

# Parity of esteem begins at home: translating empirical psychiatric research into effective public mental health

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There is increasing recognition that parity of esteem between mental and physical health disorders is essential to improve the course, outcome and quality of life of individuals within different populations. Achieving this parity now underpins the objectives of several nations. Here, we argue that parity of esteem between mental and physical health can only be realized when parity of esteem also exists across mental health disorders, particularly in terms of service commissioning and planning. Using first-episode psychosis and early intervention in psychosis services as a motivating example, we demonstrate how carefully conducted psychiatric epidemiology can be translated to develop precise forecasts of the anticipated incidence of first-episode psychosis in different populations, based on an understanding of underlying local needs and inequalities. Open-access prediction tools such as PsyMaptic will allow commissioners of mental health services to more effectively allocate resources across services, based on empirical evidence and local need, thus reducing inequalities in access to mental health care.

Received 2 May 2013; Revised 10 July 2013; Accepted 10 July 2013; First published online 9 August 2013

**Key words:** Early intervention in psychosis, health services research, parity of esteem, prediction, public mental health.

## Introduction

Achieving parity of esteem between mental and physical health has become a major priority in several countries within the last 12 months. At a recent White House conference on mental health, the 44th President of the USA, Barack Obama, issued a statement to say that from 2014, no healthcare provider in the USA would be allowed to deny anyone insurance on the basis of pre-existing mental health problems (The White House, 2013), effectively putting in motion the country's 2008 Paul Wellstone and Pete Domenici Parity and Addiction Equity Act. There is growing pressure in other countries, too, to make parity of esteem between mental and physical health a key goal. On the last World Health Day the President of the Royal College of Psychiatrists, Professor Sue Bailey, was joined by colleagues from Australia, New Zealand and Canada in calling upon governments across the world to give equal footing to mental and physical health (Royal College of Psychiatrists, 2012), with publication of the College's landmark report, 'Whole-Person Care: from rhetoric to reality' setting

forth a blueprint for realizing this aim (Royal College of Psychiatrists, 2013).

## Physical and mental co-morbidity in people experiencing psychosis

It is now widely recognized that a high degree of co-morbidity exists between mental and physical health (Lasser *et al.* 2000; Grant *et al.* 2004; Egede, 2007; Moussavi *et al.* 2007; McManus *et al.* 2010; Department of Health, 2011; Champion *et al.* 2012). As such, improved outcomes in one domain will probably require investment in the other. One of the starkest challenges facing the parity of esteem agenda is the reduced life expectancy of between 10 and 25 years in people diagnosed with schizophrenia (Laursen *et al.* 2012). This is not due solely to elevated rates of suicide in this population, with excess mortality primarily attributable to cardiovascular and respiratory diseases (Mortensen & Juel, 1993; Brown *et al.* 2000; Saha, 2007; Lawrence *et al.* 2010; Department of Health, 2011). While side-effects of anti-psychotic medication are probably an important contributor to this, people with pre-existing mental health disorders also tend to receive poorer physical health care (Kohn *et al.* 2004; Mitchell *et al.* 2009; Lord *et al.* 2010), tend to lead more unhealthy life-styles (Brown *et al.* 1999; McCreadie, 2003) and are less likely to receive behavioural and life-style advice, including in

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regard to smoking cessation (Campion *et al.* 2012). The prevalence of tobacco smoking in people with psychotic disorder (Lasser *et al.* 2000), including those in early intervention in psychosis settings (Wade *et al.* 2006; James & Das, 2012), is estimated to be as high as 70%.

Although the incidence and prevalence of psychotic disorders is lower than for other psychiatric conditions, they nevertheless contribute substantially to lifelong social, functional and physical disability (Rossler *et al.* 2005), given their often poor prognoses and early age at onset. As such, the cost to health services and society of psychotic disorders is relatively large; in 2005/6 the total cost of schizophrenia alone was estimated to be £6.7 billion in England (Mangalore & Knapp, 2007), and similar costs for all psychotic disorders in Europe have more recently been estimated to be the third highest of any psychiatric disorder, narrowly behind common mental disorders and dementias (Gustavsson *et al.* 2011).

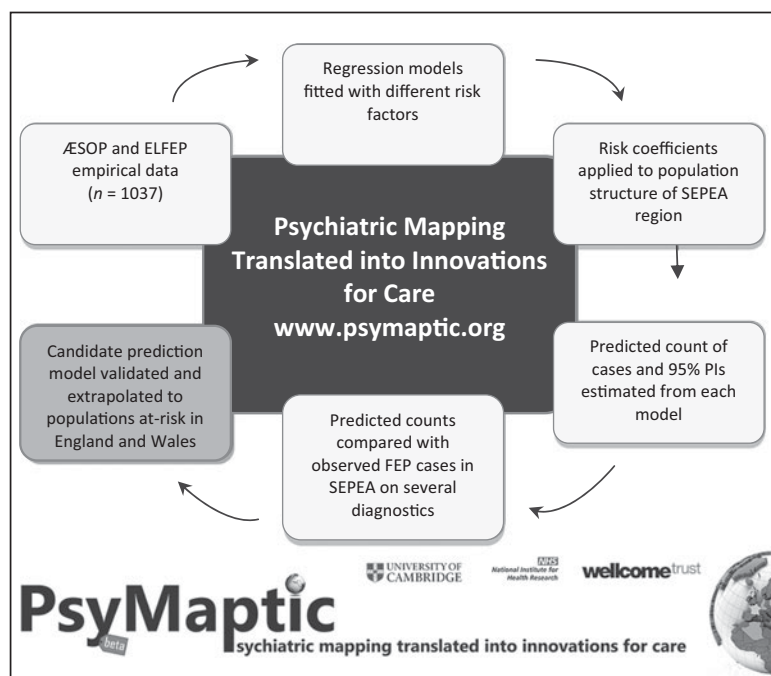
#### Development and controversies of early intervention in psychosis services (EIS)

Beginning in the last decade of the previous millennium, empirical evidence began to suggest that earlier clinical intervention following the onset of psychotic symptoms led to better health and social outcomes for people with severe mental illness (McGorry *et al.* 1996), with fewer relapses and readmissions later in life. A longer duration of untreated psychosis (DUP) is known to be predictive of poorer clinical and social outcomes (Marshall *et al.* 2005; Perkins *et al.* 2005). The idea of early intervention in psychosis gained sufficient momentum for multidisciplinary EIS to be introduced nationally in many countries, including England (Department of Health, 2001), Australia and New Zealand. Further, specialist first-episode psychosis (FEP) services, including prodromal and early intervention initiatives, have also been established on an *ad hoc* basis elsewhere, including the USA (Addington *et al.* 2012; Caplan *et al.* 2013), Canada (Iyer *et al.* 2010), India (Iyer *et al.* 2010), Brazil (Brietzke *et al.* 2011), South Korea (Lee *et al.* 2012), Hong Kong (Hui *et al.* 2013) and Japan (Koike *et al.* 2011). Such services aim to reduce DUP and tackle health and social inequalities in young people experiencing FEP (typically aged up to 35 years old), thus targeting improvement over a range of clinical, economic and social outcomes. We would expect (Kirkbride *et al.* 2006) such services to see at least 76% and 63% of all men and women, respectively, who would develop FEP in their lifetime (Kirkbride *et al.* 2006).

Proponents of EIS cite evidence to show that when intervention is sustained, people experiencing severe

mental illness have improved clinical (Craig *et al.* 2004; Mihalopoulos *et al.* 2009) and social outcomes (Garety *et al.* 2006; Bertelsen *et al.* 2008; Mihalopoulos *et al.* 2009). Typically, however, EIS only provide support to young people in the first 3–5 years of disorder, before referring them on to standard care. Without continued intervention, some evidence indicates that initial gains may be eroded (Marshall & Rathbone, 2011). This problem has been used by those on both sides of the EIS debate to justify the continued support or highlight the shortcomings of EIS—see Bosanac *et al.* (2010) and McGorry *et al.* (2010) for criticism and rebuttal of this and other aspects of EIS care. The provision of continued effective care for young people with psychosis after EIS is an important issue, discussed in greater detail elsewhere (Lester *et al.* 2012). There is a strong economic justification for EIS. Per participant annual costs are lower than through standard care (McCrone *et al.* 2011), particularly over time (Valmaggia *et al.* 2009). Also, there is evidence that every pound or dollar spent on EIS leads to exponential downstream cost savings; these are associated with fewer future inpatient admissions, lower future treatment costs for mental and physical health problems, and indirect savings associated with people remaining in or entering employment (Mihalopoulos *et al.* 2009; McCrone *et al.* 2011). Finally, EIS are seen as largely beneficial by the patients themselves and their carers (Lester *et al.* 2011, 2012).

The deployment of EIS has, however, attracted criticism on several grounds. These include lack of improvement in outcomes unless intervention is sustained (Marshall & Rathbone, 2011), possible lack of clinical improvement in symptoms over standard care in the longer term (Bertelsen *et al.* 2008), issues surrounding the definition of caseness and DUP (Bosanac *et al.* 2010), ethical issues raised by treating those in the prodromal (pre-clinical) phase of psychosis [including possible stigmatization (Raven *et al.* 2012) and the administration of medication to non-clinical groups who may never have gone on to develop psychosis (Pelosi & Birchwood, 2003; Raven *et al.* 2012)], discontinuities in care pathways (Pelosi, 2009) and possible age–sex discrimination (Pelosi & Birchwood, 2003). Notwithstanding some evidence supporting the cost-effectiveness of EIS (Mihalopoulos *et al.* 2009; Valmaggia *et al.* 2009; McCrone *et al.* 2011), one particular criticism of such services is that resources could have been better invested in other areas of psychosis and psychiatric care (Pelosi & Birchwood, 2003; Pelosi, 2009; Bosanac *et al.* 2010). Kelly *et al.* (2007), for example, have highlighted the need for flexible, adaptive EIS to fit in with existing local healthcare practices and culturally influenced help-seeking



**Fig. 1.** Schematic overview of the PsyMaptic prediction process. AESOP, Aetiology and Ethnicity in Schizophrenia and Other Psychoses; ELFEP, East London First Episode Psychosis; SEPEA, Social Epidemiology of Psychoses in East Anglia; PI, prediction interval; FEP, first-episode psychosis.

behaviour in rural communities, where there may be insufficient demand for stand-alone EIS teams.

### Parity of esteem, EIS delivery and local need

We, like Kelly *et al.* (2007), also note a more fundamental problem with EIS delivery: for such services to be efficient and effective they must be: (1) resourced according to anticipated local need; and (2) be designed to reflect the underlying sociocultural structure of the population at risk which they serve. We posit that mismatches between EIS delivery and utilization (see below) lie at the heart of continued controversies in regard to funding of EIS and other mental health services (Amos, 2012; Mihalopoulos *et al.* 2012). In countries where mental healthcare is predominantly provided by the state, addressing social and economic disparities in psychiatric morbidity and health service delivery has become an increasingly important political issue at a time of economic uncertainty (Department of Health, 2007, 2011; Council of Australian Governments, 2012). If EIS delivery can be based on more realistic models of predicted psychosis in different communities, centred on local need, then resources can be allocated more efficiently within the mental health system as a whole. The benefits of accurate prediction of local demand for EIS and other mental health services is not limited to potential gains in efficiency; explicitly modelling the underlying

sociodemographic, economic and cultural determinants of mental health disorders should also reveal the probable structure of local demand, facilitating effective service delivery centred around the particular sociocultural needs of local populations. As such, a necessary precursor to achieving parity of esteem between physical and mental health will be creating the conditions for parity of esteem to arise within mental health, such that culturally sensitive resources are delivered efficiently and effectively based on local population needs across a range of mental health disorders. To do this, healthcare commissioners and policymakers need access to robust, precise predictions of anticipated service utilization, based on empirical data.

In this article, we showcase the development of one such tool, known as PsyMaptic (Psychiatric Mapping Translated into Innovations for Care; [www.psymaptic.org](http://www.psymaptic.org)) (see Fig. 1), which translates empirical population-based estimates of disease risk into expected morbidity in different populations, having taken into account variation in local population structures and exposure to socio-environmental characteristics associated with disorder. PsyMaptic is currently an incidence-based prediction tool for FEP in England and Wales, though the modelling methodology underpinning the tool (Kirkbride *et al.* 2013) can easily be extended to prevalence-based scenarios, other disorders or geographical regions where

the epidemiology is well-characterized and accurate population denominator data are available. Here, we briefly set out the context under which the tool was developed, before providing an overview of the methodology, prediction validity and limitations of this approach.

### Background to EIS implementation in England

EIS for people aged 14–35 years old in England were nationally commissioned by the Department of Health in 2002, based on a uniform incidence rate for service resourcing of around 51 new cases per 100 000 people per year (Department of Health, 2001)<sup>†</sup>. Although the accompanying Mental Health Policy Implementation Guide (MH-PIG) specified that '[a]n understanding of local epidemiology is needed as the size of the population covered will depend on a number of different factors including: Geography of the area; Health and Social service boundaries, [and] Demography and epidemiology' (Department of Health, 2001, p. 55), the Department of Health did not delineate how such variation should be integrated into service development. Since their inception anecdotal reports and service audits have emerged to suggest that under this uniform commissioning EIS capacity was either being outstripped by public utilization (Mahmood & Fisher, 2006), or that such services were operating under capacity (Tiffin & Glover, 2007).

Although EIS funding is influenced by a range of local and national policy factors, and is not solely determined by anticipated caseloads, services in more deprived, urban populations were more likely to report running over capacity (Mahmood & Fisher, 2006; Lester *et al.* 2009). By contrast, while effective EIS delivery in rural areas faces a number of unique challenges (Craig, 2003; Kelly *et al.* 2007; Lester *et al.* 2009), rural services were generally more likely to see fewer than expected cases under the Department of Health's uniform rate (Tiffin & Glover, 2007). In one audit, four of nine regional EIS leads suggested low caseloads 'were partly due to the original targets overestimating the case prevalence [*sic*] in non-urban areas' (Tiffin & Glover, 2007). This mismatch threatens mental health service provision in different regions in different ways. In more urban areas, where the risk of psychotic disorder is elevated (Kirkbride *et al.* 2012a), services may not be able to meet targets to provide adequate care for services users. In less urban settings, where services may operate under capacity, future funding may be threatened if services do not meet national guidance which recommends that each

key worker should manage a caseload of 15 service users.

### Development of the PsyMaptic prediction tool

Fundamental to the development of our PsyMaptic prediction tool is the assertion that healthcare delivery should be evidence-based (McGorry, 2012). In developing PsyMaptic (Kirkbride *et al.* 2013) we investigated the validity of several different empirical models, informed by robust population-based FEP data from two large, methodologically similar epidemiological studies: the Aetiology and Ethnicity in Schizophrenia and Other Psychoses (AESOP) study and the East London First Episode Psychosis (ELFEP) study (Kirkbride *et al.* 2006, 2008). These studies were conducted prior to the introduction of EIS, and included 1037 people aged 16–64 years with FEP. This allowed us to precisely estimate the incidence rates of psychotic disorders in different sociodemographic groups in three areas of England (London, Nottinghamshire and Bristol). A total of six different negative binomial regression models were tested, which all included age group, sex, their interaction, and ethnic group as important predictors of psychosis risk. In addition, five of these models included a measure of the social environment, including four different components of deprivation or population density at the local authority district (LAD) level ( $n=21$ ). We retained regression coefficients from each model, and applied them to the population at risk in a new region, in order to predict the expected count of FEP cases according to the size of the population in different sociodemographic strata, given the model. These models were tested in the catchment area of a markedly different region, East Anglia, at a later period in time (between 2009 and 2012), where we had concurrently estimated observed FEP incidence, aged 16–35 years, as seen through six EIS in the Social Epidemiology of Psychoses in East Anglia (SEPEA) study (Kirkbride *et al.* 2012c). Only observed cases meeting International Classification of Diseases, tenth revision (ICD-10) clinical diagnosis for FEP 6 months after acceptance into the service were included in our comparison sample.

### Validation of PsyMaptic prediction models

We validated each prediction model by comparing how closely it predicted observed caseloads in this new region according to a range of validation metrics (see Kirkbride *et al.* 2013). Our most accurate model for FEP prediction in EIS included age group, sex, their interaction, ethnic group and LAD-level population density. Overall this model predicted that 508 FEP cases, aged 16–35 years, would occur over a

<sup>†</sup> The notes appear after the main text.

2.5-year period in East Anglia, with a 95% prediction interval (95% PI) of 459–559 cases (Kirkbride *et al.* 2013). The observed number of FEP cases ascertained from the SEPEA study during this time period was 522. In addition, our model correctly<sup>2</sup> predicted the number of cases observed in five out of six of our EIS and 19 out of 21 LADs. All our prediction models out-performed the Department of Health's uniform prediction rate, which over-predicted expected cases (716; 95% PI 664–769) overall, and only predicted accurately in two out of six and thirteen out of twenty-one EIS and LAD, respectively. We applied our best-fitting model to the 2009 mid-year population estimates for all LADs in England and Wales to obtain national estimates of the predicted annual incidence of psychotic disorders, which we have translated into a free tool for public mental health ([www.psymaptic.org](http://www.psymaptic.org)). Overall our model predicts 5826 new FEP cases per year (95% PI 5656–5990) in the age range 16–35 years in England, with just a further 92 cases in Wales (95% PI 75–114). This is considerably fewer than the Department of Health's previous estimate ( $n=7500$ ) (Department of Health, 2000).

### Strengths and limitations of the PsyMaptic prediction tool

Our models are predicated on clinically relevant case-loads meeting ICD-10 diagnostic criteria for psychotic disorder 6 months after EIS acceptance. They are not based on the broader range of psychopathology often seen at initial referral to EIS, a problem sometimes compounded by the important EIS policy not to diagnose at first presentation in order to allow symptom evolution, and avoid stigmatizing young people who may (or may not) be in their first episode of psychosis. Services will therefore require sufficient resourcing to manage the broader referral base that they are likely to see beyond the strict diagnosis of ICD-10 psychotic disorder. Reducing the false-positive rate in EIS presents a separate opportunity to improve pathways to care within the health system, and improve the delivery of services to young people who may require some degree of psychiatric triage and signposting to the most appropriate service.

The accurate translation of epidemiological models of disease risk into tools for public mental health planning and service commissioning should increase the efficiency and effectiveness of mental health provision in healthcare systems throughout the world. PsyMaptic provides proof of concept of one such approach. Unlike the current 'gold standard' for EIS commissioning in England, our approach dynamically adapts to anticipated local need for psychosis services in young people, and is responsive to changes

in the sociodemographic structure of different communities over time. Because the PsyMaptic model translates robust coefficients of psychosis risk to the sociodemographic and socio-environmental profiles of the underlying population at risk in different regions, it highlights those communities where annual demand for services is likely to be highest (or lowest). This information should facilitate more efficient allocation of finite resources to EIS where they are most needed. One natural extension of PsyMaptic would clearly be to develop and apply similar models to other psychiatric disorders where the epidemiology is well characterized, including common mental disorders, dementia and autism spectrum disorders. Our prediction models could also be adapted to focus on the supply of cross-disorder mental health teams, including crisis and home resolution teams, intake and treatment teams and child and adolescent mental health services. Furthermore, because PsyMaptic predictions are based on local need, this tool could provide service planners with an indication of the likely sociodemographic composition of their services, paving the way for the effective delivery of culturally sensitive mental health care services.

We hope that our translational tool is a valuable resource for newly formed clinical commissioning groups, service planners, and EIS leads and teams in England and Wales. In the future, we hope to deploy the tool in other international settings. Our tool may also have utility for researchers planning studies in particular populations (i.e. specific age or ethnic groups). Our proposed approach, if reliable, will meet recent calls by the Department of Health and other institutions, including the Royal College of Psychiatrists, Royal College of General Practitioners and the Royal Society of Public Health, that health service provision should be based around local need (Joint Commissioning Panel for Mental Health, 2012).

### Conclusion

Our approach highlights local need for psychosis services according to age, sex, ethnic group and level of urbanization. As such it begins to illuminate those communities that are likely to face the largest inequalities in regard to the burden of severe mental illness. A body of international research (van Os *et al.* 2000; Allardyce *et al.* 2005; Veling *et al.* 2008; Zammit *et al.* 2010), including our own work in England (Kirkbride *et al.* 2008, 2012a, b), now suggests that social inequalities themselves are associated with increased rates of psychotic illness. Tools to identify and tackle regional inequalities in the social and economic determinants of mental health and well-being, as well as in inequalities in the allocation of resources within and beyond

the mental health system, can serve as the evidence base upon which to found effective service delivery for the prevention and management of mental health disorders. Developing these capabilities lies at the heart of many national political objectives to improve clinical, social and economic outcomes in people experiencing mental health problems, including in the USA (The White House, 2013) and UK (Department of Health, 2011). Parity of esteem between physical and mental health service provision will only begin to be achieved when we move towards parity of esteem within mental health systems. This will only be realized when service commissioning is underpinned by evidence-based tools that map psychiatric risk according to the local needs of different communities.

### Acknowledgements

J.B.K. was supported by a Sir Henry Wellcome Research Fellowship from the Wellcome Trust (grant no. WT085540), through which the SEPEA study ([www.sepea.org](http://www.sepea.org)) was established. P.B.J. directs the National Institute for Health Research (NIHR) Collaboration for Leadership in Applied Health Research and Care (CLAHRC) for Cambridgeshire & Peterborough and is supported by NIHR grant no. RP-PG-0606-1335. The SEPEA study has been adopted by the Mental Health Research Network (MHRN). The authors are grateful to the clinical services and staff participating in the SEPEA study, and the MHRN for their support.

### Declaration of Interest

None.

### Notes

<sup>1</sup> The Department of Health recommended a uniform rate to commission EIS, which 'should manage 150 new cases per year... It is envisaged that each Early Intervention Service will cater for a population of around 1 million people.' [Department of Health (2001), p. 55]. At the time 29.4% of the English population were estimated to be aged 14–35 years old, suggesting that EIS in England were commissioned on the basis of a uniform rate of 51.0 FEP cases per 100 000 person-years over the age range 14–35 years (i.e.  $[150/(1000000 \times 0.294)] \times 100000$ ).

<sup>2</sup> We defined a 'correct' prediction to occur when the observed number of cases fell within the 95% PIs for a given estimate. See Kirkbride *et al.* (2013) for full details of our methodology.

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