

**Pre and post-sentence mental health service use by a population cohort of older offenders ( $\geq 45$  years) in Western Australia**

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**Abstract**

**Purpose:** Information on older offenders' mental health service (MHS) use before and after sentence is sparse. We therefore aimed to determine the 1-year prevalence of MHS use before sentence, and the likelihood and predictors of MHS use in the 5-year post-sentence period by first-time older adult offenders ( $\geq 45$  years).

**Methods:** Pre- and post-sentence MHS use by a cohort of 1,853 first-time offenders over 45 years in Western Australia was determined through whole-population linked administrative data. Logistic regression models compared the 1-year pre-sentence MHS contacts between offenders and matched non-offenders. Cox proportional hazards regression models identified the socio-demographic, offending and pre-sentence health service variables that determined post-sentence MHS use.

**Results:** Older offenders were six times more likely to have used MHSs than non-offenders before sentence. Substance use was the most commonly treated disorder. Non-custodial offenders were twice more likely than prisoners to have been treated for any mental disorder and substance use disorders, and violent offenders were four times more likely to have attempted self-harm than non-violent offenders before being sentenced. The strongest predictors of post-sentence MHS contact were past psychiatric diagnosis in offenders with a pre-sentence MHS contact; and pre-sentence hospitalisation for attempted self-harm or physical illness, or being a male in those without. Discontinuity in MHS use after sentence by over half of the offenders with a prior contact was prominent.

**Conclusion:** Better detection and treatment of mental disorders in older offenders to ensure continuity of care at all transition points through age-sensitive correctional and community-based MHSs is needed.

## Introduction

Growing proportions of older prisoners have been reported over recent decades in most western countries (1) including Australia (2). While this growth is partly attributed to ageing populations and rising crime rates by older people (1, 3), other reasons include the imposition of longer sentences leading to ageing of violent offenders incarcerated when younger, increased incarceration rates for repeat offenders and retrospective sentencing for serious offences committed earlier in life (3-6). Those incarcerated first at older ages constitute over half of all 'old' prisoners and experience relatively more adjustment problems with imprisonment compared with re-offenders or those who grow old in prison (1, 3).

Research has demonstrated greater physical and psychiatric morbidity in older prisoners compared with younger prisoners and the older general population (4, 7-9). While young offenders mostly present with acute health conditions requiring short-term management, diseases in older offenders are usually chronic and progressive (4, 6). Estimates indicate that on average, older offenders have three chronic health conditions and almost 20% have a comorbid mental illness (10), mostly including dementia, affective psychoses, depression, anxiety and alcohol dependence disorders (4). Older offenders' requirements for multi-speciality treatments and long-term care (11) may lead to incarceration costs which may be up to three-times that for younger offenders (5, 10). However, while physical healthcare may mostly be appropriate, psychiatric care could be compromised for this group (12).

Furthermore, we recently identified poor post-sentence health outcomes associated with age and low pre-sentence MHS use whereby, older first-time offenders ( $\geq 45$  years) without pre-sentence MHS contact had a significantly elevated risk of natural death within 2 years of sentence completion than younger offenders (13). Therefore, information on pre-sentence

MHS use and predictors of post-sentence MHS are vital for informing service provision and improvements for this group of first-time older offenders.

To date, only a few whole-population studies have reported offenders to have a greater likelihood of using MHSs before sentencing compared with the wider non-offending community (14-18). Only two other studies have identified the predictors of MHS use in ex-offenders (19, 20): one focussing on adult offenders younger than 45 years (19) and the other on substance abuse service use (20). However, no study has targeted older offenders although in 2012 people over 45 years constituted 11% of prison entrants Australia-wide, of whom over two-fifths reported a diagnosed mental illness and almost one-third used psychiatric medicines (21). Even greater proportions would have served non-custodial sentences (22).

This paper describes MHS use 1 year before the first-ever (index) sentence in an offender cohort aged  $\geq 45$  years in Western Australia (WA). We also explore the probability of MHS use within 5 years of sentence completion and identify the socio-demographic, offending and pre-sentence health service use predictors of post-sentence MHS contact in this group.

## **Methods**

### Defining 'older' offenders

Offenders are believed to age faster than the general population and exhibit health problems prematurely by about ten years (3-5) due to a range of behavioural, lifestyle and associated health factors (6), although the evidence is unclear. Further, the poorer health and lower life expectancy of Indigenous compared with non-Indigenous Australians is well-established (23). Most 'older' offender research uses age thresholds between 50-65 years (4, 24). However, the Australian Institute of Criminology recommends a threshold of 50 years and 45

years to characterise older non-Indigenous and Indigenous offenders, respectively (2). For these reasons and to ensure sufficient statistical power, we used a uniform age threshold of 45 years to define our cohort. A threshold of 50 years ( $n=1,053$ ) was insufficient to examine statistical associations reliably while including offenders 45-49 years nearly doubled the sample (43.2% of cohort), thus enabling more precise comparisons to be performed.

### Study populations

The offender cohort included 1,853 offenders aged  $\geq 45$  years who commenced their index (first-ever) sentence in WA between 1<sup>st</sup> January 1985 and 31<sup>st</sup> December 1994, either on a community correction (non-custodial) order or in one of WA's 13 prisons, and completed it before the censor date of 31<sup>st</sup> December 2008; thus excluding 29 offenders who either died while serving their index sentence or were still serving it on the censor date. A comparison group of 1,877 non-sentenced people, henceforth referred to as 'non-offenders', was selected from the WA Electoral Roll by frequency-matching to offenders of the same gender and age-group at sentence commencement. Matching on Indigenous status was not possible as it was not available on the Electoral Roll. Detailed selection criteria are described elsewhere (18). For each non-offender, a hypothetical sentence start and end date was created corresponding to their matched offender and 13 people who either died before completing their hypothetical sentence or were still serving it on the censor date were removed, with 1,864 non-offenders included.

### Data sources

The WA Department of Corrective Services provided correctional records for offenders. Offender and non-offender records were probabilistically linked (25) through the WA Data Linkage System to State-wide statutory health data collections; the Hospital Morbidity Data

System for inpatient separations, the Mental Health Information System for public outpatient, ambulatory and community-based psychiatric services and the Mortality Register for deaths (26).

#### MHS contact

A MHS contact was defined as any public or private psychiatric inpatient admission or any contact with public non-admitted MHSs. Presence of diagnosed mental disorders was determined from a primary diagnosis in non-admitted records, or the primary or any of the 21 secondary diagnoses in inpatient records. Changes in diagnostic coding systems over time (27) were harmonised by transforming all psychiatric diagnostic codes to the International Classification of Diseases, 9<sup>th</sup> Revision, Clinical Modification (ICD-9-CM), effective in Australia from 1988 to July-1999 and corresponding to the timing of most study events.

#### Pre-sentence history

MHS contacts in the 1-year and 5-year pre-sentence periods were identified through psychiatric diagnoses (ICD-9-CM codes 290-319) during each period, and the latest psychiatric diagnosis established (18, 27-29). For 1-year pre-sentence MHS use, seven diagnostic categories were created in order of severity (16, 18, 29, 30). These comprised: non-affective psychotic disorders (295, 297, 298), affective psychotic disorders (296), personality disorders (301), substance use disorders (291, 292, 303, 304, 305), neurotic or depressive disorders (300, 311), adjustment disorders (308, 309) and a residual category comprising mental disorders of insufficient frequency or direct relevance to be analysed separately (290, 293, 294, 299, 302, 306, 307, 310, 312-319). If the last MHS contact had multiple psychiatric diagnoses, then the most serious condition according to the hierarchy was chosen (16, 18, 27-30).

Thereafter, 5-year pre-sentence MHS use was defined through diagnostic categories including psychoses (295-298), substance use (291, 292, 303, 304, 305) and other mental disorders (290, 293, 294, 299-302, 306-319). In case of multiple diagnoses on the last MHS contact, psychotic disorders took precedence over substance use disorders which were selected over other mental disorders (19, 29). Both 1-year and 5-year history of attempted self-harm was identified from the hospital external cause of injury codes (E950.0-E959.9, E980.0-E980.6). Similarly, a 5-year pre-sentence history of physical illness was defined as any hospitalisation for physical illness (ICD-9-CM codes excluding 290-310; ICD-10-AM codes excluding F00-F99).

#### Post-sentence outcomes

MHS contacts within 5 years of sentence completion were identified. Follow-up was censored at 5 years or earlier if non-offenders died (n=89) and for offenders, if they were re-sentenced (n=185) or died (n=96). Primary outcomes were the time to first MHS contact post-index sentence for: (i) any mental disorder (290-319); (ii) psychotic disorder (295-298); (iii) substance use disorder (291, 292, 303, 304, 305); (iv) other mental disorder (290, 293, 294, 299-302, 306-319); and (v) attempted self-harm (E950.0-E959.9, E980.0-E980.6).

#### Social and geographic disadvantage

Social disadvantage was measured through the Index of Relative Socio-Economic Disadvantage (IRSD) (31), a summary measure of Socio-Economic Index for Areas (SEIFA) indicating relative disadvantage in terms of accessibility to education, employment and income (32). IRSD quintiles (most disadvantaged to least disadvantaged) from the national Census year (1986, 1991 or 1996) closest to the year of index offence were used. Geographical accessibility was measured via the Accessibility and Remoteness Index of

Australia (ARIA) scores from the 1996 Census, classified into highly accessible (ARIA scores: 0.00-1.84), accessible (1.84-5.80) and remote (5.80-12.00) categories (33). Residential postcode at the time of index sentence was used to determine both measures.

#### Offence type

Offences were classified using the Australian and New Zealand Standard Offence Classification (ANZSOC)(34). For a person concurrently convicted of multiple offences, the most serious crime was determined through the National Offence Index (35). Offenders were thereafter categorised as violent (ANZSOC codes: 0111- 0621) and non-violent (0711-1695).

#### Custodial setting and release type

Offenders were classified as being imprisoned or serving a non-custodial order. Those who had served a part of their sentence in both settings (n=231, 12.3%), mostly on being transferred to community corrections from prison, were included in the prisoner group (18). Offenders could be released to freedom or conditionally (e.g. bail, parole, home detention) or resentenced.

#### Statistical analyses

Cohort characteristics and pre-sentence service use were described using descriptive statistics overall and separately for each gender-race demographic group. Logistic regression models adjusted for gender, race and age compared 1-year pre-sentence MHS use across offender and non-offender groups. Kaplan-Meier estimates of the 5-year probability of post-sentence MHS outcomes were calculated for the full cohort and separately for offenders with (n=392) and without (n=1,461) a 5-year pre-sentence MHS contact, and also for the respective groups of non-offenders with (n=124) and without (n=1,740) a prior MHS contact.



Multivariable Cox regression models identified determinants for the outcomes any mental disorder and substance use disorder, separately for offenders with and without a 5-year pre-sentence MHS contact. Predictors examined included socio-demographic variables (gender, race, age at index sentence completion, ARIA, SEIFA), characteristics related to the index sentence (offence type, custodial setting, sentence duration) and pre-sentence health history (mental illness, physical illness and attempted self-harm). All analyses were performed using SAS version 9.3.

The Research and Evaluation Committee of the Department of Corrective Services, and the Human Research and Ethics Committees of the Department of Health and The University of Western Australia approved this study.

## **Results**

The offender cohort (n=1,853) comprised 74.3% non-Indigenous males, 17.1% non-Indigenous females, 6.7% Indigenous males and 1.9% Indigenous females (Table 1). Most offenders were greatly disadvantaged socio-economically (48.2%), lived in highly accessible areas (73.1%), were non-violent (58.1%), served community correction orders (62.9%) and were unconditionally released to freedom (84.1%). Indigenous males were the exception with (64.8% violent offenders and 55.2% imprisoned). Over 60% of the cohort was aged 45-54 years both at sentence commencement (mean=53.2 years, SD=7.1) and completion (mean=54.4 years, SD=7.3). The mean index sentence was 1.2 years (SD=1.4) and the post-sentence follow-up was 4.5 years (SD=1.3), with 84.8% offenders having 5-year follow-up.

[TABLES 1-2 SOMEWHERE HERE]

A 5-year pre-sentence MHS contact was present in 392 (21.2%) offenders and 124 (6.7%) non-offenders. Substance use was the most commonly treated disorder for offenders and non-offenders in both periods. Overall, a 5-year pre-sentence history of attempted self-harm was identified in 3.1% offenders and 0.3% non-offenders; and hospitalisation for physical illness in 46% offenders and 42.2% non-offenders.

#### 1-year pre-sentence MHS use

1-year pre-sentence MHS contact existed for 221 (11.9%) offenders and 43 (2.3%) non-offenders, ranging from 8.6-8.8% in Indigenous female and male offenders to 11.9-13.6% in non-Indigenous male and female offenders (Table 1). Due to the small numbers of Indigenous female offenders (n=35), they were excluded from further gender-race comparisons. Substance use was the most common disorder in offenders (5.7% overall, 6.4% Indigenous males, 6.3% non-Indigenous males and 2.9% non-Indigenous females) and non-offenders (1.1%) (Table 2), followed by neurotic/depressive disorders (1.7% overall, 1.6% Indigenous males, 1.0% non-Indigenous males and 4.4% non-Indigenous females) and non-offenders (0.5%). Of those with a treated mental disorder, only 26 (1.4%) offenders and 1 (0.05%) non-offender had a co- substance use disorder recorded in the 1-year pre-sentence period.

#### *Offenders versus non-offenders*

Offenders were six-times more likely ( $p < 0.0001$ ) to have had  $\geq 1$  MHS contact for any disorder than non-offenders in the 1-year pre-sentence period, after adjusting for gender, race and age (Table 3). Adjusted Odds Ratios (ORs) were higher in offenders for all diagnostic categories especially, adjustment disorders (OR=32.0,  $p < 0.001$ ) and affective psychoses (OR=15.3,  $p < 0.01$ ), as well attempted self-harm (OR=13.4,  $p < 0.001$ ) than non-offenders.

*Violent versus non-violent offenders*

Violent and non-violent offenders had similar 1-year pre-sentence MHS contact for most mental disorders, although treated attempted self-harm was higher in violent offenders (OR=4.2,  $p<0.01$ ) than their non-violent peers (Table 3).

*Custodial setting*

Prisoners were less likely than those on community orders to have had pre-sentence MHS contact for any mental disorder (OR=0.6,  $p<0.01$ ) and for substance use disorders (OR=0.5,  $p<0.01$ ); with no differences for other diagnoses (Table 3).

[TABLE 3-4 SOMEWHERE HERE]

*5-year post-sentence MHS use*

The 5-year probability of any post-sentence MHS contact was 23.0% in offenders and 8.6% in non-offenders (Table 4). It was lower (15.3%) for offenders without and higher (52.2%) for offenders with pre-sentence MHS contact. The likelihood of post-sentence MHS use was highest for substance use disorders both in offenders with (37.4% overall, 52.4% in Indigenous males, 39.4% in non-Indigenous males, and 23.9% in non-Indigenous females) and without (10.8% overall, 16.5% in Indigenous males, 11.3% in non-Indigenous males and 6.4% in non-Indigenous females) pre-sentence MHS contact (Figure 1). Similar patterns, of a lower magnitude, existed for all treated conditions in all demographics groups of non-offenders (Table 4).

[FIGURE 1 SOMEWHERE HERE]

### Predictors of MHS use in the 5-years post-sentencing

Among offenders with a pre-sentence MHS contact, the nature of past psychiatric diagnosis was a consistent predictor of for post-sentence MHS use for any mental disorder and for substance use disorders (Table 5). Relative to offenders with a pre-sentence history of other disorders, those with a history of psychotic disorders were twice as likely to have a post-sentence MHS contact (Hazard Ratio (HR):2.1,  $p<0.01$ ) for any mental disorder, while those with a substance use disorder history were 2.7-times ( $p<0.0001$ ) more likely to have a post-sentence substance use MHS contact. Also, a 1-year pre-sentence MHS contact was 1.5-times ( $p<0.05$ ) more likely than an earlier (1-5 year) contact to lead to post-sentence MHS use.

[TABLE 5 SOMEWHERE HERE]

Among offenders without pre-sentence MHS contact, pre-sentence hospitalisation for attempted self-harm or physical illness, or being a male were the strongest predictors of post-sentence MHS use (Table 5). The HRs for post-sentence MHS contacts were 3.5 ( $p<0.05$ ) for any mental disorder and 6.6 ( $p<0.001$ ) for substance use disorder in offenders with a history of attempted self-harm; and 1.7 ( $p<0.001$ ) for any mental disorder and 1.5 ( $p<0.05$ ) for substance use disorder in those with a history of physical illness. Males were twice as likely ( $p<0.05$ ) to use MHSs for substance use disorders after sentence than females without a pre-sentence MHS contact.

No other socio-demographic variables were strong or consistent determinants of MHS outcome in offenders with a MHS use history (Table 5). However, within offenders without pre-sentence MHS contact, the most disadvantaged offenders had a greater likelihood of post-sentence MHS contact for any mental disorder (HR: 1.6,  $p<0.05$ ) and substance use disorder

(HR: 1.8,  $p < 0.05$ ) compared with the least disadvantaged offenders. None of the offence variables were strongly associated with either MHS outcome in offenders with or without prior MHS contact,

## **Discussion**

Offenders over 45 years were six-times ( $p < 0.0001$ ) more likely to have used MHSs for any mental disorder than non-offenders (11.9 vs 2.3 %) in the 1-year before their index sentence after adjusting for gender, race and age. They also had a greater likelihood of MHS contact within 5 years of sentence completion than non-offenders. These findings are consistent with results from our previous work on first-time offenders younger than 45 years who were eight-times ( $p < 0.0001$ ) more likely to have used MHSs for any mental disorder than their matched non-offenders (8.3 vs. 1.1 %) (18). In fact, the relatively greater prevalence of gender- and race-adjusted 1-year pre-sentence MHS contacts in older offenders (11.9%) than their younger (8.3%) counterparts counterparts (OR: 1.5, 95 % CI: 1.3–1.7,  $p < 0.0001$ ) is consistent with the high psychiatric morbidity reported in older offenders (4, 36), although general population studies report reducing prevalence of mental disorders with age (37, 38). However, as two-fifths of older ( $\geq 45$  years) Australian prison entrants have a diagnosed mental illness (21), our findings highlight the limited MHS use by older offenders with mental illness as observed in the general population (39, 40).

Older non-custodial offenders had greater likelihood of 1-year pre-sentence MHS contacts for any mental and substance use disorders than older prisoners which is in contrast to our findings in offenders younger than 45 years where a similar likelihood was observed (18). Given that two-thirds of older offenders were serving non-custodial sentences, this emphasises the importance of routine screening for mental disorders in this group to facilitate on-going community-based management during sentence. However, although pre-sentence

MHS contact prevalence differed by custodial setting, it was not a determinant of post-sentence MHS contact in multivariable analyses. This is surprising given that non-custodial offenders would likely have greater post-sentence MHS contacts relative to ex-prisoners due to greater morbidity at sentence commencement, better familiarity, access and absence of incarceration related stigma (19, 41). Further, reviews have recognized short-comings in MHS provision by Australian prison health services (42, 43). Therefore, our findings may be explained by relatively better screening and treatment of mental and substance use disorders available for prisoners than for non-custodial offenders (44), which may lead to a better post-release uptake of MHSs by ex-prisoners as well.

While violent offenders are reported to have greater psychiatric hospitalisations than non-violent offenders (15), we found no difference in MHS use between these groups in either the pre- or post-sentence periods after adjusting for other variables, with one exception. Violent offenders were four-times more likely than non-violent offenders to have attempted self-harm in the 1-year before their index sentence, possibly related to their underlying mental disorders, inherent aggression and impulsivity (45). Co-occurrence of aggression against the self and others has been previously illustrated in violent psychiatric inpatients (46). Indeed, research has identified an overlap in the factors predictive of the risk of violence towards others and the risk of self-harm (46-48). Similar to our findings, these studies identified a history of self-harm to be strongly predictive of future violence to others (46-48) and highlighted the relevance of jointly managing both issues in forensic populations.

Almost half of the offenders with a pre-sentence MHS contact did not use MHSs within 5 years of sentence completion. Of those who did, offenders with psychotic disorders were more likely to use MHSs than those with other disorders. This differential MHS use is similar to observations in the Australian community (49, 50) and offenders younger than 45 years(19), and may indicate greater treatment-seeking behaviour, for those with more serious

underlying psychopathology (49). It raises concerns regarding the adequacy of current throughcare and/or transitional care practices which link offenders with appropriate community based services (51).

Exclusively in older offenders without a MHS contact, pre-sentence hospitalisation for physical illness was a strong predictor of post-sentence MHS contact, similar to findings in adult offenders younger than 45 years (19). General population studies have identified higher prevalence of mental disorders (28.0% vs. 17.6%) (52) and a greater likelihood of using MHSs in people with chronic physical illnesses than in those without (53, 54). Experiencing an adverse physical event also increases the likelihood of receiving healthcare and prescriptions by at least three times (55). Thus, our findings are reasonably explained by the greater prevalence (52) and/or risk of developing mental disorders (56-58) in people with chronic physical health conditions possibly due to the common underlying risk factors and/or changes in lifestyle and social factors leading to mental health deterioration (55, 57).

The prevalence of mental illness in older offenders is known to differ by age sub-groups (4). However, we found that although older age-groups generally had greater adjusted probabilities of post-sentence MHS contact than those aged 45-49 years, most differences were not significant. This lack of significant differences in post-sentence MHS use, especially between those aged 45-49 and 50-54, is notable and validates our use of 45 years as the cut-off age. Therefore, while 50 years is an often used criterion for defining 'older' offenders (24), the use of 45 years may be a plausible option for identifying older offenders for future studies restricted by low power using the 50-year cut-off age.

Interestingly, older males without a pre-sentence MHS contact were twice as likely as females to use MHSs after their sentence. This differs from findings in younger offenders (19) as well as the general population (37) where females were more likely to use MHSs. It is possibly explained by the association of serious mental disorders with higher MHS use (19,

37) considering that non-Indigenous male offenders (74% of our cohort) had a greater baseline prevalence of psychotic disorders than non-Indigenous female offenders in this cohort. No other evaluated socio-demographic characteristics were associated with post-sentence MHS use, although many older prisoners face socio-economic hardship related to employment difficulties, reduced family and social cohesion, or limited accommodation options (21), which can compromise their ability to cope after release.

Arrest data were unavailable for our study which used sentencing records to ascertain first-time older offenders. Nevertheless, prevalence estimates of MHS use as identified by whole-population studies on younger offenders who were either arrested (14) or sentenced (18) in WA over the same time period are similar (11.1% arrested vs. 8.3% sentenced). Importantly, previous research has identified that most offenders with a psychiatric treatment history were arrested before their first MHS contact (14, 59, 60) suggesting that this contact was likely initiated by the criminal justice system. In a forensic population, this raises the issue of malingering, i.e. presentation of exaggerated or false symptoms to gain benefit in a court of law; estimated to be present in one-fifth of all forensic assessments (61, 62). Our data showed that of 221 older offenders with a 1-year pre-sentence MHS contact, only 39 offenders (17.7%) did not have a prior (1-5 year) MHS contact, consistent with previous estimates of psychiatric malingering in this population (61, 62). Most offenders (82.3%) had both a recent (0-1 year) and remote (1-5 year) pre-sentence MHS contact history and were very likely to be genuine MHS users. Further, the finding of a 12-month pre-sentence MHS contact (versus a 1-5 year contact) being a strong determinant of post-sentence MHS use adds weight to the credibility of most pre-sentence contacts for psychiatric care in this cohort.

The whole-population design of our study using routinely-collected administrative data overcame methodological limitations of previous survey-based studies including issues related to sample size limitations, loss-to-follow-up and selection, recall and social



desirability biases (63). However, even with a whole-population cohort of offenders, few MHS contacts in some diagnostic categories and sub-groups of older offenders limited comparisons. Indeed, the low proportion of MHS contacts with comorbid substance use may be attributable to the under-treatment of substance use disorders (64) or their under-reporting on administrative databases (65). Other limitations included a lack of information on contact with general practitioners or private psychologists or psychiatrists for their mental healthcare, which were not captured in the available data collections. However, greater social disadvantage in offenders makes use of private secondary healthcare less likely than by the general population. While mentally ill people in the community commonly make contact with general practitioners (66), possibly leading to low use of secondary MHSs, no published study has investigated the engagement of offenders with general practitioners for mental health care. On the contrary, offenders are reported to commonly use emergency department services (67), data which were unavailable. In addition, no information about relative changes in perceived psychological well-being (68) at sentence completion relative to commencement was available. Similarly, specific throughcare and/or transitional care services (51) from the criminal justice system to the community-based MHSs received by each offender were not known. Lastly, due to the inability to match on race, the proportion of Indigenous non-offenders received (1.3% of comparison group) was markedly less than their representation in the cohort (8.6%), although it was consistent with the census estimates (1.6% of WA population  $\geq 45$  years) (69). Future studies using alternative study designs and rich data may elicit the influence of personal, social, criminal justice and health system factors on offenders' engagement with psychiatric services.

## Conclusion

Pre-sentence MHS use by first-time older offenders is significantly greater than their counterparts in the general population as well as first-time younger offenders. The greater baseline prevalence of MHS use by older offenders sentenced to non-custodial orders than prisons warrants attention to the identification and continuing treatment of mental disorders upon sentence commencement for this large and often over-looked group. The high proportion of offenders discontinuing MHS use after sentence, especially those treated for non-psychotic disorders before sentence is noteworthy. Among offenders with no prior MHS use, those with a pre-sentence hospitalisation for attempted self-harm and/or physical illness, those from the most disadvantaged areas and men were more likely to use MHSs after sentence. These findings underscore the need for better detection and treatment of mental disorders in these vulnerable groups through individually tailored age-sensitive correctional and community-based MHSs at all transition points to comprehensively address the health requirements of this special needs group of offenders. However, despite several contemporary correctional programs aimed at improving post-release community integration of prisoners in WA (70), few are currently age-sensitive.

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### **Conflict of interest**

On behalf of all authors, the corresponding author states that there is no conflict of interest.

### **Disclaimer**

The results and discussions of this study are not an expression of the views or policies of the Department of Corrective Services, the Department of Health or the Department of the Attorney General.

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**Table 1.** Baseline demographic, offence and health characteristics, and follow-up details in older offenders and matched non-offenders aged  $\geq 45$  years at time of their first-ever or hypothetical sentence (expressed as a percentage of the number of people in each group)

Description	Offenders					Non-offenders					
	ALL	IF	IM	NF	NM	ALL	IF	IM	NF	NM	
Total number of people in each group:	1853	35	125	316	1377	1864	4	19	332	1509	
Age at start of first or hypothetical sentence	45-49 years	43.2	42.9	49.6	45.9	42.0	43.3	25.0	36.8	45.5	42.9
	50-54 years	25.3	28.6	27.2	26.6	24.8	25.2	75.0	31.6	28.0	24.3
	55-59 years	14.7	14.3	12.8	13.9	15.0	14.2	0.0	5.3	13.9	14.4
	60-64 years	8.9	11.4	4.8	8.5	9.3	9.4	0.0	15.8	7.2	9.9
	$\geq 65$ years	7.9	2.9	5.6	5.1	8.9	7.9	0.0	10.5	5.4	8.5
	Median age (in years)	51.1	51.0	50.0	50.5	51.3	50.6	51.5	53.0	50.1	50.8
	Mean age (SD) (in years)	53.2 (7.1)	52.6 (6.3)	51.7 (6.0)	52.4 (6.6)	53.5 (7.3)	53.0 (7.7)	50.9 (2.3)	53.5 (7.3)	52.3 (7.4)	53.2 (7.8)
ARIA category	Highly accessible	73.1	31.4	25.6	83.9	76.0	70.4	25.0	31.6	77.7	69.5
	Accessible	11.2	20.0	13.6	5.7	12.0	11.5	50.0	10.5	10.5	11.7
	Remote	9.3	37.1	52.8	4.4	5.8	5.2	0.0	52.6	2.7	5.0
	Missing	6.4	11.4	8.0	6.0	6.2	12.9	25.0	5.3	9.0	13.9
SEIFA category	Most disadvantaged	29.4	42.9	48.0	25.6	28.2	15.9	75.0	47.4	15.7	15.4
	More disadvantaged	18.8	17.1	14.4	17.7	19.5	19.4	0.0	10.5	20.2	19.4
	Average disadvantaged	13.9	11.4	15.2	13.9	13.9	12.6	0.0	0.0	12.4	12.9
	Less disadvantaged	12.1	8.6	8.0	13.0	12.4	11.9	0.0	5.3	14.2	11.5
	Least disadvantaged	19.2	8.6	6.4	23.7	19.5	27.2	0.0	31.6	28.6	26.9
	Missing	6.6	11.4	8.0	6.0	6.5	13.1	25.0	5.3	9.0	14.1
Nature of offence	Violent	41.9	37.1	64.8	12.3	46.8					
	Non-violent	58.1	62.9	35.2	87.7	53.2					
Custodial setting	Prison order	37.1	40.0	55.2	15.5	40.3					
	Community correction order	62.9	60.0	44.8	84.5	59.7			na		
Release type	Released to freedom	84.1	91.4	84.0	93.4	81.8					
	Conditional release	10.8	5.7	10.4	3.5	12.7					
	Other release	5.1	2.9	5.6	3.2	5.5					
Duration of first or hypothetical sentence	< 0.5 year	31.9	51.4	56.8	27.5	30.1	31.3	25.0	26.3	27.1	32.3
	0.5-1 years	25.4	14.3	13.6	33.9	24.8	17.3	50.0	21.1	18.4	17.0
	1-1.5 years	16.2	5.7	12.0	16.5	16.8	24.8	0.0	21.1	31.3	23.5



Table 1 continued:

Description	Offenders					Non-offenders					
	ALL	IF	IM	NF	NM	ALL	IF	IM	NF	NM	
Total number of people in each group:	1853	35	125	316	1377	1864	4	19	332	1509	
1.5-2 years	9.6	8.6	8.8	12.0	9.1	5.6	0.0	10.5	5.7	5.5	
2-3 years	9.3	11.4	4.0	8.5	9.9	13.1	25.0	15.8	14.2	12.8	
> 3 years	7.6	8.6	4.8	1.6	9.2	7.9	0.0	5.3	3.3	9.0	
Median (in years)	1.0	0.5	0.4	1.0	1.0	1.0	0.5	1.0	1.0	1.0	
Mean (SD) (in years)	1.2 (1.4)	0.9 (1.0)	0.8 (1.1)	1.1 (0.9)	1.3 (1.5)	1.2 (1.4)	0.9 (0.8)	1.2 (1.1)	1.0 (0.9)	1.3 (1.5)	
45-49 years	35.1	40.0	44.0	37.7	33.6	37.4	25.0	31.6	40.1	36.9	
50-54 years	27.2	25.7	29.6	31.0	26.1	26.9	75.0	26.3	31.0	25.8	
55-59 years	17.4	20.0	13.6	15.2	18.2	16.2	0.0	15.8	15.4	16.4	
Age at end of first or hypothetical sentence	60-64 years	10.7	8.6	7.2	10.1	11.2	9.9	0.0	5.3	7.5	10.5
>= 65 years	9.6	5.7	5.6	6.0	10.8	9.6	0.0	21.1	6.0	10.3	
Median (in years)	52.2	52.2	50.6	51.8	52.6	52.0	52.7	54.1	51.3	52.1	
Mean (SD) (in years)	54.4 (7.3)	53.5 (6.3)	52.5 (6.1)	53.5 (6.6)	54.8 (7.5)	54.2 (7.8)	51.8 (2.5)	54.7 (7.5)	53.3 (7.3)	54.4 (7.9)	
Censoring reason	Died	5.2	5.7	6.4	1.9	5.8	4.5	0.0	10.5	2.1	5.0
Re-sentenced	10.0	20.0	19.2	8.2	9.3	na	na	na	na	na	
Completed 5-year follow-up	84.8	74.3	74.4	89.9	84.8	95.4	100	89.5	97.9	94.9	
Follow-up time	Mean (SD) (in years)	4.5 (1.3)	4.0 (1.9)	4.2 (1.6)	4.7 (1.0)	4.5 (1.3)	4.9 (0.6)	5.0 (0.0)	4.9 (0.6)	4.9 (0.5)	4.9 (0.6)
5-year h/o MHS use	No MHS use in 0-5 years	78.8	77.1	78.4	78.2	79.1	93.4	100	84.2	94.0	93.3
Used MHS in 0-1 year	11.9	8.6	8.8	13.6	11.9	2.3	0.0	10.5	1.2	2.4	
Used MHS in 1-5 years	9.2	14.3	12.8	8.2	9.0	4.4	0.0	5.3	4.8	4.3	
Past psychiatric diagnosis (5-year)	Psychotic disorders	1.9	0.0	0.0	1.6	2.3	0.6	0.0	0.0	1.2	0.5
Substance use disorders	12.7	17.1	18.4	7.6	13.2	3.9	0.0	15.8	0.9	4.4	
Other disorders	6.5	5.7	3.2	12.7	5.5	2.0	0.0	0.0	3.9	1.7	
5-year h/o other health service use	Attempted self-harm	3.1	5.7	3.2	7.0	2.1	0.3	0.0	0.0	0.6	0.2
Physical illness	46.0	54.3	54.4	53.2	43.4	42.2	50.0	68.4	45.8	41.0	

IF: Indigenous Females; IM: Indigenous Males; NF: Non-Indigenous Females; NM: Non-Indigenous Males; SD: Standard Deviation; h/o: Pre-sentence history of; MHS: Mental Health Service; na: not applicable

**Table 2.** Baseline 1-year pre-sentence prevalence of mental health service contacts in subsets of older offenders and non-offenders (≥45 years) (expressed as a percentage of the no. of people in each group)

Diagnostic category (Column %)	Full cohort						Indigenous males						Non-Indigenous females						Non-Indigenous males					
	Noff	Off	Vio	Nvio	Pri	Com	Noff	Off	Vio	Nvio	Pri	Com	Noff	Off	Vio	Nvio	Pri	Com	Noff	Off	Vio	Nvio	Pri	Com
No. of people in each sub-group	1864	1853	777	1076	687	1166	19	125	81	44	69	56	332	316	39	277	49	267	1509	1377	644	733	555	822
Non-affective psychoses	0.2	0.6	0.8	0.5	0.6	0.6	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.2	0.8	0.9	0.7	0.7	0.9
Affective psychoses	0.1	0.8	0.9	0.7	0.4	0.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.3	2.6	1.1	2.0	1.1	0.1	0.7	0.9	0.6	0.4	1.0
Personality disorders	0.1	0.8	0.8	0.8	0.2	1.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.3	0.0	1.4	0.0	1.5	0.1	0.8	0.9	0.7	0.2	1.2
Substance use disorders	1.1	5.7	5.9	5.5	3.9	6.7	10.5	6.4	8.6	2.3	5.8	7.1	0.0	2.9	7.7	2.2	0.0	3.4	1.2	6.3	5.6	7.0	4.1	7.8
Neurotic/ depressive disorders	0.5	1.7	1.2	2.1	1.3	2.0	0.0	1.6	2.5	0.0	2.9	0.0	0.9	4.4	0.0	5.1	10.2	3.4	0.5	1.0	0.9	1.1	0.4	1.5
Adjustment disorders	0.1	1.6	1.8	1.4	1.3	1.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.9	7.7	2.2	0.0	3.4	0.1	1.5	1.7	1.2	1.6	1.3
Residual disorders	0.2	0.8	1.3	0.5	1.2	0.6	0.0	0.8	0.0	2.3	1.5	0.0	0.0	1.0	2.6	0.7	0.0	1.1	0.2	0.8	1.4	0.3	1.3	0.5
Any mental disorder	2.2	11.9	12.6	11.4	8.9	13.7	10.5	8.8	11.1	4.6	10.1	7.1	1.2	13.6	20.5	12.6	12.2	13.9	2.3	11.9	12.4	11.5	8.7	14.1
Attempted self-harm	0.1	1.4	2.1	0.8	1.0	1.5	0.0	0.8	1.2	0.0	1.5	0.0	0.0	2.5	12.8	1.1	2.0	2.6	0.1	1.2	1.6	0.8	0.9	1.3

MHS: Mental Health Service; Noff: Non-offenders; Off: Offenders; Vio: Violent; Nvio: Non-violent; Pri: Offenders in prison; Com: Offenders on community correction order

NOTE: Indigenous females were removed from this analysis due to their small numbers

**Table 3.** Comparison of gender, race and age adjusted 1-year pre-sentence prevalence of mental health service contacts between non-offenders, offenders and their subsets ( $\geq 45$  years) (Odds Ratios)

Diagnostic category	Offenders vs. Non-offenders	Violent vs. Non-violent	Prison vs. Community Correction
Non-affective psychoses	3.0 (1.0 - 9.4)	1.4 (0.4 - 4.6)	0.8 (0.2 - 2.9)
Affective psychoses	15.3 <sup>^</sup> (2.0 - $\infty$ )	2.0 (0.7 - 6.3)	0.5 (0.1 - 1.9)
Personality disorders	8.2 <sup>^</sup> (1.9 - 36.1)	1.3 (0.4 - 3.8)	0.1 (0.0 - 1.0)
Substance use disorders	5.5 <sup>‡</sup> (3.4 - 9.0)	1.0 (0.6 - 1.5)	0.5 <sup>^</sup> (0.3 - 0.8)
Neurotic/ depressive disorders	3.2 <sup>^</sup> (1.5 - 6.5)	0.8 (0.3 - 1.8)	0.9 (0.4 - 2.0)
Adjustment disorders	32.0 <sup>†</sup> (4.4 - $\infty$ )	1.9 (0.8 - 4.1)	0.9 (0.4 - 2.1)
Residual mental disorders	14.1 <sup>‡</sup> (5.1 - 39.0)	2.0 * (1.1 - 3.7)	1.3 (0.7 - 2.3)
Any mental disorder	6.0 <sup>‡</sup> (4.3 - 8.4)	1.2 (0.9 - 1.7)	0.6 <sup>^</sup> (0.5 - 0.9)
Attempted self-harm	13.4 <sup>†</sup> (3.2 - 56.8)	4.2 <sup>^</sup> (1.7 - 10.5)	0.8 (0.3 - 1.9)

\*:  $p < 0.05$ ; <sup>^</sup>:  $p < 0.01$ ; <sup>†</sup>:  $p < 0.001$ ; <sup>‡</sup>:  $p < 0.0001$ ;  $\infty$ : Infinity

**Table 4.** Five-year probability of post-sentence mental health service contact for various psychiatric disorders in subgroups of older adult offenders and non-offenders (≥45 years) (expressed as a percentage)

Groups	Outcomes	Full Cohort						Indigenous males						Non-Indigenous females						Non-Indigenous Males					
		Noff	Off	Vio	Nvio	Pri	Com	Noff	Off	Vio	Nvio	Pri	Com	Noff	Off	Vio	Nvio	Pri	Com	Noff	Off	Vio	Nvio	Pri	Com
Full cohort	Total people at risk:	1864	1853	777	1076	687	1166	19	125	81	44	69	56	332	316	39	277	49	267	1509	1377	644	733	555	822
	Any mental disorder	8.6	23.0	25.3	21.2	20.3	24.5	10.5	25.0	25.9	23.3	30.2	18.7	8.2	25.3	41.7	23.2	18.8	26.5	8.7	22.2	24.3	20.4	19.4	24.1
	Psychotic disorders	1.4	3.6	3.2	4.0	2.9	4.0	5.6	0.0	0.0	0.0	0.0	0.0	1.2	5.2	5.6	5.2	8.3	4.7	1.3	3.6	3.5	3.7	2.7	4.2
	Substance use disorders	5.5	16.4	20.5	13.4	14.8	17.3	10.5	24.0	24.4	23.3	28.4	18.7	2.4	10.3	30.0	7.6	8.5	10.6	6.1	17.1	19.4	15.0	13.9	19.1
	Other disorders	3.2	9.0	7.5	10.0	7.4	9.9	5.6	4.8	1.5	11.0	8.7	0.0	5.2	18.1	19.8	17.9	12.5	19.1	2.7	7.3	7.5	7.2	7.0	7.6
	Attempted self-harm	0.2	1.8	1.5	1.9	1.3	2.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.6	8.4	4.1	2.1	5.1	0.3	1.3	1.3	1.2	1.4	1.2
Pre-sentence MHS contact present	Total people at risk:	124	392	183	209	119	273	3	27	19	8	17	10	20	69	14	55	8	61	101	288	147	141	91	196
	Any mental disorder	33.3	52.2	49.8	54.3	46.7	54.5	66.7	52.4	49.1	62.5	66.8	25.9	47.4	62.7	80.4	59.1	25.0	67.7	29.4	50.0	47.7	52.4	45.2	52.1
	Psychotic disorders	11.0	11.5	8.2	14.5	8.0	13.0	33.3	0.0	0.0	0.0	0.0	0.0	15.8	17.7	7.7	20.2	25.0	16.8	9.2	11.3	9.4	13.3	8.1	12.7
	Substance use disorders	20.3	37.4	41.7	33.4	38.8	36.8	66.7	52.4	49.1	62.5	66.8	25.9	5.3	23.9	61.4	14.9	25.0	23.7	21.8	39.4	39.2	39.6	34.7	41.6
	Other disorders	15.4	24.0	17.3	30.0	18.3	26.5	33.3	8.8	0.0	31.4	13.5	0.0	31.6	51.1	47.6	52.1	25.0	54.6	11.4	19.3	17.0	21.7	19.0	19.5
	Attempted self-harm	2.5	6.0	5.4	6.5	4.2	6.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	14.9	22.6	12.9	12.5	15.2	3.1	4.4	4.4	4.6	4.3	4.6
Pre-sentence MHS contact absent	Total people at risk:	1740	1461	594	867	568	893	16	98	62	36	52	46	312	247	25	222	41	206	1408	1089	497	592	463	626
	Any mental disorder	6.9	15.3	17.8	13.5	15.0	15.4	0.0	17.7	18.9	15.6	18.2	17.4	5.8	14.9	21.3	14.2	17.7	14.3	7.3	15.1	17.5	13.1	14.5	15.5
	Psychotic disorders	0.7	1.6	1.6	1.5	1.9	1.3	0.0	0.0	0.0	0.0	0.0	0.0	0.3	1.7	4.3	1.4	5.0	1.1	0.8	1.6	1.7	1.5	1.6	1.6
	Substance use disorders	4.5	10.8	14.0	8.7	10.0	11.4	0.0	16.5	16.9	15.6	15.8	17.4	2.3	6.4	12.5	5.7	5.1	6.7	5.0	11.3	13.5	9.5	10.0	12.2
	Other disorders	2.3	5.1	4.6	5.4	5.3	4.9	0.0	3.7	2.0	6.6	7.0	0.0	3.6	8.9	4.3	9.4	10.0	8.7	2.1	4.3	4.8	3.9	4.8	4.0
	Attempted self-harm	0.1	0.7	0.4	0.9	0.8	0.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.7	0.0	1.9	0.0	2.0	0.1	0.5	0.4	0.6	1.0	0.2

MHS: Mental Health Service; Noff: Non-offenders; Off: Offenders; Vio: Violent; Nvio: Non-violent; Pri: Prison; Com: Community correction

NOTE: Indigenous females were removed from this analysis due to their small numbers

**Table 5.** Multivariable analysis of all predictors of post-sentence mental health service use by older offenders (≥45 years) with and without a pre-sentence history of mental health service contact (Hazard Ratios)

Five-year pre-sentence MHS use history:		Present		Absent	
Parameter	Group	Any mental disorder	Substance use disorders	Any mental disorder	Substance use disorders
Proportion of offenders with outcome:		190 / 392	135 / 392	207 / 1461	146 / 1461
Gender	p-value				*
(REF: Males)	Females	1.2 (0.8 - 1.8)	0.7 (0.4 - 1.2)	1.0 (0.6 - 1.4)	0.5 * (0.3 - 0.9)
Race	p-value				
(REF: Non-Indigenous)	Indigenous	0.9 (0.5 - 1.6)	1.0 (0.6 - 1.9)	1.0 (0.6 - 1.8)	1.4 (0.7 - 2.5)
ARIA category	p-value				
(REF: Remote)	Highly accessible	1.1 (0.6 - 1.9)	0.7 (0.4 - 1.4)	1.0 (0.6 - 1.7)	1.0 (0.6 - 1.9)
	Accessible	1.2 (0.6 - 2.5)	0.8 (0.4 - 1.8)	1.2 (0.6 - 2.1)	1.1 (0.6 - 2.2)
SEIFA category	p-value				
(REF: Least disadvantaged)	Most disadvantaged	1.1 (0.8 - 1.7)	1.4 (0.8 - 2.3)	1.6 * (1.0 - 2.4)	1.8 * (1.1 - 3.2)
	More disadvantaged	0.8 (0.5 - 1.3)	1.0 (0.6 - 1.9)	1.1 (0.7 - 1.8)	1.5 (0.8 - 2.8)
	Average disadvantage	1.3 (0.8 - 2.2)	1.1 (0.6 - 2.2)	1.5 (0.9 - 2.5)	2.0 * (1.1 - 3.7)
	Less disadvantaged	0.6 (0.3 - 1.1)	0.7 (0.3 - 1.6)	1.8 * (1.1 - 2.9)	1.8 (1.0 - 3.4)
Age group at end of first sentence	p-value				
(REF: 45-49 years)	≥ 65 years	1.0 (0.5 - 2.0)	1.2 (0.5 - 2.6)	1.6 (1.0 - 2.5)	1.4 (0.8 - 2.5)
	60-64 years	1.1 (0.7 - 1.8)	1.3 (0.7 - 2.4)	1.0 (0.6 - 1.8)	1.2 (0.6 - 2.2)
	55-59 years	0.7 (0.5 - 1.2)	1.0 (0.6 - 1.7)	1.4 (1.0 - 2.2)	1.8 * (1.1 - 2.9)
	50-54 years	1.3 (0.8 - 1.8)	1.4 (0.9 - 2.2)	1.3 (0.9 - 1.9)	1.5 (0.9 - 2.3)
Nature of offence	p-value				
	Violent vs. Non-violent	0.8 (0.6 - 1.1)	1.0 (0.7 - 1.5)	1.3 (0.9 - 1.7)	1.4 (1.0 - 2.0)
Custodial setting	p-value				
	Prison vs. Com Correction	0.8 (0.5 - 1.1)	0.9 (0.6 - 1.4)	0.9 (0.7 - 1.3)	0.8 (0.5 - 1.1)
Length of first sentence	p-value		*		
(REF: 0-0.5 years)	> 3 years	0.5 (0.3 - 1.1)	0.3 * (0.1 - 0.9)	0.6 (0.3 - 1.1)	0.4 * (0.2 - 1.0)
	2-3 years	0.4 ^ (0.2 - 0.7)	0.5 (0.2 - 1.0)	0.9 (0.6 - 1.6)	0.6 (0.3 - 1.3)
	1.5-2 years	0.7 (0.4 - 1.1)	0.7 (0.4 - 1.2)	1.3 (0.8 - 2.0)	1.4 (0.8 - 2.4)
	1-1.5 years	0.6 * (0.4 - 1.0)	0.7 (0.4 - 1.1)	1.0 (0.7 - 1.6)	1.0 (0.6 - 1.6)
	0.5-1 year	0.8 (0.6 - 1.2)	0.7 (0.5 - 1.2)	1.1 (0.8 - 1.6)	1.2 (0.8 - 1.9)
5-year h/o physical illness	p-value			†	*
	Yes vs. No	0.7 (0.5 - 1.1)	0.8 (0.5 - 1.4)	1.7 † (1.3 - 2.2)	1.5 * (1.1 - 2.1)
5-year h/o attempted self-harm	p-value			*	†
	Yes vs. No	1.5 (1.0 - 2.4)	1.5 (0.8 - 2.6)	3.5 * (1.2 - 9.8)	6.6 † (2.3 - 19.2)
5-year h/o MHS use	p-value	*	*	These variables are not applicable to the models for people without a pre-sentence history of MHS contact	
	0-1 year vs. 1-5 years	1.5 * (1.1 - 2.1)	1.6 * (1.1 - 2.3)		
Past psychiatric diagnosis	p-value	*	†		
(REF: Other disorders)	Psychotic disorders	2.1 ^ (1.3 - 3.6)	1.1 (0.5 - 2.4)		
	Substance use disorders	1.2 (0.8 - 1.7)	2.7 ‡ (1.7 - 4.5)		

MHS: Mental Health Service; h/o: Pre-sentence history of; REF: Reference group; na: not applicable

\*: p<0.05; ^: p<0.01; †: p<0.001; ‡: p<0.0001

**Figure 1.** Five-year unadjusted probability of post-sentence MHS use by older (≥45 years) offenders

