

1 **Title:** Ageing patients in forensic psychiatric settings: A review of the
2 literature

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5 **Running head:** Review on ageing forensic psychiatric patients
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44 **Abstract**

45

46 Objectives. The prevalence of ageing patients in forensic psychiatric settings is increasing.
47 However, limited research has reported around this population. The aim of this scoping
48 review is to synthesise the current evidence around ageing forensic psychiatric patients.

49

50 Methods. The literature was searched through four databases and Google searches. The
51 identified outputs were screened for suitability and assessed for quality. Quantitative data
52 were extracted and analysed on SPSS; qualitative data were extracted onto NVivo and
53 analysed through inductive thematic analysis.

54

55 Results. Seven studies were included in the review. Quantitative results reported around
56 demographics, service contact, offending patterns, mental and physical health of ageing
57 patients. Qualitative findings focused on age-friendliness of services, staff-patient rapport,
58 activities, security issues and discharge planning.

59

60 Conclusions. Ageing forensic psychiatric patients present with complex and unique needs in
61 relation to treatment, activities, mental, physical and support. Further research looking at
62 individual patients' needs is paramount to inform policy development and good practice in
63 this area.

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67 **Keywords:** Forensic psychiatry, ageing, older patients, scoping review

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71 **Key points**

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- 73 • Despite the increasing prevalence, there is limited literature reporting around ageing
74 forensic psychiatric patients. We reviewed and synthesised the international evidence
75 available.
- 76 • We gathered, analysed and reported data by using systematic methodologies and
77 reporting systems.
- 78 • We included seven studies, which cover (through quantitative and qualitative data) a
79 range of topics, including patients' health, offences, contact with services, treatment,
80 and issues of security and service age-friendliness.
- 81 • We derived ethical, financial and legal implications from our findings, emphasising
82 the need for patient-centred research to further advancements in policy and practice.

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92 Introduction

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94 Each year, in the United Kingdom, people over 60 years are responsible for about 11
95 homicides and 300 sexual offences¹. Ageing offenders who have committed an offence and
96 who have a mental disorder may be diverted from the justice system to forensic mental health
97 services, which in the UK context, also accommodate patients with no index offence but who
98 still pose an immediate threat to their own safety or the safety of others.

99

100 Wong, Lumsden, Fenton, and Fenwick² reported, in a study from Broadmoor Hospital, one of
101 three high security hospitals in England and Wales, that only 8% of all patients were over 50
102 years old. However, given the recent changes in societal attitudes toward older offenders (i.e.
103 older offenders are treated less leniently than in the past, in particular when they commit
104 sexual offences)³⁻⁵ and the phenomenon of an ageing population⁶ -among other factors- older
105 patients in secure settings have now come to account for a higher share of the total
106 population. In a national multicentre study of long-stay patients in medium and high secure
107 settings in England, around 30% were aged over 50 years old⁷. Similar prevalence rates have
108 been reported in other developed countries. In a recent study we carried out in Italian forensic
109 psychiatric settings, we found that one in five patients was over the age of 50⁸.

110

111 Ageing forensic psychiatric patients present with unique mental, physical and social care
112 needs, which may differ from those of the younger patients because of the ageing factor, from
113 those of older people in the community, given the added challenges of life in forensic
114 psychiatric settings^{9,10} and from those of ageing prisoners, owing to their mental health status.
115 This renders knowledge and expertise acquired with similar populations inapplicable and
116 specialist research in this area essential¹¹ to ensure equal opportunities for recovery in ageing
117 forensic psychiatric patients.

118

119 Unfortunately, despite increasing prevalence rates, limited evidence exists at present around
120 ageing patients in the forensic psychiatric system and no review has been published in this
121 area. This scoping review aims to bridge this gap and investigate the status of research around
122 ageing forensic psychiatric patients. The guiding research question of this work is: *'What is
123 known about ageing patients living in secure forensic psychiatric setting?'*

124 Methods

125

126 We deemed a scoping review the most suitable methodology to answer our research question.
127 According to Mays, Roberts and Popay¹², scoping reviews are ideal where *"an area is
128 complex or has not been reviewed comprehensively before"*.

129

130 Arksey and O'Malley¹³ identified five main steps in scoping reviews: (i) Setting the research
131 question, which needs to be broad in scope, so as to allow identification of all the relevant
132 literature in the area of interest; (ii) retrieving the sources; (iii) undertaking a systematic
133 process of appraisal and selection of sources relevant to answer the question; (iv) charting the
134 data (i.e. systematic extraction and reporting in tables); and (v) collating, summarising and
135 reporting the results. These guidelines were followed in our scoping review.

136

137 Search strategy

138

139 Our search strategy was developed using the PICO (Population, Intervention, Comparison,
140 Outcomes) approach. This tool enabled us to identify three domains, from which we derived

141 search terms: (i). The age domain, including terms such as ‘aging’, ‘older’, ‘elderly’,
142 ‘ageing’; (ii). The setting domain, including terms such as ‘forensic psychiatry’, ‘high
143 security’, ‘medium security’; (iii). The mental health domain, including terms such as ‘mental
144 disorder’, ‘psychiatric disorder’, ‘mental health’.

145
146 The electronic searches were run on four databases, covering the range of relevant disciplines
147 in this field: PsycInfo for Psychology; Medline and Embase for Medicine and Psychiatry; and
148 the International Bibliography of Social Sciences for Sociology. We tried to keep our search
149 strategy consistent across databases as much as possible, although some minor modifications
150 were necessary, given the unique characteristics of the databases. To identify further relevant
151 literature, we also searched Google using the same strategy and inspected the first 100 results.
152

153 Selection of papers

154

155 Inclusion criteria:

156

- 157 1. Study on patients aged 50+ in forensic psychiatric units. Although we acknowledge
158 that the process of ageing varies across different individuals, that feeling “older” is
159 subjective and that no consensus exists among researchers around a cut-off for
160 inclusion in the older age category, we used 50 years old as criterion for this review.
161 This was because people in restrictive settings (e.g. prison) have been evidenced to
162 undergo a quicker ageing process of around ten years compared to the normative
163 population, given their frequent histories of health neglect and substance abuse^{14,15,16}.
164 Given that 60 years old is generally used in general old age research, we deemed the
165 50-year-old cut-off appropriate.
- 166 2. Research focusing on secure forensic psychiatric settings (low, medium or high
167 security).
- 168 3. Studies collecting primary data with a primary aim to report on any aspect related to
169 ageing forensic psychiatric patients. This includes both quantitative (e.g. prevalence
170 rates of psychiatric disorder) and qualitative (e.g. feedback on service experience)
171 data. We chose not to discriminate a priori on any type of data at the study selection
172 phase, given that we expected to retrieve a very limited number of studies. In
173 addition, we aimed to report on the overall status of research around this population
174 and therefore we deliberately kept a broad focus for our investigation.
- 175 4. Study published in any language and year.

176

177 Exclusion criteria:

178

- 179 1. Non-empirical research (i.e. not collecting primary data) such as editorials,
180 correspondence, discussion papers, literature reviews and book chapters not based on
181 original data.
- 182 2. Any research conducted in non-secure psychiatric settings, such as in general
183 psychiatry or in community forensic psychiatric care
- 184 3. Out of scope (i.e. not around ageing forensic psychiatric patients).

185

186 Quality screening

187

188 Because of the limited number of articles we retrieved, we did not exclude any on the
189 grounds of quality. However, to assess the quality of our sources, we undertook a quality
190 screening.

191 In the process, we adopted the quality scoring system used in a dementia prevalence study by
192 Prince et al.¹⁷, attributing a numerical score for items: (i) number of participants; (ii) sex
193 representativeness; (iii) number of investigation sites; (iv) number of assessments undertaken;
194 and (v) response rates. We removed the item on response rate, as the information was not
195 reported in most studies and because most studies were retrospective in nature, rendering
196 response rate inapplicable.

197

198 Data extraction

199

200 Quantitative data around the sample of ageing patients were reported in all the included
201 studies. Quantitative data were extracted onto IBM SPSS Statistics version 22¹⁸. At the stage
202 of data extraction, we extracted any type of quantitative data provided in the studies. We
203 chose not to discard any data at this stage, as this was in line with the explorative aim of our
204 review.

205

206 Qualitative information was reported in one study only. Relevant data were extracted onto
207 NVivo 11¹⁹ and used to supplement quantitative results.

208

209 Data analysis

210

211 Given that all studies reported data on prevalence, we initially aimed for a meta-analysis to
212 derive aggregated prevalence rates for a variety of demographic, clinical, social and treatment
213 characteristics. Upon extracting data onto SPSS, however, we concluded that such analysis
214 was not feasible, given the heterogeneity of reported data.

215

216 We therefore concentrated on the following five variables, as these were reflected in several
217 or all of the studies: Demographics, contact with services, offending behaviour, mental health
218 and physical health. The qualitative data were summarised from the only one study that
219 reported them.

220

221 Results

222

223 The selection process is reported in Figure 1 through a PRISMA flow diagram²⁰. The
224 database search identified 2,840 articles (PsycInfo: 371; Medline: 796; Embase: 1237; IBSS:
225 436); the Google search identified 26 additional records. A total of 2,866 articles were
226 screened. Of these, we excluded 2,829 records, their title or abstract being not relevant
227 (n=2,617) or because of duplicates (n=212). The remaining articles (n=37) were assessed for
228 eligibility against the inclusion/exclusion criteria.

229

230 Of the 37 full-text articles that we assessed for eligibility against the inclusion/exclusion
231 criteria, we excluded 28 records, of which 13 were not empirical, 12 were in non-forensic
232 psychiatric settings and three were out of scope for other reasons. In addition, we were not
233 able to gain access to the full text of 2 articles. We therefore included a final number of 7
234 articles in the analysis.

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239 Study characteristics

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241 The studies were similar in many of their characteristics. All seven articles were from the
242 decade 2000-2010, showing a potentially decreased research interest over the last seven
243 years, despite the increasing number of ageing patients in secure settings. All studies were
244 from the United Kingdom, with the exception of one from the United States of America²¹,
245 despite our search strategy being inclusive of articles published in any language. All studies
246 were published in peer-reviewed journals.

247

248 In terms of design, six studies were retrospective cohort surveys, reporting previously
249 collected quantitative data. The authors gained access to the data through a database or
250 through the clinical notes of the patients. We acknowledge the novelty of the study by
251 Yorston & Taylor²², which was the only one employing also a qualitative methodology of
252 investigation and which can therefore be considered a pioneering example of qualitative
253 research with ageing forensic psychiatric patients. Only one study²³ collected data in multiple
254 sites, while the others were single-site studies. In the former case, both medium and high
255 security settings were included, in the latter, either type of security only. In all of the UK
256 studies, no low security units were included. For the US study²¹, the level of security was
257 unspecified.

258

259 While all studies opted for different cut-off ages for inclusion in the “older” age category,
260 most did not provide any explanation. Only two studies stated their rationale^{23,25}, a choice
261 that we found helpful, given the ongoing debate on when a patient is to be considered
262 “older”.

263

264 All study characteristics are reported in Table 2.

265

266 Quality Appraisal

267

268 Having similar characteristics, the studies also shared similar quality, with overall quality
269 scores ranging from 4 to 6 (Out of a maximum of 8). We note that all studies, except for one
270 that does not report this information²¹, included female patients also in their investigation,
271 despite women representing the minority of patients. This is in contrast with research in other
272 restrictive settings (i.e. prisons), which traditionally focus on male samples²⁴.

273

274 Details of the quality assessments are reported in Table 1.

275

276 *Enter Table 1 here*

277

278 Topic 1: Demographic data

279

280 Details on all variables for each study are included in the supplementary material at the end
281 of the document. The number of participants included ranged from 11 to 83. The age cut-off
282 varied greatly, from 55 years old²⁵ to 65 years old^{26,27}. Participants were mostly males, with
283 prevalence rates ranging from 90.4% to 96.9%. The ratio between male and female patients
284 ranged from 9:1 to 31:1.

285

286 In relation to marital status, the largest proportion of participants were single, peaking at 73%
287 of the total sample in the study by Shah²⁸. Data on socio-economic status (SES) were only
288 reported by Lightbody, Gow and Gibb²⁵, who evidenced that most of the patients had lower

289 SES and tended to have relatively low levels of formal education. In terms of ethnic
290 composition, Whites were most prevalent in all studies except in the US study²¹, which
291 reported 54.2% as non-Whites. Age categories were reported in only one study²³, which
292 found that the large majority (85%) of participants were aged between 60 and 69 years old.
293 The overall mean age, reported in three studies ranged from 65²² to 70 years old²³.

294

295 Topic 2: Contact with services

296

297 The length of stay varied greatly across studies, but in all cases the patients spent a very long
298 time in secure facilities, ranging from an average of 14²⁵ to 26 years²⁸. In terms of admission
299 source, prison was the most frequent one, with roughly one in three patients^{23,25,26}. Most
300 patients were admitted with criminal charges, with prevalence ranging from 89%²³ to
301 55.2%²⁵. Sixty-one²⁵ of the patients were admitted in secure services at a younger age and
302 had graduated into seniority whilst in forensic psychiatric care, due to the seriousness of their
303 condition / offence.

304

305 In relation to admission history, the majority of patients (65%) had previous psychiatric
306 admission²³. Yorston and Taylor²² reported that the number of previous psychiatric
307 admissions averaged two (range 0-10). According to Lightbody, Gow and Gibb²⁵, 77.8% of
308 patients had previous use of general psychiatric services and 58.3% of forensic services. Data
309 on discharge evidenced that 27.8% were discharged to other forensic psychiatric services
310 (25% of which to lower secure services) or to general psychiatric services (2.8%), and that
311 8.3% were referred to court²⁵.

312

313 Topic 3: Offending behaviour

314

315 Most patients (82% and 72% respectively) had an offending history^{25,28}. The victims of the
316 current index offence were more frequently acquaintances of the perpetrator (39%) than
317 strangers (21%), including their partners (18%), siblings (8%), parents (3%) and other people
318 they knew (10%)²¹.

319

320 Homicide was the primary offence leading to admission^{22,23,25,28}, but sexual offences were
321 also quite prevalent, peaking at 56%²⁶ and 47%²⁷. Sexual offences most likely occurred at
322 home (72%) and minors and females were the most frequent victims, with a prevalence of
323 100% in two studies for the former group^{26,27} and of 65% for the latter²⁷. The perpetrators
324 were all males (100%)²⁶. Indecent exposure accounted for 67% of the sexual offences²⁶.

325

326 Topic 4: Mental health

327

328 All studies reported point prevalence in relation to mental disorder except one²³, whose data
329 relate to life time prevalence instead. Psychotic illness, including schizophrenia, schizotypal,
330 and delusional disorder were most prevalent, peaking at 91.6% of the patients²². Personality
331 disorder was present in rates ranging from 3%²⁶ to 16.6%²², and depression affected between
332 6%²⁶ and 42% (lifetime prevalence)²³.

333

334 In relation to dementia, the highest prevalence was reported by Paradis, Broner, Maher, and
335 O'Rourke²¹ (40% of which around 80% Alzheimer's). Two studies reported prevalence
336 below the 10% mark^{21,27}. Alcohol abuse prevalence ranged from 3% to 6%^{21,26}. However, the
337 rates were much higher if regular consumption was considered (41% to 55.6%)^{25,26}.

338

339 Data on pharmacological treatment for psychiatric illness were only reported in one study²⁸.
340 The author found that 82% of the patients were prescribed antipsychotics, 55% drugs with
341 anticholinergic properties, 27% mood stabilisers, and 9% benzodiazepines. On average, each
342 patient was administered two psychotropic medications.

343

344 [Topic 5: Physical health](#)

345

346 Data on physical health were more sparsely reported. Curtice, Parker, Wismayer, and
347 Tomison²⁶ found that 43.8% of the patient suffered from one health problem and 15.6% from
348 two or more. These figures added up to almost 60% of the total. On average, each patient had
349 one to two diagnoses of physical illness upon admission, which increased to more than two
350 upon discharge^{25,28}. This affected the number of medications administered, which averaged
351 from three to four on admission to six on discharge^{25,28}.

352

353 Mobility problems were quite prevalent, affecting up to 61.1% of the ageing patients in one
354 study²⁵. One-fifth of the sample suffered from sensory impairment, including hearing (16%)
355 and eyesight problems (6%)²⁶. Cardiac disease, hypertension and diabetes were also
356 widespread, with prevalence of 23%, 15%, and 13% respectively²¹.

357

358 [Summary of qualitative findings](#)

359

360 The qualitative findings are based on the study by Yorston and Taylor²³. Both the patients
361 and the members of staff commented on whether the potential development of dedicated units
362 for the care of ageing patients would be welcome. Several arguments were offered in support
363 of such service. The patients complained that younger patients in the current mixed
364 environment were noisy and disruptive. The members of staff added that although the risk of
365 abuse against ageing patients on the part of the younger (assaultive) ones was remote, a
366 dedicated ward for the ageing group could further reduce potential abuse/victimisation.

367

368 Another argument in support of the creation of ageing patients' wards related to the unique
369 needs of this population in relation to care, treatment and security and the barriers to
370 addressing these in the current mixed ward. For example, occupational therapists reported the
371 difficulty of introducing handrails for the benefit of the ageing patients' mobility, as these
372 would present security issues with the younger patients.

373

374 Qualitative data from this study also highlighted the importance of building good rapport
375 with the members of staff, particularly those working on the ward. The nurses seemed to play
376 a central role in promoting the emotional wellbeing of the patients, given the extended time
377 they spent daily with them. Emotional support from the nurses was found to be an important
378 coping mechanism to deal with the challenges of life in forensic psychiatric settings and
379 several patients reported their preference to talk to the nurses, as opposed to the medical staff
380 or to other patients, in times of difficulties.

381

382 Patients gave mixed feedback on the activities available within the service. Although in
383 general, the existing programme, which included age-friendly workshop and gardening
384 projects as well as educational activities, was deemed satisfactory, some patients lamented
385 that there were limited opportunities to take part. The main reasons for this were the reduced
386 availability of staff and a tighter regime of security which followed the Tilt report²⁹, an
387 independent review of all aspects of physical security carried out at all three high-security
388 hospitals in England (Ashworth, Broadmoor and Rampton), and which, as a result limited

389 movement within the facility. Patients emphasised the importance of getting off the ward to
390 boost their recovery. Restrictions on movement also affected visits from their families. In this
391 regard, the patients complained that, while in the past intimacy with their family had been
392 tolerated, it was now utterly forbidden.

393

394 Discharge from the service came to represent a highly stressful event for those ageing
395 patients who had spent a long time in the service. Several patients reported issues of
396 attachment, stating that they did not want to leave the service for the uncertainty of new
397 accommodation. These challenges were difficult to overcome and required extra effort on the
398 part of the multidisciplinary team to encourage the patient. For this reason, several members
399 of staff called for individual discharge plans tailored to the needs of ageing patients who had
400 been in the service for a long time.

401 Discussion

402

403 In this scoping review, we aimed to report on the existing empirical literature around ageing
404 patients in forensic psychiatric settings. We deem our explorative work timely and essential
405 groundwork to inform and guide the development of dedicated policy and good practice. We
406 kept the focus of our strategy quite broad, by searching for all sources reporting around this
407 population.

408

409 Our review found that ageing forensic psychiatric patients presented with a high prevalence
410 of complex psychiatric illness, in particular psychotic disorders. A large number of patients
411 were treated with drugs with anticholinergic properties, which research evidenced may
412 negatively affect cognitive functioning³⁰. Dementia was found to be highly prevalent among
413 the ageing patients, particularly in the American sample. Although these high rates may be
414 reflective of a focus on long-term care in the US context, they are nonetheless worthy of
415 attention.

416

417 All the studies reported on female patients as well. This was welcome, as thus far, research in
418 other forensic settings (e.g. prisons) often fails to include female samples²⁴, potentially
419 invalidating the generalisability of findings. Secondly, existing research evidenced that
420 female patients have unique gender-related needs and poorer health compared to male
421 patients, thus requiring adequate attention in research³¹.

422

423 Our findings also evidenced frequent previous admission to forensic psychiatric services,
424 very long-stay in secure units and mixed feelings about the benefits of the activities and
425 rehabilitation programmes currently available for the ageing patients. This all seems to
426 suggest that the unique complex needs of this populations may not be fully met in the current
427 service provision, thus requiring further debate on potential ways to improve the system, such
428 as the development of dedicated services for ageing patients.

429

430 Given that many of the challenges of older forensic psychiatric patients reflect those
431 experienced by ageing prisoners (e.g. mixing issues with younger people, age-friendliness of
432 service, release anxiety), possible service re-design can also be informed by some successful
433 initiatives undertaken in the prison system. Among the many examples available in the prison
434 literature³², buddy schemes and peer-support programmes¹⁶ (i.e. support provided by younger
435 patients to older patients in different activities of daily living) could be integrated in the
436 forensic psychiatric model to boost social inclusion and peer rapport. Modifications to
437 promote age-friendly environments (i.e. visual aids, quieter dining tables/zones)³³, as

438 pioneered in a number of UK prisons, could also be carried out in secure settings, to ensure
439 equal opportunities of service access to less physically-able patients or patients with cognitive
440 impairment/dementia.

441

442 Our review also presents important implications on ethical, legal and economic grounds. On
443 ethical grounds, the scarcity of scientific literature currently available requires further
444 research to help identify the needs of ageing patients and facilitate the implementation of
445 effective treatment plans, to grant them equal opportunities to move along the care pathway.
446 This would prevent a so-called “Warehouse effect”, the risk for forensic psychiatric
447 institutions to become “dumping grounds” for the ageing patients³⁴, particularly those who
448 develop progressive conditions (e.g. dementia) or who are terminally ill and may not require
449 high security.

450

451 On legal grounds, the United Nations Convention on the Rights of Persons with Disabilities³⁵
452 and the National Service Framework for Older People³⁶ and more recently the NICE
453 guidelines on mental wellbeing and independence in older people³⁷ recommend that all older
454 people have the right to benefit from the same type of quality care that is granted to younger
455 citizens. These policies mandate that service providers adequately attend to the needs of
456 ageing people, including those who live in forensic psychiatric settings. In terms of financial
457 implications, failure to address the ageing patients’ needs may have a negative impact on
458 public costs, given the financial burden of secure services.

459

460 This review presents with some limitations. Despite our efforts, we were only able to include
461 papers published in peer-reviewed journals. Although this ensured quality to the studies, the
462 lack of unpublished sources (e.g. academic theses) may have generated publication bias.

463

464 We found great variability in relation to the age cut-off for inclusion in the ageing patients’
465 category, showing how consensus in research still needs to be developed in this respect. The
466 variance in the age inclusion criterion affects the comparability of research data across the
467 different studies. It also prevents a meta-synthesis of the data, necessary for comparison
468 purposes with other populations in forensic settings (e.g. younger patients or prison
469 population). In line with Loeb and AbuDagga³⁸, we argue that consensus upon age cut-off
470 should be reached to facilitate advancement in research in this area.

471

472 All the articles but one were from the United Kingdom. This may be due to several reasons,
473 such as policy development (see for example, “National Service Framework for Older
474 People”³⁶), increasing the attention of social and health care researchers around older people.
475 This may also account for the fact that all the articles were from the decade 2000-2010, but
476 does not explain the absence of studies after 2010, despite the sustained effort of the
477 government to develop policy (see for example “Mental wellbeing and independence in older
478 people”³⁷) and promote research in this area.

479

480 Another possible reason for the fact that we mostly retrieved articles from the United
481 Kingdom may derive from our search terms which were in English. For our search to retrieve
482 articles from other countries, these would have needed to either have been published in
483 English or to at least have an abstract or the key words in English. None of the UK studies
484 included patients sampled from low secure settings. Given that these settings offer the
485 majority of secure beds³⁹, results from the UK studies may not be representative of the
486 overall population.

487 Most studies relied on patients' data collected by members of staff of researchers. The study
488 by Yorston and Taylor²² was the only one reporting the ageing patients' views. By giving
489 voice to the individual patients and gathering their own perspectives on the service, this study
490 represents research which needs to be sustained over time, to ensure that forensic psychiatric
491 services are geared toward the benefits of their primary stakeholders.

492 Conclusions

493

494 Our findings evidenced an urgent need to strengthen the current evidence-base around the
495 experience of ageing forensic psychiatric patients and around whether the current service is
496 meeting their individual needs⁴⁰. Feedback is crucial for service improvement and the ageing
497 patients, having lived experience of the service, can provide unique insight of the complex
498 issues surrounding the experience of ageing in forensic psychiatric settings.

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734 Figure 1. Selection of papers

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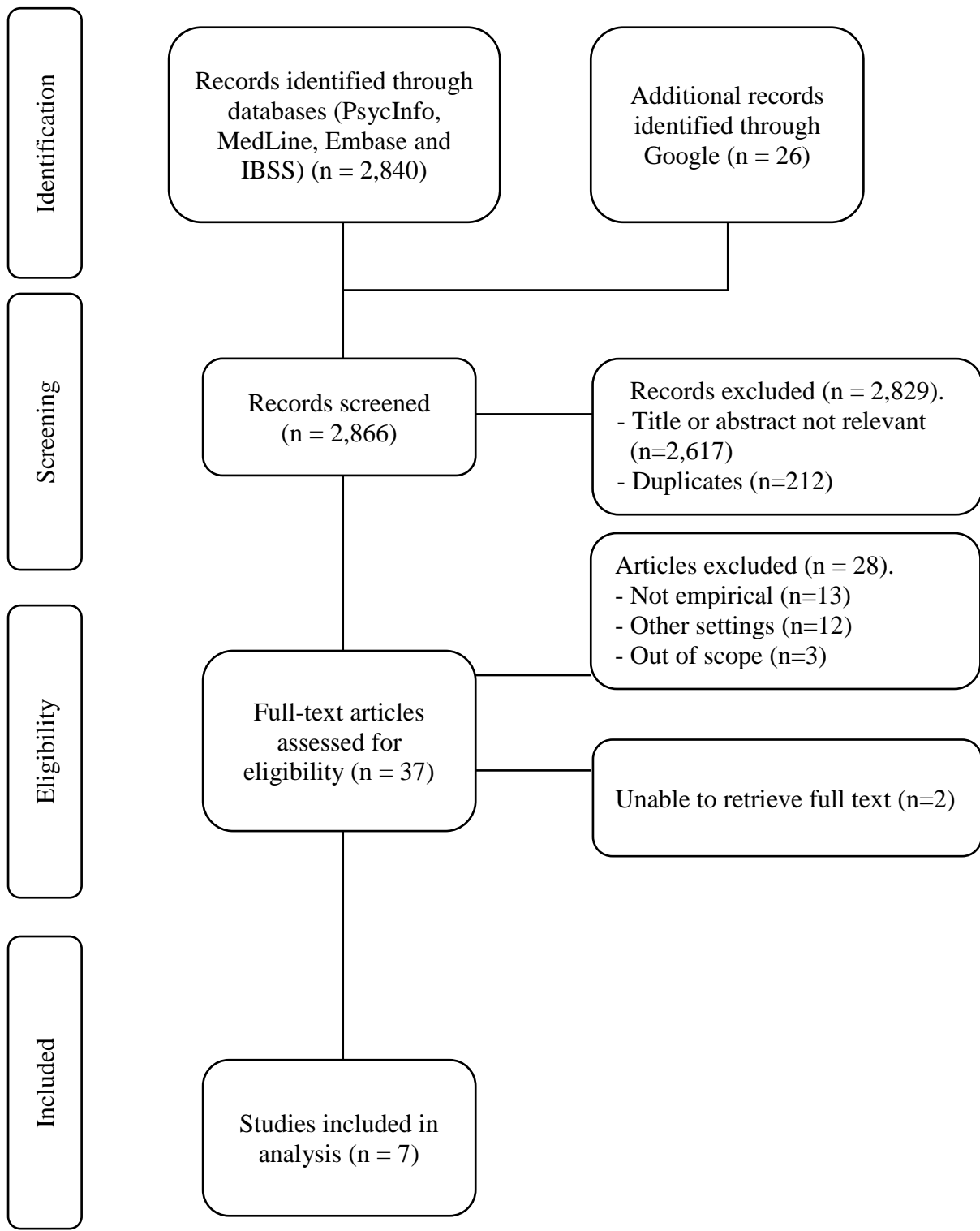


Table 1. Quality screening (Prince et al.)¹⁷

| <i>Author(s)</i> | <i>Participants</i> ¹ | <i>Sex</i> ² | <i>Sites</i> ³ | <i>Measures</i> ⁴ | <i>Total</i> |
|-------------------------------------------------|----------------------------------|-------------------------|---------------------------|------------------------------|--------------|
| <i>Coid, Fazel & Khatan</i> | 2 | 1 | 2 | 1 | 6 |
| <i>Curtice, Parker, Wismayer, & Tomison</i> | 1 | 1 | 1 | 2 | 5 |
| <i>Lightbody, Gow, & Gibb</i> | 1 | 2 | 1 | 1 | 5 |
| <i>Paradis, Broner, Maher, & O'Rourke</i> | 2 | -* | 1 | 1 | 4** |
| <i>Shah</i> | 1 | 2 | 1 | 1 | 5 |
| <i>Tomar, Treasden, & Shah</i> | 2 | 2 | 1 | 1 | 6 |
| <i>Yorston & Taylor</i> | 1 | 2 | 1 | 1 | 5 |

¹Up to 40, one point; 40+, two points

²Females below 5% of total participants, one point; females above 5% of total participants, two points

³Single-site, one point; multi-site, two points

⁴Access to clinical note OR access to database, one point; Access to clinical note AND access to database, two points

* Does not report

** One score missing

Table 2. Study characteristics

| <i>Author(s), year</i> | <i>Country</i> | <i>Design</i> | <i>Publication</i> | <i>Methodology</i> | <i>Data source</i> | <i>Site (security)</i> |
|-------------------------------------------------------|----------------|----------------------|--------------------|--------------------|------------------------|------------------------|
| <i>Coid, Fazel, & Kahtan, 2002</i> | UK | Retrospective cohort | Journal | Quantitative | Database | Multi (high + medium) |
| <i>Curtice, Parker, Wismayer, & Tomison, 2003</i> | UK | Retrospective cohort | Journal | Quantitative | Database, case notes | Single (medium) |
| <i>Lightbody, Gow, & Gibb, 2010</i> | UK | Retrospective cohort | Journal | Quantitative | Case notes | Single (high) |
| <i>Paradis, Broner, Maher, & O'Rourke, 2000</i> | USA | Retrospective cohort | Journal | Quantitative | Case notes | Single (not reported) |
| <i>Shah, 2006</i> | UK | Retrospective cohort | Journal | Quantitative | Case-notes | Single (high) |
| <i>Tomar, Treasden, & Shah, 2005</i> | UK | Retrospective cohort | Journal | Quantitative | Database | Single (medium) |
| <i>Yorston & Taylor, 2009</i> | UK | Cross-sectional | Journal | Mixed | Interviews, case notes | Single (high) |

Supplementary Table 1. Patients' sex and age

| <i>Author(s)</i> | <i>N</i> | <i>Sex</i> | | | <i>Age</i> | | | | <i>Mean</i> |
|-------------------------------------------------|----------|------------|----------|-----------|------------|------------|----------|------------|-------------|
| | | Male | Female | Inclusion | 60-69 y.o. | 70-79 y.o. | 80+ y.o. | >65 y.o. | |
| <i>Coid, Fazel, & Kahtan</i> | 61 | 58 (95.1%) | 3 (4.9%) | 60+ | 44 (85%) | 7 (13%) | 1 (2%) | 26 (42.6%) | 70.2 |
| <i>Curtice, Parker, Wismayer, & Tomison</i> | 32 | 31 (96.9%) | 1 (3.1%) | 65+ | | | | | |
| <i>Lightbody, Gow, & Gibb</i> | 36 | 34 (94.4%) | 2 (5.6%) | 55+ | | | | | |
| <i>Paradis, Broner, Maher, & O'Rourke</i> | 83 | | | 62+ | | | | | 66.7 |
| <i>Shah</i> | 11 | 10 (91%) | 1 (9%) | 60+ | | | | | |
| <i>Tomar, Treasden, & Shah</i> | 42 | 38 (90.4%) | 4 (9.6%) | 65+ | | | | | |
| <i>Yorston & Taylor</i> | 12 | 11 (91.7%) | 1 (8.3%) | 60+ | | | | | 65 |

Supplementary Table 2. Patients' ethnicity and marital status

| <i>Author(s)</i> | <i>Ethnicity</i> | | | | <i>Marital status</i> | | |
|-------------------------------------------------|------------------|------------|------------|------------|-----------------------|------------|------------------------------|
| | White | Non-white | Black | Hispanic | Married | Single | Separated, divorced, widowed |
| <i>Coid, Fazel, & Kahtan</i> | 55 (88%) | 6 (12%) | | | | 16 (31%) | |
| <i>Curtice, Parker, Wismayer, & Tomison</i> | 32 (100%) | 0 (0%) | 0 (0%) | 0 (0%) | | | |
| <i>Lightbody, Gow, & Gibb</i> | 32 (100%) | 0 (0%) | 0 (0%) | 0 (0%) | 2 (5.6%) | 21 (58.3%) | 13 (36.1%) |
| <i>Paradis, Broner, Maher, & O'Rourke</i> | 38 (45.8%) | 45 (54.2%) | 31 (37.3%) | 12 (14.4%) | | | |
| <i>Shah</i> | 6 (55%) | 3 (27%) | 3 (27%) | 0 (%) | 0 (0%) | 8 (73%) | 3 (27%) |
| <i>Yorston & Taylor</i> | 12 (100%) | 0 (0%) | 0 (0%) | 0 (0%) | | | |

Supplementary Table 3. Patients' education and living arrangement prior to admission

| <i>Author(s)</i> | <i>Education</i> | | | | <i>Living arrangement prior to admission</i> | | | | | |
|---------------------------------------------------------|-----------------------|------------------|---------------------------|----------------------|----------------------------------------------|---------------------|----------|------------|-------------|-------------|
| | School - no degree | School degree | University - no degree | University degree | Sheltered housing | Residential home | Homeless | Homeowner | Family | Alone |
| <i>Curtice, Parker, Wismayer, & Tomison</i> | | | | | 7 (22%) | 2 (6%) | | 17 (53%) | | |
| <i>Lightbody, Gow, & Gibb</i> | 20 (55.6%) | 7 (19.4%) | 1 (2.8%) | 1 (2.8%) | | | | | | |
| <i>Paradis, Broner, Maher, & O'Rourke</i> | | 8 (9.7%) | | 5 (6%) | | 2 (2%) | 5 (6%) | | 34 (41%) | 15 (18%) |
| <i>Tomar, Treasden, & Shah</i> | | | | | | 3 (7.1%) | | 11 (26.2%) | | |

Supplementary Table 4. Patients' length of stay and where the patients were staying prior to admission

| <i>Author(s)</i> | <i>Length of stay (years)</i> | <i>Source of referral</i> | | | | | |
|-------------------------------------------------|-------------------------------|---------------------------|----------------------|------------------|-------------------------------|-----------------------------|---------------|
| | | Secure services | Other sources | Community | Open psychiatric wards | Intensive Care Units | Prison |
| <i>Coid, Fazel, & Kahtan</i> | | 18 (29.5%) | 43 (70.5%) | | | | 23 (38%) |
| <i>Curtice, Parker, Wismayer, & Tomison</i> | | | | | | | 9 (28%) |
| <i>Lightbody, Gow, & Gibb</i> | 14 | 15 (41.7%) | | 2 (5.6%) | 4 (11.1%) | 3 (8.3%) | 12 (33.3%) |
| <i>Shah</i> | 26 | | | | | | |
| <i>Tomar, Treasden, & Shah</i> | | | | 14 (33%) | | | |
| <i>Yorston & Taylor</i> | 17 | | | | | | 1 (8.3%) |

Supplementary Table 5. Data on admission and source of referral to secure services

| <i>Author(s)</i> | <i>Previous admission</i> | | | <i>Current admission</i> | | | | <i>Source of referral</i> | | | |
|-------------------------------------------------|---------------------------|--------------------|---------------------|--------------------------|-----------------|--------------------|----------|---------------------------|-----------|----------|----------|
| | Psychiatric | General psychiatry | Forensic psychiatry | N | Criminal charge | No criminal charge | Informal | Formal | Solicitor | GP | Court |
| <i>Coid, Fazel, & Kahtan</i> | 34 (65%) | | | 54 | 7 (11%) (89%) | | | | | | |
| <i>Curtice, Parker, Wismayer, & Tomison</i> | | | | | | | 27 (84%) | 5 (16%) | 21 (66%) | 3 (9.4%) | 3 (9.4%) |
| <i>Lightbody, Gow, & Gibb</i> | 29 (80.6%) | 28 (77.8%) | 21 (58.3%) | 20 (55.6%) | 16 (44.4%) | | | | | | |
| <i>Paradis, Broner, Maher, & O'Rourke</i> | 23 (28%) | | | | | | | | | | |
| <i>Shah</i> | | | | 2 | | | | | | | |
| <i>Tomar, Treasden, & Shah</i> | | | | | 10 (18%) | | | | | | |
| <i>Yorston & Taylor</i> | | | 3 (25%) | 9 (75%) | 3 (25%) | | | | | | |

Supplementary Table 6. Index offences

| <i>Author(s)</i> | <i>Homicide</i> | <i>Attempted murder</i> | <i>Assault</i> | <i>Violent offence</i> | <i>Firearm</i> | <i>Arson</i> |
|-------------------------------------------------|-----------------|-------------------------|----------------|------------------------|----------------|--------------|
| <i>Coid, Fazel, & Kahtan</i> | 27 (50%) | 17 (32%) | | | 3 (6%) | 5 (9%) |
| <i>Curtice, Parker, Wismayer, & Tomison</i> | 3 (9%) | | | 8 (25%) | | 1 (3%) |
| <i>Lightbody, Gow, & Gibb</i> | 9 (25%) | | | 5 (13.9%) | | |
| <i>Paradis, Broner, Maher, & O'Rourke</i> | 14 (17%) | 5 (6%) | 19 (23%) | 59 (71%) | | 9 (11%) |
| <i>Shah</i> | 4 (36%) | 2 (18%) | 2 (18%) | | | |
| <i>Tomar, Treasden, & Shah</i> | 11 (26%) | | | 15 (36%) | | |
| <i>Yorston & Taylor</i> | 5 (41.6%) | 2 (16.6%) | | | | |

Supplementary Table 7. Sexual offences

| <i>Author(s)</i> | <i>Sexual offence</i> | <i>Victim</i> | | <i>Location</i> | | <i>Offender</i> | | |
|-------------------------------------------------|-----------------------|---------------|-----------|-----------------|---------|-----------------|------------------------|---------------|
| | | Female | Minor | Home | Public | Male | With mental Disability | With dementia |
| <i>Coid, Fazel, & Kahtan</i> | 4 (8%) | | | | | | | |
| <i>Curtice, Parker, Wismayer, & Tomison</i> | 18 (56%) | | 18 (100%) | 13 (72%) | 5 (28%) | 18 (100%) | 6 (33%) | 3 (17%) |
| <i>Lightbody, Gow, & Gibb</i> | 2 (5.6%) | | | | | | | |
| <i>Paradis, Broner, Maher, & O'Rourke</i> | 2 (3%) | | | | | | | |
| <i>Shah</i> | 1 (9%) | | | | | | | |
| <i>Tomar, Treasden, & Shah</i> | 20 (47%) | 13 (65%) | 20 100% | | | | | |
| <i>Yorston & Taylor</i> | 3 (25%) | | 3 (25%) | | | | | |

Supplementary Table 8. Previous offences

| <i>Author(s)</i> | <i>N</i> <i>(average)</i> | <i>No previous offence</i> | <i>Previous offence</i> | <i>Type of offence</i> | | | |
|-------------------------------------------------|------------------------------|----------------------------|-------------------------|------------------------|----------------|--------|---------------------|
| | | | | Violence | Sexual offence | Arson | Acquisitive offence |
| <i>Coid, Fazel, & Kahtan</i> | | | | 26 (50%) | 5 (10%) | 3 (6%) | 21 (40%) |
| <i>Curtice, Parker, Wismayer, & Tomison</i> | | 19 (59%) | 13 (41%) | 7/18 (39%) | | | |
| <i>Lightbody, Gow, & Gibb</i> | 11 | 10 (27.8%) | 26 (72.2%) | | | | |
| <i>Shah</i> | 5 | | | | | | |
| <i>Tomar, Treasden, & Shah</i> | | 42 (100 %) | 0 (0%) | | | | |

Supplementary Table 9. Psychiatric disorder

| <i>Author(s)</i> | <i>Mental disorder</i> | | <i>Depression</i> | <i>Schizophrenia</i> | <i>Schizoaffective disorder</i> | <i>Psychotic illness*</i> | <i>Personality disorder</i> | <i>Somatoform disorder</i> | <i>Self-harm</i> |
|-------------------------------------------------|------------------------|----------|-----------------------|-----------------------|---------------------------------|---------------------------|-----------------------------|----------------------------|------------------|
| | present | absent | | | | | | | |
| <i>Coid, Fazel, & Kahtan</i> | | | 22 (42%) ⁺ | 17 (33%) ⁺ | | | 2 (4%) ⁺ | | |
| <i>Curtice, Parker, Wismayer, & Tomison</i> | 14 (44%) | 18 (56%) | 2 (6%) | 2 (6%) | 1 (3%) | | 1 (3%) | | |
| <i>Lightbody, Gow, & Gibb</i> | | | 4 (11.1%) | | | 23 (63.9%) | 3 (8.3%) | 1 (2.8%) | 19 (52.8%) |
| <i>Paradis, Broner, Maher, & O'Rourke</i> | | | | 13 (15.6%) | 3 (3.6%) | 33 (40%) | | | |
| <i>Shah</i> | | | 1 (9%) | 9 (82%) | | | | | 2 (18%) |
| <i>Tomar, Treasden, & Shah</i> | 29 (69%) | 12 (31%) | | | | 9 (21%) | 3 (7%) | | |
| <i>Yorston & Taylor</i> | | | | 4 (33.3%) | 1 (8.3%) | 11 (91.6%) | 2 (16.6%) | | 1 (8.3%) |

* Schizophrenia, schizotypal, delusional disorder

⁺ Life time prevalence

Supplementary Table 10. Dementias, organic brain syndrome, alcohol and substance abuse

| <i>Author(s)</i> | <i>Dementia</i> | <i>Alzheimer's</i> | <i>Cognitive impairment</i> | <i>Organic brain syndrome</i> | <i>Learning Disability</i> | <i>Alcohol</i> | | <i>Substance abuse</i> | |
|-------------------------------------------------|-----------------|--------------------|-----------------------------|-------------------------------|----------------------------|----------------|------------|------------------------|----------|
| | | | | | | Abuse | Use | Current | Previous |
| <i>Coid, Fazel, & Kahtan</i> | | | | 17 (33%)* | | 15 (29%)* | | | |
| <i>Curtice, Parker, Wismayer, & Tomison</i> | 6 (19%) | | 7 (22%) | | 1 (3%) | 1 (3%) | 13 (41%) | | |
| <i>Lightbody, Gow, & Gibb</i> | | | | 1 (2.8%) | | | 20 (55.6%) | 5 (13.9%) | |
| <i>Paradis, Broner, Maher, & O'Rourke</i> | 9 (7%) | 27 (33%) | | 10 (12%) | | 5 (6%) | 37 (45%) | 1 (1.2%) | 6 (8%) |
| <i>Shah</i> | 3 (27%) | | | | | | | | 1 (9%) |
| <i>Tomar, Treasden, & Shah</i> | 4 (9.5%) | | | 9 (21%) | | | | | |
| <i>Yorston & Taylor</i> | | | 1 (8.3%) | | 1 (8.3%) | | | | |

* Lifetime prevalence

Supplementary Table 11. Physical health

| <i>Author(s)</i> | <i>Mobility problem</i> | <i>Sensory impairment</i> | <i>Hearing problem</i> | <i>Visual problem</i> | <i>Cardiac problem</i> | <i>Hypertension</i> | <i>Diabetes</i> |
|--------------------------------------------------|-------------------------|---------------------------|------------------------|-----------------------|------------------------|---------------------|-----------------|
| <i>Coid, Fazel, & Kahtan</i> | | | | | | | |
| <i>Curtice, Parker, Wismayer, & Tominson</i> | 9 (28%) | | 5 (16%) | 2 (6%) | | | |
| <i>Lightbody, Gow, & Gibb</i> | 22 (61.1%) | 7 (19.4%) | | | | | |
| <i>Paradis, Broner, Maher, & O'Rourke</i> | | | | | 19 (23%) | 12 (15%) | 11 (13%) |
| <i>Shah</i> | | | | | | | |
| <i>Tomar, Treasden, & Shah</i> | | | | | | | |
| <i>Yorston & Taylor</i> | | | | | | | |

Supplementary Table 12. Health problems and medications

| <i>Author(s)</i> | <i>Health problems</i> | | <i>Average N diagnoses</i> | | <i>Average N medications</i> | |
|--------------------------------------------------|------------------------|-----------|----------------------------|-----------|------------------------------|-----------|
| | 1 | 2+ | Admission | Discharge | Admission | Discharge |
| <i>Curtice, Parker, Wismayer, & Tominson</i> | 14 (43.8%) | 5 (15.6%) | | | | |
| <i>Lightbody, Gow, & Gibb</i> | | | 1.2 | 2.4 | 3.1 | 6.3 |
| <i>Shah</i> | | | 2 | | 4 | |