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Incidence of treated first episode psychosis from an Australian early intervention service and its association with neighbourhood characteristics

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ABSTRACT

Objectives: Psychotic disorder incidence varies geographically and is associated with neighbourhood characteristics, including social deprivation, population density, unemployment, social capital or social fragmentation. Yet it is not known whether these findings are applicable to Australia's unique geography. This study aimed to determine whether the incidence of first episode psychosis (FEP) varies according to neighbourhood characteristics in an Australian cohort.

Method: This study included all young people, aged 15 to 24, with an FEP who attended Orygen Youth Health in Melbourne, from a geographically defined catchment area encompassing Northern and Western Melbourne, over a 44-month period. Neighbourhood demographic data was collected from the 2011 Australian National Census. Negative binomial regression was used to determine incidence rate ratios controlled for age, sex and migrant status.

Results: A total of 747 young people had an FEP during the 44-month study period and 722 were included in this study. Of these, 58.0% were males and 67.9% had a non-affective psychotic disorder; the mean age of the cohort was 19.1 years. The incidence of FEP in young people aged 15 to 24 in the catchment area was 123.2 per 100,000 person-years. There was a higher incidence of FEP in neighbourhoods of greatest social deprivation (IRR = 1.65, CI = 1.06–2.51, p = .02), highest unemployment (IRR = 1.56, CI = 1.04–2.35, p = .03) and above average social fragmentation (IRR = 1.42, CI = 1.02–1.97, p = .04), when controlled for age, sex and migrant status.

Conclusions: This study highlights variation in psychotic disorder incidence and the need for this disparity to be reflected in appropriate resource allocation.

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1. Introduction

The incidence of psychotic disorders, such as schizophrenia, varies between countries and at least a five-fold difference between countries has been observed (Jongsma et al., 2018; McGrath et al., 2004). Additionally, it is now recognised that the incidence of psychotic disorders varies at the neighbourhood level (March et al., 2008; Richardson et al., 2018), with higher incidence of psychotic disorders observed in neighbourhoods of higher urbanicity (Heinz et al., 2013; Kelly et al., 2010), population density (Kelly et al., 2010), social deprivation (O'Donoghue et al., 2016b), unemployment (Bhavsar et al., 2014), social fragmentation (O'Donoghue et al., 2016a; Veling et al., 2015) and lower social capital (Kirkbride et al., 2008); as well as higher incidence of psychotic disorder in ethnic minorities and migrant groups (Jongsma et al., 2017), particularly in neighbourhoods of low ethnic density (Schofield et al., 2017). Despite many conflicting theories (e.g. social defeat (Selten and Cantor-Graae, 2007)), the underlying cause of this variation remains unknown (Jongsma et al., 2017). Research to date has mainly been conducted in Europe and the Americas and therefore it is not known whether these findings translate to other countries. The extension of these findings to Australia would strengthen the consistency of evidence for these associations across the developed world.

Knowledge on the neighbourhood factors associated with the incidence of psychotic disorders could have potential benefits in furthering the understanding of the aetiology of these disorders (Piantadosi, 1994) as well as for clinical services through improving resource allocation (Hill, 1965; Schofield et al., 2017). The ability to reliably predict the incidence of psychotic disorders could determine where specialist services for psychotic disorders should be located and how they should be adequately resourced (Kirkbride and Jones, 2013). Furthermore, an

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essential component of early intervention for psychosis services is public educational campaigns to reduce the delays in individuals seeking help and a knowledge of the areas of high expected treated incidence could result in more targeted, focused campaigns (Krstev et al., 2004). This has particular relevance to Australia, with the ongoing extension of early intervention for psychosis services nationally.

Therefore, the aims of this study are to determine: (i) the treated incidence of FEP in young people aged 15 to 24 from a geographically defined catchment area and (ii) whether the treated incidence of FEP varies according to neighbourhood characteristics, specifically social deprivation, unemployment, proportion of people volunteering (a proxy for social capital) and social fragmentation, when controlled for age, sex and migrant status.

2. Methods

2.1. Setting

The Early Psychosis Prevention and Intervention Centre (EPPIC) is an Early Intervention in Psychosis Service within Orygen Youth Health, a state-funded youth mental health service covering a defined catchment area within Northern and Western Melbourne. At the time of the study, this area contained a total population of over 1 million, of which 156,280 individuals were aged between 15 and 24 years (Statistics, 2011). The catchment area consists of 59 postcode sectors. The catchment area is a disadvantaged region within the Australian state of Victoria. The median SEIFA score for postcodes in the catchment area was 1007.7 (inter-quartile range (IQR): 957.6–1043.1) compared to a median SEIFA score of 1011.0 (IQR: 967.7–1049.7) for the whole of Victoria. The catchment also has a higher global unemployment rate at 6.5% (median postcode 6.4%, IQR: 4.5%–6.5%), compared to Victoria's unemployment rate of 5.4% (median postcode 4.8%, IQR: 3.5%–5.3%). The catchment also had higher level of social fragmentation with median postcode Congdon Measure of Social Fragmentation score of 0.60 (IQR: 0.06–1.45), compared to whole of Victoria's median of −0.03 (IQR: −0.63–0.64). The catchment area also had markedly lower rates of volunteering, which may represent a lower level of social capital (catchment postcode median volunteering rate 14.2% (IQR: 10.9%–18.6%)) compared to Victorian postcode median volunteering rate 25.5% (IQR: 20.2%–32.8%). A comparison of the characteristics of the catchment area and the state of Victoria is presented in Table 1.

2.2. Participants

This study included all eligible clients registered with EPPIC between 1st January 2011 and 30th September 2014. To be referred to EPPIC, clients must be between 15 and 24 years of age, reside within the catchment area, and have experienced a FEP, defined as experiencing full threshold psychotic symptoms daily for at least one week. Sources of referral include local mental health services, general practitioners, law enforcement agencies, community support services, family members and friends, and self-referral. All psychotic disorders were included, including drug-induced psychotic disorder. Orygen Youth Health also operates a clinic for young people who are identified as having the at-risk mental state from the ultra-high risk for psychosis criteria and this study included the young people in this clinic who transition/developed a first episode of psychosis during the study period.

Table 1
Characteristics of the catchment area compared to the whole of the state Victoria.

Catchment area vs Victoria	Catchment	Victoria
Population	1,124,595	5,328,069
Population aged 15–24	166,760	716,663
Percentage persons born outside Australia	34.88%	26.30%
Percentage persons aged 15–24 born outside Australia	26.69%	19.29%
Social deprivation (SEIFA score)	1007.7 (inter-quartile range (IQR): 957.6–1043.1)	1011.0 (IQR: 967.7–1049.7)
Unemployment	6.5% (median postcode 6.4%, IQR: 4.5%–6.5%)	5.4% (median postcode 4.8%, IQR: 3.5%–5.3%)
Social fragmentation	0.60 (IQR: 0.06–1.45)	−0.03 (IQR: −0.63-0.64)
Social capital	14.2% (IQR: 10.9%–18.6%)	25.5% (IQR: 20.2%–32.8%)

2.3. Study design & sources of information

This is a naturalistic cohort study. Information was obtained from clients' clinical files, which consisted of psychiatric assessment reports, three-monthly client reviews, inpatient admission and discharge summaries, EPPIC discharge summaries, and clinical notes. The postcode at which the client was residing at the time of entry to service was recorded. Diagnoses of psychotic disorders and concurrent diagnoses, such as substance abuse disorders, were made by the treating consultant psychiatrist at three months after service entry and reviewed at discharge according to DSM-IV classification of mental disorders. Some individuals disengaged from the service before a longitudinal assessment and adequate diagnosis could be made. These individuals were given a generic diagnosis of 'First episode of psychosis'. Non-affective psychotic disorders included schizophreniform disorder, schizophrenia, delusional disorder, drug-induced psychosis, brief psychotic disorder and psychosis not-otherwise-specified (NOS). Affective psychotic disorders included schizoaffective disorder, bipolar affective disorder and depression with psychosis.

2.4. Census data collection and definition of neighbourhood characteristics

Neighbourhood demographic data was collected from publicly available components of the 2011 Australian National Census for all 665 postcodes in the Australian State of Victoria. This data was stratified according to sex and included the total population within a postcode as well as the total population aged 15 to 24 years. For all Victorian postcodes, census data was also collected on residents' marital and volunteer work status as well as the household composition and tenure type of local dwellings. Data was also obtained relating to unemployment within each postcode as well as the number of residents who had moved to the postcode within the last year. One postcode of the 59 within the catchment area was excluded from analysis as it had a population between 15 and 24 of only 3. Data was collated in Microsoft Excel and the statistical analysis was performed using Stata 12 (StataCorp, 2017).

Social deprivation describes relative socio-economic disadvantage within the community. Postcode scores for social deprivation were obtained from the Australian Bureau of Statistics' 2011 Census as Socio-Economic Indexes for Areas (SEIFA) scores. The index used by this study was the Index of Relative Socio-Economic Disadvantage. Unemployment refers to the proportion of people in a postcode that are unemployed as defined in the census data. Social capital describes the strengths of the bonds that hold the network of society together and can be divided into an active component, such as volunteering, and a passive component, such as trust in neighbours (De Silva et al., 2005). The proportion of people engaged in volunteering was taken as a proxy measure for social capital, replicating previous methods of determining social capital (Putnam et al., 1993).

Social fragmentation refers to the disintegration of a community's network of social bonds and is conceptualised as impairing moral guidance provided to community-members (Durkheim and Simpson, 1951). Social fragmentation is a composite measure composed of many census variables. The measure utilised by this study is that developed by Congdon (1996), which has been utilised in many studies

examining the association between social fragmentation and psychotic disorder incidence (Congdon, 1996; O'Donoghue et al., 2016a; Omer et al., 2014). This measure of social fragmentation is composed of four census variables: the percentage of single-person households, dwellings rented, persons having lived at a different address one-year prior, and (socially defined) unmarried persons. Data for these variables were collated for all 665 postcodes in the Australian state of Victoria, three of which were excluded due to zero values. Sample mean and standard deviation were calculated for each of the four census variables within the remaining population of 662 postcodes. For each postcode, the deviation from the mean (z-score) was calculated for each of these census variables. For the census variable of the percentage of persons having lived at a different address one-year prior, all negative z-scores were multiplied by negative one to give a positive value, as a negative value still represents a positive level of population mobility (i.e. mobility out of the postcode). The social fragmentation score for a postcode is the sum of the postcode's z-scores for each of these four census variables.

For each neighbourhood characteristic, postcodes were arranged into quartiles, based on their ranking within the state of Victorian. This method was chosen over ranking them within the catchment area because the catchment area is located within an area of Melbourne with higher social deprivation. Therefore, if postcodes were ranked according to the catchment area, it could potentially result in deprived areas being classified as affluent. No postcodes within the catchment area were within quartile 1 for unemployment and social capital and therefore the analysis pertaining to unemployment, the 2nd quartile was used as the reference range. For social capital, only three postcodes were classified as quartile 2 and seven were quartile 3, therefore quartile 2 and 3 combined were used as the reference range.

2.5. Statistical analysis

Negative binomial regression was used to estimate incidence rate ratios, controlling for age, sex and migrant status. The likelihood ratio test was used to assess whether the use of a negative binomial regression model was justified compared to a Poisson regression model, and in all cases the additional parameter in the negative binomial regression model was necessary to account for over-dispersion in the data. The correlations between neighbourhood characteristics were also examined to assess collinearity.

3. Results

3.1. Description of participants

A total of 747 young people presented with a FEP during the study period. No postcode data was available for eleven cases, and fourteen were not residing in the catchment area at the time of presentation; therefore, a total of 722 (96.7%) young people were included. Within the cohort, 419 (58.0%) were male and 303 (42.0%) were female. The mean age was 19.5 (SD ± 2.85) and the median age was 20 (IQR 17–22). The majority of the cohort had never been married (N = 685, 94.9%), resided with their parents (N = 476, 65.9%) and were either students (N = 287, 39.7%) or unemployed (N = 262, 36.3%).

A total of 33.4% (N = 241) had a diagnosis of schizophreniform disorder or schizophrenia and 15.4% (N = 111) had a diagnosis of bipolar affective disorder. A diagnosis of 'Psychotic disorder – not differentiated' was applied to 11.9% (N = 86) of the cohort and it could not be determined whether these individuals experienced a non-affective or affective psychotic disorder. Therefore, of the remainder of the cohort, 67.9% (N = 432) were known to have had a non-affective psychotic disorder and 32.1% (N = 204) had an affective psychotic disorder. Over half the cohort had co-morbid substance abuse (N = 406, 59.4%), with the most common substance abuse disorders being cannabis (N = 357, 52.2%), amphetamines (N = 182, 26.6%) and alcohol (N = 119, 17.4%). The demographic and clinical characteristics of the cohort are presented in Table 2.

3.2. Catchment treated incidence

The catchment area population-at-risk (those aged 15 to 24) was 156,280 and this resulted in a treated crude incidence rate of 123.2 cases per 100,000 person-years in those aged 15 to 24. Males and females respectively had treated incidence rates of 142.1 and 104.1 cases per 100,000 person-years in those aged 15 to 24.

3.3. Correlation of neighbourhood characteristics

Social deprivation, unemployment, social fragmentation and social capital were all positively correlated with each other except for social fragmentation and social capital which were negatively associated. Especially strong correlations existed between social deprivation and unemployment ($R = 0.55$), social deprivation and low social capital ($R = 0.56$) and between social fragmentation and population density (0.54). The correlations between the neighbourhood characteristics are presented in Table 3.

3.4. Social deprivation

The most deprived neighbourhoods had a 65% higher treated incidence rate of psychotic disorders compared to the most affluent neighbourhoods (Incidence Risk Ratio (IRR) =1.65, 95% Confidence Interval (CI) =1.08–2.51, p = .02), when controlled for age, sex and migrant status. This association was strongest for non-affective psychotic disorders, which had a two-fold increase in the treated incidence rate of non-affective psychotic disorders in the most deprived neighbourhoods (IRR = 2.07, CI = 1.32–3.22, p = .001). The incidence rate ratios for each neighbourhood characteristic for the total cohort and non-affective/affective psychotic disorders are presented in Table 4.

3.5. Unemployment

Neighbourhoods with the highest levels of unemployment had a 56% higher treated incidence of psychotic disorders compared to neighbourhoods in the second quartile (IRR = 1.56, CI = 1.04–2.35, p = .03), when controlled for age, sex and migrant status. This association between a higher incidence and neighbourhood unemployment levels was stronger in the sub-group with a non-affective psychotic disorder (IRR = 1.67, CI = 1.07–2.61, p = .02) and was not present for those with an affective psychotic disorder.

3.6. Social capital

There was no significant association between the incidence of all first episode psychotic disorders and the level of volunteering at a neighbourhood level (a proxy for social capital), however there was a 52% increased incidence rate of non-affective first episode psychotic disorders in the neighbourhoods with the lowest proportion of volunteering (IRR = 1.52, CI = 1.03–2.24, p = .04), when controlled for age, sex and migrant status.

3.7. Social fragmentation

There was a non-linear association between the incidence of psychotic disorders and the level of neighbourhood social fragmentation. Neighbourhoods of above average social fragmentation (Quartile 3) had a 75% higher treated incidence of psychotic disorder compared to neighbourhoods of low social fragmentation (IRR = 1.75, CI = 1.26–2.43, p = .001) and a 42% higher treated incidence rate in the neighbourhoods with the greatest social fragmentation (Quartile 4) (IRR = 1.42, CI = 1.02–1.97, p = .04). This association between a

Table 2
Correlations between neighbourhood characteristics.

Neighbourhood characteristics correlation (R-values)	Social deprivation	Unemployment	Social fragmentation	Low social capital	Population density
Social deprivation	1	0.55	0.32	0.56	−0.04
Unemployment		1	0.20	0.17	0.38
Social fragmentation			1	−0.24	0.54
Low social capital				1	−0.25
Population density					1

higher treated incidence and neighbourhood social fragmentation was stronger in the sub-group with a non-affective psychotic disorder (Quartile 3 - IRR = 2.09, CI = 1.41–3.08, p < .001) (Quartile 4 – IRR = 1.49, CI = 1.00–2.21, p = .047) and was not present for those with an affective psychotic disorder.

3.8. Population density

There was no association between the level of population density and the treated incidence of psychotic disorder. This was consistent for both non-affective and affective psychotic disorders.

4. Discussion

4.1. Summary of findings

This study found a higher incidence of treated first episode psychosis in neighbourhoods of greatest deprivation, above average unemployment, and above average social fragmentation. There was a higher incidence of non-affective psychotic disorders in neighbourhoods with the lowest proportion of volunteering (a proxy for social capital). There was no association between population density and the treated incidence of psychotic disorder.

Table 3
Demographic and clinical characteristics of cohort.

	Mean	SD
Age	19.1	3.5
	n	%
Sex		
Male	419	58.0
Female	303	42.0
Marital status		
Never married	685	94.9
Married/De-facto	27	3.7
Separated/divorced	5	0.7
Unknown	5	0.7
Living arrangements		
Alone	40	5.5
Partner	45	6.2
Friends	83	11.5
Parents	476	65.9
Other	78	10.8
Employment status at baseline		
Home duties	6	0.8
Unemployed	262	36.3
Employed	127	17.6
Student	287	39.7
Disability pension		
Diagnosis		
Schizophreniform disorder	149	20.6
Schizophrenia	92	12.7
Schizoaffective disorder	31	4.3
Delusional disorder	8	1.1
Substance-induced psychotic disorder	76	10.5
Bipolar affective disorder	111	15.4
Major depressive disorder	61	8.4
Psychotic disorder NOS	93	12.9
Brief psychotic disorder	15	2.1
Unspecified (FEP)	86	11.9
Substance use disorder[a]		
Any co-morbid substance abuse	406	59.4
Alcohol abuse	119	17.4
Cannabis abuse	357	52.2
Amphetamine abuse	182	26.6
MDMA abuse	40	5.8

[a] Missing data for 5.3% (N = 38) of the cohort.

4.2. Comparison to previous literature

This study's findings are consistent with the literature on this topic (O'Donoghue et al., 2016a; O'Donoghue et al., 2016b; Omer et al., 2014; Richardson et al., 2018; Veling et al., 2015; Zammit et al., 2010), and demonstrate that these findings are applicable to Australia. Interestingly, the incidence rate of first episode psychosis in this cohort is particularly high. This replicates earlier findings from this area that found an incidence rate of FEP of 167 per 100,000 person-years (Amminger et al., 2006). The major reason this incidence rate seems high is that the age-range included in this study has much higher rates of FEP than the general adult population (Kessler et al., 2007). The 3-center AeSOP study in England found a rate of approximately 60 cases per 100,000 person-years in those aged 15–24, with a very comparable rate of approximately 94 cases per 100,000 person-years in the region of Southeast London (Kirkbride et al., 2006). This study also used data from the 2011 Australian census whereas it included incident cases date from 2011 to 2013, therefore if an approximate 2% of annual population increase was accounted for, the incidence rate would decrease. It is also probable that some of the increased incidence rate in this cohort is due to the higher levels of neighbourhood characteristics investigated in this study (Table 1).

This study contrasts with most literature by showing no association between population density and the incidence of psychotic disorder (Castillejos et al., 2018; Heinz et al., 2013; Kelly et al., 2010). Population density's association with schizophrenia has been suggested to be due to its correlation with other neighbourhood factors such as social deprivation (Vassos et al., 2012). That social deprivation and population density were not correlated in this study (R = -0.04) may have contributed to the lack of an association observed between population density and the incidence of psychotic disorder.

4.3. Clinical implications

Demonstrating an association between psychotic disorder treated incidence and specific neighbourhood characteristics has utility in predicting future psychotic disorder treated incidence in different geographical areas. This is especially relevant in the provision of Early Intervention in Psychosis Services (O'Donoghue et al., 2016a), as without this information, service centres may experience differential caseloads that may impair best care provision. This was observed in England and Wales with the rollout of Early Intervention in Psychosis Services in 2002 in which it was assumed there would be a consistent incidence rates of psychotic disorder (2002). As a result, some services experienced case shortfalls (Tiffin and Glover, 2007), whilst others' caseloads were significantly higher than predicted (Cheng et al., 2011; Kirkbride et al., 2012). To aid in rectifying this resource misallocation, a free online population-level prediction tool for the incidence of FEP in England and Wales, named PsyMaptic, was developed (Kirkbride et al., 2013).

Table 4
IRR for total cohort, non-affective & affective FEP according to neighbourhood characteristics.

	Total cohort				Non-affective FEP				Affective FEP			
	IRR	95% CI		p	IRR	95% CI		p	IRR	95% CI		p
		Lower	Upper			Lower	Upper			Lower	Upper	
Social deprivation												
Quartile 1	Ref				Ref				Ref			
Quartile 2	1.40	0.92	2.14	0.12	1.52	0.97	2.37	0.07	1.80	1.04	3.11	0.04
Quartile 3	1.25	0.82	1.92	0.30	1.54	0.98	2.41	0.06	1.28	0.73	2.25	0.39
Quartile 4	1.65	1.08	2.51	0.02	2.07	1.32	3.22	0.001	1.81	1.05	3.12	0.03
Unemployment												
Quartile 2	Ref				Ref				Ref			
Quartile 3	1.27	0.80	2.02	0.31	1.27	0.76	2.12	0.36	0.88	0.49	1.56	0.65
Quartile 4	1.56	1.04	2.35	0.03	1.67	1.07	2.61	0.02	1.31	0.85	2.02	0.22
Volunteering rate (proxy for social capital)												
Quartile 2 & 3	Ref											
Quartile 4	1.36	0.99	1.88	0.06	1.52	1.03	2.24	0.04	1.12	0.71	1.76	0.63
Social fragmentation												
Quartile 1	Ref				Ref				Ref			
Quartile 2	0.84	0.55	1.27	0.40	0.90	0.54	1.49	0.67	0.75	0.39	1.43	0.38
Quartile 3	1.75	1.26	2.43	0.001	2.09	1.41	3.08	<0.001	1.31	0.82	2.09	0.26
Quartile 4	1.42	1.02	1.97	0.04	1.49	1.00	2.21	0.047	1.54	0.97	2.45	0.07
Population density												
Quartile 1	Ref				Ref				Ref			
Quartile 2	0.95	0.67	1.34	0.77	1.00	0.71	1.41	0.99	0.90	0.57	1.41	0.64
Quartile 3	0.85	0.61	1.18	0.34	0.86	0.62	1.18	0.35	0.98	0.67	1.44	0.93
Quartile 4	0.83	0.60	1.15	0.26	0.81	0.58	1.11	0.19	1.06	0.72	1.57	0.76

In determining the aetiology of psychotic disorders, the association observed between neighbourhood characteristics and psychotic disorder treated incidence does not examine possible causal relationships between deprivation and psychosis, as individuals may develop a psychotic disorder as a consequence of their deprived neighbourhood, or individuals diagnosed with a psychotic disorder may drift into deprived neighbourhoods as a consequence of the disorder (Kirkbride et al., 2014). Although this study's naturalistic cohort design cannot exclude the effect of social drift in this cohort, most of the cohort still lived with their parents and as such, they had not yet had the opportunity to 'drift' away from their neighbourhood of upbringing. It is possible that the association observed between neighbourhood characteristics and psychotic disorder treated incidence is due to an increased prevalence of risk factors for psychosis in these neighbourhoods (O'Donoghue et al., 2016b). A known risk factor for psychosis is cannabis abuse (Moore et al., 2007) which is known to be more prevalent in urban areas (Lewis et al., 1992), which are often deprived (Heinz et al., 2013). Childhood residential mobility has been demonstrated as a risk factor for psychotic disorder (Paksarian et al., 2015), as has international migration (Coid et al., 2008). Further research is needed to determine the causal relationships that may exist between neighbourhood characteristics and the development of psychotic disorders. This research could include longitudinal studies that might assist in determining the age at which specific risk factors are most influential which in turn could lead to better and more focused therapies.

4.4. Limitations

The cohort utilised in this study was restricted to those who sought help from or were referred to the Early Intervention for Psychosis service, and as such it is possible that there existed cases of FEP within this study's catchment area and study period that were not included. The use of volunteering as a proxy measure of social capital rather than a direct measure of social capital impairs confidence in the specificity of these results, however, the use of this proxy measure is attested in the literature while the generation of social capital specific data would have required extensive population surveying outside of the scope of this study. Furthermore, this study was undertaken within an urban catchment area and therefore it is not known whether these findings can be extended to rural areas. There may be some diagnostic variability in this cohort due to the use of clinical diagnoses rather than validated diagnostic instruments, however, the diagnoses were made according to DSM-IV by consultant psychiatrists following longitudinal assessments. These results also do not determine individual causality, given the 'ecological fallacy' that affected individuals may not have been exposed to their local neighbourhood level effects (Hill, 1965). Unmeasured confounding and biases may also have influenced this study's results.

5. Conclusions

Psychotic disorder treated incidence varies widely according to neighbourhood characteristics, with much higher rates in more deprived, fragmented neighbourhoods and those with high unemployment. This information is highly significant in terms of determining the most effective means of distributing already limited resources to vulnerable individuals who have experienced, or are at risk of experiencing, a psychotic illness. The geographical heterogeneity of psychotic disorder treated incidence must be matched with the appropriate allocation of resources and location of early intervention in psychosis services.

Conflict of interest

On behalf of all authors, the corresponding author states that there is no conflict of interest. This study was also approved by all appropriate ethical boards.

Contributors

Brian O'Donoghue designed the study and prepared and submitted the ethics application. Scott Eaton, Linglee Downey, Kristen Thien, Meghan Bowtell and Melissa Bardell-Williams collected the information from clients' clinical files. Scott Eaton gathered the demographic data and wrote the manuscript. Benjamin Harrap and Brian O'Donoghue performed the statistical analyses. Aswin Ratheesh, Patrick McGorry and Brian O'Donoghue provided expertise and input throughout the drafting process. All authors have approved the final manuscript.

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