White Rose Research Online

eprints@whiterose.ac.uk
https://eprints.whiterose.ac.uk
Universities of Leeds, Sheffield and York

Deposited via The University of York.

White Rose Research Online URL for this paper:
https://eprints.whiterose.ac.uk/id/eprint/168716/

Version: Published Version

Article:
Dawson, Alice, Wainwright, Verity, Shaw, Jenny et al. (2021) Processes and challenges associated with establishing a linked national suicide database across the criminal justice system. International Journal of Population Data Science. 20. ISSN: 2399-4908

https://doi.org/10.23889/ijpds.v6i1.1376

Reuse
This article is distributed under the terms of the Creative Commons Attribution (CC BY) licence. This licence allows you to distribute, remix, tweak, and build upon the work, even commercially, as long as you credit the authors for the original work. More information and the full terms of the licence here: https://creativecommons.org/licenses/

Takedown
If you consider content in White Rose Research Online to be in breach of UK law, please notify us by emailing eprints@whiterose.ac.uk including the URL of the record and the reason for the withdrawal request.

UNIVERSITY OF LEEDS
University of Sheffield
UNIVERSITY of York

International Journal of Population Data Science

Journal Website: www.ijpds.org

Processes and challenges associated with establishing a linked national suicide database across the criminal justice system

Alice Dawson[1,2], Verity Wainwright[1], Jenny Shaw[1,2], Jane Senior[1,2], Seena Fazel[3], Amanda Perry[4], Tammi Walker[5], and Daniel Pratt[1,2,*]

Submission History

Submitted:	23/06/2020
Accepted:	11/04/2020
Published:	08/06/2021

[1]Division of Psychology and Mental Health, School of Health Sciences, Faculty of Biological, Medical and Health Sciences, University of Manchester, UK
[2]Greater Manchester Mental Health NHS Foundation Trust, Manchester, UK
[3]Department of Psychiatry, Warneford Hospital, University of Oxford, UK
[4]Department of Health Sciences, University of York, UK
[5]School of Social Sciences, Humanities & Law, Teesside University, UK

Abstract

Introduction
There is a wealth of data contained within healthcare and criminal justice system (CJS) datasets that, if successfully linked, could provide more information about this population, particularly those offenders who die in non-custodial CJS settings where, comparatively, much less is known.

Objectives
This study aims to determine feasibility of conducting data linkage across key criminal justice datasets and outline the processes, methodological considerations and any other implications of setting up such a linkage.

Method
Five CJS datasets were identified for potential inclusion for linkage with Office for National Statistics (ONS) mortality data. Respective data teams were contacted, and scoping discussions were held via email, telephone contact and in person. Information was sought on available data, quality and completeness, unique identifiers, processes for record matching, cost implications, estimated timescales, required approvals, data security considerations and quality of data.

Results
All five datasets were deemed important to include and responses from data teams suggest that the proposed linkage is both feasible and valuable, within a reasonable timeframe and with minimal associated costs. The discovery of an additional 'spine' dataset provides a more effective method of record matching by linking police identifiers to unique prison and probation identifiers.

Conclusions
The proposed linkage could highlight key points across the criminal justice system at which to target suicide prevention strategies. A more comprehensive linkage, including healthcare services, would further extend the opportunity to target interventions.

Keywords
suicide; self-inflicted; death; prison; probation; police; data

Introduction

Individuals involved in the criminal justice system are at higher risk of suicide than the general population. This is supported by international research on prisoners showing elevated suicide rates versus the general population, with rate ratios typically higher than 3 in male prisoners and 9 in female prisoners when accounting for age [1, 2]. This elevated risk is not limited to time served in custody, with evidence from an international meta-analysis indicating the risk of suicide is also substantially increased for released prisoners [3–5]. Figures from England and Wales in recent years have further exposed this issue where 2016 saw the highest number of self-inflicted deaths in prisons since records began and in 2019 the rate remains above 1 in 1,000 prisoners annually [6, 7]. Suicides following police custody have also continued to rise [8].

Several countries have included prisoners in their national suicide prevention strategies as a priority (US [9], Guyana [10],

*Corresponding Author:
Email Address: daniel.pratt@manchester.ac.uk (Daniel Pratt)

https://doi.org/10.23889/ijpds.v6i1.1376
February 2021 © The Authors. Open Access under CC BY 4.0 (https://creativecommons.org/licenses/by/4.0/deed.en)

Ireland [11]), to work toward reducing high suicide rates in prisons globally. In England, the fourth progress report of the cross-government outcomes strategy to save lives highlights that the prevention of suicide among people in contact with the criminal justice system (CJS) remains a high priority, reiterating the importance of lessons that can be learned when deaths have occurred in police, prison or other custodial settings [12]. Political concerns regarding deaths occurring in custody, though, routinely outweigh any attention paid to suicides of offenders that occur in non-custodial settings, even though responsibility still rests under the umbrella of the CJS (i.e. individuals engaged in community police contact, court processes and probation supervision). This stands despite evidence that individuals within this group of 'community-based offenders' are also at a higher risk of suicide[14], where more than one in ten of general population suicides had community criminal justice contact before death [13].

It has been suggested that deaths outside custodial settings by people involved in the criminal justice system are less scrutinised than deaths occurring in prison custody [14], potentially influenced by a number of sociological and policy factors as well as methodological issues in collecting this data. One of the key methodological factors is the difficulty in simply *identifying* deaths under community supervision, where recording and reporting practices may be unreliable compared to the frequent and official reviews of deaths in custodial settings [14]. This leads to consideration of developing new methods of accurately ascertaining the prevalence of such deaths in community settings. Each contact with a CJS organisation is an opportunity for intervention, representing significant potential for suicide prevention. It follows that a clearer understanding is required of the prevalence of suicides of all individuals across the criminal justice pathway. One solution potentially lies in data that is already being routinely collected.

All CJS organisations increasingly use electronic systems to record key and relevant details about individuals who come into contact with their services, with many such organisations accessing and entering information into more than one system as part of their routine record-keeping. For example, after arrest, an individual's details may be entered by a police custody sergeant into both local and national police databases, then by the courts' mental health liaison and diversion team into a clinical database. In many cases they would also be recorded by a third-sector worker into their electronic system, as is the case for some substance misuse services. Within the UK's prison and probation services, multiple systems are used to record service user data and only a small number of these systems 'talk to each other'. This fractured technological landscape is not limited to the UK; the US lacks a comprehensive joined up framework for criminal justice data [15] and studies of the Australian CJS have established a number of legal, ethical, organisational and technical challenges of using routine administrative data for research purposes [16, 17].

However, linkage on a large scale has been, and continues to be, successful in Western Australia where the West Australia Data Linkage System (WALDS) has been running for over 20 years and now spans over 50 health and government datasets [18]. Linkage in Australia more specifically between CJS and mortality data has been established for research purposes with Registrar-General Death records [19] and the National Death Index [20]. In the UK, smaller scale linkage with police data has been successfully implemented recently with substance misuse data [21, 22].

Effective identification and monitoring are key themes in improving outcomes for individuals at risk of suicide [23], supporting the rationale for investigating ways of developing a more connected knowledge base.

The objective of the current study was to review the electronic systems used by the UK's CJS organisations (i.e. police, prison and probation) and scope out the methodological considerations, permission pathways and technical challenges of linking all datasets with ONS mortality data, at the level of the individual. The ONS already routinely records details of all registered deaths by suicide in the UK (sex, gender, age, geographical area and method of suicide) which would provide the required identifiers for linkage with CJS systems.

Such a linkage would potentially provide a comprehensive insight into individuals who die by suicide who have had contact with the CJS. Details would include demographics of the population, contact with services, mental health needs, their chronological pathway through the CJS, assessed level of risk and, importantly, discrepancies between datasets (e.g. the prison system had recorded a suicide risk but this was not recorded after release on probation systems).

This paper also considers challenges in the use of routinely collected CJS data for research purposes internationally. Further, it could demonstrate the value of a linked resource specifically for suicide prevention strategies by offering data on potential intervention timepoints for this population (e.g. how long before death was last contact and with which service?), and observations on disparity of information held across different organisations (e.g. did police custody record a self-harm marker which was not recorded on reception to prison?), which could indicate where more effective information-sharing policies are required to assist risk management.

Method

In 2018 and 2019, the research team investigated the feasibility of linking the ONS suicide data with the following five UK criminal justice datasets:

- Police National Computer (PNC)
- Perito; system for Independent Office for Police Conduct (IOPC)
- Offender Assessment System (OASys)
- Prison National Offender Management Information System (P-NOMIS)
- nDelius (national probation case management system)

Detailed scoping discussions were initiated with the respective data teams/research correspondents through either enquiry mailboxes, contact details on publications or, where available, use of existing professional networks within the wider research team. Email was the primary method for correspondence, though this was supplemented with telephone calls for further

clarification. Drafts of information were sent to teams for accuracy checking and feedback before inclusion as definitive findings.

After explaining the purpose of the study, the CJS data teams were first asked if a version of data linkage was at the very least possible. If so, full lists of data items were requested; where these were not available to be shared, a list of examples of required data items compiled by the wider research team were sent to clarify whether or not they were recorded. Data items of potential interest from each dataset were collated and refined as full lists were made available or individual data items were confirmed as extractable. Supplementary Appendix 1 shows the resultant list of available data items across each of the datasets considered.

Clarification was also sought from the data teams on which identifiers would be needed for linkage and what unique identifier is used within each dataset. Details were sought on the full process of linkage, including any approval processes for access, costs associated, understanding of available data items, timescales, transfer of data and secure data storage. Each data team was also questioned about the quality of the data held (i.e. completeness of fields, date ranges, if they are mandatory, if they rely on self-report or are validated in any way).

Results

Contact was successfully made with all CJS data teams, with all teams expressing that, in principle, a version of the proposed data linkage was possible. To begin with, permission to access ONS UK mortality data would need to be secured via the Research Accreditation Service [24].

Office for National Statistics

For permitted access to the ONS mortality data, submission of an application with a detailed research proposal summarising how the project serves "*the public good*" is required. Similar schemes exist to access national statistics in other countries (e.g. Australian Bureau of Statistics 'safe people criteria' [25]), In this instance, the request would be to obtain a list of all individuals in England and Wales who died by suicide within a specified period. Identifiers would be required to include name, date of birth and postcode area, as a minimum.

One issue considered in any of the subsequent linkage steps would be the likelihood of one-to-many matches using the non-unique identifiers within the ONS suicide dataset. Although this may require additional manual record-matching in the first instance, the research team was apprised of a 'spine' dataset developed by the Justice Statistics Analytical Services team at the Ministry of Justice (MoJ). Once a record has been matched to an individual in the police database (PNC), their unique police identifier then becomes available (PNCID). The 'spine' dataset then provides a link between the PNCID and other criminal justice unique identifiers (such as the prison number and probation case reference number [CRN]). Obtaining unique identifiers in this way would ensure all subsequent linking is both quicker and less prone to any false-matches.

Figure 1 shows the proposed data flow diagram for the resultant linkage. Each CJS dataset is now considered in turn.

Police

As police contact is usually the first step in the CJS pathway, police records are the first logical step in the linkage chain. This would tell us which individuals on the ONS mortality list had ever had contact with the police (so all other cases can be excluded). The data flow diagram (Figure 1) shows the required identifiers needed for this linkage (i.e. name, date of birth, gender and postcode) and examples of data items that can extracted from the PNC such as details of offences, disposals at court and previous convictions. Another benefit of including this dataset is that details of the relevant police service should be available; this provides a route to potentially request more detailed information about the individual concerned (i.e. police markers, periods in police custody, police contact [including domestic violence], and arrest details). As shown in Figure 1, the same data team can use these identifiers to record match in the 'spine' dataset, to return the specific identifiers for prison and probation systems.

As opposed to sending identifiers for record matching within the PNC, linkage to Perito (the IOPC dataset) would be done by the research team after requesting an extract of all 'apparent suicides' in the specified time period. Linking with the Perito dataset should significantly supplement information on all apparent suicides in police custody, as these cases are independently investigated with available data almost 100% complete and fact-checked including risk warning flags (e.g. violence, self-harm, weapons), mental health issues, substance misuse, dates of police contact and reason for arrest. All deaths occurring within two days of release from police custody should be independently investigated and fact-checked within the Perito system.

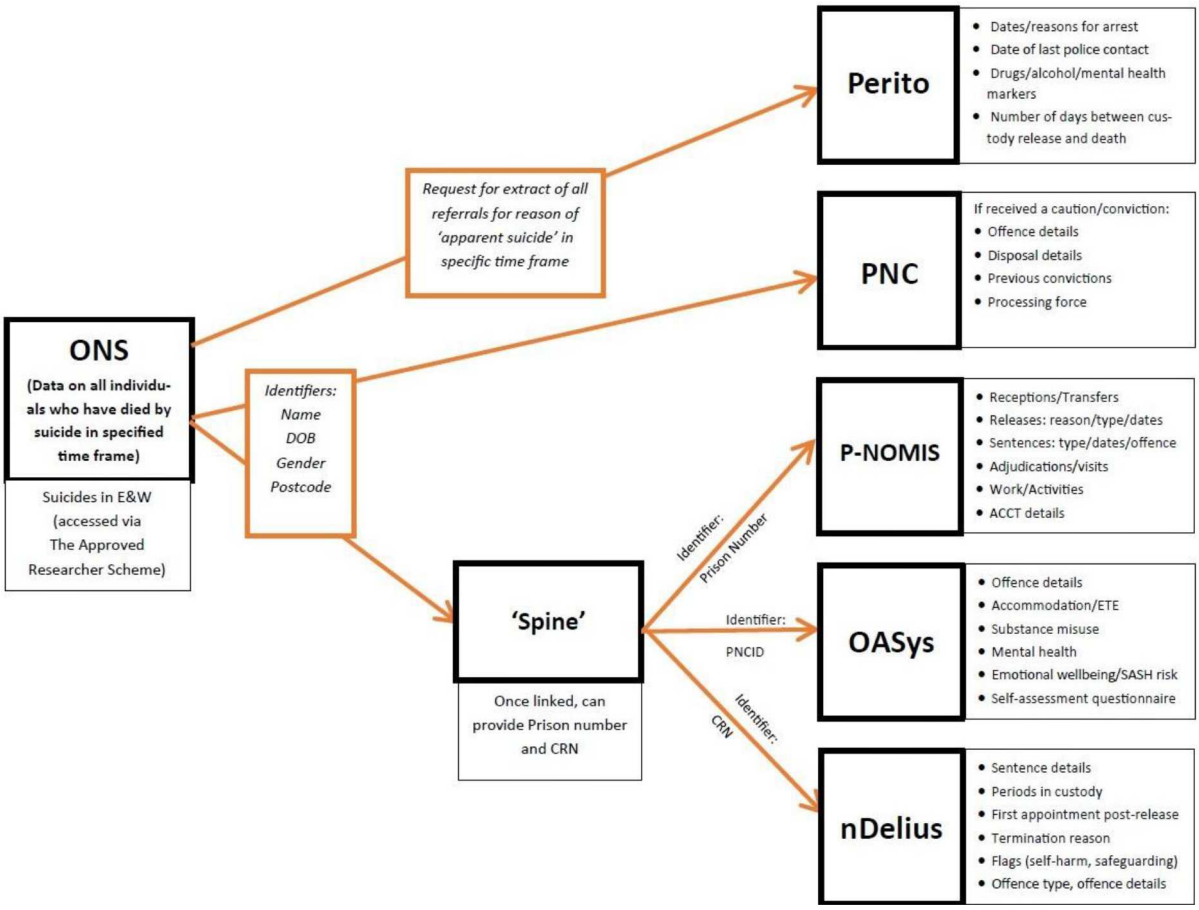
For deaths occurring beyond two days of release and up to one year after there are three categories of death as defined by the IOPC [8] (with further context provided during scoping discussions): those that are deemed relevant to police contact by the referring force and are independently investigated; those that are referred to the IOPC but not accepted for investigation; and those not brought to the attention of the police. The first category will comprise a good quality, fact-checked, dataset and the second category (referred but not accepted for investigation) will be contained within Perito but will be more limited and perhaps less reliable (in this case, further information can be sought from the processing service). For the third category, where police/related organisations may not have been made aware of the death, relevant data should still be available from the PNC dataset. The exception to this will be individuals who have not had a caution or conviction since 2000 (i.e. may have had periods in police custody, but no police contact has resulted in caution or conviction).

Supplementary Appendix 2 provides a summary of the data, processes, costs and timescales for linking with police data (two datasets).

Probation (i.e. both Community Rehabilitation Companies and HMPPS probation)

Her Majesty's Prison and Probation Service (HMPPS) data exist primarily on three main systems: nDelius (probation/court), OASys (probation/prison) and P-NOMIS (prison).

Figure 1: Criminal justice data linkage flow diagram



The benefit of the inclusion of the OASys dataset is that at least one assessment (the Basic Custody Screening Tool) is mandatory within the first week of custody and then 12 weeks pre-release for all people in prison, regardless of status (i.e. remand, sentenced). Although chiefly based on self-report, these assessments contain up to date but limited descriptive data (i.e. yes/no answers to questions on topics such as substance misuse, health, relationships etc.). A more detailed full assessment should be completed at the start and end of every prison sentence and updated every three or six months (dependent upon risk) and, additionally, all significant changes should be noted (i.e. release from custody, further offences and other significant changes of circumstance).

If guidance on frequency of updating OASys is met, it should be accurate at the date of assessment, however, more up-to-date and detailed information is likely to be available through nDelius (i.e. offence and sentence details, dates/details of appointments, court dates, periods in custody, etc.). This is because, for those under community supervision, nDelius should be updated for every contact with, or relating to, that individual. The PNCID and Probation CRN returned from the 'spine' after police linkage would be sent to the respective data teams for linkage (as shown in Figure 1).

Supplementary Appendix 3 provides a summary of the data, processes, costs and timescales for linking with probation data (two datasets).

Prison

For prison data, the P-NOMIS data team has already produced a number of reports relevant to the current areas of interest and suggest there exists good data quality for almost all requested data fields (see Supplementary Appendix 1 for requested items). The P-NOMIS dataset also uniquely provides information on pertinent aspects of life in prison custody, such as adjudications; visits; any care under ACCT[1] procedures; engagement with purposeful activity; mandatory drug testing; and conduct and disciplinary infractions while in custody. The P-NOMIS system should be updated with all external movements and when a person's circumstances change, for example their legal status or Incentives and Earned Privileges (IEP)[2] level. However, the quality of recording in P-NOMIS was reported to be inconsistent across the prison estate for England and Wales. The prisoner ID numbers obtained from the 'spine' would be sent to the P-NOMIS data team for linkage. Supplementary Appendix 4 provides

[1]Assessment, Care in Custody and Teamwork (suicide and self-harm risk case management system).
[2]Incentive and Earned Privilege level (status and privilege scheme within prisons).

a summary of the data, processes, costs and timescales for linking with prison data (note, OASys from the probation section is also used by prison staff).

Discussion

The potential linkage of five criminal justice datasets in England and Wales was investigated, with a focus upon three key considerations: feasibility, value, and cost. Regarding feasibility, police data would provide the *minimum* required linkage. The current scoping exercise clarified that linkage of ONS mortality data with only Perito or the PNC extract would likely exclude a significant proportion of relevant individuals (deaths not referred to the IOPC and arrests not resulting in caution or conviction, respectively), therefore both Perito and PNC should be included within the linkage exercise. Linkage with the 'spine' would also provide unique identifiers for subsequent data linkage with the OASys, nDelius and P-NOMIS datasets, thus making record-matching much more efficient, with fewer false-positives or one-to-many matches. We conclude that the proposed linkage with these five datasets would be eminently feasible.

In considering the value of such a data linkage exercise, a comprehensive list of available data fields could not be obtained for all datasets. However, confirmation was received from each of the CJS data teams that, as a minimum, the provisional requested data items are populated and could be included in a shared extract. Supplementary Appendix 1 details this provisional list of variables and from which dataset each variable could be extracted; illustrating a breadth of key risk factors that this linkage could report on (e.g. days from release from custody to death, self-harm history). Measures of data completeness were not available for most datasets, but teams offered a general response of high quality for the data fields requested, with a few exceptions (i.e. prison visits were noted as not consistently recorded by establishments and the collection of some demographic items were not mandatory). On this issue of feasibility this is generally promising, however obtaining reliable quantified measures of data completeness for key variables would be a priority in the commencement of such a linkage, given the integral importance to the value of the output. Of note with the data items is that all datasets record basic demographics, indicating duplication of inputting for different services in relation to the same individual. There are obvious implications in terms of potential for inaccuracies and use of resource, leading to a suggestion that solutions such as shared databases or improved 'communication' between different CJS datasets could significantly streamline parts of the process.

An additional benefit of linkage of the five CJS datasets is that no costs would likely be incurred for the decision, linkage or delivery of the extract (see timescales and cost subsections in Appendices; note this relates to any fees levied by the data teams for each organisation and does not account for costs associated with researcher time and work). Further to this, governance for the prison and probation datasets is provided through one approval process via the HMPPS National Research Committee (NRC), with no additional research governance approvals required to request access to police data (only the negotiation of access to the Data Sharing Agreements with the data teams). This should minimise the time spent securing access to the data, with a predicted turnaround of no more than 12 weeks once all access agreements are in place.

A foreseeable issue with the data linkage is the common use of aliases within the criminal justice population. For a number of different reasons, including typing errors, intoxication, deliberate misinformation and nicknames [26–28], there is a relatively high incidence of aliases, with Vollm [27] reporting an incidence of between 17% and 46% in a forensic psychiatric sample. A recent Australian study compared the quality of linkage with a youth justice cohort with mortality data including or excluding aliases and concluded that not including aliases excluded 14% of deaths [29]. Their findings illustrate the benefit of lowering the threshold for verification of any future criminal justice data linkage, considering the high prevalence of aliases in this population. It also further supports any recommendation for improved communication between systems or a shared database given that the police, probation and prison systems all have the option to record aliases.

The data linkage proposed here offers the potential to provide a breadth of epidemiological evidence on contact rates with UK CJS services amongst those who die by suicide, as well as characteristics of this group. Making such evidence available to the CJS services, could then inform operational risk management priorities and improve early identification of at-risk individuals. The utility of such a dataset could be expanded to identify risk and protective factors in this population with the inclusion of a comparison group of justice-involved individuals who did not die by suicide. Future research might also consider the best way to identify an appropriate comparison group so that risk factors can be examined.

Successful linkage, as outlined in this paper, could subsequently provide a foundation to extend to include linkage with healthcare and other relevant governmental datasets. Primary healthcare services, secondary healthcare services, and specialist mental health and substance misuse services could significantly supplement the data garnered from the CJS linkage exercise, which would potentially contribute even more detailed and verified information on the individuals' health, NHS service usage and lifestyle. For instance, although most CJS datasets would offer opportunity to record if an individual has experienced drug or alcohol misuse, this may often rely on self-report and would not reliably contain details of their history or any treatments offered or undertaken. As seen in Supplementary Appendix 1, there are a number of other key health related variables that are not contained within CJS datasets, further supporting a subsequent more comprehensive linkage with healthcare data in the future. Australian data linkage studies including the National Coronial Information System were able to provide further information on cause of death [21]. In the UK, if a case is investigated by a coroner, these details are used as standard in the ONS, however further detail on the causes of death are rarely provided [30]. Inclusion of UK coronial data to further improve research as has been done in Australia could be useful, but this may require a more manual, qualitative approach to enhance the dataset, rather than through data linkage.

In conclusion, the CJS data linkage proposed here offers a realistic plan with a relatively short-term output but leaves plenty of scope to follow up with subsequent healthcare

dataset linkage, which may offer a fuller picture of this under-researched population. Further, it could assist in identifying key points at which to target interventions for suicide prevention across the spectrum of services, many of which would likely be vital in identifying this risk and/or delivering the intervention.

Ethics statement

No particular permissions were deemed necessary for this scoping exercise, however, it formed part of a wider project funded by the National Institute for Health Research Policy Research Programme; 'Managing the Risk of Self-Inflicted Death to Support a Psychologically Safe and Rehabilitative Criminal Justice Pathway', PR-R16-0516-21003.

Conflicts of interests

The authors declare that they have no conflicts of interests.

Author contributions

AD conducted the scoping exercise with all data teams and prepared the manuscript.

DP was the academic lead on the study and provided guidance and advice on the scoping exercise.

JSh, JS, DP, SF, AP and TW developed the protocol for the investigation as part of the funding bid for the wider project.

VW, JS, JSh, SF, AP, TW and DP provided feedback on draft sections of the paper.

JSh was responsible for overall supervision of the study.

Acknowledgements

Thanks go to the individuals and teams who assisted with queries in the development of this feasibility study, including representatives from:

- National Confidential Inquiry into Suicide and Safety in Mental Health (NCISH)
- Independent Office for Police Conduct
- Ministry of Justice National Application Reporting Team
- HMPPS Research and Evaluation Team
- The OASys Business Team
- nDelius Service Team
- Ministry of Justice Statistics Analytics Team
- Public Health England

Funding

This report is independent research funded by the National Institute for Health Research Policy Research Programme ('Managing the Risk of Self-Inflicted Death to Support a Psychologically Safe and Rehabilitative Criminal Justice Pathway', PR-R16-0516-21003). The views expressed in this publication are those of the author(s) and not necessarily those of the NIHR or the Department of Health and Social Care.

Supplementary appendices

- Supplementary Appendix 1: Provisional list of potential requested data items, and where each may be extracted from.
- Supplementary Appendix 2: Summary of the data, processes, costs and timescales for linking with police data.
- Supplementary Appendix 3: Summary of the data, processes, costs and timescales for linking with probation data.
- Supplementary Appendix 4: Summary of the data, processes, costs and timescales for linking with prison data.

References

1. Fazel S, Ramesh T, Hawton K. Suicide in prisons: an international study of prevalence and contributory factors. Lancet Psychiatry 2017; 4(12):946–952. https://doi.org/10.1016/S2215-0366(17)30430-3.

2. Fazel S, Grann M, Kling B, Hawton K. Prison suicide in 12 countries: an ecological study of 861 suicides during 2003–2007. Soc Psychiatry Psychiatr Epidemiol 2011; 46:191–195. https://doi.org/10.1007/s00127-010-0184-4.

3. Zlodre J, Fazel S. All-Cause and External Mortality in Released Prisoners: Systematic Review and Meta-Analysis. Am J Public Health 2012; 102(12):67–75. https://doi.org/10.2105/AJPH.2012.300764.

4. Pratt D, Piper M, Appleby L, Webb R, Shaw J. Suicide in recently released prisoners: a population-based cohort study. Lancet. 2006; 368:119–23. https://doi.org/10.1016/S0140-6736(06)69002-8.

5. Spittal MJ, Forsyth S, Pirkis J. Suicide in adults released from prison in Queensland, Australia: A cohort study. J Epidemiol Community Health 2014; 68:993–998. https://doi.org/10.1136/jech-2014-204295.

6. Ministry of Justice. Deaths in Prison Custody 1978-2019. Accessed in Sep 2020 from https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/861738/deaths-prison-custody-1978-2019.xlsx

7. Ministry of Justice. A review of self-inflicted deaths in prison custody in 2016. London: Ministry of Justice; 2018.

8. Independent Office for Police Conduct. Deaths during or following police contact: Statistics for England and Wales 2018/2019. London: Independent Office for Police Conduct; 2019.

9. U.S. Department of Health and Human Services (HHS) Office of the Surgeon General and National Action Alliance for Suicide Prevention. 2012 National Strategy for Suicide Prevention: Goals and Objectives for Action. Washington, DC: HHS; 2012.

10. Ministry of Public Health Guyana. *National Suicide Prevention Plan.* "A National Suicide Prevention Strategy for Guyana". Ministry of Public Health, Guyana, 2014.

11. Department of Health. Connecting for life: Ireland's National Strategy to reduce suicide 2015-2020. Dublin: Department of Health; 2015.

12. HM Government. Preventing suicide in England: fourth progress report of the cross-government outcomes strategy to save lives. London: HM Government; 2019.

13. King C, Senior J, Webb RT, Millar T, Piper M, Pearsall A, Humber N, Appleby L, Shaw J. Suicide by people in a community justice pathway: Population-based nested case–control study. Br J Psychiatry 2015; 207(2):175–6. https://doi.org/10.1192/bjp.bp.114.154831.

14. Phillips, J., Gelsthorpe, L. & Padfield, N. (2017). Non-custodial deaths: Missing, ignored or unimportant? Criminol Crim Justice 2017; 19(2):160–178. https://doi.org/10.1177%2F1748895817745939

15. Lacy, D. Analysis of the criminal justice system's data architecture. Washington DC: National Criminal Justice Reference Service, Office of Justice Programs: Revised 2017.

16. Jeanneret R, Spiranovic C, Eckstein L, McWhirter R, Arstein-Kerslake A, Scanlan J, Kirkby K, Watters P and Vickers J. Enhancing early detection of cognitive impairment in the criminal justice system: feasibility of a proposed method. Current Issues in Criminal Justice 2019; 31(1):60–74. https://doi.org/10.1080/10345329.2018.1556283

17. Stewart, A, Dennison, S, Allard, T, Thompson, C, Broidy, L, & Chrzanowski, A. Administrative data linkage as a tool for developmental and life-course criminology: The Queensland Linkage Project. Aust N Z J Criminol 2015; 48(3):409–428. https://doi.org/10.1177/0004865815589830

18. Eitelhuber T, Thackray J, Hodges S, Alan J. Fit for purpose - developing a software platform to support the modern challenges of data linkage in Western Australia. Int J Pop Data Sci. 2018; 3(3). https://doi.org/10.23889/ijpds.v3i3.435

19. Ferrante A, Loh N, Maller M. Assessing the Impact of Time Spent in Custody and Mortality on the Estimation of Recidivism. Current Issues in Criminal Justice, 2009; 21(2):273–287. https://doi.org/10.1080/10345329.2009.12035845

20. Kinner S, Degenhardt L, Coffey C, Hearps S, Spittal M, Sawyer S, Patton G. Substance use and risk of death in young offenders: A prospective data linkage study. Drug Alcohol Rev. 2015; 34:46–50. https://doi.org/10.1111/dar.12179

21. Ministry of Justice and Public Health England. The impact of community-based drug and alcohol treatment on re-offending: Joint experimental statistical report from the Ministry of Justice and Public Health England. London: Author; 2017.

22. Willey H, Eastwood B, Gee I, Marsden J. Is treatment for alcohol use disorder associated with reductions in criminal offending? A national data linkage cohort study in England. Drug Alcohol Depend 2016; 161:67–76. https://doi.org/10.1016/j.drugalcdep.2016.01.020

23. Prison and Probation Ombudsman.Learning lessons bulletin: Self-Inflicted deaths among female prisoners. London: Prison and Probation Ombudsman; 2017.

24. Office for National Statistics. *Accessing secure research data as an accredited researcher*. Available from: https://www.ons.gov.uk/aboutus/whatwedo/statistics/requestingstatistics/approvedresearcherscheme#becoming-an-accredited-researcher-under-the-digital-economy-act-2017. Accessed 19th August 2020.

25. Australian Bureau of Statistics. *About the Data Lab.*Available from: https://www.abs.gov.au/websitedbs/D3310114.nsf/home/CURF:+About+the+ABS+Data+Laboratory+(ABSDL) Accessed 19th August 2020.

26. DeLisi M, Drury A, Behnken M, Vaughn MG, Caudill JW, Trulson CR. Alias: Lying to the police and pathological criminal behavior. J Forensic Leg Med 2013; 20:508–512. https://doi.org/10.1016/j.jflm.2013.02.009

27. Völlm B, Jamieson L, Gordon H, Taylor PJ. Name change among offender patients: an English high security hospital sample. Crim Behav Ment Health 2002; 12(4):269–281. https://doi.org/10.1002/cbm.505

28. Kariminia A, Butler T, Corben S, Kaldor J, Levy M, Law M. Mortality among prisoners: how accurate is the Australian National Death Index? Aust N Z J Public Health 2007; 29(6):572–575. https://doi.org/0.1111/j.1467-842X.2005.tb00253.x

29. Tibble H, Law H, Spittal M, Karmel R, Borschmann R, Hail-Jares J, Thomas L, Kinner S. The importance of including aliases in data linkage with vulnerable populations. BMC Med Res Methodol. 2018; 18,76. https://doi.org/10.1186/s12874-018-0536-4

30. Office for National Statistics. User guide to mortality statistics. Available from: https://www.ons.gov.uk/peoplepopulationandcommunity/birthsdeathsandmarriages/deaths/methodologies/userguidetomortalitystatisticsjuly2017. Accessed 7th September 2020.

Abbreviations

ACCT : Assessment, Care in Custody and Teamwork
CJS : Criminal justice system
CRC : Community Rehabilitation Company
CRN : Case Reference Number
CSV : Comma-separated values (file format for a spreadsheet or database)
DSA : Data Sharing Agreement
HMPPS : Her Majesty's Prison and Probation Service
IAO : Information Asset Owner
IEP : Incentives and Earned Privileges
IOPC : Independent Office for Police Conduct
IPCC : Independent Police Complaints Commission
ISA : Information Sharing Agreement
MoJ : Ministry of Justice
NRC : National Research Committee
OASys : Offender Assessment System
ONS : Office for National Statistics
P-NOMIS : Prison National Offender Management Information System
PNC : Police National Computer
SID : Self-inflicted death

: Supplementary Appendix 1: Provisional list of requested data items

	PNC[a]	NOMIS[b]	Delius[c]	OASys[d]
Individual				
Age at death/DOB	X	X	X	X
Gender	X	X	X	X
Ethnicity	X	X	X	X
Date of assessment/update			X	X
Demographics (i.e. age, religion, ethnic code	X	X	X	X
Flags/Markers		X	X	
Accommodation status		X	X	X
Offending and Sentencing History				
Offence	X	X	X	X
Reason for arrest				
Reason for contact				
Offence details	X		X	X
Previous convictions	X			
Police Force	X			
Date of arrest/last police contact				
Periods in Police Custody				
Sentence Start/End Date		X	X	
Sentence Type	X	X	X	X
Sentence Requirements			X	X
Breach of order and outcomes			X	
Court dates			X	
Custodial				
IEP[e] Level		X		
Details of adjudications		X		
Details of visits		X		
Work/Activities		X		
ACCT[f] Details (i.e. dates, number of ACCTs etc.)		X		
Prison Transfer/Release		X	X	
Type of Release		X		
First appointment post-release			X	
Risk or marker		X	X	X
Cause of death				
Date of incident				
Date of death		X	X	
Inquest verdict				
Death in supervision			X	X
Death in custody		X		
Death in police custody				
Days between release from custody and death				
Self-harm incident		X	X	
Mental Health				
Referral to Mental Health services			X	
Disclosed psychological problems/depression				X
Suicide and self-harm thoughts or feelings				X
Disclosed psychiatric problems				X
History of psychiatric treatment				X
Previous medication for mental health problems				X
Any Special/Secure Unit stays				X
Referral to Treatment				

continued

: Supplementary Appendix 1: Continued

Onward Referral		
Mental Health Act Legal Status Classification		
Period		
Community Treatment Order		
Hospital Provider Spell		
Ward Stay		
Primary Diagnosis		
Type of mental health need		
Secondary Diagnosis		
Prescriptions of psychotropic drugs		
Substances		
Referral to substance misuse support	X	
Drug misuse	X	X
Type of Drug	X	X
Level of use	X	X
Alcohol misuse	X	X
Month entering and leaving treatment		
Number of times accessed treatment		
Type of treatment received		
Discharge reasons		

[a]Police National Computer.
[b]Prison dataset
[c]Probation dataset.
[d]Shared prison and probation dataset.
[e]Incentive and Earned Privilege level (status and privilege scheme within prisons).
[f]Assessment, Care in Custody and Teamwork (suicide and self-harm risk case management system).

: Supplementary Appendix 2: Summary of the data, processes, costs andtimescales for linking with police data

	PNC (Police National Computer)	**Perito (Independent Office for Police Conduct Case Management System)**
Dataset	Extract from the Police National Database relating to convictions and cautions.	Data on individuals who died by suicide during or following police contact.
Data	Unique identifier: *PNCID* *Range:* 2000-present (only for individuals who have had a caution or conviction since 2000) *Completeness:* Most non-demographic fields are mandatory. Specifics on completeness provided after data request.	Unique identifier: *CTMSnum (Case Reference Number)* *Range:* 2004-present (retention period of six years unless statutory reasons for retention exist) *Completeness:* data should be close to 100% for independently investigated case. This will be lower for other cases but can be developed with manual follow up.
Process	1. Email to datalinkingteam@justice.gov.uk with subject:*Request to Data Access Group.* 2. Detail request for data access including data items requested and approvals to share the individual level data for linkage. 3. The data linking team will then send Data Sharing Agreement and Privacy Impact Agreement templates and work with us to populate these. 4. Both agreements are sent over to the Data Compliance Team to review. 5. Agreements are processed by the Legal Team before being sent back to the Data Compliance Team for sign-off. 6. Once agreed, two extracts can be shared: one with the main linkage and another from the 'Spine' with unique identifiers. Extracts are shared as a CSV flat file (one entry per offence per disposal). Transfer must be to a .cjsm account through a password protected winzip file.	As the IOPC only hold cases of individuals who have died during or following Police contact (up to two days and in some cases, longer), they will not need a list of identifiers from the ONS. Instead, cases will be identified by the agreed date range and cause of death being suicide. 1. Informal 'approval' process; approach IOPC with data request (data items requested and date range). 2. Data Sharing Agreement will be drawn up which outlines provision and handling of information and signed by both parties. 3. Report would be provided in excel spreadsheet via Egress Secure email system. 4. For some cases, there will be limited information where agreements are in place with friends or family of the deceased not to share information. In these cases, next steps depend on the type of investigation the case is subject to: (a) Independent investigations; the Research Team at IOPC will link up with the lead investigator on the case to determine what can be shared and to review sharing of information if the investigation is still underway. (b) All other types of investigation; enough information will be provided by the IOPC that the relevant police service can be contacted for case identification (for linkage) and additional information.
Timescale and cost	*Timescale:* Whole process likely to take around 6 months. Once agreements are in place, extract will be provided in 2-4 weeks. *Cost:* none directly incurred from the data team.	*Timescale:* Likely to take no longer than 12 weeks. *Cost:* none directly incurred from the data team

: Supplementary Appendix 3: Summary of the data, processes, costs andtimescales for linking with probation data

Data Source	**nDelius (Probation Case Management System)** Data on individuals who are or have been under probation supervision. Used by Community Rehabilitation Company (CRC) and HMPPS probation	**OASys (Offender Assessment System (Probation and Prison)** Data on all individuals who have been under probation supervision (including Standalone Unpaid Work) or have been in prison (including unsentenced).
Data	*Unique identifier:* Probation CRN (Case Reference Number) *Range:* Since 2014 *Completeness:* >80% for most requested fields, less accurate for some that require manual input (i.e. recalls)	*Unique identifier:* PNCID *Range:* 2015 – present *Completeness:* No record of completeness available. It is rare to have missing fields but possible that 'don't know' may be used (i.e. where the assessment is completed in absence of the individual)
Process	1. Obtain NRC approval and authorisation to seek data from the Information Asset Owner (IAO). 2. Use IAO authorisation to approach the nDelius Reporting Team (NDeliusQueries@noms.gsi.gov.uk) to discuss the data required, how, where and when it can be delivered. 3. We would be provided with a document to complete in order to fully establish what extract is required, how it will be used etc. 4. We are then provided with an ISA for completion, stipulating how the data should be stored and deleted, for us to complete and return. 5. Formally request the data required in the form of a report from the nDelius team. Report would be provided in an excel spreadsheet via secure email.	1. Obtain HMPPS NRC approval and authorisation to seek data from the IAO. Cost implications (if any) are set by the NRC. 2. Use IAO authorisation to approach the OASys Business Team (oasysqueries@noms.gsi.gov.uk) to discuss the data required, how, where and when it can be delivered. 3. OASys business team would provide a document for us to complete in order to fully establish what extract is required, how it will be used etc. Once completed, *they* liaise with Information Security as to the most appropriate method for the data storage. 4. We are then provided with an ISA for completion, stipulating how the data should be stored and deleted, for us to complete and return. 5. Formally request the data required in the form of a report from the OASys team. Report would be provided in an excel spreadsheet via secure email.
Timescale and cost	*Timescale:* 2 – 3 weeks: see OASys section for breakdown. *Cost:* none directly incurred from the data team	*Timescale:* 2–3 weeks: extraction takes 1-2 weeks, including testing for data validity; then checked and approved by the OASys team and the statistics team which takes a further week. *Cost:* none directly incurred from the data team

: Supplementary Appendix 4: Summary of the data, processes, costs andtimescales for linking with prison data

Data Source	**P-NOMIS (Prison National Offender Management Information System)** Data on all individuals who have been in prison; including those on remand, sentenced and non-criminal prisoners.
Data	*Unique identifier:* Prison Number *Range:* Public Prisons since 2010 Private Prisons since 2012 *Completeness:* >97% (exception of visits which are inconsistently marked as completed across the estate) Full list of data fields not shared
Process	1. Obtain HMPPS NRC approval and authorisation to seek data from the IAO. 2. Use IAO authorisation to obtain an appropriate ISA from the Information Assurance Team (informationassurance@noms.gsi.gov.uk). 3. Contact the National Reporting Team (NOMSApplicationsReportingTeam@noms.gsi.gov.uk) who will work with us to define what data we want, how it can be delivered, to where and what timescales, once the information sharing agreement is in place. A brief version of step 3 may be needed before step 2 to inform the ISA. 4. The ISA will inform an estimate of cost and timescales, based on priority and complexity of the request. 5. Once negotiated, we can formally request the extraction of data through the National Reporting Team; assuming no external support is needed, extract may be provided with no cost attached. 6. Report is provided on a password protected excel spreadsheet via secure email.
Timescale and cost	*Timescale:* 2 – 6 weeks once ISA in place *Cost:* none directly incurred from the data team