A SYSTEMATIC REVIEW OF RECIDIVISM RATES OF OLDER ADULT MALE SEX OFFENDERS

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Purpose: This study aimed to systematically review the recidivism rates of older male sex offenders (50+) relative to their younger counterparts.

Background: The older sex offender population in the UK is growing, which creates new challenges for offender management (i.e. risk management and psychological treatment). To address these challenges, it is important to consider recidivism risk among this aging population. No previous systematic review has focused on the reoffending of the older sex offender.

Methods: Six electronic databases were searched, as was the reference list of a relevant meta-analysis. Inclusion criteria were applied to the search results. The included studies were quality assessed using pre-defined criteria. This was followed by data extraction and synthesis.

Results: The electronic search returned 4,266 results. One additional publication was identified through hand searching. 1,137 duplicates, one meta-analysis, and 3,051 irrelevant publications were excluded. 48 publications were excluded due to not meeting the inclusion criteria. 11 publications were not accessible in the timeframe. Two studies were excluded as they did not meet the minimum threshold criteria, and another was excluded due to missing data. A further five studies were excluded that re-analysed already included samples. This left 11 publications containing 11 studies.

Conclusions: Older sex offenders generally have lower sexual recidivism rates than younger offenders. However, this appears to be moderated by several factors, including offender typology, actuarial risk and criminal history, and results vary. These factors, alongside the poor quality of some studies, make it very difficult to determine the critical age of desistance from sexual offending. Given the importance of this in relation to case management, it is recommended that further high-quality research is conducted in this area.

Key Words: sex offender, recidivism, sexual reoffending, age, risk management

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Sexual offending is a worldwide phenomenon that has enduring negative effects on the mental and physical health of victims (Craig et al., 2008). Consequently, it has become an area of considerable public concern (Rettenberger et al., 2015). Understandably, people (including the general public and professionals) want to know the level of risk posed by sex offenders, the general perception being that "all sex offenders do it again" or at least they would "if you let them out" (Harris & Hanson, 2004). Contrary to this belief, research has found that upon release from prison, most sex offenders do not go on to commit further sexual offences (Bench, & Allen, 2013; Harris & Hanson, 2004; Rettenberger et al., 2015). For example, in Austria, Rettenberger et al. (2015) reported sexual recidivism rates of 6% at five years after release. Similarly, in the UK, Tully et al. (2015) found around 6% reconviction at two years, and a higher rate of 17% at four years. Although studies with longer follow-up periods have reported higher rates of sexual recidivism (e.g. Harris & Hanson, 2004), they too offer little support for the public perception that sex offenders reoffend at a high rate.

The Relationship between Age and Sexual Recidivism

Public concern surrounding sexual offending has undoubtedly been one of the catalysts for the plethora of research in this area. Many studies have examined sexual recidivism rates and factors that may serve to extenuate or mitigate reoffending. One factor that has been of considerable interest to researchers is that of age at release. Actuarial risk measures (e.g. Static-99R, Helmus et al., 2012; Rapid Risk Assessment of Sexual Offence Recidivism [RRASOR], Hanson, 1997; Risk Matrix 2000, Thornton et al., 2003; Sex Offender Risk Appraisal Guide [SORAG], Quinsey et al., 2006; Minnesota Sex Offender Screening tool [MnSOST-R], Epperson et al., 2003) incorporate age to determine the risk of sexual recidivism. Although the measures differ in how they dichotomise age, there appears to be a general consensus within these tools that younger offenders (i.e. aged 18-24) pose the greatest risk of reoffending. This assertion is supported by a number of studies (e.g. Fazel et al., 2006; Hanson, 2006). For example, Hanson (2006) reported sexual recidivism rates of 16.2% for offenders below the age of 25, 14.4% for those aged 25-39, 8.8% for those aged 40-49, 7.5% for those aged 50-59 and 2.0% for those over 60. Research has shown that age differences can be further compounded when offenders have several previous convictions. For instance, Thornton (2006) found that offenders aged 18-24, with two prior sexual sentencing occasions, had a sexual recidivism rate of 80%; almost double that of the next age band (i.e. 25-39, 43%).

Although within these tools and the literature more generally, here is a consensus that young offenders are at the greatest risk of reoffending, the age at which risk begins to decrease is far less definitive. This is reflected in the different actuarial risk measures. The RRASOR considers being over the age of 25 as a low-risk item. In contrast, the MnSOST-R classifies those over the age of 31 as lower risk. Other measures consider the relationship in greater depth. For example, the Risk Matrix 2000 classifies those aged 25-34 as an intermediate risk and those over the age of 34 a lower risk. The SORAG further expands upon this, including multiple risk classifications, with those over the age of 39 considered least likely to recidivate. The Static-99R depending on their age. Offenders aged 18-34.9 receive

a score of 1, 35-39.9 a score of 0, 40-59.9 a score of -1, and 60+ a score of -3. This lack of agreement among the actuarial risk measures is perhaps unsurprising given the inconsistencies in the literature. Some papers report a steady decline in sexual recidivism with age (e.g. Nicholaichuk et al., 2014), others have reported plateaus in the middle years (e.g. Hanson, 2006), and others curvilinear relationships (e.g. Rettenberger et al., 2015). This is an issue which complicates, and does not assist, risk management decisions in cases where the offender is older or has aged considerably since their original offences.

Sexual Recidivism Rates for Offenders over the Age of 50

In 2013 Operation Yewtree was launched by police in the UK. Initially, the aim of the operation was to investigate multiple allegations of sexual misconduct that had been made against the deceased UK celebrity Jimmy Savile. However, the remit of the operation soon became much broader. Hundreds of victims of historic sex offences came forward and what followed was the arrest and, in many cases, the prosecution of an older generation of sex offenders who had offended many years ago. Operation Yewtree has contributed to the growing number of sex offenders in the UK, who fall into the over 50 age band. This ageing offender population raises new challenges in terms of offender management (i.e. risk and treatment). To address these challenges effectively, one must know more about the level of risk posed by the older offender.

Consistent with previous research on general criminality, (e.g. Sampson & Laub, 2003) some studies have found that older sex offenders (i.e. > 50) have low rates of recidivism (e.g. Harris & Hanson, 2004; Nicholaichuk et al., 2014). For example, Nicholaichuk et al. (2014) reported a recidivism rate of 5.6% for their over 50 cohort which was less than half that of the under 50s. Explanations for the lower reoffending rate for those over 50 could include physical health deterioration or a reduction in time at risk due to mortality. Conversely, it could relate to a change in reporting rates, with a greater reluctance to report the elderly or attributing their behaviour to deteriorating mental health, as opposed to criminal deviance (Thornton, 2006). Although it is not clear through what mechanisms, some studies suggest that age attenuates risk. However, this trend may need to be treated with caution because these studies often include only a small sample of older offenders (e.g. Prentky & Lee, 2007; Thornton, 2006). Nevertheless, some researchers have argued that the findings are compelling enough that risk assessments should be adjusted to take ageing into account (Lussier & Healey, 2009). Nicholaichuk et al. (2014), however, caution against such adjustments. Their findings suggest that the potential mitigating effects of age may be moderated by other factors such as offender type, the offender's social situation, and their level of risk. In fact, in Nicholaichuk et al.'s study (2014) the recidivism rates of the high-risk older offenders (i.e. > 50) were equivalent to their younger high-risk counterparts, demonstrating the inconsistency in this area of the literature.

Other studies have also yielded findings that undermine the veracity of the claim that actuarial risk measures should be adjusted to account for the mitigating effects of age. Craig (2011), for example, reported the highest level of sexual recidivism amongst their oldest age band. Within the first 5 years after release, Craig (2011) reported that 14.3% of offenders over the age of 45 had reoffended sexually, compared to 6.7% below the

age of 25, 8.8% aged 25-34 and 6.7% aged 35-44. Other studies that have included more extensive age bands (i.e. over 60) have also reported high rates of recidivism for those offenders in their late 40s and 50s. For example, Rettenberger et al. (2015) found the highest rate of sexual recidivism in their 40-59 age band (i.e. 8.5%). However, the recidivism rate dropped rapidly to 3.9% in the over 60s. This suggests that it is possible that 60, opposed to 50, maybe the critical age at which desistance from sexual offending occurs for most life course persistent offenders. Hypotheses as to why this could be the case include that over 50s are now in better physical health than in previous generations or are no longer being perceived as elderly or incapable.

Drawing Conclusions on Recidivism Rates

The current literature on sexual recidivism rates is riddled with inconsistencies not just in the findings, but also in methodology. When evaluating the literature, one must first consider how "recidivism" is defined (Harris & Hanson, 2004). Some studies have defined recidivism as simply a conviction for a new sexual offence (e.g. Thornton, 2006); other studies have included charges for a new sexual offence (e.g. Hanson et al., 2004); others have extended this further to take into account arrests (e.g. Bench & Allen, 2013) and some studies only include proven reconvictions (e.g. Tully et al., 2015). Logic would suggest that the broader the definition, the larger the recidivism estimate, but it is not clear to what degree the problems in defining recidivism impact the available literature. It is well established that when estimating sexual recidivism rates, there are inherent problems because many sexual offences go unreported (Besserer & Trainor, 2000). Therefore, the rates of reconviction cited in the literature are highly likely to underestimate the true rates of reoffending (Falshaw et al., 2003). This may be even more prevalent amongst the older sex offender population due to differences in the rates of reporting (Thornton, 2006).

Recidivism estimates are also dependent upon the type of sex offender (i.e. rapist, extra-familial child molesters, intra-familial child molesters) and the length of the follow-up period. Rettenberger et al. (2015), for example, reported recidivism rates of 8% for their child molester subgroup, but this rate was halved at 4% for their rapist subgroup. Harris and Hanson (2004) also found child molesters, specifically those who operated outside the family and had male victims, posed the greatest risk of recidivism. The extra-familial male-victim child molesters had recidivism rates of 23% after 5 years, 28% after 10 years, and 35% after 15 years. This was considerably higher than rapists (14%, 21%, and 24%), incest offenders (6%, 9%, and 13%) and extra-familial female-victim child molesters (9%, 13%, and 16%). As can be seen from Harris and Hanson's (2004) results, irrespective of offender type, the longer the follow-up period the greater the cumulative number of recidivists. However, it is important to be aware of the distinction between this cumulative value and yearly rates of recidivism. Although the cumulative value increases, the likelihood of recidivism decreases for each year offence-free (Harris & Hanson, 2004). When offender type is considered alongside age, research has found that the recidivism rates of rapists and incest offenders decline steadily throughout life, whilst extra-familial child molesters show little decline until after the age of 50 (Hanson, 2002). Thus, suggesting that the extra-familial child molesters are the most persistent in their offending.

A study by Socia et al. (2015) found differential age effects, dependent upon victim/offender type. Overall, they found that for every 1-year increase in age (above the mean) there was a 1% decrease in the likelihood of sex offender transience (i.e. homelessness). However, when victim type was taken into consideration, a significant reduction in transience was only reported for those offenders with child victims. It was found that for those with child victims, each 1-year increase in age, resulted in a 2% decrease in the likelihood of sex offender transience. Although sex offender transience is not indicative of recidivism, it has been found to increase the risk of recidivism (Socia et al., 2015). Victim/offender type is not the only factor that may moderate the relationship between age and reoffending. Thornton (2006) found evidence of a linear relationship between age at release and sexual recidivism. More specifically, with each year of increasing age, the odds of sexual reoffending declined by approximately 0.02. However, this was only evident when the number of prior sexual sentencing occasions was controlled. When prior sexual sentencing occasions were included in the analysis for offenders with no prior sexual sentencing occasions, age at release and recidivism were unrelated; for those with one prior sexual sentencing occasion there was a gradual linear decline in the odds of sexual recidivism; and for those with two or more prior sexual sentencing occasions there was a curvilinear relationship. This demonstrates that age is a factor that needs attention alongside other risk-relevant factors.

Offending history and victim/offender characteristics are both considered static risk factors. However, when considering the risk of recidivism, dynamic factors should also be considered, with dynamic risk tools emerging more and more in the literature on sex offender risk assessment (e.g. Tully et al., 201). Research has found that severity, impact, and relative importance of dynamic risk factors vary with age and that although the severity of dynamic risk factors tends to be lower for older offenders (i.e. 41+), their impact is often greater (Spruit et al., 2017). Dynamic risk factors can thus be said to have a greater predictive power for recidivism in offenders over the age of 40. Spruit et al. (2017) found that problems with drug misuse were the most important predictor of recidivism amongst this age group. Their findings highlight the importance of considering dynamic risk factors when deciding how to manage and treat older sex offenders. Given that dynamic risk factors were found to be strongly associated with recidivism in older adults, Spruit et al. (2017) postulate that treatment that targets criminogenic needs should be more effective in this age group, as opposed to other age groups. That being said, Olver et al. (2013) found treatment to be largely ineffective in reducing recidivism rates in the over 50s. However, this could be because the over 50 age group, in their study, were inherently lower risk than the other age bands. This is supported by the work of Tewskbury et al. (2012). Their research found that older offenders are less likely to have a high-risk trajectory.

The Current Study

The inconsistencies in the methodologies and findings within the research into the recidivism of older sex offenders make it very difficult for practitioners and policymakers to make evidence-based, defensible decisions about the risk posed by the ageing sex offender population. This causes problems at a time when convictions for non-recent sexual offending are increasing, possibly linked to high profile campaigns such as Operation Yewtree

in the UK which rightly have inspired victims of non-recent sex offences to come forward and report their abuser. It is thus likely that the older sex offender population is growing in the UK, as is the trend in other countries (e.g. Canada, Nicholaichuk et al., 2014), creating new challenges in respect to offender management. This relates both to sex offender specific challenges (e.g. what sort of risk reduction treatment might be required) and age specific challenges (e.g. the increased healthcare needs of an elderly population needing to be met in prison). In order to effectively address challenges related to risk management and psychological treatment decisions, it is therefore essential to consider the risk posed by this ageing population, yet the basis of such knowledge, including the recidivism rates of this population, has not been systematically reviewed to date. Given the difficulties summarised above, a systematic review that collates the recidivism research on this would prove invaluable. It would provide practitioners and policy makers a source to draw scientifically sound conclusions to aid decision making. To date, no systematic review exists that focuses on the recidivism rates of offenders over the age of 50 and none which compare these rates to younger sex offender recidivism rates. The current review aims to address this gap in the literature. Its aim is to consider whether older sex offenders are a distinct population with a distinct recidivism rate. The themes in the literature to date suggest that the recidivism rate is likely to be lower compared to that of younger sex offenders. If this is the case, then it follows their risk should be viewed differently, which may mean that this population is managed and treated differently to younger sex offenders.

METHOD

The PRISMA (Moher et al, 2009) guidance was followed in conducting this systematic review. A rapid approach to systematic review was taken. All the basic principles of a full systematic review were followed.

Search Strategy: Sources of Literature

The search was limited to references published from 1980 onwards, as sex offender risk assessment and recidivism research began to develop after this time. The following search techniques were used to source relevant publications:

a) Electronic bibliographic databases:

OVID: PsycINFO (1980–Jan 2018, completed on 03rd Jan 2018)

OVID: MEDLINE (1980–Jan 2018, completed on 03rd Jan 2018)

OVID: EMBASE (1980–Jan 2018, completed on 03rd Jan 2018)

Web of Science (Science Citation Index Expanded [SCI-EXPANDED]; Social Sciences Citation Index [SSCI]; Arts and Humanities Citation Index [A&HCI]; Conference Proceedings Citation Index — Science [CPCI-S]; Conference Proceedings Citation Index — Social Science and Humanities [CPCI-SSH]; 1980–2018, completed on 03rd Jan 2018)

PROQUEST: ASSIA (After Dec 1979, completed on 03rd Jan 2018)

b) Gateways:

Cochrane Central (1980–2018, completed on 02nd Jan 2018)

c) Meta-analyses:

One meta-analysis (Hanson & Bussiere, 1998) was identified through electronic and hand searching. The reference list of the meta-analysis was searched and considered in relation to the inclusion/exclusion criteria.

d) Contact with experts:

Professor Roderic Broadhurst (Australian National University) and Dr. Richard Packard were contacted to obtain further information/data pertaining to the review.

Search strategy: Search Terms

The following is a guide to the search terms that were applied to all databases (the search terms were adapted to meet the requirements of each database due to field differences, see Appendix A for search syntax):

(sex offender/sex offending/rape/paedophilia)

AND

(recidivism/reoffend/repeat/reconviction)

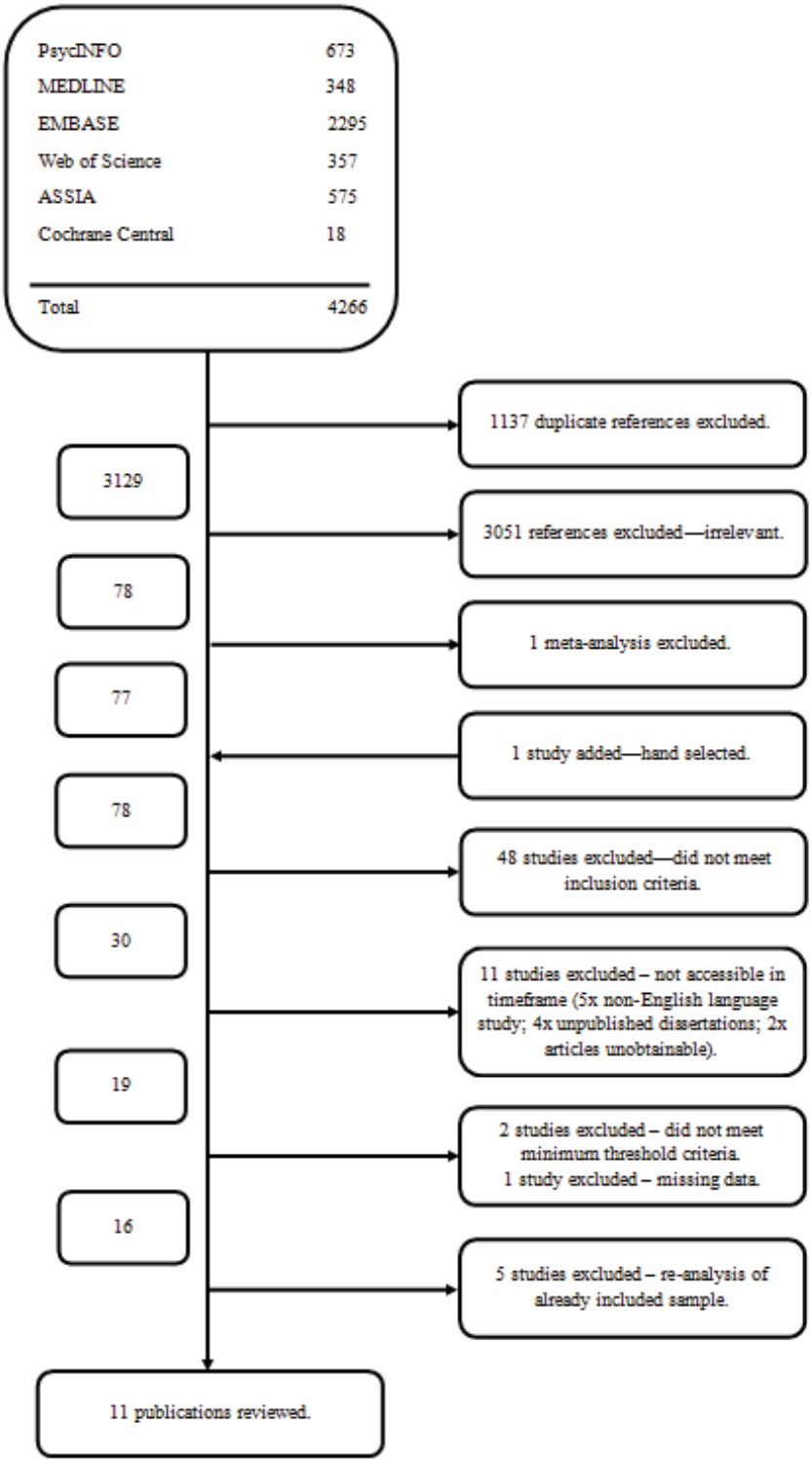
AND

(age/elderly/retired/geriatric)

Study Selection

Inclusion and exclusion criteria were applied to the studies retrieved through the searches (see Box 1); pre-defined inclusion and exclusion forms were used (see Appendix B). Studies that met all the inclusion criteria were selected to go through to the quality appraisal and review stage. Where information relating to the inclusion criteria was unclear, authors were contacted directly to provide further clarification. See Appendix C for excluded studies and Figure 1. for search strategy.

Figure 1. Systematic Review Search Strategy



Box 1

Definitions of Inclusion and Exclusion Criteria.

Population: Adult male sex offenders (18 and over).

Exposure: Ageing/older than 50.

Outcome: Sexual reoffending, reconviction or recidivism.

Study type: Case control or cohort.

Language: No restriction.

Date of publication: 1980 onwards.

Exclusion: Opinion papers, editorials, reviews etc.

The population was limited to adult males (defined as males aged 18 or over). Only studies reporting recidivism rates of the offenders (outcome) with the age group (exposure) were included. Data was extracted from studies detailing comparators of a younger population i.e., if recidivism was reported by age group in the study. However, so long as the study stated the outcomes for offenders aged over 50 (distinct from outcomes for under 50) and any further breakdown e.g., 60-70, then it was included without having to detail an under 50 comparator group.

Sexual recidivism rate was selected as the outcome. 'Recidivism' was considered to be reconviction, charge, re-arrest, re-admission, re-imprisonment or self-reported recidivism for a sexual offence.

To include all relevant research and avoid publication bias no limits were set on language. However, the authors did not have the resources to translate non-English language studies. The number of non-English language studies is included in Fig 1. Opinion papers were excluded as, by their nature, they do not empirically evaluate. Included studies were then quality assessed.

Quality Assessment

Quality assessment of the remaining studies were undertaken in two phases.

A) Threshold criteria:

- Clear description of age of sex offender population.
- Clear definition of outcome measure (recidivism definition).
- Appropriate quantification of recidivism rate.

Papers that did not meet all these criteria were excluded after phase one for not meeting the minimum quality threshold (see Appendix C for excluded studies and Figure 1 for search strategy).

B) Quality assessment forms

Quality assessment forms/checklists were pre-defined by adapting checklists from the Critical Appraisal Skills Programme (CASP, 2004, 2006, see Appendices D and E).

All of the included studies were independently assessed by two reviewers (researcher, or registered forensic psychologist with doctorate level academic qualifications) to aid the consistency of the assessment process. An intra-class correlation coefficient (ICC) of 0.91 was achieved between the reviewers. According to Fleiss' (1986) guidelines ICC values of 0.75 and over are considered 'excellent'.

Data Extraction

A pre-defined data extraction pro-forma was used to extract the data from the included studies prior to synthesis (see Appendix F).

RESULTS

Description of Studies

The full search returned 4,266 publications. 1,137 duplicates, one meta-analysis, and 3,051 irrelevant publications were excluded. One publication was identified and added through hand searching. A further 48 publications were excluded due to not meeting the inclusion criteria (refer to Box 1 for inclusion/exclusion criteria), along with 11 publications that were not accessible in the timeframe, two publications that did not meet the minimum threshold criteria, one publication where data was missing and five publications that involved the re-analysis of already included samples. The remaining 11 studies were included in the review. See Appendix C for reasons for exclusion.

Characteristics of Included Studies

None of the studies included in this review were included in Hanson and Bussiere's (1998) meta-analysis. Although the meta-analysis included a number of relevant studies, none met the threshold criteria for inclusion; all of the studies were excluded on the basis of exposure (i.e. none included an over 50 age band). All the studies included in this review were published after Hanson and Bussiere's (1998) meta-analysis.

The number of participants included within this review of 11 studies is 15,691. However, there is *potentially* some overlap in the participant samples. Nicholaichuk et al. (2014) may overlap with three studies (Barbaree et al., 2003; Looman & Abracen, 2010; Lussier & Healey, 2009). However, it is particularly difficult to determine whether there is any overlap with Looman and Abracen's (2010) sample as no date is given as to when the data was collected. Five studies (Hanson, 2006; Helmus et al., 2012; Olver et al., 2013; Rettenberger et al., 2013; Wollert et al., 2010) were excluded during the search phase because the samples were analysed in other included studies.

The countries where the sex offenders were sampled from were Canada (four studies), England and Wales (one study), New Zealand (one study), Austria (one study), USA (one study), Germany (one study), Sweden (one study), and Australia (one study). The extent to which 'plea bargaining' (i.e., where an offender pleads guilty to a lesser offence) applies across these countries is unknown. In countries that allow 'plea bargaining', sexual charges could potentially be negotiated to non-sexual charges leading to sexual recidivism rates being underestimated.

The type of sex offenders considered in the reviewed studies varied. Types included contact (e.g., rapists and child molesters) and non-contact (e.g. 'hands off') offenders; and offenders of low, medium, and high risk. The age bands also varied across studies. The oldest age bands included in the studies were as follows: 50+ (four studies), 51+ (one study), 55+ (one study), 60+ (five studies). Of the studies that included a 60+ age band two studies included a 50-59 and one study included a 51-60 band. Five studies included age bands that straddled 50. Thus, making it difficult, within these studies, to determine accurate recidivism rates for those specifically over the age of 50.

The most prevalent definition of outcome considered in the included studies was reconviction (seven studies). Definitions also included re-arrest (one study), conviction for a new contact sexual offence (one study), post-release charges (one study), and 'sexual reoffending' (one study). Of the 11 studies included in the review seven employed case-control designs and four were cohort designs.

Quality of Included Studies

Quality scores for studies employing a case-control design ranged from 29 to 38 and for those employing a cohort design 26 to 27. All of the studies, considered in the review, utilised a large number of participants ($n > 100$). Most studies also included a large sample ($n > 50$) of offenders over 50 (eight studies, 73%). All of the studies had a mean follow up period of over two years with the majority having a mean follow up period of five years or more (ten studies, 91%). Substantially fewer studies had a mean follow up of ten years or more (four studies, 36%). Most of the studies described both the age bands (ten studies, 91%) and the outcome measure (nine studies, 82%) clearly. However, it was not always clear, in the reviewed studies, how the authors dealt with missing data. See Table 1 for details of the methodological factors considered when reviewing the included studies.

Table 1: *Methodological Considerations of Systematically Reviewed Studies*

	No. of studies (n=11)			
	Yes	Partial	No	Unclear
Large n (n>100)	11 (100%)	0	0	0
50+ age band large n (n>50)	8 (73%)	0	2 (18%)	1 (9%)
Follow-up ≥ 2 years	11 (100%)	0	0	0
Follow-up ≥ 5 years	10 (91%)	0	1 (9%)	0
Follow-up ≥ 10 years	4 (36%)	0	7 (64%)	0
Age bands clearly described	10 (91%)	1 (9%)	0	0
Outcome measure clearly described	9 (82%)	2 (18%)	0	0
Missing information dealt with appropriately	2 (18%)	0	1 (9%)	8 (73%)
Rates of recidivism clearly reported	11 (100%)	0	0	0

Descriptive Data Synthesis

In the studies reviewed the overall sexual recidivism rate ranged from 6.0% (Rettenberger et al., 2015) to 28.2% (Prentky & Lee, 2007). The sexual recidivism rate for the over 50s ranged from 3.8% (Barbaree et al., 2003) to 13.0% (Janka et al., 2012) (see Table 2). Two studies found that recidivism rates remained relatively stable across the life span (Broadhurst & Loh, 2003; Janka et al., 2012) and one study found that the risk of recidivism decreased until the age of 55 when it then began to increase again (Fazel et al., 2006). The other eight studies reported the lowest rate of recidivism in their oldest age band. However, only five of these studies (Barbaree et al., 2003; Looman & Abracen, 2010; Nicholaichuk et al., 2014; Prentky & Lee, 2007; Skelton & Vess, 2008) demonstrated a clear decline in sexual offending over the age of 50. The findings of the other studies are more complex and suggest that 60, as opposed to 50, may be the critical age at which age related desistance from sexual offending begins to occur.

Lussier and Healey (2009) included two age bands over 50: 50-59 and 60+. The study reported a recidivism rate of 10.3% for the 50-59 age group (an increase of 1.9% on the previous age band i.e. 40-49) and a recidivism rate of 0.0% for the 60+ age band. Although this would indicate that the critical age of desistance is 60 the recidivism rates reported in this study were not adjusted for time at risk. After adjusting for time at risk and Static-99 scores, for every 1-year increase in age, recidivism rates dropped by 4%.

Rettenberger et al. (2015) and Thorton (2006) also included a 60+ age band. Again, both studies, reported this group as having the lowest rate of recidivism. Both of these studies included a 40-59 age band. In Thorton (2006) the 40-59 age band had a higher rate of recidivism than the under 18s, whilst in Rettenberger et al. (2015) the 40-59 age band had the highest rate of recidivism overall. Although both studies only show a decline in sexual offending after the age of 60 it is impossible to determine, with any certainty, the critical age of desistance as the age bands straddle 50. The high rates of recidivism observed in

the 40-59 age bands may have been skewed by the under 50s. The findings of Skelton and Vess (2008) and Barbaree et al. (2003) lend support to this assertion. In both studies the recidivism rate for the 41-50 age band was higher than that of the 51+ (6.0% vs. 4.0% and 7.6% vs. 3.8% respectively). However, as previously noted this was not the case in Lussier and Healey's study (2009). These conflicting findings highlight the difficulties associated with determining a critical age of desistance from sexual offending.

Determining this critical age can be further compounded by differences in offender typology and actuarial risk. Of the studies reviewed three reported recidivism rates for rapists and child molesters separately (Looman & Abracen, 2010; Prentky & Lee, 2007; Rettenberger et al., 2015). Across all three studies, the oldest age bands had the lowest rates of recidivism for both rapists and child molesters. In Prentky and Lee (2007) and Rettenberger et al. (2015) the reoffending rates for the older child molesters were higher than that of the older rapists (0.0% vs. 16.7% and 0.0% vs. 4.6). Conversely, in Looman and Abracen (2010), the recidivism rate for the older rapists (5.3%) was higher than that of the older child molesters (4.5%). However, the difference in recidivism rate is likely due to the difference in sample size; only one rapist and one child molester over 50 went on to reoffend. Interestingly, none of these studies considered the interaction between age, typology, and actuarial risk.

Only three of the studies included in this review reported recidivism rates as a function of age and actuarial risk (Janka et al., 2012; Nicholaichuk et al., 2014; Skelton & Vess, 2008). Across all three studies, regardless of age, high risk offenders were found to have higher recidivism rates. In the 50+ age band, Janka et al. (2012) reported recidivism rates of 5.8% for the low risk and 34.8% for the high-risk offenders. Nicholaichuk et al. (2014) reported similar findings with the lowest risk offenders, in the 50+ age band, recidivating at a rate of 2.9% and the highest risk at a rate of 40.0%. 40.0% is incredibly high. In fact, it was higher than the low, medium, and high-risk offenders in the younger age bands. Skelton and Vess's study (2008) was an exception to this. In their study the recidivism rate of the high-risk offenders in the 60+ age band was only 6.0%. This is not that dissimilar from the recidivism rates reported for the low and medium risk offenders in this age group (3.0% and 4.0% respectively). That being said, it is very different from the recidivism rate (i.e., 9.0%) reported for the high risk offenders in the 51-60 age band; the recidivism rates of the low and medium risk offenders were comparable to those reported in the 60+ age band (2.0% and 4.0% respectively). This suggests that there are potentially different critical ages of desistance dependent upon the actuarial risk of the offender.

The decision was made not to run a meta-analysis due to the heterogeneity (e.g., differences in design, participants, outcome, age bandings) of the studies included in this review. Issues of heterogeneity are compounded by it being likely that samples in the studies consist of historic offenders, and those who may have already offended at a relatively older age, and this is not clear in any of the studies. This heterogeneity would have rendered the analysis meaningless.

Table 2: *Summary of Results*

Reference	Sample Size	Follow-up	Location	Offender/ Offence Type	Sexual Recidivism Rate	Age Bands			Quality Score[a]
						Band	Sample Size	Sexual Recidivism Rate	
Barbaree, H.E., Blanchard, R., & Langton C.M. (2003). The Development of Sexual Aggression through the Life Span: The Effect of Age on Sexual Arousal and Recidivism among Sex Offenders. *Ann. N.Y. Acad. Sci., 989*(1), 59-71.	468	5.9 years	Canada	175 rapists, 155 child molesters, 93 familial offenders, 45 mixed offenders	11.3%	21-30 31-40 41-50 51+	105 160 116 87	16.78% 11.21% 7.64% 3.82% *(note: 5-year failure rate)*	29*
Broadhurst, R. & Loh, N. (2003). The probabilities of sex offender re-arrest. *Criminal Behaviour and Mental Health, 13*(2), 121-139.	2424	5.7 years	Western Australia	Victim/offence type: 1132 adult female, 397 child, 246 juvenile, 75 incest, 476 exposure, 99 other	9.8%	<16 16-18 18-24 24-30 30-40 40-50 50+	187 223 541 310 473 346 344	8.56% / 20% 5.38% / 12% 8.87% / 22% 10.65% / 28% 8.67% / 24% 11.85% / 33% 10.76% / 28% *(percentage of cases failing by cut-off date / ultimate probability of re-arrest)*	32*
Fazel, S., Sjostedt, G., Langstrom, N., & Grann, M. (2006). Risk factors for criminal recidivism in older sexual offenders. *Sexual Abuse: A Journal of Research and Treatment, 18*(2), 159-167.	1303	8.9 years	Sweden	551 convicted of rape or sexual coercion, 596 of child molestation, 156 of other nonpenetrative offences	7.5%	<25 25-39 40-54 55+	103 498 539 163	10.7% 9.4% 5.6% 6.1%	31*
Janka, C., Gallasch-Nemitz, F., Biedermann, J., & Dahle, K. (2012). The significance of offending behavior for predicting sexual recidivism among sex offenders of various age groups. *International Journal of Law and Psychiatry, 35*(3), 159-164.	682	5 years	Germany	321 offenders convicted for sexual coercion or rape, 308 convicted for child sexual abuse, 53 convicted of both	13%	14-20 21-34 35-49 50+	70 285 235 92	14.3% 13.3% 12.8% 13%	35*

Reference	Sample Size	Follow-up	Location	Offender/ Offence Type	Sexual Recidivism Rate	Age Bands			Quality Score[a]
						Band	Sample Size	Sexual Recidivism Rate	
Looman, J., & Abracen, J. (2010). Comparison of measures of risk for recidivism in sexual offenders. *Journal of Interpersonal Violence, 25*(5), 791-807.	419	6.5 years	Canada	196 rapists (victims 16+), 101 child molesters (victims (younger than 12), 57 (victims 13-15), 23 mixed offenders (victims adults and children), 30 incest offenders. Remaining offenders committed other offences including exhibitionism	12.9%	25-35 50+	79 27 19 22	25.3% (rapists) 25.9% (child molester) 5.3% (rapist) 4.5% (child molester)	27
Lussier, P., & Healey, J. (2009). Rediscovering Quetelet, Again: The "Aging" Offender and the Prediction of Reoffending in a Sample of Adult Sex Offenders. *Justice Quarterly, 26*(4), 827-856.	521	4.5 years	Canada	Sexual assault (59%), sexual interference (14.8%), sexual assault with a weapon (10%), invitation to sexual touching (9.5%), incest (8.1%), anal intercourse (7.7%), aggravated sexual assault (6.8%)	15.2% (includes violent recidivism)	20-29 30-39 40-49 50-59 60+	74 147 154 87 51	36.5% 19% 8.4% 10.3% 0%	27
Nicholaichuk, T.P., Olver, M.E., Gu, D., & Wong, S.C.P. (2014). Age, actuarial risk, and long-term recidivism in a national sample of sex offenders. *Sexual Abuse: A Journal of Research and Treatment, 26*(5), 406-428.	2158	12 years	Canada	937 rapists, 571 intrafamilial child molesters, 257 extrafamilial child molesters, 274 mixed offenders, 119 unknown	12.6%	Under 50 50+	1481 517	14.8% 5.6%	38*
Prentky, R. A., & Lee, A. F. S. (2007). Effect of age-at-release on long term sexual re-offense rates in civilly committed sexual offenders. *Sex Abuse, 19*(1), 43-59.	248	25 years	USA	136 rapists, 115 child molesters	28.23%	18-<30 30-<40 40-<50 50-<60 60+	58 98 46 28 18	25.86% 33.67% 30.43% 21.43% 11.11%	27

Reference	Sample Size	Follow-up	Location	Offender/ Offence Type	Sexual Recidivism Rate	Age Bands			Quality Score[a]
						Band	Sample Size	Sexual Recidivism Rate	
Rettenberger, M., Briken, P., Turner, D., & Eher, R. (2015). Sexual Offender Recidivism among a population-based prison sample. *International Journal of Offender Therapy and Comparative Criminology, 59*(4), 424-444.	836	5 years (as reported for age)	Austria	414 child molesters, 388 rapists, 34 other	6%	<25 25-39.99 40-59.99 >60	102 329 328 77	6.9% 4.3% 8.5% 3.9%	34*
Skelton, A., & Vess, J. (2008). Risk of sexual recidivism as a function of age and actuarial risk. *Journal of Sexual Aggression, 14*(3), 199-209.	5880	10.4 years	New Zealand	1,811 offenders sexually only offended against children, 3,199 only against adults and 870 offended against both	9%	<20 20-30 31-40 41-50 51-60 60+	217 1,491 1,647 1,209 754 562	13% 12% 11% 6% 4% 3%	26
Thornton, D. (2006). Age and sexual recidivism: A variable connection. *Sexual Abuse: A Journal of Research and Treatment, 18*(2), 123-135.	752	10 years	England and Wales	Not reported	21.4%	Under 18 18-24 25-39 40-59 60+	33 145 321 230 23	12.12% 21.38% 25.55% 18.70% 4.35%	34*

[a]Cohort studies maximum 32 points, case–control studies (marked with *) maximum 42 points. Higher score=better quality.

DISCUSSION

The main aim of this systematic review was to determine whether older sex offenders (over 50) are a distinct population with a distinct recidivism rate. The review also assessed the quality of the included studies.

The systematic review revealed mixed results. Five studies reported a decline in sexual recidivism in offenders over the age of 50 (Barbaree et al., 2003; Looman & Abracen, 2010; Nicholaichuk et al., 2014; Prentky & Lee, 2007; Skelton & Vess, 2008); three studies reported a decline in sexual recidivism over the age of 60 (Lussier & Healey, 2009; Rettenberger et al., 2015; Thornton, 2006); and three studies reported no decline in sexual recidivism (Broadhurst & Loh, 2003; Fazel et al., 2006; Janka et al., 2012). Methodological differences may account for some of these disparate findings. Most notably, the studies varied in terms of the age bands they included. Some studies included age bands that straddled 50. Rettenberger et al. (2015) and Thornton (2006) both included a 40-59 and 60+ age band. In both studies a decline in sexual recidivism was only observed after the age of 60. Although, this may indicate that 60 is the critical age of desistance from sexual offending, it is equally possible that the high rates of recidivism observed in 40-59 age group were the result of the under 50s skewing the data. Interestingly, all of the studies (e.g., Janka et al., 2012) that reported no decline in recidivism failed to include a 60+ age

band. It is possible that this was simply due to lack of available research population of this age category.

The studies also varied in the extent to which they took into account other factors (e.g., level of risk, offender type) known to influence sexual recidivism rates. Lussier and Healey's study (2009) controlled for two factors: time at risk and actuarial score. After adjusting for these two factors, a 1-year increase in age, lead to a 4% reduction in recidivism rates. It appears from the findings of the included studies that actuarial score may moderate the relationship between age and sexual recidivism. Those from higher actuarial risk categories appear to be more persistent in their offending with high-risk offenders, over the age of 50, more likely to recidivate than their younger, lower-risk peers (Janka et al., 2012; Nicholaichuk et al., 2014; Skelton & Vess, 2008). In fact, Nicholaichuk et al. (2014) reported the recidivism rate to be higher for older (50+), as opposed to younger (<50), high-risk offenders. This may explain the unusual pattern of reoffending seen in Fazel et al. (2006) where recidivism rates increased in the 55+ age band; the offenders in their sample were considered representative of the more serious end of the sexual offender spectrum. Had the study included a 60+ age band the recidivism rate may have begun to fall again. Skelton and Vess (2008) found that after the age of 60+ the recidivism rates of the high-risk offenders more closely resembled their lower-risk counterparts.

Another factor that may moderate this relationship is the number of prior sexual sentencing occasions, with more prior sentencing occasions resulting in higher rates of recidivism (Thornton, 2006). The pattern of reoffending appears to be very similar to that observed for actuarial risk. Thornton (2006) found that older offenders (40-59), with two or more sentencing occasions, were more likely to reoffend than their younger peers who had fewer prior convictions. Only after the age of 60 did this cease to be the case. In fact, in the 60+ age band, those with no prior sexual sentencing occasions were the most likely to recidivate. Interestingly, for those with no prior sexual sentencing occasions the rate of recidivism remained relatively stable across the lifespan. This reflects the disparate findings reported in Broadhurst and Loh (2003). Their study found very little variation in recidivism rates across the different age bands. Yet, they only included first time offenders in their sample (equivalent to no prior sentencing occasions). Thornton (2006) suggests that, for these first-time offenders, a true relationship with age may exist. However, it may be disguised by 'age on offending' history being confounded with some other unknown variable (e.g., type of offence). In fact, the findings of the studies included in this review suggest that offender typology may moderate the relationship between age and sexual recidivism, with child molesters being more persistent offenders than rapists.

In line with previous meta-analysis (e.g., Hanson & Bussiere, 1998), this systematic review suggests that older sex offenders generally pose less of a recidivism risk than their younger counterparts. However, given the disparate findings it is beyond the scope of this paper to determine, with any certainty, the critical age of desistance from sexual offending. That is if one even exists at all. Desistance is likely influenced by an aetiology of factors including age, typology, actuarial risk, and offending history. As such, each of-

fender's risk should be assessed on an individual basis. Although age should be considered in the decision-making process, it should not be considered in isolation.

Limitations of the Reviewed Studies

Overall, the quality of the reviewed studies was good. However, there were several inherent biases present. The first of these was a measurement bias. Definitions of the outcome measure varied across studies. More than half of the studies (63.6%) used reconviction as the outcome measure. Other studies used rearrest, and post-release charges. This limits the comparability of the results and may account for some of the variability in the findings. These definitions are also problematic in that they rely upon official records. Many sexual offences are believed to go undetected and therefore would never appear on these records. This results in recidivism rates being sorely underestimated. A phenomenon that is likely perpetuated amongst the ageing population given the public's far greater reluctance to report the crimes of the elderly (Thornton, 2006). Comparability of the results was further confounded by variations in age bands and the length of the follow-up period. Almost all the studies (91.0%) had a mean follow-up of at least five years. However, this fell to 36.0% at ten years.

The review only included published research. Although this ensured that all the included studies had been peer-reviewed, it left the review open to publication bias. Publication bias reduces the validity of the systematic review. The recidivism rates reported in the review may not be fully representative of the primary research in this area, as the findings of unpublished studies may differ from those of the included studies. The review was also subject to a language bias. Five non-English language publications were excluded from the review due to time constraints. The review treated all studies as independent, despite some potential but uncertain overlap in the samples. This was the result of study authors not always stating clearly whether their sample had been used in previous research. It is therefore possible that the number of participants in the review was overestimated, which may have impacted upon the findings pertaining to recidivism. Readers should keep this is mind when interpreting the conclusions of the systematic review.

Difficulties also arose in relation to the composition of the samples of the included studies. Ethnicity was reported infrequently. Where this information was provided 'caucasians' were overrepresented. Given the lack of information and sample bias it is unclear as to which ethnic backgrounds the findings can be applied. Previous research has found that recidivism rates can vary across cultures (Olver et al., 2018). In many of the studies the age bands were also not evenly distributed, with the older age bands often comprising of far fewer participants. Thornton's study (2006), for example, only included 23 offenders in the oldest age band. However, this is likely an issue inherent in research pertaining to the older offender. This review suggest that older sex offenders generally have lower recidivism rates than their younger counterparts. Thus, accruing a comparable sample size is far more challenging as the pool of potential offenders is far smaller. In terms of the ageing offender, an issue this paper does not resolve, and one that is particularly relevant in the current climate, is whether those convicted of 'historic' (often also called 'non-recent') sexual offences pose a similar risk to those convicted of a more recent offence. None of the

studies included in the review appeared to make this important distinction. This would be a very interesting avenue for future research given recent campaigns such as 'Operation Yewtree' in the UK, which specifically sought to examine non-recent sex offending and bring offenders to justice.

Conclusions and Recommendations

In conclusion, the findings of this systematic review suggest that older sex offenders generally have lower rates of sexual recidivism than their younger peers. However, there appear to be several other factors, including offender typology, actuarial risk, and criminal history, that can moderate this relationship. Due to these factors, it makes it very difficult to determine, with any certainty, the critical age of desistance from sexual offending. Given the importance of this in terms of case management it is recommended that future research explore this further. Future research should attempt to address the limitations of previous studies by analysing a large, heterogeneous sample of ageing sex offenders (in respect to actuarial risk, criminal history, offender typology, recency of index offence and ethnicity), being clear on age-banding, and using as matched a control (younger) group of sex offenders as possible. This should enable as much information as possible to be gathered about the interplay of factors that lead to reoffending amongst this population. This should assist practitioners in making defensible decisions regarding offender risk and treatment. Based on the findings of this review, age should be considered when making these decisions. That being said, a blanket approach should not be taken as there appears to be a small proportion of offenders, over the age of 50, who present a very high risk of sexual reoffending.

DECLARATION OF INTEREST STATEMENT

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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Date Received: 01/2019
Date Accepted: 11/2020

Suggested citation: Smethurst, A.J., Bamford, J., & Tully, R. (2021). A Systematic Review of Recidivism Rates of Older Male Sex Offenders. [Electronic Version]. *Applied Psychology in Criminal Justice,* 16(1), 23-51.

APPENDIX A. SEARCH SYNTAX

OVID: PsycINFO (3rd January 2018)

1. sex* offen*.mp. (14,498)
2. exp sex offenses/ (28,419)
3. exp child abuse/or exp sexual abuse/or sex* abuse.mp. (53,383)
4. exp rape/or acquaintance rape.m.p. or rape.mp. (10,054)
5. sex* assault.mp. (344)
6. pedophilia.m.p. or child molest*.mp. (2,776)
7. paedophilia.mp. or exp paraphilias/ (8,405)
8. recidivism.m.p. or reconvict*.mp. (8,461)
9. reoffen*.mp. (1,246)
10. age*.mp. or old*.mp. or elder*.mp. (1,312,509)

11. exp aging/or geriatric.mp. or senior.mp. (145,264)
12. 1 or 2 or 3 or 4 or 5 or 6 or 7 (68,975)
13. 8 or 9 (8,964)
14. 10 or 11 (1,342,457)
15. 12 and 13 and 14 (695)
16. limit 15 to yr = "1980-current" (673)

OVID: MEDLINE (3rd January 2018)

1. sex* offen*.mp. (8,823)
2. exp sex offenses/ (20,982)
3. exp child abuse/ (27,303)
4. rape.mp. or acquaintance rape.m.p. (10,086)
5. sex* assault.mp. or sex* abuse.m.p. (20,941)
6. pedophilia.m.p. or child molest*.mp. (1,235)
7. exp paraphilic disorders (5,116)
8. recidivism.m.p. or reconvict*.m.p.(3,147)
9. reoffen*.mp. (421)
10. age*.mp. or old*m.p. or elder*m.p. (8,480,697)
11. exp aging/ (224,278)
12. retir*.mp. or geriatric.mp. or senior.mp. (156,887)
13. 1 or 2 or 3 or 4 or 5 or 6 or 7 (53,035)
14. 8 or 9 (3,370)
15. 10 or 11 or 12 (8,575,060)
16. 13 and 14 and 15 (350)
16. limit 15 to yr = "1980-current" (348)

OVID:EMBASE (3rd January 2018)

1. sex* offen*.mp. (9,274)
2. exp child abuse/ (37,176)
3. exp sexual abuse/ (22,787)
4. exp rape/ (7,637)
5. sex* assault.mp. or sex* abuse.mp. (80,534)
6. pedophilia.m.p. or child molest*.mp. (3,069)
7. paedophilia.mp. or paraphilias.m.p (1,481)
8. recidivism.m.p. or reconvict*.mp. (12,416)
9. reoffen*.mp. (1979)
10. age*.mp. or old*.mp. or elder*.mp. or retir*.mp. or geriatric.mp. or senior.mp. (15,178,287)
11. exp aged/ (2,910,857)
12. 1 or 2 or 3 or 4 or 5 or 6 or 7 (110,175)
13. 8 or 9 (13,219)
14. 10 or 11 (15,178,302)
15. 12 and 13 and 14 (2295)
16. limit 15 to yr = "1980-current" (2295)

Web of Science (Science Citation Index Expanded (SCI-EXPANDED); Social Sciences Citation Index (SSCI); Arts and Humanities Citation Index (A&HCI); Conference Proceedings Citation Index — Science (CPCI-S); Conference Proceedings Citation Index — Social Science and Humanities (CPCI-SSH); 1980–2018) (3rd January 2018)

1. TS= ("sex* offen*" OR "child abuse" OR "sex* abuse" OR paedophilia OR rape OR "sex* assault" OR paraphili*) Databases=SCI-EXPANDED, SSCI, A&HCI, CPCI-S, CPCI-SSH Timespan=1980–2018 Lemmatization=On (59,032)
2. TS= (recidivism OR reconviction OR reoffen*) Databases=SCI-EXPANDED, SSCI, A&HCI, CPCI-S, CPCI-SSH Timespan=1980–2018 Lemmatization=On (7,557)
3. TS= (age* OR old* OR elder* OR retir* OR geriatric or senior) Databases=SCI-EXPANDED, SSCI, A&HCI, CPCI-S, CPCI-SSH Timespan=1980–2018 Lemmatization=On (4,641,110)
4. #3 AND #2 AND #1 Databases=SCI-EXPANDED, SSCI, A&HCI, CPCI-S, CPCI-SSH Timespan=1980–2018 Lemmatization=On (357)

Applied Social Sciences Index and Abstract (ASSIA; 1980-current date) (3rd January 2018)

1. sex* offen*.mp. (12,948)
2. exp sex offending/ (48)
3. exp child abuse/or exp sexual abuse/or sex* abuse.mp. (34,905)
4. exp rape/or acquaintance rape.m.p. or rape.mp. (7,777)
5. exp sexual assault/ or exp sexual deviance/ or sex* assault.mp. (10,259)
6. pedophilia.m.p. or child molest*.mp. (1,827)
7. paedophilia.mp. or exp paraphilia/ (668)
8. exp recidivism/ or exp reconviction/ or reconvict*.mp. (2,581)
9. exp reoffending/ or reoffen*.mp. (1,303)
10. age*.mp. or old*.mp. or elder*.mp. or retir*.mp. (349, 953)
11. exp aging/ or geriatric.mp. or senior.mp. (50,864)
12. 1 or 2 or 3 or 4 or 5 or 6 or 7 (47,113)
13. 8 or 9 (3,310)
14. 10 or 11 (360,862)
15. 12 and 13 and 14 (614)
16. limit 15 to yr = "1980-current" (575)

Cochrane Central (1980-2018) (2nd January 2018)

1. sex* offen*.mp. (278)
2. exp sex offenses/ (443)
3. exp child abuse/ (532)
4. exp rape/ (107)

5. sex* abuse.mp. or "rape".mp. or "acquaintance rape".mp. or sex* assault.mp. (1709)
6. exp pedophilia/ (15)
7. exp paraphilic disorders/ (39)
8. child molest*.mp. or "paedophilia".mp. (32)
9. "recidivism".m.p. or reconvict*.mp. (288)
10. reoffen*.mp. (36)
11. age*.mp. or old*.mp. or elder*.mp. (601,643)
12. retir*.mp. or "geriatric".mp. or "senior".mp. (8152)
13. 1 or 2 or 3 or 4 or 5 or 6 or 7 or 8 (2148)
14. 9 or 10 (311)
15. 11 or 12 (603,169)
16. 12 and 13 and 14 (18)
17. limit 15 to yr = "1980-current" (18)

APPENDIX B. INCLUSION / EXCLUSION FORM

Full reference:

Inclusion Criteria	Met?	Comments
Population:		
• Adult male?	Yes/No	
• AND		
• Sexual offender?	Yes/No	
Exposure:		Age bands?
• 50+ age band included in study?	Yes/No	
Outcome:		How measured?
• Reconviction?	Yes/No	
• Re-arrest?		
• Self-report?		
• New charge?		
• Re-imprisonment?		
• Re-admission?		
Study type:		Which type?
• Case control?	Yes/No	
• Cohort?		
Exclusion:		
• Not an opinion paper	Yes/No	
• Not an editorial		
• Not a review		
Conclusion:	Included/excluded	

APPENDIX C. RELEVANT STUDIES EXCLUDED

Study	Reason for exclusion
Amirault & Lussier (2011)	Exposure
Babchishin, Hanson, & Blais (2016)	Exposure
Barbaree, Langton, Blanchard, & Boer (2008)	Exposure
Barbaree, Langton, Blanchard, & Cantor (2009)	Minimum threshold criteria
Barbaree & Marshall (1988)	Exposure
Bench & Allen (2013)	Exposure
Bengston & Lund (2008)	Non-English language not accessible
Boccaccini, Murrie, Caperton, & Hawes (2009)	Exposure
Broadhurst & Maller (1992)	Exposure
Burt, Olver, & Wong (2016)	Population and exposure
Cann, Falshaw, & Friendship (2004)	Exposure
Cockram (2005)	Population and exposure
Coid, Hickey, Kahtan, Zhang, & Yang (2007)	Population and exposure
Craig (2011)	Exposure
Dahle, Janka, Gallasch, & Lehmann (2008)	Non-English language not accessible
Dahle, Janka, Gallasch-Nemitz, & Lehmann (2009)	Non-English language not accessible
Dickey, Nussbaum, Chevolleau, & Davidson (2002)	Exposure
Dixon (2010)	Unpublished dissertation not accessible
Eher, Schilling, Haubner-MacLean, Jahn, & Rettenberger (2012)	Non-English language not accessible
Eke, Seto, & Williams (2011)	Exposure
Escarela, Francis, & Soothill (2000)	Exposure
Farrington, Harada, Shinkai, & Moriya (2015)	Exposure
Firestone, Bradford, McCoy, Greenberg, Curry, & Larose (2000)	Exposure
Firestone, Bradford, McCoy, Greenberg, Larose, & Curry (1998)	Exposure
Firestone, Bradford, McCoy, Greenberg, Larose & Curry (1999)	Exposure
Francis, Harris, Wallace, Knight, & Soothill (2014)	Exposure
Freeman (2007)	Exposure
Hanson (1998)	Population and exposure
Hanson (2002)	Minimum threshold criteria
Hanson (2006)	Potential sample cross-over
Hanson, Harris Letourneau, Helmus, & Thornton (2018)	Exposure
Hanson, Scott, & Steffy (1995)	Exposure
Hanson, Steffy, & Gauthier (1993)	Exposure
Harris & Rice (2007)	Population and exposure

Study	Reason for exclusion
Heller & Ehrlich (1984)	Unobtainable
Helmus, Thornton, Hanson, & Babchishin (2012)	Potential sample cross-over
Hill, Habermann, Klusmann, Berner, & Briken (2008)	Exposure
Janka, Gallasch-Nemitz, & Dahle (2011)	Non-English language not accessible
Lampley (2017)	Unpublished dissertation not accessible
Langevin & Curnoe (2012)	Exposure
Langevin & Curnoe (2011)	Exposure
Levenson, Sandler, & Freeman (2012)	Exposure
Lindsay, Elliot, & Astell (2004)	Exposure
Lussier, Gress, Deslauriers-Varin & Amirault (2014)	Exposure
Lussier & McCuish (2016)	Exposure
Marshall & Barbaree (1988)	Exposure
McCoy (1998)	Unpublished dissertation not accessible
Monahan, Skeem, & Lowenkamp (2017)	Exposure
Nugent (2000)	Exposure
Olver, Nicholiachuk, Gu, & Wong (2013)	Potential sample cross-over
Olver & Wong (2015)	Population and exposure
Packard (2002)	Missing data
Patrick & Marsh (2009)	Exposure
Porter, Birt, & Boer (2001)	Population
Prouix, Pellerin, Paradis, McKibben, Aubut, & Ouimet (1997)	Exposure
Redondo, Luque, Navarro, & Martinez (2007)	Exposure
Rettenberger, Haubner-Maclean, & Eher (2013)	Potential sample cross-over
Rice, Quinsey, & Harris (1991)	Exposure
Rice & Harris (2014)	Unobtainable
Scalora & Garbin (2003)	Exposure
Seto & Eke (2015)	Exposure
Soothill, Harman, Francis, & Kirby, (2005)	Exposure
Spruit, van der Put, Gubbels, & Bindels (2017)	Population and exposure
Wakeling, Freemantle, Beech, & Elliott (2011)	Exposure
Wexler (2007)	Unpublished dissertation not accessible
Wollert, Cramer, Waggoner, Skelton, & Vess (2010)	Potential sample cross-over
Zgoba, Sager, & Witt (2003)	Exposure

APPENDIX D. QUALITY ASSESSMENT FORM: COHORT

Source database:
Full reference:

Question	Score Y(2) P(1) N(0) U	Comments
Were the study objectives clear?		
Will a cohort study address the objectives?		
Selection bias		
Was the cohort recruited in an acceptable way?		
Was the cohort representative?		
Do they have a comparison group (i.e. younger age band)?		
Measurement bias		
Was the exposure clearly defined?		
Was the outcome measure clearly stated? (Recidivism data source and definitions clearly stated)		
Was the outcome assessed uniformly across the sample (same procedure)?		
Was the follow up time long enough? (minimum 2 years)		
Was missing information dealt with appropriately?		
Attrition		
Was drop-out/non-completion rate recorded? (i.e. death)		
Was drop-out/non-completion discussed?		
Results		
Are the results reported? What are the results?		
Are the results reliable?		
Do results fit with other available evidence?		
Can the results be generalized?		
Were confounding factors discussed/taken into account (i.e. level of risk)?		

Quality score =
No. Unclear =
Quality assessment forms adapted from the Critical Appraisal Skills Programme (CASP, 2004). Studies were scored as follows in relation to each question;
0 = condition not met
1 = condition partially met
2 = condition fully met
U = unclear/insufficient information provided

APPENDIX E. QUALITY ASSESSMENT FORM: CASE-CONTROL

Source database:
Full reference:

Question	Score Y(2) P(1) N(0) U	Comments
Were the study objectives clear?		
Will a case control study address the objectives?		
Selection bias		
Were cases and controls randomly selected from the population?		
Were cases reliably assessed as such?		
Were controls reliably assessed as such?		
Were cases clearly defined?		
Were controls clearly defined?		
Were demographics of cases and controls clear?		
Were demographics of cases and controls comparable?		
Do they have a comparison group (i.e. younger age band)?		
Measurement bias		
Was the exposure clearly defined? (i.e. age bands)		
Was the outcome measure clearly stated? (Recidivism data source and definitions clearly stated)		
Was the outcome assessed uniformly across the sample (same procedure)?		
Was the follow up time long enough? (minimum 2 years)		
Was missing information dealt with appropriately?		
Attrition		
Was drop-out/non-completion rate recorded? (i.e. death)		
Was drop-out/non-completion discussed?		
Results		
Are the results reported? What are the results?		
Are the results reliable?		
Do the results fit with other available evidence?		
Can the results be generalised?		
Were confounding factors discussed/taken into account (i.e. level of risk)?		

Quality score =
No. Unclear =
Quality assessment forms adapted from the Critical Appraisal Skills Programme (CASP, 2006). Studies were scored as follows in relation to each question:
0 = condition not met
1 = condition partially met
2 = condition fully met
U = unclear/insufficient information provided

APPENDIX F. DATA EXTRACTION FORM

Source database:
Full reference:

Study type?
Location(s) of study/sample?
Age bands included:

- Exposure?
- Comparisons?

Total sample size?
Sample status e.g. subgroups (rapist/child molester)?
Risk group if applicable?
Definition of recidivism/outcome measure(s)?
(e.g. reconviction/ re-arrest /self-report)
Length of follow-up?

Re-offence rate over 50 age band:

- No/% re-offend?
- No/%not re-offend?

Re-offence rate other age bands:

- No/% re-offend?
- No/%not re-offend?

Quality assessment score?
Clarity score?
