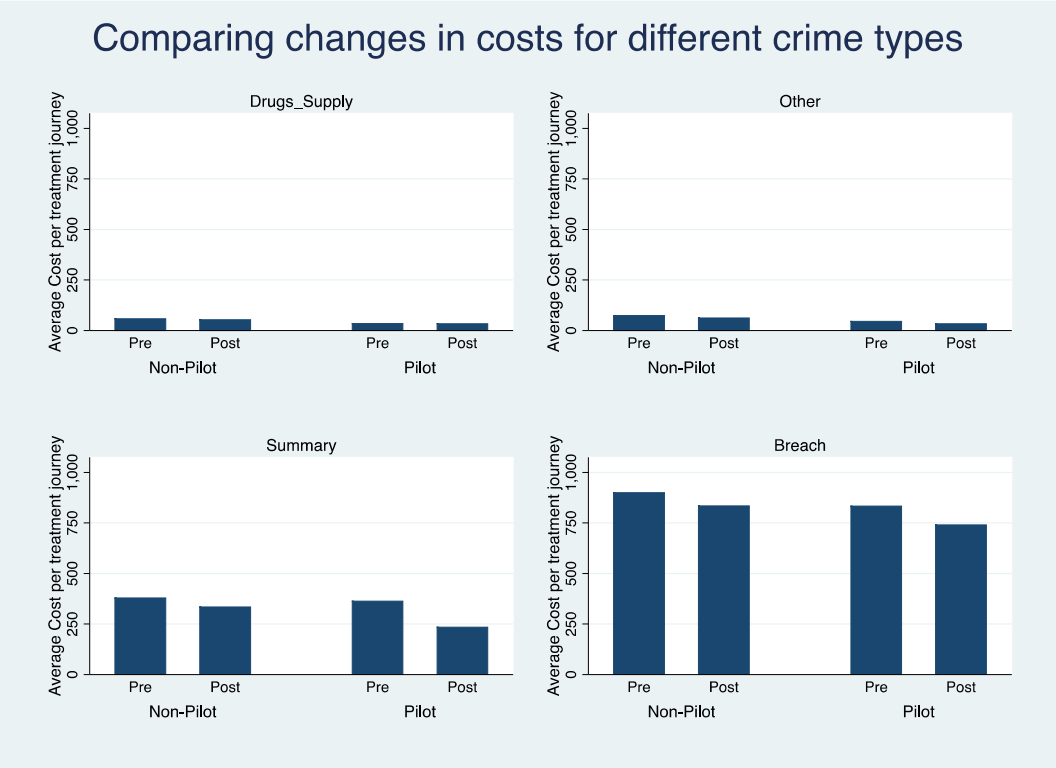
Both fraud/forgery and criminal damage have remained relatively flat for all areas, and the costs of drugs misuse offences are relatively flat for non-pilot areas, and reduced for pilot areas (Figure D15).

**Figure D15: Average costs per treatment journey by crime type**




Average costs per treatment journey have seen modest reductions for all areas for drugs supply offences (Figure D16). There have been significant reductions in the costs of summary and breach offences for all areas, although the reductions have been more pronounced in the pilot areas. These figures reflect the high incidence of these recorded crimes combined with the fact that the unit costs were assumed to be the average cost for offences contained in the IOM Toolkit.

**Figure D16: Average costs per treatment journey by crime type**



*Effects of PbR on volume of drug-related A&E attendances and hospital admissions and associated costs*

The average annual volume of admissions for drug-related behavioral problems increases with age until around age 35, decreasing thereafter (Figure D17). This inverse U-shaped profile is observed for both pilot and non-pilot areas. The population rate of admissions follows a similar age profile, but whilst the annual volume of admissions is on average higher in the pilot areas (particularly for ages 16-45); the population rate is actually higher for non-pilot areas (particularly for ages 25-55).

A different age profile is observed for the annual volume of admissions for drug-related overdoses, with both the volume and (general) population rate of admissions decreasing as age increases. Noisier profiles are observed for the pilot areas, reflecting substantially smaller samples.

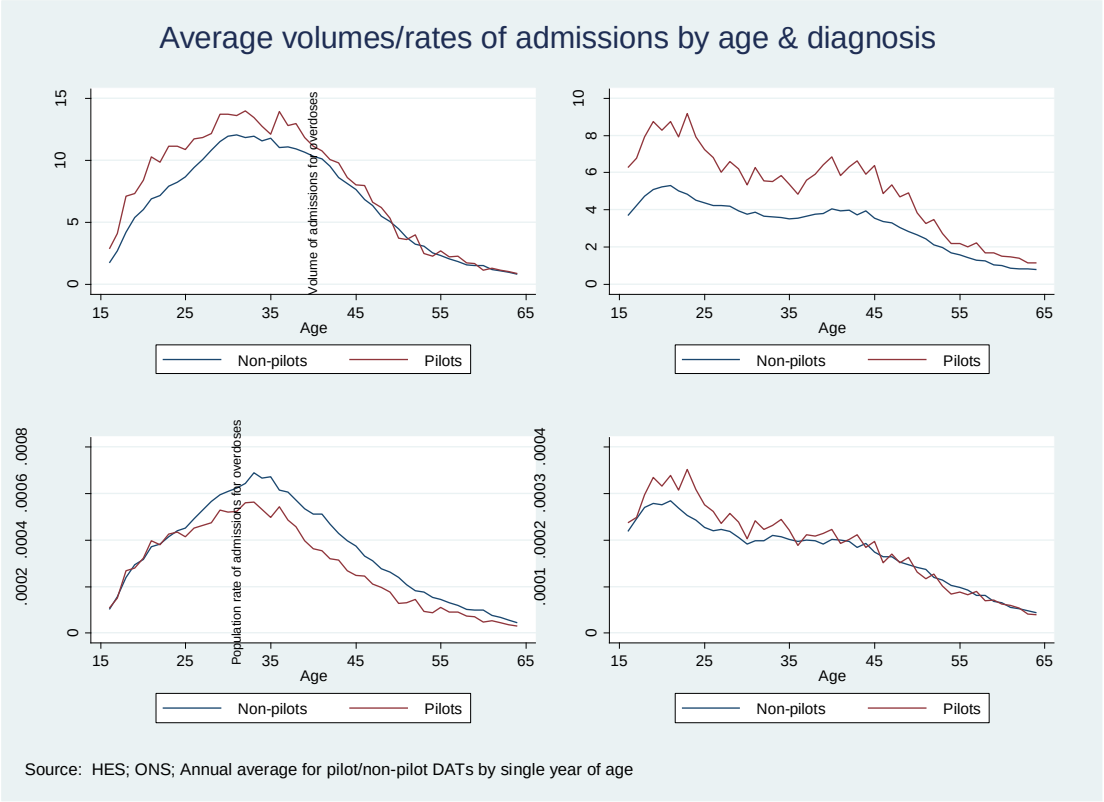
Average annual total and per admission costs for both types of drug-related admission are shown in Figure D18. Costs per admission are higher for all ages for admissions for drug-related behavioral and mental health problems compared with for drug-related overdoses. For both types of diagnosis, costs per admission increase steadily as age increases, although costs per admission for drug-related overdoses increase particularly steeply between ages 50-65. There are no differential patterns by age for comparing pilot and non-pilot areas for costs per admission.

Average annual total costs show the combination of the volume of admissions and the cost per admission. Total costs are considerably higher across all ages for admissions for drug-related behavioral and mental health problems compared with for drug-related overdoses, reflecting both higher volumes and costs per admission. For admissions for mental and behavioral problems, the inverse U-shape indicates that volume dominates costs per admission in determining total costs.

In Figure D19, we illustrate the average trends over time for pilot and non-pilot DATs in terms of the volume of admissions and population rate of admissions for both sets of diagnoses. A differential change comparing pilot with non-pilot DATs can be observed for the average volume of admissions for drug-related behavioral problems, with a larger increase observed for pilot DATs from around the final quarter of 2010. This is reflected in a closing of the gap between the population rates over time for admissions for drug-related behavioral problems.

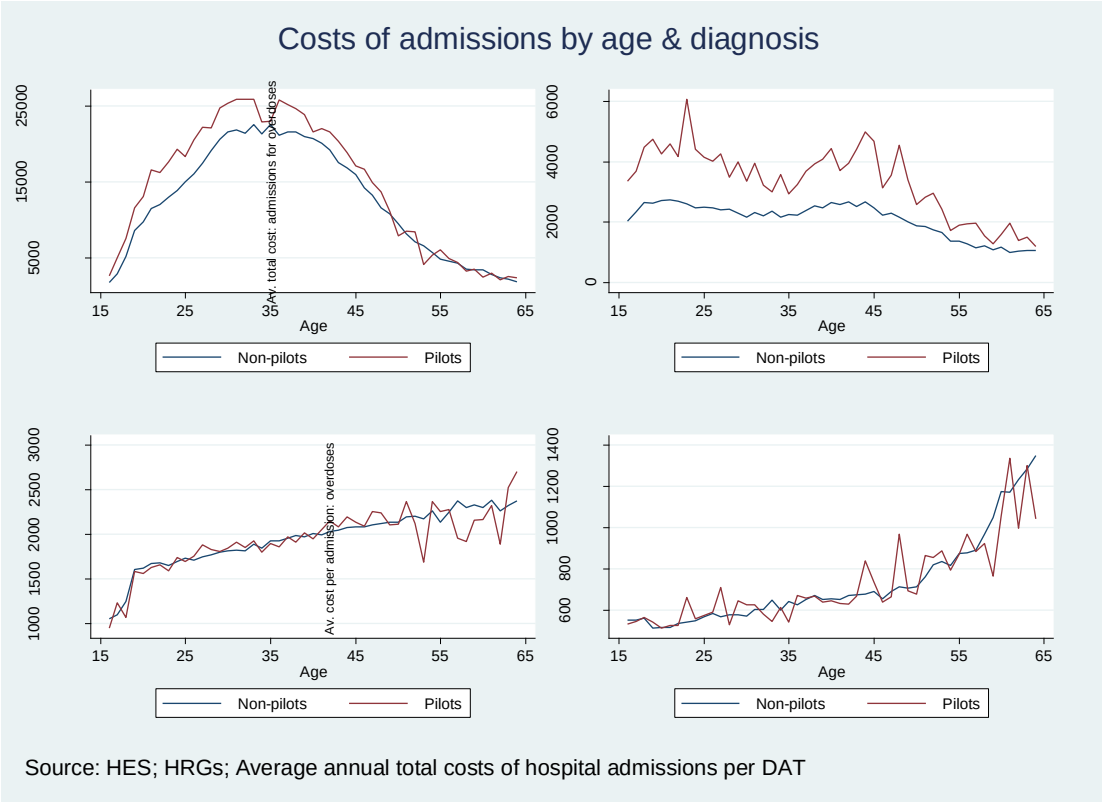
No differential trends can be observed for volumes or rates of admissions for drug-related overdoses, as the average volume has steadily but modestly increased across the analysis period.

**Figure D17: Volume/population rate of admissions by age, diagnosis & pilot status**



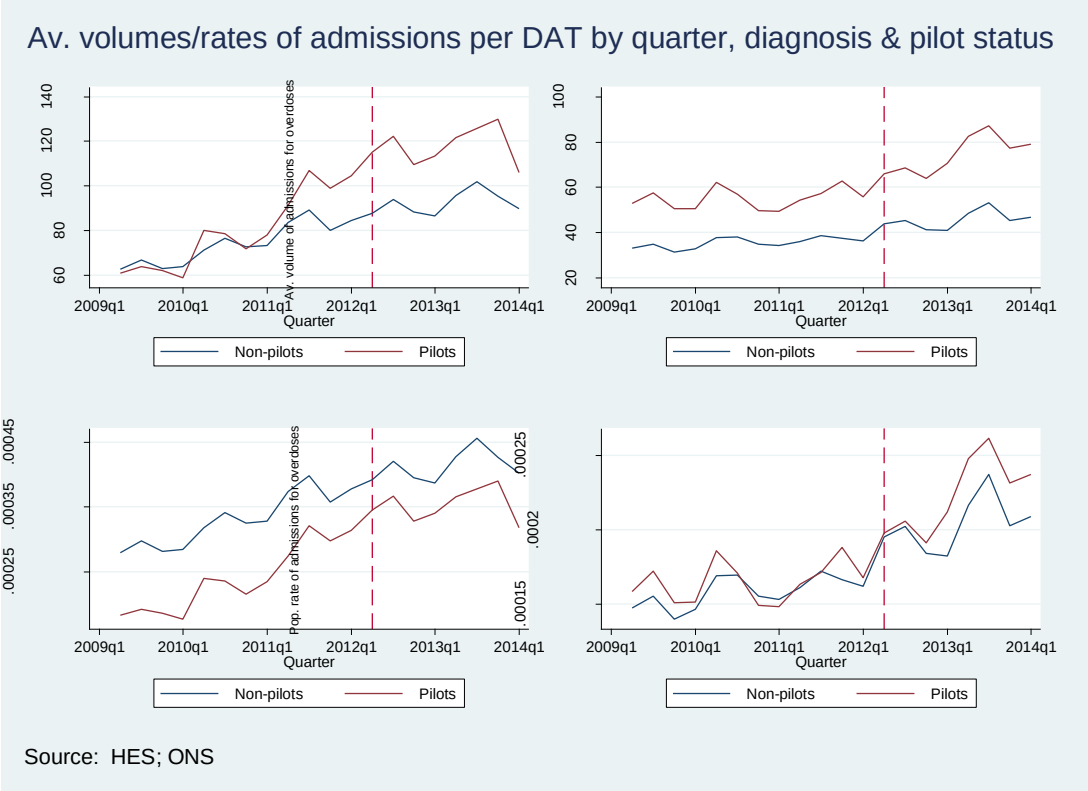

Source: HES; ONS; Annual average for pilot/non-pilot DATs by single year of age

**Figure D18: Total/per admission capita costs of by age, diagnosis & pilot status**



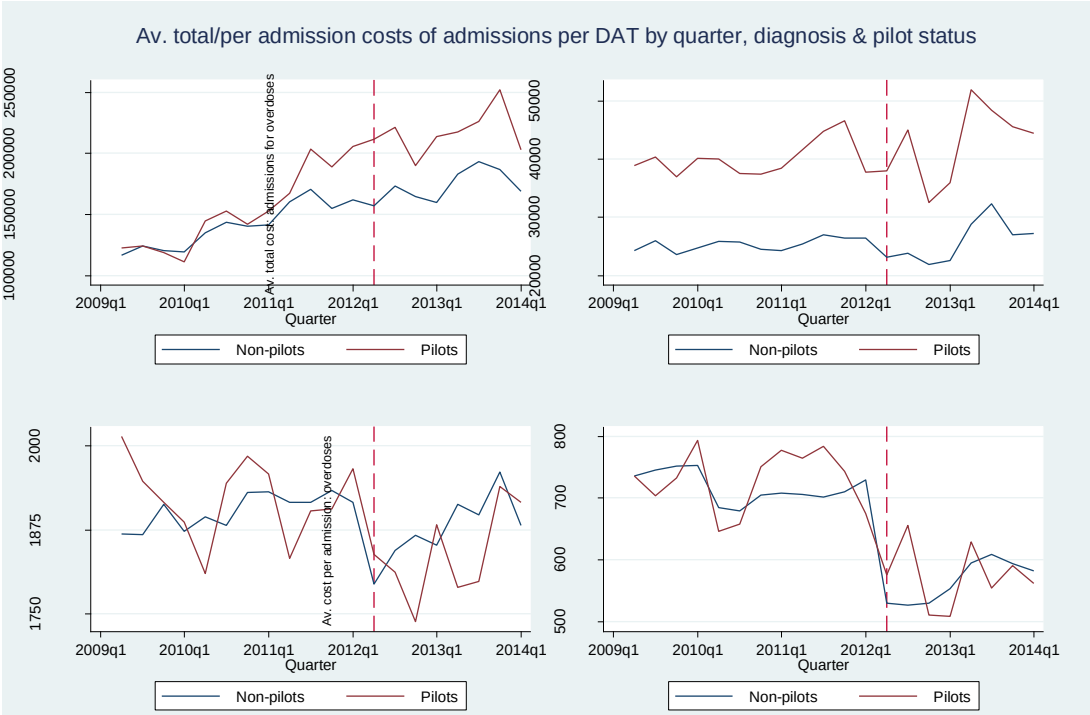

Source: HES; HRGs; Average annual total costs of hospital admissions per DAT

**Figure D19: Volume/rates of admissions by quarter, diagnosis & pilot status**




Source: HES; ONS

**Figure D20: Total/per admission costs of by quarter, diagnosis and pilot status**




Source: HES; HRGs

Figure D20 illustrates the changes over time in terms of per admission and total admission costs for pilot and non-pilot DATs. No differential patterns are observed in cost per admission for either

behavioral problems or overdoses when comparing pilot and non-pilot DATs. For both types of diagnosis, per capita costs display a 'noisy' profile (although this in part reflects the scaling of the y-axis). The costs per admission have reduced over time for all areas for admissions for drug-related overdoses from just under £750 in the second quarter of 2009 to just under £600 in the first quarter of 2014.

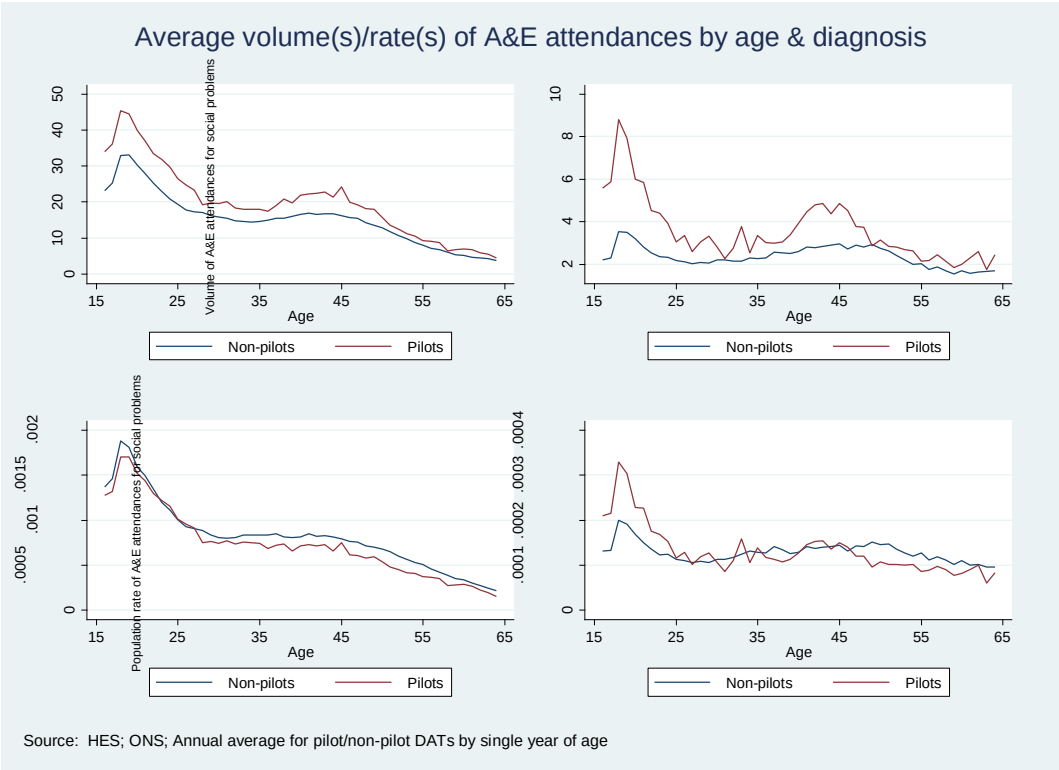
Total costs again show the combined effects of changes in volume and changes in cost per admission. Changes in volume result in a differential pattern over time for average total costs for admissions for behavioral problems – the increase in the pilot DATs is larger in the increase in the non-pilot DATs from mid-2011.

*A&E Attendances*

Figure D21 illustrates the how the volume of attendances and population rate of attendances vary by age. For poisonings, the age profiles are markedly similar, though the pilots have, on average, a slightly higher volume and a slightly higher population rate. The volumes of attendances for social problems are slightly higher in the pilot areas on average – particularly at younger ages.

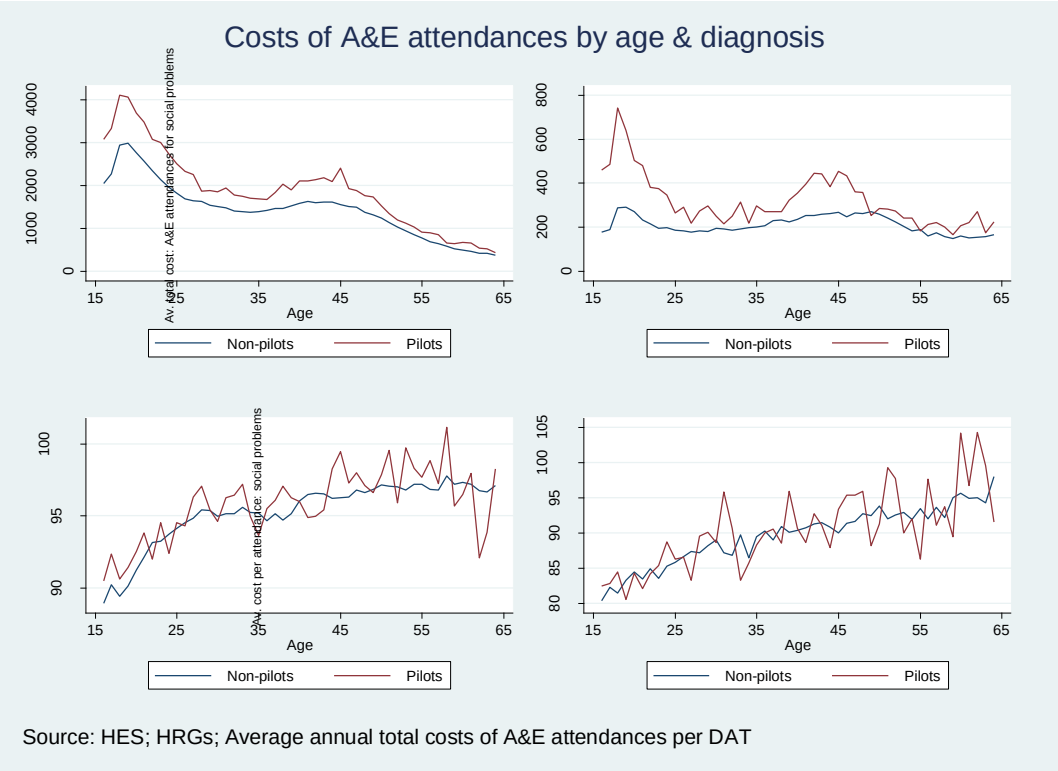
Figure D22 shows patterns by age for both the annual average total cost per DAT; and the average cost per attendance for pilot and non-pilot DATs. There are no differences in the patterns by age in the average cost per attendance comparing pilot DATs with non-pilot DATs – though it is noticeable that the trends by age for pilot DATs display a noisier profile (due to smaller samples). Differences in total costs therefore reflect differences in volumes.

**Figure D21: Volume/population rate of admissions by age, diagnosis & pilot status**




Source: HES; ONS; Annual average for pilot/non-pilot DATs by single year of age

**Figure D22: Total/per admission capita costs of by age, diagnosis & pilot status**

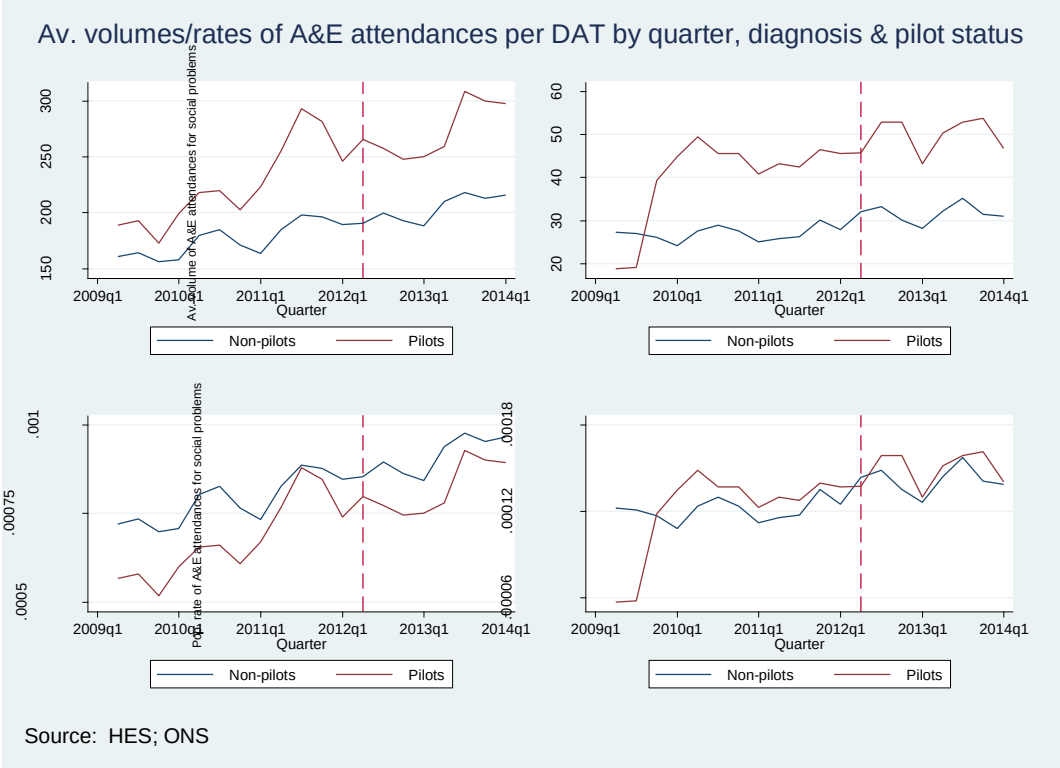



Source: HES; HRGs; Average annual total costs of A&E attendances per DAT

Figure D23 shows the changes over time in the average volume and the population rate of attendances for the pilot and non-pilot DATs. For both social problems and poisonings, there do not appear to be any obvious differential changes over time in either volume(s) or the population rates after the introduction of PbR.

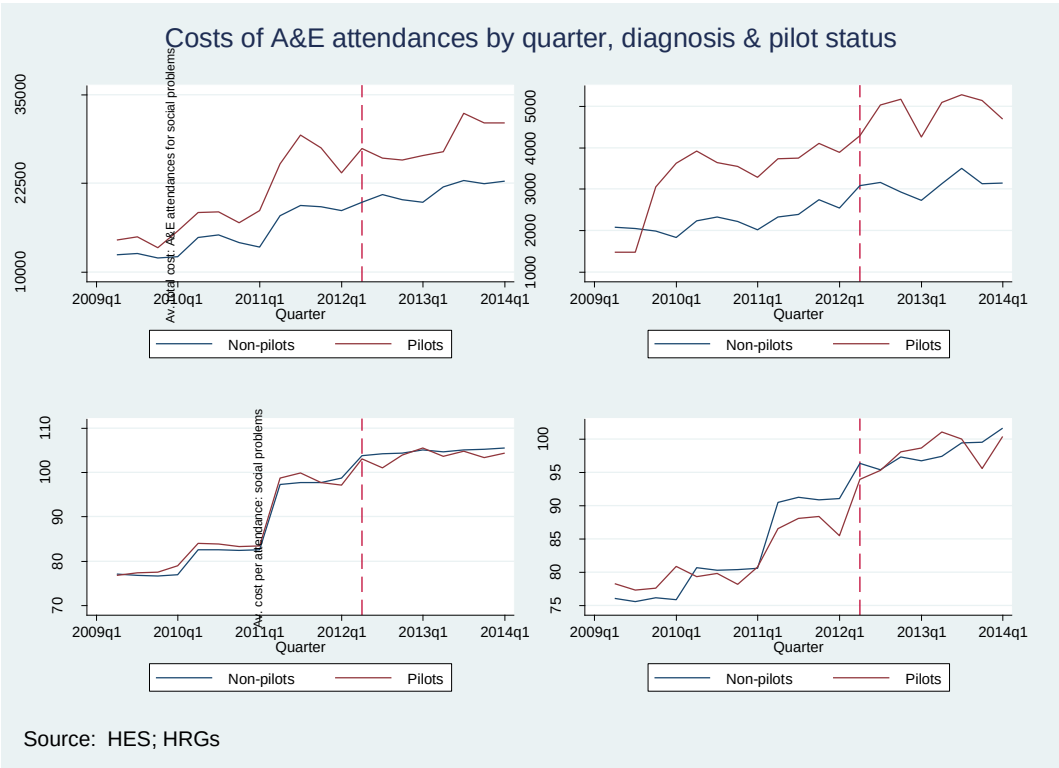
Figure D24 shows changes over time in both total costs and costs per admission for pilot and non-pilot DATs. Overall, differences in total costs reflect differences in volume and there are no obvious differential changes over time. Costs per admission are markedly similar across the analysis period.

**Figure D23: Volume/rates of admissions by quarter, diagnosis & pilot status**




Source: HES; ONS

**Figure D24: Total/per admission costs of by quarter, diagnosis and pilot status**




Source: HES; HRGs