**Supplemental materials**

## Supplemental Methods

## Systematic review search terms

Example of the search strategy used to search Embase. We adapted this strategy to the specific structure and operation of each database included in the review (see <http://doi.org/10.17605/OSF.IO/5R2XW>). Quotation marks were used to search for whole phrases, truncations (such as asterisks) were used so that various spellings of the key terms would be included in the search results. Both Medical Subject Heading (MeSH) and free text searches were used to ensure a comprehensive search was conducted. Terms (e.g. Ireland) and searches were combined using Boolean operators (such as AND, OR) and limits were added to increase the precision of the search.

**1** schizo\*.tw.

**2** psychotic.tw.

**3** psychos?s.tw.

**4** ((severe or serious or chronic) and mental and (illness\* or disorder\*)).tw.

**5** SMI.tw.

**6** chronic psychosis.tw.

**7** schizophrenia/ or schizophrenia spectrum disorder/ or catatonic schizophrenia/ or

 paranoid schizophrenia/ or residual schizophrenia/

**8** cannabis-induced psychosis/ or drug induced psychosis/ or experimental psychosis/ or

 alcohol psychosis/ or paranoid psychosis/ or psychosis/ or childhood psychosis/ or acute

 psychosis/ or methamphetamine-induced psychosis/ or cocaine-induced psychosis/

**9** psychosis/ or brief psychotic disorder/ or endogenous psychosis/ or experimental

 psychosis/

**10** delusion\* disorder.tw.

**11** 1 or 2 or 3 or 4 or 5 or 6 or 7 or 8 or 9 or 10

**12** (inciden\* or epidemiolog\*).tw.

**13** ((first\* or 1st) adj3 episode\*).tw.

**14** ((first\* or 1st\*) adj3 hospital\* adj3 (contact\* or admission\* or admit\*)).tw.

**15** (case and register\*).tw.

**16** (prospective\* or population-based or communit\* or survey\*).tw.

**17** 12 or 13 or 14 or 15 or 16

**18** Ireland/ or "Republic of Ireland"/ or ROI/ or "Irish republic"/ or Irish/ or "Irish

 population"/ or Eire/ or "Emerald Isle"/ or Cavan/

**19** Monaghan or Ireland or Republic of Ireland or ROI or Irish Republic or Irish

 population or EIRE or Emerald Isle or Cavan.tw

**20** 18 or 19

**21** 11 and 17 and 20

**22** limit 19 to (human and english language and yr="1950 -Current")

### **Data extraction: further details**

Citation-level data (Supplemental Table 2) included information on the authors, setting, publication year, mid-point of case ascertainment, diagnostic outcome(s) included, and risk of bias (see below). Rate-level data included any reported incidence rates per 100,000 person-years and corresponding uncertainty (i.e. 95% confidence intervals [95%CI]) as well as number of new cases and person-time at risk. We extracted all rates reported in each citation, across all available individual- and/or area-level strata (Supplemental Table 2) reported in the paper and including both crude and standardised rates where reported.

## Supplemental Results

#### *All first episode psychotic disorders: median age-at-onset*

Nkire et al.19 reported the median age at first presentation as 32 years old (interquartile range [IQR]: 29 years) in the CAMFEPS study, although this was earlier in men (29 years old; IQR: 24 years) than women (37 years old; IQR: 28 years). Recent data from the COPE EIP service in the same catchment area reported younger median age-at-first-contact for both men (24 years; IQR: 11) and women (29 years; IQR: 17).10 Jablensky et al.42 observed that 41.8% of all new cases in Dublin were aged 15-24 years old, 29.8% aged 25-34 years old, 19.4% aged 35-44 years old and just 9.0% aged 45-54 years old.

#### *Other psychotic outcomes*

Both Nkire et al.19 and Fayyaz et al.10 reported the incidence of a range of other psychotic outcomes separately in the Cavan-Monaghan population between 1995 and 2016. Rates ranged from just 0.2 per 100,000 person-years for "simple deteriorative disorder” to 2.0 per 100,000 person-years for schizoaffective disorders, delusional disorders and psychosis “not otherwise specified” [NOS], separately.

**Supplemental Figure 1: Diagnostic outcomes reported in included citations**

**Supplemental Figure 2: Crude incidence rate per 100,000 person-years for non-affective psychotic disorders and schizophrenia in the 3-county study,**40 **by age group and sex**

**(B)**

**(A)**

Legend: 100 kpy: 100,000 person-years. (A) Non-affective psychotic disorders; (B) Schizophrenia

**Supplemental Figure 3: Funnel plot to assess small study effects in citations of the incidence of schizophrenia in the Republic of Ireland, 1974-2016**

Legend: 100 kpy: 100,000 person-years. Funnel plots can be used to assess the possibility of small study effects (i.e. publication bias) in the observed literature. Evidence that small study effects may be present is apparent when the data points are asymmetrically distributed around the pooled effect (solid black vertical line), often with small studies (towards the left on the x-axis) with large standard errors (i.e. small sample sizes, lower on the y-axis) missing from the bottom left quadrant of the figure. Here we see no evidence of small studies reporting small effects (lower left hand quadrant) missing, although the small number of data points (N=8) make it difficult to draw definitive conclusions.

**Supplemental Figure 4: Crude incidence rate per 100,000 person-years for schizophrenia in the Republic of Ireland, by sex**

Legend: 100 kpy: 100,000 person-years

**Supplemental Table 1: PRISMA statement**

| **Section and Topic**  | **Item #** | **Checklist item**  | **Location where item is reported**  |
| --- | --- | --- | --- |
| **TITLE**  |  |
| Title  | 1 | Identify the report as a systematic review. | 1 |
| **ABSTRACT**  |  |
| Abstract  | 2 | See the PRISMA 2020 for Abstracts checklist. | 2 |
| **INTRODUCTION**  |  |
| Rationale  | 3 | Describe the rationale for the review in the context of existing knowledge. | 4-5 |
| Objectives  | 4 | Provide an explicit statement of the objective(s) or question(s) the review addresses. | 5 |
| **METHODS**  |  |
| Eligibility criteria  | 5 | Specify the inclusion and exclusion criteria for the review and how studies were grouped for the syntheses. | 6-9 |
| Information sources  | 6 | Specify all databases, registers, websites, organisations, reference lists and other sources searched or consulted to identify studies. Specify the date when each source was last searched or consulted. | 6-7 |
| Search strategy | 7 | Present the full search strategies for all databases, registers and websites, including any filters and limits used. | S1-S2 |
| Selection process | 8 | Specify the methods used to decide whether a study met the inclusion criteria of the review, including how many reviewers screened each record and each report retrieved, whether they worked independently, and if applicable, details of automation tools used in the process. | 7 |
| Data collection process  | 9 | Specify the methods used to collect data from reports, including how many reviewers collected data from each report, whether they worked independently, any processes for obtaining or confirming data from study investigators, and if applicable, details of automation tools used in the process. | 7 |
| Data items  | 10a | List and define all outcomes for which data were sought. Specify whether all results that were compatible with each outcome domain in each study were sought (e.g. for all measures, time points, analyses), and if not, the methods used to decide which results to collect. | 7-8, S2, ST3 |
| 10b | List and define all other variables for which data were sought (e.g. participant and intervention characteristics, funding sources). Describe any assumptions made about any missing or unclear information. | 7-8, S2, ST2 |
| Study risk of bias assessment | 11 | Specify the methods used to assess risk of bias in the included studies, including details of the tool(s) used, how many reviewers assessed each study and whether they worked independently, and if applicable, details of automation tools used in the process. | 8 |
| Effect measures  | 12 | Specify for each outcome the effect measure(s) (e.g. risk ratio, mean difference) used in the synthesis or presentation of results. | 8 |
| Synthesis methods | 13a | Describe the processes used to decide which studies were eligible for each synthesis (e.g. tabulating the study intervention characteristics and comparing against the planned groups for each synthesis (item #5)). | 8-9 |
| 13b | Describe any methods required to prepare the data for presentation or synthesis, such as handling of missing summary statistics, or data conversions. | 8-9 |
| 13c | Describe any methods used to tabulate or visually display results of individual studies and syntheses. | 8-9 |
| 13d | Describe any methods used to synthesize results and provide a rationale for the choice(s). If meta-analysis was performed, describe the model(s), method(s) to identify the presence and extent of statistical heterogeneity, and software package(s) used. | 8-9 |
| 13e | Describe any methods used to explore possible causes of heterogeneity among study results (e.g. subgroup analysis, meta-regression). | 8-9 |
| 13f | Describe any sensitivity analyses conducted to assess robustness of the synthesized results. | N/A |
| Reporting bias assessment | 14 | Describe any methods used to assess risk of bias due to missing results in a synthesis (arising from reporting biases). | 8-9, ST4 |
| Certainty assessment | 15 | Describe any methods used to assess certainty (or confidence) in the body of evidence for an outcome. | 8-9 |
| **RESULTS**  |  |
| Study selection  | 16a | Describe the results of the search and selection process, from the number of records identified in the search to the number of studies included in the review, ideally using a flow diagram. | 2, 9, Fig 1 |
| 16b | Cite studies that might appear to meet the inclusion criteria, but which were excluded, and explain why they were excluded. | N/A |
| Study characteristics  | 17 | Cite each included study and present its characteristics. | 9-10, Table 1, SF1 |
| Risk of bias in studies  | 18 | Present assessments of risk of bias for each included study. | 10, Table 1, ST5 |
| Results of individual studies  | 19 | For all outcomes, present, for each study: (a) summary statistics for each group (where appropriate) and (b) an effect estimate and its precision (e.g. confidence/credible interval), ideally using structured tables or plots. | 11-17, S3, SF2-SF8 |
| Results of syntheses | 20a | For each synthesis, briefly summarise the characteristics and risk of bias among contributing studies. | 11-17 |
| 20b | Present results of all statistical syntheses conducted. If meta-analysis was done, present for each the summary estimate and its precision (e.g. confidence/credible interval) and measures of statistical heterogeneity. If comparing groups, describe the direction of the effect. | 11-17 |
| 20c | Present results of all investigations of possible causes of heterogeneity among study results. | 13 |
| 20d | Present results of all sensitivity analyses conducted to assess the robustness of the synthesized results. | N/A |
| Reporting biases | 21 | Present assessments of risk of bias due to missing results (arising from reporting biases) for each synthesis assessed. | 13 |
| Certainty of evidence  | 22 | Present assessments of certainty (or confidence) in the body of evidence for each outcome assessed. | 11-17 |
| **DISCUSSION**  |  |
| Discussion  | 23a | Provide a general interpretation of the results in the context of other evidence. | 17-18 |
| 23b | Discuss any limitations of the evidence included in the review. | 20-22 |
| 23c | Discuss any limitations of the review processes used. | 20-22 |
| 23d | Discuss implications of the results for practice, policy, and future research. | 18-20, 22 |
| **OTHER INFORMATION** |  |
| Registration and protocol | 24a | Provide registration information for the review, including register name and registration number, or state that the review was not registered. | 5-6 |
| 24b | Indicate where the review protocol can be accessed, or state that a protocol was not prepared. | 5-6 |
| 24c | Describe and explain any amendments to information provided at registration or in the protocol. | S17 |
| Support | 25 | Describe sources of financial or non-financial support for the review, and the role of the funders or sponsors in the review. | 34 |
| Competing interests | 26 | Declare any competing interests of review authors. | 34-35 |
| Availability of data, code and other materials | 27 | Report which of the following are publicly available and where they can be found: template data collection forms; data extracted from included studies; data used for all analyses; analytic code; any other materials used in the review. | 35 |

**Supplemental Table 2: Variables for data extracted from citations meeting inclusion criteria**

|  |  |  |  |
| --- | --- | --- | --- |
| Citation-level  | Rate-level | Individual level | Area-level |
| Setting | Number of new cases  | Age stratum | Deprivation |
| Authors | Population at-risk | Sex | Social fragmentation  |
| Publication year | Case ascertainment duration  | Country of birth | Social capital |
| Publication journal | Person-years at risk | Ethnicity | Population density |
| DOI | Crude incidence | Social class or SES | Urbanicity |
| Diagnostic outcome(s) | Standardised incidence |  |  |
| Study quality | Standard error |  |  |
| Midpoint year of case ascertainment  | 95% CIs |  |  |

Legend: DOI: digital object identifier; 95% CI: 95% confidence interval; SES: socioeconomic status

**Supplemental Table 3: Diagnostic outcomes considered in this review alongside example ICD-10 codes**

|  |  |
| --- | --- |
| Diagnostic outcome | Indicative ICD-10 codes |
| All FEP disorders | F10-33 (as defined below) |
| Non-affective psychotic disorders | F20-29 |
| Schizophrenia | F20 |
| Affective psychotic disorders | F30-33 (as defined below) |
| Bipolar disorder with psychotic features | F30.2, F31.2 |
| Depression with psychotic features | F32.3, F33.3 |
| Substance-induced psychotic disorders | F1X.5, where X = 0-9 |

Legend: ICD-10 : International Classification of Diseases, tenth revision

**Supplemental Table 4: Risk of bias criteria of included citations**

|  |  |
| --- | --- |
| Item | Description |
| a. Defined catchment area | Setting clearly defined in citation |
| b. Accurate denominator data | Population at-risk clearly stated including accurate source i.e. Census |
| c. Population-based case finding | Attempt to identify all new cases in population, not solely treated cases |
| d. Standardised research diagnosis | Standardised research methodology to diagnose cases  |
| e. Blinding to demographic variables\* | Blinding of research/clinical team to factors such as ethnicity to avoid observer bias |
| f. Reported inclusion criteria | Clearly stated inclusion criteria |
| g. Leakage study | Attempt to identify potential cases missed by original case finding procedure |
| h. Sufficient data to derive incidence rate & standard error | Estimate of statistical uncertainty around reported incidence provided |
| i. Crude & standardised rates reported | Both crude and standardised rates reported |

Legend: ICD-10 : International Classification of Diseases, tenth revision

\* In a minor deviation to the protocol, this study quality criteria was later dropped, because no citation provided incidence data by ethnicity or migrant status, the main reason for the use of blinding in such studies. Thus, 8 study quality contributed to the risk of bias assessment

**Supplemental Table 5: Risk of bias criteria of included citations**

|  |  |  |
| --- | --- | --- |
|  | Criterion\* |  |
| Citation | **A** | **B** | **C** | **D** | **F** | **G** | **H** | **I** | **Total****/8** |
| Baldwin, 200232 | 1 | 1 | 0 | 1 | 1 | 0 | 1 | 0 | **5** |
| Baldwin, 200335 # | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | **1** |
| Baldwin, 200527 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | **7** |
| Browne, 200539 # | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | **2** |
| Daly, 199531 | 1 | 0 | 0 | 1 | 1 | 1 | 1 | 0 | **5** |
| Fayyaz, 202110 | 1 | 1 | 1 | 1 | 1 | 0 | 1 | 0 | **6** |
| Jablensky, 199242 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | **7** |
| Keatinge, 198730 | 1 | 1 | 0 | 0 | 1 | 0 | 1 | 1 | **5** |
| Keatinge, 198838 | 1 | 1 | 0 | 0 | 0 | 0 | 1 | 1 | **4** |
| Keatinge, 198626 | 1 | 1 | 0 | 0 | 1 | 0 | 1 | 1 | **5** |
| Kelly, 201041 | 1 | 1 | 1 | 1 | 0 | 0 | 1 | 0 | **5** |
| Kingston, 201134 | 1 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | **4** |
| Lyne, 201437 # | 1 | 0 | 1 | 1 | 1 | 0 | 0 | 0 | **4** |
| Morgan, 200128 # | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | **2** |
| Ninuallain, 198740 | 1 | 0 | 0 | 1 | 0 | 1 | 1 | 0 | **4** |
| Nkire, 202119 | 1 | 0 | 1 | 1 | 1 | 1 | 1 | 0 | **6** |
| O’Donoghue, 201620 | 1 | 1 | 1 | 1 | 1 | 0 | 1 | 1 | **7** |
| Omer, 201229 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | **2** |
| Omer, 201443 | 1 | 1 | 0 | 0 | 1 | 1 | 1 | 1 | **6** |
| Owoeye, 201336 | 1 | 0 | 1 | 1 | 1 | 1 | 1 | 0 | **6** |
| Scully, 200218 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | **7** |
| Waddington, 200433 # | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | **2** |
| Total (%) | 23 (100.0) | 12 (52.2) | 11 (47.8) | 13 (56.5) | 15 (65.2) | 8 (34.8) | 20 (87.0) | 6 (26.1) | **-** |
| Median (IQR) | - | - | - | - | - | - | - | - | **5 (4-6)** |

Legend: IQR: interquartile range

\* Criterion E omitted (see Table 3 and Methods for details)

# Rated from conference abstract

Risk of bias criteria:

* Criterion A = Defined catchment area
* Criterion B = Accurate denominator data
* Criterion C = Population-based case finding
* Criterion D = Standardised research diagnosis used
* Criterion F = Inclusion criteria clearly listed
* Criterion G = Leakage study conducted
* Criterion H = Provision of sufficient data to derive an incidence rate and standard error
* Criterion I = Reporting of crude and standardised/adjusted rates