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Evaluating Circles of Support and Accountability (CoSA) in England and Wales

Feasibility study for an impact evaluation of proven reoffending

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Background

Circles of Support and Accountability (CoSA) provides a community-based approach to the support and management of individuals convicted of sexual offences, aimed at reducing reoffending. Established in Canada in 1994, CoSA providers now operate in several countries, including England, Wales and the USA.

Aims and objectives

In 2021, His Majesty's Prison and Probation Service (HMPPS) requested that the Ministry of Justice's (MoJ) Justice Data Lab (JDL) conduct an impact evaluation of CoSA in England and Wales. The aim of this study was to assess the feasibility of conducting that impact evaluation, ensuring that it is robust and that resources are used effectively.

Methodology

The methodology consisted of a thorough review of relevant documentation and exploratory analyses on a provisional CoSA treatment group dataset. The review included examining past evaluations, particularly the 2017 impact evaluation of the Core Sex Offender Treatment Programme (SOTP) (Mews, Di Bella & Purver, 2017), to develop strategies to address previous methodological limitations. Proposals and recommendations were discussed with an external working group of subject matter and methodological experts.

The feasibility assessment focused on Propensity Score Matching (PSM), a statistical matching technique that controls for confounding variables to create a balanced comparison between treatment and control groups, allowing for an assessment of effectiveness. The JDL has extensive experience using PSM, having published nearly 300 impact evaluations based on this method since its inception in 2013.[1] [2]

[1] Accessing the Justice Data Lab service - GOV.UK (www.gov.uk)

[2] Justice Data Lab statistics - GOV.UK (www.gov.uk)

Recommendations

The feasibility assessment explored several research questions related to a potential future impact evaluation of CoSA. After a comprehensive investigation, the JDL has provided specific analytical recommendations for any future CoSA impact evaluation, which are summarised in Table 1.

Table 1: Summary of analytical recommendations from the feasibility study

Section	Research question	Recommendation
Balancing offence-related sexual interests	**RQ1.** What are the most effective data sources for measuring offence-related sexual interests?	Instead of using a single tool to measure offence-related sexual interests, also known as sexual deviancy and/or paraphilia, it is recommended to include a wide range of variables associated with paraphilia in the PSM model. Controlling for these proposed variables should minimise bias due to offence-related sexual interests.
Defining an outcome measure	**RQ2.** Should breaches of licence conditions, particularly recalls to prison, be counted as a reoffence?	Developing a new reoffending outcome measure that incorporates breaches, including recalls to prison for failure to comply with licence conditions, would be complex and resource intensive. Therefore, it is recommended to remain aligned to the department-wide approach of counting only new and separate offences as a reoffence. Where possible, descriptive statistics on recall incidents will be provided to offer

		some insight into how recalls may affect results.
	RQ3. From what starting point should reoffending be measured?	To avoid measuring any non-intervention effects during the waiting period between the index date and intervention start date, it is recommended that the follow-up period begin once an individual starts their CoSA participation (intervention start date). For the comparison group, pseudo intervention start dates will be calculated to ensure consistency in measuring outcomes.
	RQ4. What is the optimal follow-up period to measure reoffending?	To account for differences in sexual reoffending rates and patterns, as well as the extended time required to secure a conviction at court, a five-year fixed follow-up period is recommended. Complementary survival analysis to provide more detailed insights into reoffending patterns will also be conducted.
Using OASys[3] records	**RQ5.** From what point should OASys records be selected?	OASys records that are more complete are more useful because they provide the greatest amount of data. However, it is important to balance the completeness of the OASys record with proximity to the analysis

[3] Offender Assessment System (OASys) provides offending-related risks and needs information.

		period. Therefore, it is recommended that: • For those who started CoSA in custody, the most complete OASys record within the 12 months before or 1 month after intervention start date be selected. • For those who started CoSA through the gate (following release from custody) or in the community (during a non-custodial sentence), the most complete OASys record within the 18 months before or 1 month after intervention start date be selected.
	RQ6. How should missing and/or incomplete OASys records be handled?	Given the importance of OASys records for the impact evaluation, it is recommended that all individuals without an OASys record be excluded from the analysis. However, individuals with missing data in their OASys record should remain in the analysis to minimise bias and ensure methodological consistency with similar evaluations.

Creating the treatment and comparison groups	**RQ7.** How should CoSA eligibility and suitability criteria be applied?	To ensure balance across the treatment and comparison group, a number of measures have been recommended to account for CoSA eligibility and suitability criteria, including offence details and OASys items.
Accounting for observed differences	**RQ8.** How should differences in sex be accounted for?	Males and females exhibit different reoffending rates and patterns, so the standard JDL approach is to analyse them separately. However, due to the small number of females in the treatment group (fewer than ten), it is unlikely that statistically significant results will be reliably detected. Therefore, it is recommended that females be excluded from the analysis.
	RQ9. How should differences in participation route be accounted for?	When matching individuals across the treatment and comparison group, it is important to consider the impact of their CoSA participation route (whether in custody, through the gate or in the community). Different participation routes may introduce bias in the analysis, as individuals entering CoSA through different routes may have different characteristics and experiences. Therefore, it is

		recommended to create a flag for matching individuals according to participation route.
	RQ10. How should differences in participation in additional programmes be accounted for?	Participation in other reducing reoffending programmes could influence reoffending rates. To account for this, it is recommended to create a flag indicating whether an individual has participated in another accredited programme during the analysis period. This flag should be included in the PSM model.
	RQ11. How should differences in completion status be accounted for?	Some individuals in the treatment group may have ended their participation before fully 'completing' the intervention. It is recommended that a sub-analysis be conducted to explore difference in CoSA effectiveness between those who completed the intervention as intended and those who did not.
	RQ12. How should differences in social capital be accounted for?	As CoSA aims to provide participants with a social network they might otherwise lack, it is recommended to include several OASys items in the PSM model to account for differences in social capital.

Sample sizes and power calculations	**RQ13.** What is the expected treatment group sample size after applying relevant filters?	From the 792 records submitted in the provisional treatment group dataset, 363 records remain after applying the relevant filters (prior to PSM). The filters include: • 252 records not identified on the Police National Computer (PNC) • 62 records without a corresponding entry in the reoffending database for their period of CoSA participation • 115 records that did not meet the inclusion criteria
	RQ14. How should the impact of attrition be handled?	Attrition, or loss to follow-up, can occur for reasons such as leaving the country or death. This can result in a biased sample and an underestimation of reoffending. The JDL's preference would be to identify and exclude these individuals. However, since the data does not allow for their identification, they will be retained in the analysis, and their impact will be taken into consideration when interpreting the findings.
	RQ15. Would an impact evaluation be sufficiently	Power calculations undertaken indicate that

	powered to detect a significant treatment effect?	there is sufficient statistical power to detect a statistically significant treatment effect for the general reoffending measure, if such an effect exists. However, this is not the case for the sexual reoffending measure. Whilst low statistical power may indicate a limited ability to detect a statistically significant treatment effect for the sexual reoffending outcome, the possibility of finding significance cannot be completely ruled out.

Conclusions

This paper provides evidence that an impact evaluation of CoSA is feasible. Such an evaluation would provide valuable insights into the effectiveness of CoSA, which could inform future development and decisions about future commissioning.

Introduction

Circles of Support and Accountability

Circles of Support and Accountability (CoSA) provides a community-based approach to the support and management of people convicted of sexual offences. CoSA aims to reduce reoffending and help individuals convicted of sexual offences in taking accountability for their actions.

CoSA was established in Canada in 1994 to support the safe reintegration of a high-risk offender with a long history of sexually abusing children, who was leaving prison without supervision. CoSA expanded across Canada and into the USA before reaching the UK in 2002, when it was set up by the Religious Society of Friends (the Quakers). In 2008, Circles UK was launched as the national umbrella organisation for the development and delivery of CoSA provision. Currently, CoSA is available across much of England and Wales.

CoSA targets individuals who have committed sexual or sexually motivated offences against children and/or adults. CoSA is suitable for individuals with a medium, high or very high risk of serious harm. While contact offences are prioritised, non-contact offences are considered where there is evidence of escalating risk.

CoSA operates by creating a support network where the Core Member (an individual convicted of a sexual offence) takes responsibility for their ongoing risk and behaviour. A group of four to six trained volunteers from the local community form a ‘Circle’ around the Core Member, offering support and practical guidance, such as developing social skills, securing suitable accommodation and finding appropriate hobbies, interests and work. These efforts aim to improve the Core Member’s self-esteem and confidence, strengthen their social connections and facilitate their safe reintegration into the community, ultimately reducing their risk of reoffending.

Large-scale studies on the effectiveness of CoSA are limited. Some examples include:

- **Wilson, Picheca, & Prinzo, 2007:** This study investigated the impact of the original CoSA pilot project in Canada on sexual recidivism. A group of 60 CoSA participants were compared to a matched comparison group of 60 non-participants. Results showed a 70 percent reduction in sexual recidivism for those who participated compared to the matched comparison group. The average follow-up period was 4.5 years.

- **Wilson, Cortoni, & McWhinnie, 2009:** This study replicated the 2007 evaluation across different regions in Canada to verify if the findings were consistent. It followed the same methodology, comparing 44 CoSA participants to a matched group of 44 non-participants. Results showed an 83 percent reduction in sexual recidivism for offenders who participated in CoSA compared to the matched comparison group. The average follow-up period was roughly 3 years.

- **Bates, Williams, Wilson, & Wilson, 2013:** This study evaluated the outcomes of CoSA provision in the south-east of England. A group of 71 CoSA participants were compared to a matched group of 71 non-participants. Results showed significantly lower incidence of violent and contact sexual reconviction for those who participated in CoSA compared to the matched comparison group. The average follow-up period was 4.5 years.

- **Duwe, 2018:** This study evaluated the effectiveness of CoSA in Minnesota using a randomised control trial (RCT). A group of 50 CoSA participants were compared to a randomly assigned control group of 50 non-participants. Results showed that CoSA significantly reduced both general and sexual recidivism, lowering the risk of rearrest for a new sex offence by 88 percent. The average follow-up period was roughly 6 years.

Aims and objectives

In 2021, His Majesty's Prison and Probation Service (HMPPS) approached the Ministry of Justice's (MoJ) Justice Data Lab (JDL) to conduct an impact evaluation of CoSA in England and Wales. This study aims to assess the feasibility of conducting that impact evaluation.

Impact evaluations often require substantial financial, time and human resource investments; conducting a feasibility assessment can help ensure that these resources are used efficiently and effectively. Evaluating interventions that target sexual offending presents additional complexities. Previous studies, such as the 2017 impact evaluation of the Core Sex Offender Treatment Programme (SOTP) by Mews et al., have highlighted specific methodological challenges. A key limitation of the 2017 study was the lack of empirical data on sexual deviancy, which is a known variable associated with sexual reoffending (Hanson and Bussière, 1998). Addressing these issues is crucial to ensure that any future evaluation of CoSA provides an accurate estimate of its impact.

This feasibility assessment seeks to address a number of research questions related to any future evaluation of CoSA. This paper is structured according to these research themes and questions, detailed in Table 2.

Table 2: Structure of the main body of the feasibility paper organised by research themes and questions

Section	Research question
Balancing offence-related sexual interests	**RQ1.** What are the most effective data sources for measuring offence-related sexual interests?
Defining an outcome measure	**RQ2.** Should breaches of licence conditions, particularly recalls to prison, be counted as a reoffence?
	RQ3. From what starting point should reoffending be measured?
	RQ4. What is the optimal follow-up period to measure reoffending?
Using OASys records	**RQ5.** From what point should OASys records be selected?
	RQ6. How should missing and/or incomplete OASys records be handled?

Creating the treatment and comparison groups	**RQ7.** How should CoSA eligibility and suitability criteria be applied?
Accounting for observed differences	**RQ8.** How should differences in sex be accounted for?
	RQ9. How should differences in participation route be accounted for?
	RQ10. How should differences in participation in additional programmes be accounted for?
	RQ11. How should differences in completion status be accounted for?
	RQ12. How should differences in social capital be accounted for?
Sample sizes and power calculations	**RQ13.** What is the expected treatment group sample size after applying relevant filters?
	RQ14. How should the impact of attrition be handled?
	RQ15. Would an impact evaluation be sufficiently powered to detect a significant treatment effect?

Feasibility methodology

The feasibility study was conducted by the JDL, a team of analysts based at the MoJ. The JDL performed an extensive review of relevant documentation and literature and conducted exploratory analyses on a preliminary CoSA treatment group dataset provided by Circles UK. This review included a detailed examination of previous studies, particularly the 2017 Core SOTP by Mews et al., to identify methodological limitations and develop

strategies to address them. The findings and recommendations were shared with an external working group consisting of subject matter and methodological experts. Feedback from this working group has been integrated into the recommendations.

This paper does not aim to present a final evaluation design and the proposed methodology is subject to change as exploration continues. All figures in this paper are based on a provisional treatment group dataset, provided to the MoJ by Circles UK, which is subject to change.

As CoSA is already operational, this feasibility assessment focused on retrospective evaluation methods rather than prospective ones, like an RCT.[4] RCTs are considered the gold standard for assessing the effectiveness of an intervention. In the absence of an RCT and when using retrospective data, quasi-experimental methods serve as a suitable alternative.

Propensity Score Matching (PSM) is a quasi-experimental statistical matching technique that uses factors associated with both receiving the intervention and the outcome to predict a 'propensity score' representing the likelihood of receiving the intervention conditional on these factors. Individuals in the treatment group are matched to similar individuals in the comparison group based on their propensity scores. This method helps ensure the groups are similar, reducing bias and allowing for a more accurate comparison of treatment effects.

PSM was therefore proposed to evaluate CoSA. PSM forms the basis of the standard JDL methodology and was also used to evaluate the MoJ's Core SOTP in 2017. The JDL has extensive experience using PSM, having published nearly 300 impact evaluations based on this method since its inception in 2013. The JDL methodology has been through several rounds of peer review[5] and is regularly scrutinised by an Advisory Group led by New Philanthropy Capital (NPC),[6] a think tank and consultancy for the social sector.

[4] Hariton, E., & Locascio, J. J. (2018). Randomised controlled trials—the gold standard for effectiveness research. BJOG: an international journal of obstetrics and gynaecology, 125(13), 1716.

[5] https://assets.publishing.service.gov.uk/media/5a7df20aed915d74e33ef0b1/justice-data-lab-methodology.pdf

[6] Charity Support, Advice, Impact Measurement, Philanthropy Impact – NPC (thinknpc.org)

Balancing offence-related sexual interests

Sexual deviancy is an umbrella term which describes sexual interests or behaviours that are regarded as significantly different from the standards established by a culture or subculture. **Paraphilia** is a more specific term used to describe such behaviour and can be defined as any intense and persistent sexual interest or arousal to atypical stimuli. Sexual deviancy is considered a legacy term, largely replaced by the more specific definition of paraphilia. **Offence-related sexual interests** is the term used by HMPPS to describe sexual deviancy and paraphilia, as it is deemed less stigmatising. However, both sexual deviancy and paraphilia remain in use in academia, and so all terms will be used throughout depending on the research or measure being discussed.

Offence-related sexual interests are key predictors of sexual recidivism. In a meta-analysis of 95 studies involving over 31,000 sexual offenders, sexual deviancy emerged as the strongest predictor of sexual recidivism (Hanson & Morton-Bourgon, 2005). However, the measurement of these interests is complex and there is a lack of comprehensive empirical data available. Concerns about this gap were highlighted following the 2017 impact evaluation of the Core SOTP, with the authors noting the absence of such data as a critical limitation of their study (Mews et al., 2017). Including a measure of offence-related sexual interests in any impact evaluation of CoSA is crucial to ensure these characteristics are balanced across treatment and comparison groups.

RQ1. What are the most effective data sources for measuring offence-related sexual interests?

Several established tools exist to measure sexual deviancy or specific types of paraphilia. This feasibility study explored several of these tools to determine the most suitable for an impact evaluation of CoSA. The following tools were considered (please see Table A.1 in Annex A for a detailed description of each tool and an assessment of their suitability):

- **A Scale for General Paraphilia (SGP):** The SGP is a rating scale designed to assess general paraphilia using routine or readily available background and

offence details. It consists of a 16-item scale that generates a final score based on items sourced from an individual's offence history or OASys records.

- **The Screening Scale for Paedophilic Interests (SSPI/SSPI-2):** The SSPI is a tool designed to assess sexual interest in children, primarily focused on factors such as age and gender of victims. Scores on the SSPI range from 0-5, with higher scores indicating a greater likelihood of sexual interest in children. The SSPI-2 is a revised version introduced in 2017 that aims to improve the assessment capabilities of the original tool.

- **The Severe Sexual Sadism Scale (SeSaS):** The SeSaS is a tool designed to assess strong sexual urges, fantasies or acts that involve inflicting psychological or physical suffering on others. It consists of 11 dichotomous (yes/no) items that evaluate behavioural indicators of severe sexual sadism within the context of sexual offences.

- **The OASys Sexual Reoffending Predictor (OSP):**[7] The OSP is a risk assessment tool used by HMPPS to predict sexual reoffending among men convicted of current or past sexual or sexually motivated offences. The OSP generates two scores, calculated as part of the Risk of Serious Recidivism (RSR) tool within section of OASys: **OSP/C,** which predicts the risk of contact sexual reoffending, and **OSP/I,** which predicts the risk of offending related to indecent images of children.

- **The Risk Matrix 2000/s (RM2000s):** RM2000/s is a risk assessment tool specifically designed for adult males who have ever been convicted of a sexual offence, committed when the individual was age 16 or over. The RM2000/s predicts sexual recidivism and consists of seven items, generally static in nature (i.e., only subject to change due to aging or new criminality). These items typically

[7] On 28 March 2024, the OSP tool was updated to improve the prediction of indirect contact offending into the scale with indecent image offending. All new OSP assessments now produce two new scales - OSP/DC (direct contact) and OSP/IIC (images and indirect contact). For the purposes of the evaluation, the previous scores (OSP/C and OSP/I) will be used, as was the practice at the time of data collection.

assess factors related to age, sexual and general criminal history, as well as sexual offence/victim type and relationship history.

Following a detailed assessment of the strengths and limitations of each tool, and considering resource and data constraints, the JDL does not recommend a single tool for measuring offence-related sexual interests. Instead, it is recommended to include a wide range of variables associated with paraphilia from selected tools in the PSM model. The model will include variables from SSPI-2, SGP and OSP, as well as additional OASys and offence-related variables considered to be associated with paraphilia. Please see Table A.2 in Annex A for the full list of recommended variables to measure offence-related sexual interests.

SSPI-2, OSP and SGP are designed to generate a composite score from multiple variables. Using these composite scores in the PSM model, rather than the individual variables, helps maintain the tools' validity, which may be due to the weightings and interactions of the variables. However, if using composite scores is not feasible, the individual variables that comprise these scores can be used instead. This approach can also provide the PSM model with more flexibility to identify which variables predict participation.

For SSPI-2 and SGP, calculating exact composite scores is not possible due to data limitations. For example, accurately calculating responses for the 16 items in the SGP would require advanced machine learning techniques. Therefore, individual variables from SSPI-2 and SGP will be used in the PSM model. In contrast, since the necessary data for the OSP are available, the composite score will be used as intended in the PSM model, with separate OSP/C and OSP/I scores.

Incorporating variables from well-validated measures like SSPI-2 and OSP, along with additional OASys variables, aims to address the lack of comprehensive data on offence-related sexual interests. While certain aspects of paraphilia cannot be directly measured or observed, controlling for these proposed variables should mitigate bias due to offence-related sexual interests.

Defining an outcome measure

As a standard approach, the JDL use established reoffending criteria from the MoJ's Guide to Proven Reoffending Statistics[8] and report on three key reoffending metrics:

1. Binary measure of reoffending (reoffending rate) – this is the percentage of individuals in the group who commit at least one proven reoffence.

2. Frequency of reoffences committed – this is the number of proven reoffences committed per person within the group.

3. Time to first reoffence – this is the average number of days from the start of the follow-up period (index date) to the date of the first proven reoffence, calculated only for those who reoffend.

As CoSA focuses on addressing sexual offending, the evaluation would measure both general reoffending (all offences, including sexual offences) and sexual reoffending (sexual offences only) as separate outcome measures. Following the standard JDL approach, the three reoffending metrics would be included for each outcome measure.

However, it is important to consider whether this standard approach adequately captures the relevant outcomes of interest for this specific evaluation. In this feasibility paper, the JDL has considered how to operationalise reoffending in an impact evaluation of CoSA. This includes defining a reoffence, determining the starting point for measuring reoffending and establishing the appropriate length of the follow-up period.

RQ2. Should breaches of licence conditions, particularly recalls to prison, be counted as a reoffence?

While some sexual offending studies only consider proven convictions when measuring recidivism, others adopt broader criteria that include arrests, charges or police reports on lapse behaviour. In a meta-analysis conducted by Hanson and Morton-Bourgon (2005) of

[8] https://assets.publishing.service.gov.uk/media/60ffeadd8fa8f5042fd6e876/Guide-to-proven-reoffending-July21_Final.pdf

82 studies on sexual recidivism, the following criteria were used: 24 studies used reconviction, 25 studies used arrests, 3 studies used reincarceration and 26 studies used multiple criteria (including arrest, parole violations and on-criminal justice system reports).

A breach refers to an offender's failure to comply with one or more of their licence conditions following release from prison, or with any requirements of community sentences. These breaches may or may not be linked to the offender being charged with further offences. Traditionally, the MoJ's Proven Reoffending Statistics exclude such breaches from the definition of a reoffence, and the JDL follows this approach. This is because breaches are not offences in themselves, and most likely would not result in a conviction if they occurred independently from an initial conviction. For example, failing to comply with a licence condition that prohibits travel outside the UK without permission from a supervising officer is not inherently a crime. Additionally, the PNC does not record all breaches, making it difficult to ensure that all instances are captured.

However, the conditions attached to licences for sexual offences are often directly related to sexual offending behaviour. Restrictions may include avoiding contact with known sex offenders (except within a treatment programme) or maintaining distance from children's play areas, swimming pools or schools. If a sex offender is recalled to prison for breaching the conditions of their licence, it is possible that they have exhibited behaviour that CoSA aims to prevent. Therefore, it is important to consider whether to include breaches that lead to recall to prison when measuring reoffending outcomes in a CoSA impact evaluation.

Obtaining recall rates (the proportion of individuals released from prison who are subsequently recalled) presents challenges due to data availability and quality. While it may be possible to provide a simple indication of trends, obtaining recall data for a CoSA impact evaluation would likely be a complex and time-consuming process.

Competing risks presents another challenge. The current approach of excluding recalls from outcome measures may influence reoffending because recalled individuals are no longer at liberty to reoffend. For instance, an individual released under specific conditions may be recalled to prison if they violate those conditions, which competes with the

possibility of reoffending. If recall happens before a reoffence, then reoffending cannot occur while the individual is in custody.

After careful consideration, it was concluded that developing a new reoffending outcome measure that incorporates breaches (including recalls to prison due to a breach) would likely be complex and resource-intensive compared to the potential insights gained. Therefore, it is recommended that the reoffending outcome measure for the CoSA evaluation aligns with the department-wide approach, counting only new and separate offences as a reoffence. To gain insights into how recalls may affect results, descriptive statistics on recall incidents and timings across treatment and comparison groups will be conducted, subject to data availability.

RQ3. From what starting point should reoffending be measured?

Choosing the starting point for measuring reoffending is crucial for accurately assessing the impact of CoSA in any evaluation. The starting point is referred to as the **index date**. The standard JDL approach defines the index date as the earliest point an individual is at risk of reoffending (referred to as **standard index date),** which can be one of the following:

- Release date from custody for individuals serving custodial sentences
- Conviction date for individuals serving non-custodial sentences

However, there can be a substantial gap between the standard index date and when someone first participates in CoSA (intervention start date). As outlined in Table 3, data from the provisional CoSA treatment group dataset shows that 65 percent of participants start CoSA more than 6 months after the standard index date, with 42 percent starting more than 1 year after. This period between their standard index date and CoSA start date is referred to as their **‘waiting time’.** Given the length of these waiting times for the treatment group, it is important to consider whether the standard index date remains suitable, or if an alternative index date would be more appropriate.

Table 3: Breakdown of waiting time for the provisional CoSA treatment group[9]

Waiting time	Frequency
Less than 0 months	24
0 months to less than 6 months	103
6 months to less than 12 months	82
12 months to less than 24 months	96
24 months and above	58

As part of this feasibility study, three potential dates were considered as starting points for measuring reoffending:

1. **Start date of period at risk.** This is the release date from custody for individuals serving custodial sentences or conviction date for individuals serving non-custodial sentences. This is also referred to as the standard index date and represents the standard JDL approach.

2. **Intervention start date**. This is the point at which an individual begins their participation in CoSA. For individuals starting in custody, this would be their release date. For the comparison group, a pseudo intervention start date would be calculated.

3. **Intervention end date**. This is when an individual's participation with CoSA ends. For the comparison group, pseudo intervention start and end dates would need to be calculated.

[9] This includes individuals with a waiting time of less than 0 months, representing those who start participation before their custodial release date.

Option 3 (intervention end date) was immediately excluded due to missing intervention end dates for over one-quarter of the provisional treatment group, which could bias results and significantly reduce the sample size.

Option 1 (start date of period at risk) is technically less complex but may not capture treatment effects for a large portion of the treatment group due the extended waiting times. Moreover, the standard JDL approach is to exclude participants with a waiting period of more than 6 months – if this were followed, 65 percent of participants would need to be excluded from the analysis.

Option 2 (intervention start date) avoids measuring any non-intervention effects during the follow-up period and ensures that no participants need to be excluded from the treatment group due to extended waiting periods. Therefore, the recommendation is to use the date when an individual begins their participation in CoSA as the index date.

Calculating pseudo intervention start dates

As individuals in the comparison group do not participate in CoSA, it is not possible to determine an exact start date for them. To address this, a pseudo intervention start date can be calculated.

Pseudo intervention start dates estimate when an individual would likely have begun treatment based on observed offence-related characteristics, measured prior to treatment to minimise the influence of any treatment effects. Multiple imputation can be used for this estimation, which involves creating a predictive model for a variable with missing data and then filling the missing values based on this model. The pseudo intervention start date will serve as the index date (start point for measuring reoffending) for the comparison group. It will also be used to select appropriate OASys records for analysis (as discussed in **RQ5**).

When conducting the impact evaluation, it will be essential to verify that the time individuals remain ‘offence-free’ prior to starting treatment is balanced across the treatment and comparison groups. This balance is crucial because research by Hanson et al. (2014) indicates that the longer individuals remain offence-free in the community, the less likely they are to reoffend. The process for calculating pseudo intervention start dates should ensure balance across the two group, and checks will be conducted to confirm this balance.

The proposed method for calculating pseudo intervention start dates was tested on 50 percent of the provisional CoSA treatment group and found to be sufficiently robust for the evaluation. Further details on the methodology can be found in Annex B.

RQ4. What is the optimal follow-up period to measure reoffending?

The length of the follow-up period to measure reoffending can vary in evaluations. For standard JDL evaluations, both 1-year and 2-year fixed periods have been used. However, some studies, like the evaluation of the Core SOTP (Mews et al., 2017), use a variable-length follow-up period, averaging around 8.2 years (Hanson, Harris, Helmus & Thornton, 2014). Given the complexities of sexual reoffending rates and patterns, selecting an appropriate follow-up period requires careful consideration.

Type of follow-up period

Follow-up periods can be classified as fixed or variable. A fixed follow-up period means that all individuals are observed for the same duration of time after a specific starting point. In contrast, a variable follow-up period allows each person to be observed from their unique starting point until the end of the evaluation, which can vary for each individual.

Another option is to use survival analysis, a powerful statistical method for studying the timing and risk factors associated with reoffending. This technique examines the duration until a specific event, such as reoffending, occurs. It can handle situations where outcomes for individuals are unknown at the end of the evaluation through a process known as censoring. In the context of the CoSA evaluation, this could include individuals who are recalled to custody. Survival analysis can adjust for time spent in custody, ensuring a thorough evaluation of reoffending outcomes, even for participants whose supervision in the community is disrupted due to breaches of release conditions.

To maintain consistency with other JDL evaluations, a fixed follow-up period is recommended for the CoSA evaluation. However, complementary survival analysis is also recommended to be conducted alongside standard binary reoffending measures to provide more detailed insights into reoffending patterns. If data and resource allow, an additional model would be produced to adjust for recalls.

Length of follow-up period

Sexual offenders typically exhibit lower reoffending rates compared to other offender groups,[10] necessitating longer follow-up periods to increase the likelihood of detecting treatment effects. A five-year follow-up period is often used in sexual reoffending studies.

It is also important to consider the extended time required to convict individuals of sexual offences, particularly given the substantial backlog of cases in the Crown Court. Data from the MoJ's Criminal Justice Systems Delivery Data Dashboard[11] [12] shows that, between January and December 2023, it took an average of 424 days from the point an adult rape case was charged by the Crown Prosecution Service (CPS) to its completion in court. Additionally, as of Q4 2023, there were over 700 adult rape trial cases outstanding for more than one year at the Crown Court. This highlights the need for a sufficiently long follow-up period to accommodate legal processes. The JDL follows the MoJ Proven Reoffending Statistics approach, allowing an additional 6 months for cases to be convicted in court. However, this approach has limitations, as some sexual offence cases may not be convicted within this timeframe.

Analysis of the provisional CoSA treatment group dataset indicated that a three-year fixed follow-up period would retain all individuals in the treatment group. Extending the follow-up period to five years would exclude approximately five percent of the treatment group, as their intervention start dates would surpass the cut-off point for a complete five-year follow-up. As the impact on sample size is minimal, it is recommended to use a five-year fixed follow-up period for a future CoSA evaluation.

[10] https://www.gov.uk/government/statistics/proven-reoffending-statistics-april-to-june-2022/proven-reoffending-statistics-april-to-june-2022

[11] Home - CJS Dashboard (justice.gov.uk)

[12] Following concerns about the quality of key data inputs, criminal court statistics are undergoing further checks. These concerns affect metrics in the CJS dashboard covering the stage from charge to case completion in court. These metrics have not been updated with data from the latest quarter because the release of the criminal court statistics has been postponed. This dashboard will be updated in line with the criminal court statistics. You can find out more on the criminal court statistics page.

Using OASys records

Methodologically robust impact evaluations are largely reliant on data availability. In this feasibility study, where direct and exact variables are not available, proxies have been recommended using data accessible to the JDL. These proxy variables are predominantly derived from OASys records, so careful selection of these assessments is essential.

RQ5. From what point should OASys records be selected?

OASys records provide a comprehensive overview of offender characteristics, offering valuable insights into an individual's risks and needs. OASys records are routinely utilised by the JDL for inclusion in the PSM model.

Assessments that are more complete provide a greater volume of data, which can enhance the analysis. However, it is important to balance the completeness of assessments with their proximity to the analysis period. While more complete assessments yield more data, those conducted closest to or just before the intervention start date capture the individual's circumstances and behaviours leading up to their participation. This ensures that the propensity scores accurately reflect an individual's characteristics shortly before treatment.

The standard JDL approach for selecting OASys records involves choosing the most complete assessment within the six months before or after an individual's conviction date. This approach assumes that treatment typically begins near the conviction date. However, due to the substantial waiting periods for the provisional CoSA treatment group (an average of 1.3 years), a revised approach is needed to ensure the most accurate record is selected. The selection process must also account for the different routes of CoSA participation. Table 4 highlights these routes and the varying waiting times for each group.

Table 4: Mean time between release date from custody or non-custodial conviction date (standard index date) and intervention start date, categorised by participation route.

Participation route	Proportion of treatment group	Mean waiting time
In custody	7%	0.3 years (123 days)
Through the gate *i.e. immediately after release from custody*	59%	1.3years (457 days)
In the community *i.e. while serving a non-custodial sentence, such as community order or fine.*	35%	1.6 years (571 days)

The JDL has explored the availability of OASys records under various time periods, categorised by participation route. This is illustrated in Table 5.

Table 5: Differences in OASys availability with different time restrictions in relation to intervention start dates.

Participation route	Percentage of OASys records located						
	Between 24 months prior to and 1 month after start date	**Between 18 months prior to and 1 month after start date**	**Between 12 months prior to and 1 month after start date**	**Between 6 months prior to and 1 month after start date**	**24 months prior to start date only**	**18 months prior to start date only**	**12 months prior to start date only**

In custody	91%	91%	91%	72%	91%	91%	91%
Through the gate/In the community	94%	92%	87%	73%	94%	91%	86%

The goal is to balance capturing a high percentage of OASys records with ensuring that the assessments are as close as possible to the start of treatment. This will differ by participation route due to variations in average waiting times, as shown in Table 4. For those who begin CoSA in custody, the selection window is shorter because they typically start closer to their release date. For those who start through the gate or in the community, the window is extended further back to account for longer waiting periods. In addition, extending the selection period to one month after the intervention start date helps capture any assessments completed near that time by probation services.

Based on these considerations, the recommended OASys record selection is as follows:

- For individuals who started CoSA in custody, select the most complete OASys record within the **12 months before or 1 month after the intervention start date**
- For individuals who started CoSA through the gate or in the community, select the most complete OASys record within the **18 months before or 1 month after the intervention start date**

RQ6. How should missing and/or incomplete OASys records be handled?

Due to missing data and/or failure to complete an assessment, OASys records are not available for all individuals. In the provisional CoSA treatment group, 8 percent did not have any OASys record. Given the critical role of OASys variables in the CoSA impact evaluation, it is recommended that all individuals without an OASys record be excluded from the analysis.

The extent of missing data for those who do have a record must also be carefully considered. It is recommended that individuals with missing data remain in the analysis to minimise bias and ensure methodological consistency with similar evaluations, although further filtering may naturally exclude these cases from the analysis.

Creating the treatment and comparison groups

To be accepted onto CoSA, individuals must meet specific eligibility criteria that define personal characteristics which, according to CoSA guidelines, make them eligible for the intervention. Additionally, CoSA outline a set of suitability criteria to assess the potential benefits of the intervention for each individual.

RQ7. How should CoSA eligibility and suitability criteria be applied?

Eligibility criteria

Table 6 outlines the eligibility criteria for all individuals accepted onto CoSA, along with the proposed measures to account for them. For the CoSA impact evaluation, all individuals in both the treatment and comparison groups must meet the criteria to ensure the two groups are well balanced and mitigate potential bias.

Table 6: Eligibility criteria for the treatment and comparison groups

Eligibility criteria	Proposed measures
Have committed a sexual offence or a sexually motivated offence.	• Must have been convicted of an index offence which falls under the Home Office offence category of 'Sexual offences', **OR** • Must have been convicted of an offence not within the Home Office offence category of 'Sexual offences' but has been flagged to be 'sexually motivated' on the individuals OASys record.
Are at medium or	Must have a score of medium or above on the OSP/C (contact) scale, or high on the OSP/I (images) scale.

above risk of reoffending.	
Acknowledge that he/she has committed sexually harmful behaviour.	Must score 'yes' on at least one of the following OASys items: • S2Q6 – Does the offender recognise the impact and consequences of offending on victim/community/wider society? • S2Q11 – Does the offender accept responsibility for the current offence(s)? • S12Q6 – Does the offender understand their motivation for offending?
Have statutory supervision by probation and/or police.	When undertaking the impact evaluation, the JDL will use data from nDelius to investigate the minimum length of time individuals from the treatment group are on licence/serving their sentence. This will then be reflected in the comparison group.

Participation in CoSA is entirely voluntary, requiring individuals to give their consent before taking part. Without their consent, treatment will not occur. Additionally, individuals are free to withdraw their participation at any time. While those in the treatment group are assumed to have agreed to participate in CoSA (given that this is a pre-requisite of their participation), it is not possible to determine whether individuals in the comparison group would have consented had they been offered or referred to CoSA.

Suitability criteria

Table 7 outlines the suitability criteria for all individuals accepted onto CoSA, along with the proposed measures to account for them. The suitability criteria are considered more flexible than the eligibility criteria – participants may meet all, some or none of these criteria. The following proposals aim to account for this flexibility by balancing suitability criteria across both the treatment and comparison group.

Table 7: Suitability criteria for the treatment and comparison groups

Suitability criteria	Proposed measure
Be living within the community or be within six months of release into the community.	All individuals in the comparison group must be living within the community (i.e., released from custody or serving a community sentence) or are within 6 months of release into the community.
Be motivated to stop their sexually harmful behaviour.	The OASys item '**S12Q8 – Is the offender motivated to address the offending behaviour?**' is to be included as a variable in the PSM model.
Be prepared to engage with the intervention long-term.	The OASys item **'S13Q4 – Understands the importance of completing programmes'** is to be included as a variable in the PSM model.
Display a CoSA 'area of need'. (refer to Annex C)	The following OASys items are to be included as variables in the PSM model: • S4Q2 – Is the person employed? • S6Q1 – Current relationship with close family members • S6Q4 – Current relationship with partner • S6Q6 – Previous experience of close relationships • S7Q3 – Easily influenced by criminal associates • S10Q3 – Social isolation • S10Q4 – Offender's attitude to themselves • S11Q2 – Impulsivity

	• S11Q6 – Problem-solving skills

Accounting for observed differences

Accounting for observed differences between the treatment and comparison groups is fundamental to the effectiveness of PSM. This ensures a more accurate and unbiased estimate of the treatment effect by ensuring that the groups being compared are as similar as possible in terms of observed characteristics. In this feasibility study, several observed differences have been identified, and recommendations for accounting for these differences in an impact evaluation are proposed.

RQ8. How should differences in sex be accounted for?

Males and females exhibit different reoffending rates and patterns,[13] so the standard JDL approach is to analyse them separately. However, due to the small number of females in the provisional CoSA treatment group (less than ten), it is unlikely that statistically significant results can be reliably detected. Therefore, it is recommended that females be excluded from the analysis.

RQ9. How should differences in participation route be accounted for?

When matching individuals across groups, it is important to consider the impact of different sentence types. The sentence type at the start of their CoSA participation is referred to as the participation route, which can be in custody, through the gate or in the community. It is recommended that a flag be created to facilitate exact matching of similar individuals according to participation route following propensity score estimation.

RQ10. How should differences in participation in additional programmes be accounted for?

It is important to account for differences in participation in additional programmes because such participation can influence the outcomes of an impact evaluation. If individuals in the

[13] https://www.gov.uk/government/statistics/proven-reoffending-statistics-april-to-june-2022/proven-reoffending-statistics-april-to-june-2022

treatment or comparison groups participate in other reducing reoffending programmes, these experiences can affect their reoffending. Failure to account for these differences can lead to biased results.

To address this and isolate the treatment effect of CoSA as much as possible, it is recommended that a separate flag is created to indicate whether an individual has participated in any other accredited programme during the analysis period. This flag would be included as a variable in the PSM model to control for the potential effects of these additional programmes.

It is important to note that the JDL can only include programmes for which participation is known and recorded. Therefore, any unrecorded or unknown participation in other programmes may still impact the evaluation results, representing a potential limitation of this approach.

RQ11. How should differences in completion status be accounted for?

It is important to account for differences in completion status because the effectiveness of CoSA may vary between individuals who complete the intervention as intended and those who do not. Participants who start CoSA but do not complete it, referred to as 'non-completers', may experience different outcomes compared to those who do. Understanding these differences is crucial for evaluating the true impact of CoSA.

CoSA participation is typically intended to last for 12 months but may extend beyond this period if further support is required. Research suggests that the effects of CoSA on an individual's wellbeing can be seen at 9 months (Winder, Blagden, Lievesley, Dwerryhouse, Kitson-Boyce & Elliot, 2020). This research, alongside advice from HMPPS, has informed the JDL approach for categorising participants into completers and non-completers, outlined in Table 8.

Table 8: Categorisation of CoSA completers and non-completers

Completers	Non-completers
Participation lasted more than or equal to 9 months **OR** **Participation lasted less than 9 months but termination was planned[14]**	**Participation lasted less than 9 months** **OR** **Participation lasted more than 9 months but termination was unplanned[15]**

The JDL recommends including all participants, both completers and non-completers, in the treatment group using an intent-to-treat design. However, since the goal is for individuals to complete the intervention, a sub-analysis is recommended to assess CoSA's effectiveness specifically for those who successfully completed CoSA, provided the sample size is sufficient. This approach ensures a comprehensive evaluation by considering both the overall effect of CoSA and the specific impact on those who complete the intervention as intended.

RQ12. How should differences in social capital be accounted for?

An overarching aim of CoSA is to provide sexual offenders with a form of social network, as they frequently lack communication with friends or family due to the nature of their offences. This social network plays a crucial role in aiding individuals' reintegration and reducing reoffending risks. To capture the social aspect of CoSA and account for these differences, it is recommended to include relevant OASys variables in the PSM model, as outlined in Table 9. These variables help measure and adjust for differences in social capital between the treatment and comparison groups, providing a clearer picture of CoSA's impact.

[14] A planned termination occurs where a circle is deemed by co-ordinators to have been successful.
[15] An unplanned termination occurs where a circle ends prematurely due to disengagement.

Table 9: OASys variables to be included in the PSM model to account for social capital

OASys Item	Type	Coverage (for those with an OASys record)
S3Q3 – No fixed abode	Binary variable – yes/no	98%
S6Q1 – Current relationship with close family members	Three levels: No problems, some problems, or significant problems	100%
S6Q4 – Current relationship with partner	Three levels: No problems, some problems, or significant problems	100%
S10Q3 – Social isolation	Three levels: No problems, some problems, or significant problems	100%

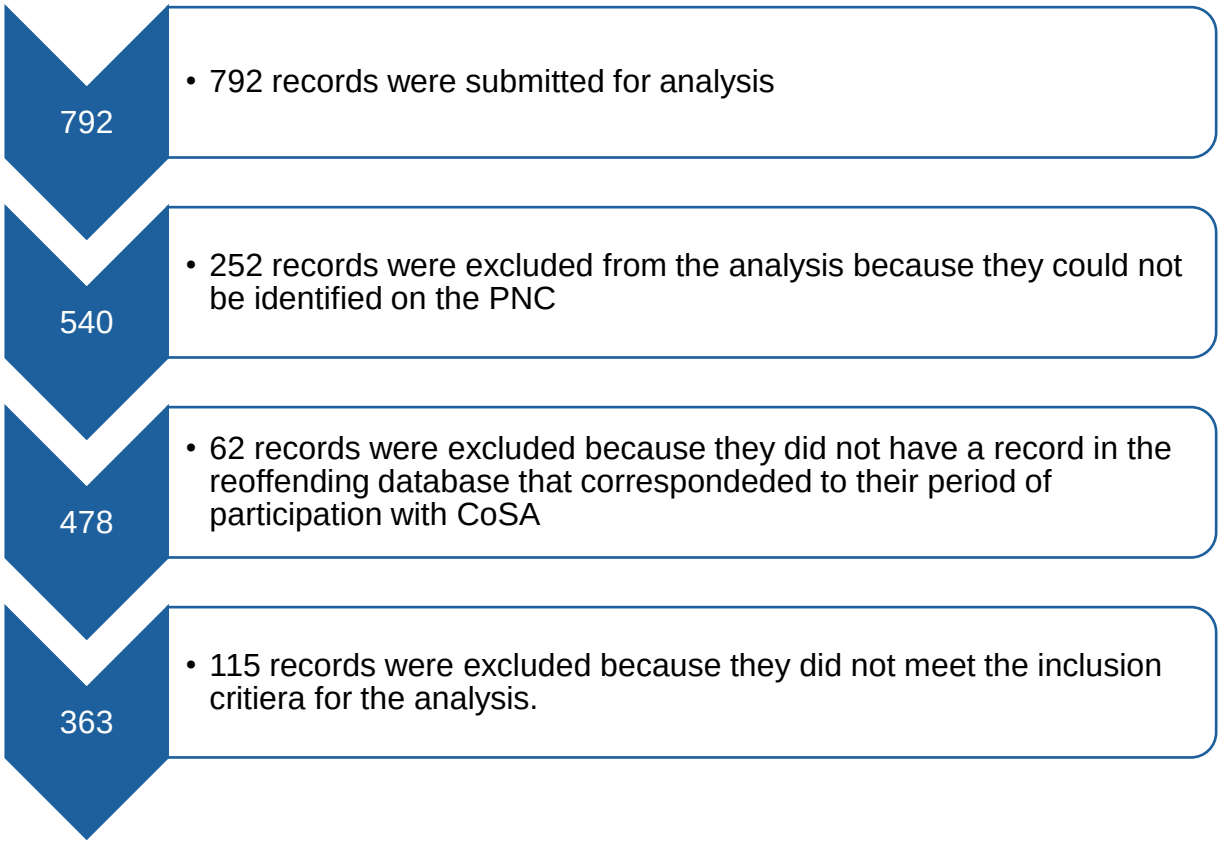
Sample sizes and power calculations

Power analyses estimate the approximate sample sizes required to detect a specific treatment effect. Power represents the likelihood of detecting an effect where one exists. Please see Annex D for detail on statistical power.

RQ13. What is the expected treatment group sample size after applying relevant filters?

Figure 1 illustrates the dropouts from the provisional CoSA treatment group at each stage of the process prior to PSM, after applying the relevant filters. It is important to note that these figures are provisional and subject to change.

Figure 1: Dropouts from the provisional CoSA treatment group dataset prior to PSM



RQ14. How should the impact of attrition be handled?

Attrition, also known as 'loss to follow-up', describes the loss of participants during a study, often due to reasons such as leaving the country or death. When using secondary data, such as Police National Computer (PNC) data, it is difficult to establish who has left the study for these reasons because such information is typically unavailable. These individuals would be classified as non-reoffenders, as the absence of any conviction data automatically indicates no reoffence has occurred.

Attrition can lead to a biased sample and an underestimation of reoffending rates, so it would be preferable to identify these individuals and exclude them from the analysis. However, due to the lack of available data, the JDL are not able to identify these individuals. Therefore, they will be retained in the analysis and their impact on the results will be considered when interpreting the findings.

RQ15. Would an impact evaluation be sufficiently powered to detect a significant treatment effect?

Table 10 illustrates the statistical power calculated for each reoffending outcome measure, based on the provisional CoSA treatment group dataset. Effect sizes ranged from 0.5 to 0.7 and are based on similar evaluations. Green indicates that it is highly likely that a true difference in reoffending outcomes between the treatment and comparison groups could be detected, amber suggests that this is less likely, whilst red suggests it is much less likely that a true difference could be detected.

Table 10: Statistical power calculations for each reoffending outcome measure

	Average power			
Description	**Sample size**	**Current scenario**	**General reoffending (baseline 40%)[16]**	**Sexual reoffending (baseline 13.7%)**

[16] For details on how the reoffending rates were obtained, refer to Annex D.

Minimum sample size which is required to obtain the academic benchmark for adequate statistical power	670		97% (**GREEN**)	80% (**GREEN**)
Maximum sample size submitted with no filters	478		93% (**GREEN**)	68% (**RED**)
Maximum sample size submitted with all filters such as eligibility and OASys criteria	363	✓	87% (**GREEN**)	57% (**RED**)

Whilst these results suggest that an impact evaluation analysing the effect of CoSA on sexual reoffending is unlikely to meet the standard academic benchmark for adequate statistical power (80%), the possibility of detecting significance cannot be ruled out.

A study with low statistical power is less likely to detect a true difference between the treatment and comparison groups. As such, after applying all filters, it is likely that the sexual reoffending outcome measure will find no significant difference between the two groups, even if participation in CoSA genuinely reduces the sexual reoffending rate. Therefore, it is important to emphasise that the failure to detect a statistically significant effect in an impact evaluation may be due to the low statistical power of the study rather than the actual impact of the intervention.

Conclusions

This paper outlines several recommendations to address the complexities involved in conducting an impact evaluation of CoSA. These proposals include measuring both general reoffending (all offences, including sexual offences) and sexual reoffending (sexual offences only) outcomes. To minimise bias in the results, it is recommended that the PSM analysis includes a number of variables associated with offence-related sexual interests. Further, extending the follow-up period for measuring reoffending is recommended to allow differences in sexual reoffending rates and patterns to be more accurately reflected.

Whilst low statistical power may indicate a limited possibility of detecting a statistically significant treatment effect for the sexual reoffending outcome measure, an impact evaluation is considered to be methodologically rigorous and may contribute valuable evidence to this field. Although one option could be to postpone the evaluation until a sufficient number of participants are available to detect a treatment effect, estimations suggest that this may not occur until at least 2029, resulting in a significant delay in the evaluation process.

The findings from this feasibility study provide evidence that an impact evaluation of CoSA is feasible. Such an evaluation would provide valuable insights into the effectiveness of CoSA, which could inform future development and decisions about future commissioning. Therefore, it is recommended that an evaluation should proceed.

Further information

Official Statistics

Our statistical practice is regulated by the Office for Statistics Regulation (OSR).

OSR sets the standards of trustworthiness, quality and value in the Code of Practice for Statistics that all producers of official statistics should adhere to.

You are welcome to contact us directly with any comments about how we meet these standards.

Alternatively, you can contact OSR by emailing regulation@statistics.gov.uk or via the OSR website.

Contact

Press enquiries should be directed to the Ministry of Justice press office.

https://www.gov.uk/government/organisations/ministry-of-justice/about/media-enquiries

Other enquiries about the analysis should be directed to:

Justice Data Lab team

E-mail: justice.datalab@justice.gov.uk

Glossary of terms

- **Accredited programmes:** programmes that are accredited for use in the community and custody. The Correctional Services Advice & Accreditation Panel (CSAAP) helps HMPPS to accredit programmes by reviewing programme design, quality assurance procedures and findings, and programme evaluations. They make recommendations about whether to accredit to the HMPPS Rehabilitation Board. HMPPS is accountable for decisions to accredit programmes.
- **Attrition:** The gradual reduction or loss of participants in a study, programme, or intervention over time, often due to factors such as dropout, non-compliance, or loss to follow-up.
- **Breaches:** Non-compliance of conditions imposed upon release from prison or during community sentences.
- **Circles of Support and Accountability** (CoSA): A community-based intervention designed to support and monitor individuals who have committed sexual offences upon their reintegration into society.
- **Circles UK**: The national body supporting the development, quality and coordination of CoSA.
- **Competing risks:** Multiple potential outcomes that may occur simultaneously, where the occurrence of one outcome may preclude the occurrence of others.
- **Completers:** Individuals who successfully complete a programme, intervention, or study according to predefined criteria or requirements. For CoSA, individuals will be classed as completers if participation duration were more than or equal to 9 months or participation duration was less than 9 months but termination was planned.
- **Composite score:** A combined score derived from multiple individual measures or variables.

- **Construct validity:** The degree to which a measurement tool or research study accurately measures the theoretical construct or concept it claims to measure.
- **Contact offences:** Criminal offences involving direct physical contact or interaction with the victim, such as inappropriate touching.
- **Control group:** A group of offenders who did not receive the intervention being analysed. The control group is made up of offenders with similar characteristics to those in the treatment group.
- **Core member:** An individual with convictions for harmful sexual behaviour who is actively participating in a CoSA intervention.
- **Core Sex Offender Treatment Programme** (SOTP): A cognitive-behavioural psychological intervention designed by HMPPS for imprisoned men who have committed sexual offences.
- **Correlation:** A statistical measure indicating the extent of relationship or association between two variables.
- **Counterfactual:** An estimate of what would have happened with regards to the reoffending of offenders in the treatment group if they had not received the treatment.
- **Descriptive statistics:** Statistical methods used to summarise and describe the characteristics of a dataset.
- **Effect size:** A value measuring the strength of the relationship between two variables in a statistical population.
- **Eligibility criteria:** Specific requirements or qualifications that individuals must meet to be considered eligible for participation in a study, programme or intervention.
- **Experimental design:** Research designs that compare the intervention with non-intervention, using controls and comparison groups that are randomly assigned.

- **Fixed follow-up period:** All participants have the same follow-up period.
- **Follow-up period:** The duration of time over which individuals are observed or monitored for outcomes after receiving an intervention.
- **Frequency of reoffences:** The number of proven reoffences committed per person within the group.
- **General reoffending**: A measure that encompasses all types of criminal offences, including both sexual and non-sexual offences, committed by an individual following their initial conviction.
- **Impact evaluation**: An assessment method used to determine the effects or consequences of an intervention, programme or policy on certain outcomes of interest, often involving comparison groups or counterfactual scenarios.
- **Index date:** The date at which the follow-up period for measuring reoffending begins. For CoSA, the index date is the intervention start date.
- **Index offence:** The primary offence for which the offender was convicted, specifically the index sentence.
- **Intent-to-treat design:** A method of analysis in which all participants are analysed together, regardless of whether they completed the intervention.
- **Intervention end date:** The date on which an individual ends participation with CoSA.
- **Intervention start date:** The date on which an individual begins participation with CoSA.
- **Justice Data Lab** (JDL): A team of analysts at the Ministry of Justice that provide a service to organisations working to reduce reoffending so that they can better understand the impact of interventions.
- **Licence**: Permission granted by authorities for an offender to be released from custody under specific conditions.

- **Logistic regression:** A technique used to predict a binary, categorical outcome; for the Justice Data Lab this will mainly be used to ascertain the likelihood of an offender receiving treatment or not. Predictions are based on the variables used in the regression.
- **Mean**: This is a measure of the average in the dataset. It is calculated by adding all the values of a dataset and dividing it by the number of values in the set.
- **Multiple imputation**: A statistical technique used to address missing data by imputing multiple plausible values for missing observations, allowing for more robust analysis and inference.
- **nDelius:** The probation case management system used for managing offenders and their risk assessments.
- **Non-completers:** Individuals who do not successfully complete a programme, intervention, or study, often due to dropout, non-compliance, or other reasons. For CoSA, individuals will be classed as completers if participation duration was less than 9 months but termination was planned or participation duration was more than 9 months.
- **Non-contact offences:** Criminal offences that do not involve direct physical contact or interaction with the victim, such as possession of child pornography.
- **OASys Sexual Reoffending Predictor** (OSP): A component of the OASys assessment system used to predict the risk of sexual reoffending among offenders.
- **OASys Violence Predictor** (OVP): Percentage likelihood of committing any violent proven reoffence within 2 years. This is based on static and dynamic factors including age, gender and criminal history.
- **Offence-related sexual interests**: A term used by HMPPS that describes paraphilia and sexual deviancy.

- **Offender Assessment System** (OASys): A system introduced in 2001 and built on the existing ‘What Works’ evidence base. It combines actuarial methods of prediction with structured professional judgement to provide standardised assessments of offenders’ risks and needs, helping to link these risks and needs to individualised sentence plans and risk management plans.

- **Offender Group Reconviction Scale** (OGRS3): Percentage likelihood of committing any offence within 2 years leading to reconviction (proven reoffending). This is based on static factors such as age, gender and criminal history. An OGRS3 score of 50% or more means that an offender is more likely than not to commit a proven reoffence within 2 years.

- **One year proven reoffending rate:** The MoJ defines this as the proportion of offenders in a cohort who commit an offence in a one-year follow-up period and were disposed of within 18 months from the start of this period, having received a court conviction, caution, reprimand or warning.

- **Outcome measures:** Variables used to assess the effects or outcomes of an intervention, programme or policy.

- **Paraphilia:** Any intense and persistent (period of six months or more) sexual interest or arousal to atypical stimuli.

- **Paraphilic disorder:** Where a paraphilia causes distress, impairment or acts of harm.

- **Police National Computer** (PNC): An administrative data system used by all police forces in England and Wales, managed by the Home Office. The PNC records offender, crime and disposal details.

- **Power analysis:** A statistical technique used to determine the minimum sample size required to detect a meaningful effect or difference in a research study with a specified level of confidence and power.

- **Predictive validity:** The extent to which the results of a measurement or assessment accurately predict future outcomes or behaviours.

- **Propensity Score Matching** (PSM): The methodology used for constructing a matched control group in Justice Data Lab analyses. Uses logistic regression to predict the likelihood of each offender receiving treatment; these predicted probabilities called propensity scores. Treated and non-treated offenders are matched based on the closeness of their propensity scores.

- **Propensity scores:** Scores representing the likelihood of individuals receiving a treatment or intervention in observational studies.

- **Proven reoffending:** Occurs when an individual commits an offence that leads to a court conviction, caution, reprimand, or warning within a specified follow-up period after being released from custody, receiving a non-custodial conviction, or starting a court order.

- **Pseudo intervention start date:** A hypothetical or simulated start date used for analytical purposes, often in studies where actual start dates are unavailable or inconsistent.

- **Quasi-experimental design:** Research designs that compare units receiving the intervention with those that do not, the controls or comparison groups not being randomly assigned.

- **Randomised Control Trial** (RCT): A scientific experiment design where participants are randomly assigned to either an experimental group that receives the intervention or a control group that does not, allowing for causal inference about the effects of the intervention.

- **Recall:** Where an offender is taken back to prison after being released on licence or parole for breaking the rules of their probation.

- **Recidivism:** The most commonly used term internationally to refer to reoffending, referring to an offender's relapse into criminal behaviour. The definition of recidivism varies.

- **Regression model:** A statistical model used to investigate the relationship between one or more independent variables and a dependent variable.

- **Risk Matrix 2000/S** (RM2000/S): Risk management tool used to assess the risk of sexual reoffending among offenders.
- **Scale for General Paraphilia** (SGP): A measurement tool used to assess the presence and severity of paraphilic interests or behaviours across different domains.
- **Screening Scale for Paedophilic Interests** (SSPI): A screening tool used to assess the presence and severity of paedophilic interests or tendencies.
- **Sexual deviancy:** An umbrella term which describes sexual interest or behaviours that are regarded as significantly different from the standards established by a culture or subculture.
- **Sexual reoffending**: A measure specifically focused on instances where an individual commits new sexual offences following their initial conviction.
- **Sexual Sadism Scale** (SeSaS): A measurement tool used to assess the presence and severity of sadistic sexual interests or behaviours.
- **Social capital:** The collective value of social networks, relationships, and interactions within a community or society, including trust, reciprocity, and cooperation, which can contribute to individual and collective well-being.
- **Standard index date:** The standard starting point for measuring reoffending in JDL evaluation. This is the earliest point an individual is at risk of reoffending: either the release date for those serving custodial sentences or the conviction date for those serving non-custodial sentences.
- **Standardised mean differences:** The standardised difference in means between the treatment and control groups, for an individual variable. The standardised mean difference is expressed as a percentage; the smaller the percentage the more similar the groups are on that variable.

- **Statistically significant difference:** A difference between groups or conditions that is unlikely to have occurred by chance alone, based on statistical analysis and typically indicated by a p-value below a predetermined threshold.
- **Suitability criteria:** Criteria used to assess whether individuals are appropriate candidates for participation in a study, programme or intervention based on their characteristics, needs or circumstances.
- **Survival analysis:** Statistical techniques used to analyse the time until an event of interest occurs, such as reoffending or relapse.
- **Time to first reoffence:** The average number of days from the start of the follow-up period (index date) to the date of the first proven reoffence, calculated only for those who reoffend.
- **Treatment dose:** The amount or intensity of an intervention received by individuals.
- **Treatment effect:** The impact or outcome resulting from an intervention or treatment.
- **Treatment group:** The group of offenders that the provider delivered their intervention to. In other words, the offenders who received 'the treatment'.
- **Unobserved variable:** A variable that influences the outcome of interest but is not directly measured or accounted for in the analysis.
- **Variable follow-up period:** Each individual is followed up from their index date until the end of the evaluation, which varies according to the individual.
- **Waiting time:** The length of time between an individual's standard index date and starting the intervention.

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Annex A

Measures of offence-related sexual interests and recommendations

Table A.1: Tools considered to measure offence-related sexual interests and assessment of their suitability

Measure	Description	Assessment of suitability
A Scale for General Paraphilia (SGP)	A Scale for General Paraphilia (SGP) was developed and validated by HMPPS in 2021 (Wakeling, Walton, Bloomfield, Wilkinson, Mathie & Carter, 2021) to provide a measure for robust evaluation of sexual offenders and provide suitable sentence support. Through various statistical analyses, the SGP demonstrated good predictive validity for sexual offending. Consequently, it has been recommended for use in future program evaluations. A 16-item scale is used to give a final score. These 16 items were taken from either offence history or OASys records.	To accurately fill in responses to the 16 questions, researchers require access to individual OASys records, which are often in written form. Calculating the complete SGP score would therefore require the use of text analysis or machine learning techniques, which currently fall outside the JDL's scope and resource capacity. Further, information for some of the 16 questions was not available exactly as the SGP intended, which would compromise the integrity and validity of the SGP.
The Screening Scale for Paedophilic	The Screening Scale for Paedophilic Interests (SSPI) was designed by Seto & Lalumière in	The SSPI is a well-developed and trusted measure of paedophilia. Additionally, studies have found

Interests (SSPI)	2001 as a means of quickly assessing sexual interest in children among individuals who have committed a sexual offence against a child (less than 15 years old). SSPI is intended to act as an aid to assessing cases or as a proxy for sexual interest in children, where other measures are not available. SSPI-2 (2017) is a revised version of SSPI. The SSPI was found to have good construct validity, with scores being significantly and positively correlated with phallometrically assessed sexual arousal to children (Seto & Lalumière, 2001; Seto, Harris, Rice & Barbaree, 2004). A score is calculated from five items about the offenders' sexual offences which have been linked to a greater sexual interest in children (i.e. paedophilia). SSPI scores range from 0 to 5, with higher scores indicating a greater likelihood of sexual interest in children.	SSPI-2 to be a good measure of paedohebephilia, defined as sexual interest in both prepubescent and pubescent children (Stephens, Seto and Cantor, 2019). Therefore, this scale adequately covers sexual interest in children under the age of 15. Paedophilia is a prevalent form of criminal paraphilic disorder. Including the SSPI in the evaluation would provide a valuable means of measuring at least one paraphilic disorder. However, relying solely on the SSPI (and/or the SSPI-2) would not be sufficient to identify other forms of sexual deviancy or paraphilic disorder. Additional measures would be needed to capture a wide array of sexually deviant traits, such as voyeurism, exhibitionism and sadism.
Sexual Sadism Scale (SeSaS)	The paraphilia of sexual sadism involves sexual fantasies, urges and behaviours focused on the subjugation and humiliation of	SeSaS cannot be obtained with data available, and therefore cannot be included in this evaluation.

	another human being. The Sexual Sadism Scale (SeSaS: Mokros, Schilling, Weiss, Nitschke, & Eher, 2012) is a measure of sexual sadism. It consists of a checklist of 11 items (yes/no) that code for crime scene behaviour. The sum of these 11 items showed a moderate to substantial correlation with clinical diagnoses of sadism and was strongly correlated with the Massachusetts Treatment Center Sadism Scale (Longpré, Guay, & Knight, 2019).	
The OASys Sexual Reoffending Predictor (OSP)	The OASys Sexual Reoffending Predictor (OSP) is a tool used to assess the risk of sexual reoffending of adult males who have ever been convicted of a sexual offence. The OSP produces two scores: OSP/C predicts the likelihood of proven reoffending for a sexual/sexually motivated contact offence; OSP/I predicts the likelihood of proven reoffending for an offence relating to possessing or downloading of indecent images of children.	While the OSP does not specifically measure sexual deviance, it could be used as a predictor of sexual deviance based on the perceived risk of a particular type of recidivism – namely, contact which causes serious harm to the victims or indecent images of children. However, it must not be used or calculated for females, as there is currently no actuarial risk assessment tool available for women convicted of sexual offences.

	Scores must be calculated for all adult males with an index offence or previous sanction for a sexual offence, or where the assessor has identified a current or previous nonsexual offence which has a sexual motivation.	
Risk Matrix 2000/S (RM2000/S)	The Risk Matrix 2000/S (RM2000/S) is a static risk measure indicating risk of sexual reoffending amongst sex offenders. It is widely used by practitioners and researchers. RM2000/S scores can only be computed for offenders who were at least 16 years old when they committed their most recent sexual offence.	In a study conducted by Philip Howard and Helen Wakeling (2021), the OSP and RM2000/S were compared for the predictive validity of reoffending. The findings indicated that OSP/C was a slightly better predictor of proven contact sexual reoffending, while OSP/I was the best predictor of proven indecent image reoffending. Consequently, OSP scores should be prioritised over RM2000/S in this evaluation.

Table A.2: Recommended variables for measuring offence-related sexual interests

Measure	Variables
OASys record	The following variables taken from the OASys record will be included in the PSM model: • S2A2A_CARRY_USE_WEAPON • S2Q2B_VIOLENCE_THREAT

	• S2Q2C_EXCESSIVE_VIOLENCE • S2Q2F_SEXUAL_ELEMENT • S2Q3A_DIRECT_VICTIM • S2Q3E_REPEAT_VICTIMISATION • S2Q3F_VICTIM_STRANGER • S2Q9_SEXUAL_MOTIVATION • S2Q10_PORNOGRAPHY • S2Q11_RESP_OF_OFFENCE • S2Q13_ESCALATION_SERIOUSNESS • S2Q14_ESTABLISHED_PATTERN • OGRS 4 score • OVP score
OSP	A composite score of the following variables, each with a different weighting: • Number of previous/current sanctions involving contact adult offences

	• Number of previous/current sanctions involving contact child offences • Number of previous/current sanctions involving other non-contact offences • Number of previous/current sanctions for indecent image of children offences • Any previous sanctions, for any offence • Current offence contact sexual offence with a stranger victim • Age at most recent sanction for a sexual offence • Age at effective assessment date
SSPI-2	A composite of the following variables: • Any male child victim (under 15) • More than one child victim (under 15) • Any victims under 12 • Any extrafamilial child victim (under 15) • Any possession of child pornography

SGP	It is not possible to calculate an SGP score, as many of the variables are either not exactly as stated (ages), or not complete for every individual (details on victim). However, we will include the following variables taken from the SGP to produce a partial proxy score: • Intrafamilial victim • Male child victim • Unrelated victim • Unrelated child victim • Stranger victim • Non-contact sex offence (index offence) • Possession of indecent images of children (index offence) • Extreme/sadistic violence associated with offence • Use of weapon during assault • Persistence after punishment for sexual offence • Victim aged under 13 • Victim aged 13-16

	• Victim aged 16+ • Number of convictions for sexual offences
Additional variables	The following index offence variables will be included in the PSM model: • Has a victim gender preference • Female victim • Male victim • Adult serious index offence • Child contact index offence • Child image index offence • Child other index offence • Family member victim • Adult serious secondary index offence • Child image secondary index offence • Child other secondary index offence • Victim family member secondary index offence

	• Number of child contact secondary index offences • Ever previously committed adult other offence • Ever previously committed child contact offence • Ever previously committed child other offence • Ever previously had victim less than 13 years old • Ever previously had male victim • Ever previously had female victim • Ever previously had family member victim • Ever committed exhibitionism offence • Ever committed rape • Any previous offence is a serious offence (child contact / adult serious) • Number of previous adult serious offences • Number of previous adult other (excluding images) offences

	• Number of previous child contact offences • Number of previous child victim offences • Number of non-sex non-violent offences during last previous year

Table A.3. Method for creating the proposed variables

Variable/flag	How it is created
Any male child victim (under 16)	HO offence codes in 'All male victim' AND either 'Victim under 13' or 'Victim under 16 (13-15)' (see table A.4) OR OASys item 'VICTIM_AGE_RANGE' in: 100, 110, 120, 170, 180 AND 'VICTIM_GENDER' = M (see table A.5).
More than one child victim (under 16)	HO offence codes in: either 'Victim under 13' or 'Victim under 16 (13-15)' (see table A.4) OR OASys item 'VICTIM_AGE_RANGE' in: 100, 110, 120, 170, 180 (see table A.5).
Any victims under 13	HO offence codes in: 'Victim under 13' (see table A.4) OR

	OASys item VICTIM_AGE_RANGE' in: 100, 110, 170 (see table A.5).
Any extrafamilial child victim (under 16)	HO offence codes in 'Victim under 13' or 'Victim under 16 (13-15)' AND in 'Extrafamilial victim' (see table A.4) OR OASys item VICTIM_AGE_RANGE' in: 100, 110, 120, 170, 180 but **NOT** in OASys VICTIM_PERPETRATOR in: 130, 140, 150, 160, 240 (see table A.5).
Any possession of child pornography	HO offence codes in 'Child Images' (See table A.4).
Only intrafamilial victim	HO offence codes: 'Intrafamilial victim' (see table A.4) **OR** OASys item VICTIM_PERPETRATOR in: 130, 140, 150, 160, 240 (see table A.5) AND no previous/index offence in HO offence codes: 'Extrafamilial victim' (see table A.4).
Any extrafamilial victim	HO offence codes in 'Extrafamilial victim' (see table A.4).
Any non-contact sex offence	HO offence codes in 'non-contact' (see table A.4).
Convicted for more than one sexual offence (persistence after punishment)	Number of previous sexual offences > 0.
Any victim aged 13-15	HO offence codes in Victim under 16 (13-15) (see table A.4) OR

	OASys item VICTIM_AGE_RANGE = 180 or 120 (see table A.5).
Number of convictions for sexual offences	Sum of previous offences where Home Office offence group = ’02 Sexual offences’.
Male victim index offence	Index offence HO offence code in: ‘All male victim’ (see table A.4).
Adult serious index offence	Index offence HO offence code in: Adult serious (see table A.4).
Child contact index offence	Index offence HO offence code in: Child contact (see table A.4).
Child image index offence	Index offence HO offence code in: Child image (see table A.4).
Child other index offence	Index offence HO offence code in: Child other (see table A.4).
Adult serious secondary offence	Secondary offence HO offence code in: Adult serious (see table A.4).
Child contact secondary offence	Secondary offence HO offence code in: Child contact (see table A.4).
Child image secondary offence	Secondary offence HO offence code in: Child image (see table A.4).
Child other secondary offence	Secondary offence HO offence code in: Child other (see table A.4).
Number of previous adult serious offence	Number of previous offences with HO offence code in: Adult serious (see table A.4).
Number of previous adult other (excluding images) offences	Number of previous offences with HO offence code in: Adult other (see table A.4).

Number of previous child contact offences	Number of previous offences with HO offence code in: Child contact (see table A.4).
Number of previous child other offences (excluding images)	Number of previous offences with HO offence code in: Child other (see table A.4).
Any rape offence	HO offence code in: rape (see table A.4).
Any exhibitionism offence	HO offence code in: exhibitionism (see table A.4).

Table A.4: Home Office offence code groupings

Group	Home Office offence codes
All child victim **As per offence descriptions, all offences where victim aged under 18**	1612, 1613, 1614, 1617, 1618, 1619, 1623, 1624, 1625, 1626, 1627, 1628, 1711, 1714, 1716, 1803, 1804, 1807, 1808, 1811, 1907, 1909, 1911, 1913, 1916, 1917, 1918, 1919, 2001, 2004, 2006, 2100, 2101, 2102, 2103, 2104, 2105, 2106, 2107, 2108, 2109, 2110, 2111, 2112, 2113, 2114, 2115, 2116, 2117, 2118, 2119, 2120, 2121, 2122, 2123, 2124, 2125, 2126, 2127, 2200, 2201, 2206, 2207, 2208, 2209, 2210, 2211, 2212, 2213, 2214, 2215, 2216, 2217, 2218, 2219, 2220, 2221, 2222, 2223, 2224, 2225, 2226, 2230, 2300, 2301, 2303, 2304, 2305, 2306, 2307, 2308, 2309, 2310, 2311, 2314, 2315, 2316, 2317, 2318, 2319, 2320, 2321, 2322, 2323, 2324, 2325, 2326, 2327, 2328, 2329, 2330, 2331, 2332, 2333, 2334, 2335, 2336, 2337, 2402, 2405, 2412, 2414, 2415, 2416, 2503, 2504, 7100, 7101, 7102, 7103, 7104, 7105, 7106, 7107, 7108, 7109, 7110, 7111, 7112, 7113, 7114, 7115, 7116, 7117, 7300, 7301, 7302, 7307, 7308, 7309, 7310, 7311, 7312, 7313,

	7314, 7315, 7316, 7317, 7318, 7400, 7401, 7402, 8602, 8610, 8615, 8801, 8802
All male victim	1600, 1602, 1605, 1606, 1611, 1612, 1613, 1614, 1615, 1616, 1623, 1625, 1626, 1700, 1711, 1712, 1713, 1714, 1715, 1716, 1800, 1802, 1803, 1804, 1805, 1806, 1807, 1808, 1809, 1810, 1811, 1909, 1910, 1913, 1914, 1917, 1919, 2104, 2105, 2107, 2109, 2113, 2115, 2119, 2121, 2123, 2125, 2203, 2205, 2207, 2209, 2213, 2215, 2219, 2221, 2223, 2225, 2305, 2307, 2309, 2311, 2315, 2317, 2319, 2321, 2323, 2325, 2327, 2329, 2331, 2333, 2335, 2337, 2410, 2411, 2412, 2413, 2414, 2415, 2416, 7001, 7003, 7005, 7007, 7017, 7019, 7103, 7105, 7107, 7115, 7308, 7310, 7314, 7316, 7401, 8802
All female victim	1617, 1618, 1619, 1620, 1621, 1624, 1627, 1628, 1902, 1903, 1904, 1907, 1908, 1911, 1912, 1916, 1918, 2000, 2001, 2002, 2003, 2004, 2005, 2006, 2100, 2101, 2102, 2103, 2106, 2108, 2112, 2114, 2118, 2120, 2122, 2124, 2200, 2201, 2202, 2204, 2206, 2208, 2212, 2214, 2218, 2220, 2222, 2224, 2301, 2303, 2304, 2306, 2308, 2310, 2314, 2316, 2318, 2320, 2322, 2324, 2326, 2328, 2330, 2332, 2334, 2336, 2401, 2402, 2403, 2405, 2406, 2407, 2500, 2501, 2502, 2503, 2504, 2505, 7002, 7004, 7006, 7008, 7018, 7020, 7102, 7104, 7106, 7114, 7307, 7309, 7313, 7315, 7402, 8801, 13900, 16502
Victim under 13	1714, 1716, 1916, 1917, 1918, 1919, 2004, 2006, 2100, 2101, 2102, 2103, 2104, 2105, 2106, 2107, 2108, 2109, 2110, 2111, 2112, 2113, 2114, 2115, 2116, 2117, 2118, 2119, 2120, 2121, 2122, 2123, 2124, 2125, 2301, 2314, 2315, 2316, 2317, 2318, 2319, 2320, 2321, 2324, 2325, 2328, 2329, 2330, 2331,

	2334, 2335, 7102, 7103, 7111, 7112, 7113, 7313, 7314, 7315, 7316, 7317, 7318
Victim under 16 (13-15)	1617, 1623, 1625, 1626, 1627, 1628, 1711, 1807, 1808, 1811, 1907, 1909, 1911, 1913, 2001, 2200, 2201, 2206, 2207, 2208, 2209, 2210, 2211, 2212, 2213, 2214, 2215, 2216, 2217, 2218, 2219, 2220, 2221, 2222, 2223, 2224, 2225, 2303, 2405, 2414, 2415, 2416, 2503, 7104, 7105, 7114, 7115, 8801, 8802
Intrafamilial victim	2300, 2301, 2302, 2303, 2304, 2305, 2306, 2307, 2308, 2309, 2310, 2311, 2312, 2313, 2314, 2315, 2316, 2317, 2318, 2319, 2320, 2321, 2322, 2323, 2324, 2325, 2326, 2327, 2328, 2329, 2330, 2331, 2332, 2333, 2334, 2335, 2336, 2337
Extrafamilial victim	839, 1600, 1602, 1605, 1606, 1611, 1612, 1613, 1614, 1615, 1616, 1617, 1618, 1619, 1620, 1621, 1622, 1623, 1624, 1625, 1626, 1627, 1628, 1700, 1711, 1712, 1713, 1714, 1715, 1716, 1800, 1802, 1803, 1804, 1805, 1806, 1807, 1808, 1809, 1810, 1811, 1900, 1902, 1903, 1904, 1907, 1908, 1909, 1910, 1911, 1912, 1913, 1914, 1916, 1917, 1918, 1919, 2000, 2001, 2002, 2003, 2004, 2005, 2006, 2100, 2101, 2102, 2103, 2104, 2105, 2106, 2107, 2108, 2109, 2110, 2111, 2112, 2113, 2114, 2115, 2116, 2117, 2118, 2119, 2120, 2121, 2122, 2123, 2124, 2125, 2126, 2127, 2200, 2201, 2202, 2203, 2204, 2205, 2206, 2207, 2208, 2209, 2210, 2211, 2212, 2213, 2214, 2215, 2216, 2217, 2218, 2219, 2220, 2221, 2222, 2223, 2224, 2225, 2226, 2230, 2400, 2401, 2402, 2403, 2405, 2406, 2407, 2410, 2411, 2412, 2413, 2414, 2415, 2416, 2417, 2418, 2419, 2500, 2501, 2502, 2503, 2504, 2505, 2700, 6608, 6617, 6618, 6619, 6620, 6807, 6808, 7000, 7001, 7002, 7003, 7004, 7005, 7006, 7007, 7008, 7009, 7010,

	7011, 7012, 7013, 7014, 7015, 7016, 7017, 7018, 7019, 7020, 7021, 7022, 7023, 7024, 7100, 7101, 7102, 7103, 7104, 7105, 7106, 7107, 7108, 7109, 7110, 7111, 7112, 7113, 7114, 7115, 7116, 7117, 7201, 7202, 7203, 7204, 7205, 7206, 7300, 7301, 7302, 7303, 7304, 7305, 7306, 7307, 7308, 7309, 7310, 7311, 7312, 7313, 7314, 7315, 7316, 7317, 7318, 7400, 7401, 7402, 8600, 8601, 8602, 8603, 8604, 8605, 8606, 8607, 8608, 8609, 8610, 8611, 8612, 8613, 8614, 8615, 8616, 8617, 8800, 8801, 8802, 8803, 8804, 8805, 8806, 8807, 8808, 8809, 8810, 8811, 8812, 10700, 10701, 10702, 10703, 10704, 10705, 10706, 10707, 10710, 13900, 16412, 16500, 16501, 16502, 16503, 16600, 16601, 16604, 16620, 16700, 16701, 16702, 50300, 50400
Child images	8602, 8610, 8615
Non-contact	2110, 2111, 2116, 2117, 2210, 2211, 2216, 2217, 2400, 2401, 2402, 2403, 2405, 2406, 2407, 2410, 2411, 2412, 2413, 2414, 2415, 2416, 2417, 2418, 2419, 2503, 2700, 6608, 6617, 6618, 6619, 6620, 6634, 6635, 6636, 6637, 7100, 7101, 7108, 7109, 7110, 7111, 7112, 7113, 7300, 7303, 7304, 7305, 7306, 7309, 7310, 7311, 7312, 7315, 7316, 7317, 7318, 8602, 8610, 8615, 8801, 8802, 10700, 10701, 10702, 10703, 10704, 10705, 10706, 10707, 10710, 16500, 16501, 16502, 16503, 16600, 16601, 16604, 16620, 16700, 16701, 16702
Adult serious	1602, 1700, 1712, 1713, 1715, 1900, 1908, 1910, 1912, 1914, 2000, 2002, 2003, 2005, 2202, 2203, 2204, 2205
Child contact	1612, 1613, 1614, 1617, 1618, 1619, 1623, 1624, 1625, 1626, 1627, 1628, 1711, 1714, 1716, 1803, 1804, 1807, 1808, 1811, 1907,

	1909, 1911, 1913, 1916, 1917, 1918, 1919, 2001, 2004, 2006, 2100, 2101, 2102, 2103, 2104, 2105, 2106, 2107, 2108, 2109, 2112, 2113, 2114, 2115, 2118, 2119, 2120, 2121, 2122, 2123, 2124, 2125, 2200, 2201, 2206, 2207, 2208, 2209, 2212, 2213, 2214, 2215, 2218, 2219, 2220, 2221, 2222, 2223, 2224, 2225, 2300, 2301, 2303, 2304, 2305, 2306, 2307, 2308, 2309, 2310, 2311, 2314, 2315, 2316, 2317, 2318, 2319, 2320, 2321, 2322, 2323, 2324, 2325, 2326, 2327, 2328, 2329, 2330, 2331, 2332, 2333, 2334, 2335, 2336, 2337, 7102, 7103, 7104, 7105, 7106, 7107, 7114, 7115, 7301, 7302, 7307, 7308, 7313, 7314, 7400, 7401, 7402
Child other	2110, 2111, 2116, 2117, 2210, 2211, 2216, 2217, 2402, 2503, 7100, 7101, 7108, 7109, 7110, 7111, 7112, 7113, 7300, 7309, 7310, 7311, 7312, 7315, 7316, 7317, 7318, 8801, 8802
Adult other (excluding images)	1600, 1605, 1606, 1611, 1612, 1613, 1614, 1615, 1616, 1618, 1619, 1620, 1621, 1622, 1800, 1802, 1805, 1806, 1809, 1810, 1902, 1903, 1904, 2312, 2313, 2500, 2501, 2502, 2504, 2505, 7000, 7001, 7002, 7003, 7004, 7005, 7006, 7007, 7008, 7009, 7010, 7011, 7012, 7013, 7014, 7015, 7016, 7017, 7018, 7019, 7020, 7021, 7022, 7023, 7024, 7201, 7202, 7203, 8803, 8804, 8805, 8806, 8807, 8809, 8810, 8811, 13900, 16412
Rape	1600, 1602, 1605, 1606, 1611, 1612, 1613, 1614, 1615, 1616, 1617, 1618, 1619, 1620, 1621, 1623, 1624, 1625, 1626, 1627, 1628, 1900, 1907, 1908, 1909, 1910, 1911, 1912, 1913, 1914, 1916, 1917, 1918, 1919
Exhibitionism	8809, 13900, 16412

Contact adult	1600, 1602, 1605, 1606, 1611, 1613, 1614, 1615, 1616, 1618, 1619, 1620, 1621, 1622, 1700, 1712, 1713, 1715, 1800, 1802, 1805, 1806, 1809, 1810, 1900, 1902, 1903, 1904, 1908, 1910, 1912, 1914, 2000, 2002, 2003, 2005, 2202, 2203, 2204, 2205, 2209, 2303, 2312, 2313, 2500, 2501, 2502, 2504, 2505, 7000, 7001, 7002, 7003, 7004, 7005, 7006, 7007, 7008, 7009, 7010, 7011, 7012, 7013, 7014, 7015, 7016, 7017, 7018, 7019, 7020, 7021, 7022, 7023, 7024, 7100, 7301, 7302, 7400, 8805, 8806, 8807

Table A.5. OASys item 'Victim Details' codes

OASys variable	Code	Description
VICTIM_AGE_RANGE_OPOL_ID	100	<5
	110	5-11
	120	12-15
	130	16-17
	140	18-49
	150	50-64
	160	65+
	170	5-12
	180	13-15
	190	18-20
	200	21-25

	210	26-49
VICTIM_PERPETRATOR_OPOL_ID	100	Stranger
	110	Spouse/partner – live in
	120	Spouse/partner – live out
	130	Sibling
	140	Son/daughter - adult
	150	Son/daughter - child
	160	Other family member
	170	Friend
	180	Colleague/associate
	190	Other Acquaintance
	200	Criminal associate
	210	Stranger offender (e.g. prisoner/probationer
	220	CJS Staff (e.g. police/prison officer)
	230	Other
	240	Father/Mother

Annex B
Process for calculating pseudo intervention start dates

The date when an individual in the treatment group begins their participation with CoSA is an important variable, as it is proposed as the starting point for measuring reoffending and for selecting the most appropriate OASys record for analysis. This data is available for those in the treatment group. However, since the comparison group do not have a CoSA start date, a pseudo intervention start date must be calculated.

The imputation process involves an algorithm that uses individual sentencing and demographic information to estimate a pseudo CoSA intervention start date for individuals in the comparison group – in other words, the hypothetical date when an individual is predicted to have started CoSA had they participated in the intervention. The algorithm uses the treatment group as training data to generate predictions for the comparison group.

For the CoSA evaluation, the imputed variables would be:

- Start date of intervention
- Days from standard index date to start of intervention ('waiting time')

A selection of variables would be used to impute these variables using data which may affect them, including observed offence-related characteristics, occurring prior to treatment to minimise the influence of any treatment effects. The variables considered for this predictive task, balancing model parsimony and accuracy, include:

- Standard index date (release date from custody or date received a community sentence)
- Index year
- Conviction date
- Conviction year
- Days from conviction to release

- Sentence length
- Participation route (community; through the gate; prison)
- Home Office offence group
- ITS severity of offence (summary only; either way; indictable only)
- Age at release
- Age at conviction
- Age at first contact with criminal justice system
- Previous prison events
- Previous court order events
- Previous convictions
- Previous sexual convictions
- Previous violent convictions
- Copas rate (logarithmic rate of convictions and cautions over time)
- Contact offence (binary indicator: is index offence is a contact offence?)
- Waiting time (when known from the treatment group)
- Ethnicity
- UK citizenship/immigration status

As the methodological approach involves selecting the sentence closest to treatment, it is not possible for an individual to have reoffended before their start date. However, in the comparison group, where pseudo start dates are calculated after selecting the sentence, this could occur. In such cases, those individuals should be removed from the comparison group.

To ensure the quality of the imputed pseudo intervention start dates, the process was tested on 50 percent of the provisional CoSA treatment group dataset. The dataset was divided into a training and validation dataset, with the imputation process applied to the validation set. Because the true start dates for individuals in the validation set were known, it was possible to calculate the difference in days between the imputed and true start dates. Descriptive statistics for these pseudo start dates indicate that the distribution of date differences is centred near zero, with a standard deviation of slightly over 2 years and with 85 percent of predictive dates falling within 2 years of the true start date.

Annex C

OASys variables to be used to proxy for CoSA area of needs

Table C.1: OASys variables to be include in PSM model as proxy for CoSA area of need

CoSA area of need	OASys item
Lack of employment/hobbies	S4Q2 – Is the person employed?
Emotional loneliness	S6Q1 – Current relationship with close family members
Lack of appropriate intimate relationships	S6Q4 – Current relationship with partner S6Q6 – Previous experience of close relationships
Easily influenced by criminal associates	S7Q3 – Are most offences committed with others? When in the community does s/he spend a large amount of their time with other offenders?
Social isolation	S10Q3 – Social isolation
Low self-esteem	S10Q4 – Offender's attitude to themselves
Impulsivity	S11Q2 – Impulsivity
Poor problem-solving	S11Q6 – Problem-solving skills
Sexual preoccupation	No single OASys item to proxy for this need

Lack of pro-social network	No single OASys item to proxy for this need

Annex D
Power analysis

Power analysis was conducted on the provisional treatment group to determine whether the statistical power was large enough for each reoffending outcome measure given the sample size, effect size and significance level.

Power analysis was conducted using the epiR package in R. For the both the general reoffending outcome measure and the sexual reoffending outcome measure, statistical power was calculated by computing the average power over a range of effect sizes. These effect sizes (odds ratios from 0.5 to 0.7 in 0.01 intervals) were obtained from literature of similar evaluations which looked at the reoffending outcomes of individuals convicted of sexual offences. Statistical power also depends on the baseline rate of reoffending in the population which for the general reoffending outcome measure was calculated to be 0.40, and for the sexual reoffending outcome measure, the baseline rate of reoffending was calculated to be 0.137. These baseline reoffending rates were taken from a meta-analysis of sexual offender treatment programmes (Lösel & Schmucker, 2017). Finally, it was presumed that statistical tests would require a threshold for statistical significance of $p < 0.05$.

Based on its statistical power, each reoffending outcome measure was assigned a RAG rating that reflects the likelihood of it generating reliable findings. These can be interpreted as follows:

- **GREEN**: Statistical power has been estimated to be greater than or equal to 0.8 (the standard academic benchmark for adequate statistical power). It is highly likely that a true difference in reoffending outcomes (of effect sizes between 0.5 and 0.7) between treatment and comparison groups would be detected.

- **AMBER**: Statistical power is equal to or greater than 0.7 but less than 0.8. A true difference in reoffending outcomes (of effect sizes between 0.5 and 0.7) between treatment and comparison groups is less likely to be detected than with the standard academic benchmark for adequate statistical power.

- **RED**: Statistical power is lower than 0.7. A true difference in reoffending (of effect sizes between 0.5 and 0.7) between treatment and comparison groups is much less likely to be detected than with the standard academic benchmark for adequate statistical power.

Annex E
Details of matching criteria

Table E.1: Variables to be included in PSM model for CoSA impact evaluation

Variable	Type	Categories
Demographics		
Ethnicity (reported by officer)	Categorical	White; Black; Asian; Other; Unknown
Nationality	Categorical	UK; Non-UK; Unknown
Age at index (release) date	Continuous (integer)	-
Index Disposal	Categorical	-
Participation route	Categorical	In custody; Through-the-gate; In the community
Any breach of licence conditions	Categorical (binary)	No; Yes
Criminal history		
Age at first contact with the Criminal Justice System	Continuous (integer)	-
Primary index offence group	Categorical	Violence against the person; Sexual offences; Robbery; Theft offences; Criminal damage and arson; Drug offences; Possession of weapons; Public order offences; Miscellaneous crimes against society; Fraud offences; Summary offences excluding motoring; Summary motoring offences; Unknown
Primary index offence severity	Categorical	Indictable only; Triable either way; Summary only
Index custodial sentence length	Categorial	Less than or equal to 6 months; More than 6 months to less than 12 months; 12 months to less than 4 years; 4 years to 10 years; More than 10 years; Mandatory Life Sentence; Other Life Sentence; Imprisonment for Public Protection
Reoffending cohort year	Categorical	-
Number of previous prison events	Continuous (integer)	-
Number of previous convictions	Continuous (integer)	-

Number of previous court orders	Continuous (integer)	-
Number of previous offences	Continuous (integer)	-
Number of previous indictable only offences	Continuous (integer)	-
Number of previous triable either way offences	Continuous (integer)	-
Number of previous summary offences	Continuous (integer)	-
Number of previous violent offences	Continuous (integer)	-
Number of previous robbery offences	Continuous (integer)	-
Number of previous public order offences	Continuous (integer)	-
Number of previous domestic burglary offences	Continuous (integer)	-
Number of previous other burglary offences	Continuous (integer)	-
Number of previous theft offences	Continuous (integer)	-
Number of previous handling offences	Continuous (integer)	-
Number of previous fraud or forgery offences	Continuous (integer)	-
Number of previous theft of vehicles offences	Continuous (integer)	-
Number of previous drink driving offences	Continuous (integer)	-
Number of previous criminal damage offences	Continuous (integer)	-
Number of previous drug import/export/production/supply offences	Continuous (integer)	-
Number of previous drug possession or supply offences	Continuous (integer)	-
Number of previous sexual offences	Continuous (integer)	-
Number of previous breach offences	Continuous (integer)	-
Copas rate (logarithmic rate of convictions and cautions over time)	Continuous (number)	-
Employment and benefits		
Any Pay As You Earn (PAYE) employment within one month before conviction	Categorical	Unknown; No; Yes
Any PAYE employment within one year before conviction	Categorical	Unknown; No; Yes

Any out-of-work benefits received within one year before conviction	Categorical	Unknown; No; Yes
Any Job Seeker's Allowance received within one year before conviction	Categorical	Unknown; No; Yes
Any Incapacity Benefit or Income Support received within one year before conviction	Categorical	Unknown; No; Yes
Accredited Programmes		
Year of participation in CoSA	Categorical	-
Any other Accredited Programme taken during the same sentence, prior to staring CoSA	Categorical (binary)	No; Yes
Offence-related sexual interests		
Any male child victim (under 16)	Categorical (binary)	Refer to table A.3 in Annex A
More than one child victim (under 16)	Categorical (binary)	Refer to table A.3 in Annex A
Any victims under 13	Categorical (binary)	Refer to table A.3 in Annex A
Any extrafamilial child victim (under 16)	Categorical (binary)	Refer to table A.3 in Annex A
Any possession of child pornography	Categorical (binary)	Refer to table A.3 in Annex A
Only intrafamilial victim	Categorical (binary)	Refer to table A.3 in Annex A
Any extrafamilial victim	Categorical (binary)	Refer to table A.3 in Annex A
Any non-contact sex offence	Categorical (binary)	Refer to table A.3 in Annex A
Convicted for more than one sexual offence (persistence after punishment)	Categorical (binary)	Refer to table A.3 in Annex A
Any victim aged 13-15	Categorical (binary)	Refer to table A.3 in Annex A
Number of convictions for sexual offences	Continuous (integer)	Refer to table A.3 in Annex A
Male victim index offence	Categorical (binary)	Refer to table A.3 in Annex A
Adult serious index offence	Categorical (binary)	Refer to table A.3 in Annex A
Child contact index offence	Categorical (binary)	Refer to table A.3 in Annex A
Child image index offence	Categorical (binary)	Refer to table A.3 in Annex A
Child other index offence	Categorical (binary)	Refer to table A.3 in Annex A
Adult serious secondary offence	Categorical (binary)	Refer to table A.3 in Annex A
Child contact secondary offence	Categorical (binary)	Refer to table A.3 in Annex A
Child image secondary offence	Categorical (binary)	Refer to table A.3 in Annex A
Child other secondary offence	Categorical (binary)	Refer to table A.3 in Annex A
Number of previous adult serious offence	Continuous (integer)	Refer to table A.3 in Annex A
Number of previous adult other (excluding images) offences	Continuous (integer)	Refer to table A.3 in Annex A

Number of previous child contact offences	Continuous (integer)	Refer to table A.3 in Annex A
Number of previous child other offences (excluding images)	Continuous (integer)	Refer to table A.3 in Annex A
Any rape offence	Categorical (binary)	Refer to table A.3 in Annex A
Any exhibitionism offence	Categorical (binary)	Refer to table A.3 in Annex A
OGRS 4 Score	Categorical (number)	1 = Low; 2 = Medium; 3 = High; 4 = Very high;
OVP Score	Continuous (integer)	Low = 0-29%; Medium = 30-59%; High = 60-79%; Very high = 80-100%; Unknown
OSP Score	Continuous (number)	Low < 21; Medium = 22-29; High = 30-35; Very high > 35;
OASys		
Offence involved carrying or using a weapon	Categorical	Unknown; Yes; No
Offence involved any violence or threat of violence/coercing	Categorical	Unknown; Yes; No
Offence involved excessive use of violence/sadistic violence	Categorical	Unknown; Yes; No
Offence involved sexual element	Categorical	Unknown; Yes; No
Direct victim(s) e.g., contact targeting	Categorical	Unknown; Yes; No
Repeat victimisation of the same person	Categorical	Unknown; Yes; No
Victim(s) was stranger(s) to the offender	Categorical	Unknown; Yes; No
Offender recognises impact	Categorical	Unknown; Yes; No
Evidenced sexual motivation to offence	Categorical	Unknown; Yes; No
Pornography acts as disinhibitor	Categorical	Unknown; Yes; No
Offender accepts responsibility for current offence	Categorical	Unknown; Yes; No
Current offence(s) an escalation in seriousness from previous offending	Categorical	Unknown; Yes; No
Current offence(s) part of an established pattern of similar offending	Categorical	Unknown; Yes; No
Does the offender currently have problems with a permanent place of accommodation?	Categorical	Unknown; No; Some; Significant
Does the offender have accommodation issues that are linked to their risk of serious	Categorical	Unknown; Yes; No

harm, risks to the individual, and other risks?		
Does the offender have accommodation issues that are linked to their offending behaviour?	Categorical	Unknown; Yes; No
Does the offender have problems with being unemployed or being unemployed upon release?	Categorical	Unknown; No; Some; Significant
Does the offender have problems with either reading, writing, or numeracy?	Categorical	Unknown; No; Some; Significant
Does the offender have employment and/or education issues that are linked to their risks of serious harm, risks to the individual, and other risks?	Categorical	Unknown; Yes; No
Does the offender have employment and/or education issues that are linked to their offending behaviour?	Categorical	Unknown; Yes; No
Does the offender currently have any problems with their financial situation?	Categorical	Unknown; No; Some; Significant
Does the offender have financial management issues that are linked to their risks of serious harm, risks to the individual, and ither risks?	Categorical	Unknown; Yes; No
Does the offender have financial management issues that are linked to their offending behaviour?	Categorical	Unknown; Yes; No
Does the offender currently have problems having a relationship with their close family members?	Categorical	Unknown; No; Some; Significant
Does the offender currently have problems with their partner?	Categorical	Unknown; No; Some; Significant
Does the offender have problems with their relationship experience?	Categorical	Unknown; No; Some; Significant
Is there evidence that the offender has ever been a victim of domestic violence/partner abuse?	Categorical	Unknown; Yes; No

Is there evidence that the offender has ever been a perpetrator of domestic violence/partner abuse?	Categorical	Unknown; Yes; No
What is the offenders current relationship status?	Categorical	Living together; Not living together; Not in a relationship
Does the offender have relationship issues that are linked to their risks of serious harm, risks to the individual, and other risks?	Categorical	Unknown; Yes; No
Does the offender have relationship issues that are linked to their offending behaviour?	Categorical	Unknown; Yes; No
Does the offender have problems with a manipulative or predatory lifestyle?	Categorical	Unknown; No; Some; Significant
Has the offender ever misused drugs?	Categorical	Unknown; Yes; No
Does the offender have issues with drug misuse that are linked to their risk of serious harm, risks to the individual, and other risks?	Categorical	Unknown; Yes; No
Does the offender have issues with drug misuse that are linked to their offending behaviour	Categorical	Unknown; Yes; No
Does the offender currently have problems with alcohol misuse?	Categorical	Unknown; No; Some; Significant
Does the offender have issues with alcohol misuse that are linked to their risk of serious harm, risks to the individual, and other risks?	Categorical	Unknown; Yes; No
Does the offender have issues with alcohol misuse that are linked to their offending behaviour	Categorical	Unknown; Yes; No
Does the offender have problems with coping with everyday life?	Categorical	Unknown; No; Some; Significant
Does the offender have psychological problems, including depression?	Categorical	Unknown; No; Some; Significant
Does the offender have problems with social isolation?	Categorical	Unknown; No; Some; Significant

Does the offender have problems with their attitude towards themselves?	Categorical	Unknown; No; Some; Significant
Does the offender have psychiatric problems?	Categorical	Unknown; No; Some; Significant
Does the offender have issues with wellbeing and mental health that are linked to their risk of serious harm, risks to the individual, and other risks?	Categorical	Unknown; Yes; No
Does the offender have issues with wellbeing and mental health that are linked to their offending behaviour?	Categorical	Unknown; Yes; No
What level of interpersonal skills does the offender possess?	Categorical	Unknown; None; Some; Significant
Does the offender have problems with impulsivity?	Categorical	Unknown; No; Some; Significant
Does the offender demonstrate problems with aggressive or controlling behaviour?	Categorical	Unknown; No; Some; Significant
Does the offender have problems with consequence awareness?	Categorical	Unknown; No; Some; Significant
Does the offender have problems understanding people's views?	Categorical	Unknown; No; Some; Significant
Does the offender have issues with their thinking and behaviour that are linked to their risk of serious harm, risks to the individual, and other risks?	Categorical	Unknown; Yes; No
Does the offender have issues with their thinking and behaviour that are linked to their offending behaviour?	Categorical	Unknown; Yes; No
Does the offender have problems understanding their motivation for offending?	Categorical	Unknown; No; Some; Significant
Does the offenders have problems with their motivation to address their offending?	Categorical	Unknown; No; Some; Significant
Does the offender understand the importance of completing programmes?	Categorical	Unknown; Yes; No
On the basis that they could be released imminently back into the community, what risk does	Categorical	Unknown; Low; Medium; High; Very High

the offender currently pose to children?		
On the basis that they could be released imminently back into the community, what risk does the offender currently pose to known adults?	Categorical	Unknown; Low; Medium; High; Very High
On the basis that they could be released imminently back into the community, what risk does the offender currently pose to the public?	Categorical	Unknown; Low; Medium; High; Very High