Introduction

David Kingdon, Paul Rowlands and George Stein

Psychiatry, according to Johann Christian Reil (1759–1813), the German anatomist who first coined the term, consists of the meeting of two minds, the mind of the patient with the mind of the doctor. As the patient's story unfolds, the doctor's task is to recognise the pattern and to do so with compassion. Pattern recognition lies at the heart of the diagnostic process throughout medicine and none more so than in psychiatry, which lacks almost all the special investigations that help clarify diagnosis in other medical specialities. Thus, detailed knowledge of the key features of all the psychiatric disorders, both common and rare, is the core body of information that the psychiatrist will need to acquire during their training years. Because of this, we have provided detailed descriptions of each and every disorder as well as their diagnostic criteria according to DSM-5 and ICD-11.

Diagnostic acumen separated from therapeutic skill is of little use to patients or their families. When Reil first introduced the term 'psychiatry', he used the term in the therapeutic sense so that the mind of the doctor would act as a healing agent on the mind of the patient. Whilst the initial consultation serves to reach a diagnostic formulation and to establish a therapeutic alliance, all the later meetings between doctor and patient involve 'treatment' in the broadest sense: the development of a collaborative management plan. At one time, particularly in the first half of the twentieth century, the skills of psychotherapy were shrouded in the mystery of psychoanalysis and were very difficult to acquire without years of training, but today a large array of therapies for almost every condition exist, the necessary skills are far easier to learn, and their descriptions are distributed throughout this book. Drug therapy, which is also an essential component of good psychiatric practice in many cases, is well covered in Chapter 3.3 for depression and Chapter 5.3 for schizophrenia. An understanding of social, cultural, historical and economic factors influencing mental health is also essential, and in all chapters, we would emphasise that the disorders described are seen in this context. All planning of 'treatment' is founded on an ongoing effort to establish a collaborative therapeutic alliance with a unique individual person using this broad holistic framework.

The 2nd edition of this textbook was published more than 15 years ago in 2008. Since then, much has changed but also much has remained the same. What has barely changed are the core descriptions of all the psychiatric disorders. This body of knowledge is unlikely to change much in the coming period and, as this is the crucial body of knowledge needed for making psychiatric diagnoses, trainees will find acquiring this body of information will serve them well throughout all their years in practice. Minor changes in diagnostic criteria, nomenclature and classification are to be expected in both the DSM and ICD systems as more knowledge is acquired.

Psychiatric research, once the concern of a few elite institutions in Europe and the USA, has expanded rapidly, and today, numerous universities the world over have large and productive academic departments of psychiatry. Thus, for the first and second editions of this book, many scientific articles on most topics were available. However, in the last few years, there has been an explosion in both the quantity and quality of scientific psychiatry (see Chapter 1). There are now systematic reviews and meta-analyses on almost every specific intervention in psychiatry. These have been included in this book, making the factual basis for psychiatry widely available and far more solid than for our previous editions.

At the same time, specific psychiatric interventions can only take place in the context of a therapeutic relationship and a service delivering psychiatric interventions. Psychiatric services, by their very nature, involve numerous skilled professionals and others, and for most of their existence, there has been a struggle to secure adequate funding. There was an expansion of services in the early part of the millennium, but since that time, austerity has restricted the implementation of new developments. The closures of psychiatric beds released some, but insufficient, funding for community developments in the 1960s, 1970s and 1980s, and a similar process in recent decades has also occurred. This has placed pressure on a shrinking stock of inpatient beds leading to increased use of the private sector and numerous out-of-area placements. At times, a sense of crisis has enveloped the whole system, and this suggests this process of bed closure has perhaps gone too far (Chapter 20). Despite this, mental health now has a higher profile, and parity with physical health care is accepted. Though this has yet to be achieved, a spirit of seeing opportunities for improvement and working towards these opportunities is required. Doctors have had an important role in leading these changes over many decades. Supporting their patients and services through challenging times is a crucial role and is based on this combination of practical clinical

experience, detailed theoretical knowledge and an ability to work alongside others.

There have also been substantial changes in the classification of disorders, with DSM-5 released in 2013 and even more radical changes in ICD-11 in 2019. In particular, changes in approaches to personality disorder have considered alternative terminology as well as a move to a dimensional rather than a categorical approach (Chapter 7.1).

Assessment, formulation and diagnosis are discussed as the basis for clinical skills (Chapter 2), and this is essential reading for those at the start of their careers. Then, each of the major disorders are explored in relation to clinical features, causation and treatment (Chapters 3–7). Some new categories have emerged with ICD-11, such as functional neurological disorder (previously, conversion disorder) and bodily distress disorder (previously, somatisation disorder; Chapters 6.5 and 6.6). Catatonia is now classified under its own heading in ICD-11, and its presentation is discussed in various chapters, including those on affective disorders, schizophrenia and neuropsychiatric conditions. Two new chapters have been added on neurodevelopmental problems, including autism and ADHD. The growing realisation (or rediscovery) that serious psychiatric disorder is associated with a high all-cause mortality and a shorter lifespan has led us to include a separate chapter on the physical health of psychiatric patients. The subspecialities of neuropsychiatry (Chapter 8), sleep disorders (Chapter 11), eating disorders (Chapter 12) and perinatal psychiatry (Chapter 13) are then covered. The book ends with a group of topics that are common to all disorders: suicide (Chapter 15), cultural and international psychiatry (Chapter 17), psychiatry in general practice (Chapter 18), psychiatry in the general hospital (Chapter 19) and finally mental health services (Chapter 20).

This is a substantial book, and reading it cover to cover would appear to be a daunting prospect for any trainee starting out in psychiatry. However, there is no need to digest its contents in the first month of the first placement, and it is intended that the greater bulk of it can be read well into the second year of the three-year core training programme and beyond. We hope it can also be used by anyone else interested in the subject. We would recommend that those new to psychiatry and mental health services focus first on understanding the organising principles of assessment (Chapter 2) and the core common conditions of depression (Chapter 3.1), bipolar disorder (Chapter 4.1), schizophrenia and its clinical features (Chapter 5.1) and their respective drug treatments (Chapters 3.3 and 5.3). The development of a therapeutic alliance is at the core of psychiatric practice, and the complexities sometimes encountered are discussed in chapters on personality disorder, body distress disorder and neuropsychiatric disorders. Other chapters deal with commonly encountered conditions as well as those less-often seen. Learning in psychiatry, as in medicine more widely, is based on the blend of clinical experience and the acquisition of theoretical knowledge, supervised by experienced clinicians. A consistent and reliable assessment technique can only be acquired by practice. Learning from the individual patient by reading the theoretical background to their problems brings an increase in understanding and meaning to the individual case. It enriches the knowledge base with which the clinician then approaches each new clinical encounter. We learn psychiatry from our individual patients and not from a book – but a book can provide a framework to organise this learning. As such, we hope that reading the whole book, sometime in the 2nd or 3rd year of a three-year training programme, will provide a feel for the breadth and depth of psychiatry as well as provide a summary of the current known facts of our discipline.

Psychiatry is however far more than a body of facts to be memorised. It is a skill, a mode of healing and an empathic profession that include a variety of differing capabilities. Defining these more diffuse qualities needed to practise successfully has proved a challenge, but the Royal College of Psychiatrists in the United Kingdom has drawn up a syllabus to form the basis of the necessary values and skills required to practise. The new curriculum has guided the selection of content included in this book, and further details are given in Appendix I.1.

We are extremely grateful to the authors who have either fully updated or provided completely new chapters for this edition. These chapters are erudite, concise and readable. Each contain a wealth of information drawn from the considerable expertise of these leaders in their field, providing evidence and practical guidance which, we're sure, will be of great value to readers in their clinical practice – and for their exams.

Appendix I.1: Broad Themes for Psychiatry within the Revised Curricula

Veryan Richards and Paul Rowlands

The Purpose of a Curriculum in Psychiatry

'The purpose of the core and higher psychiatry curricula is to train medical doctors to specialise in the assessment, diagnosis, treatment, management of patients with mental disorders in a wide range of clinical settings in collaboration with the patient, other health professionals and relevant others including families and carers of all ages.'[1]

One of the great strengths that psychiatry brings to the diagnosis, care and treatment of patients is the fact that psychiatrists come from an extended, holistic training background that takes into account the psychological, biological, social, cultural, spiritual and gender context in which all these issues are embedded. 'This holistic person-centred care approach underpins the speciality of psychiatry and the key role of psychiatrists in multi-disciplinary teams.'[1] Psychiatrists also work with capacity and risk issues and address prevention, advocacy and the reduction of stigma.

A person-centred and recovery-oriented approach to clinical practice is now an explicit part of health service policy in the UK: 'Person-centred care focuses on the patient as a person, with 'personhood' being its superordinate principle'.[2] This forms the key message of *Person-Centred Care: Implications for Training in Psychiatry* (CR215) and reminds us that the language we use in clinical practice is of crucial importance.[2,3] Person-centred care is now a central feature of the revised curricula, comprising a number of different but related components.

Generic Professional Capabilities and Specific Speciality Curricula

Good Medical Practice[4] and *Core Values for Psychiatrists* (CR204)[5] are the foundation documents for the revised curricula. There is a new curricula structure that aligns to the General Medical Council (GMC) frameworks *Excellence by Design*[6] and *Generic Professional Capabilities*[7] and in line with the principles of the *Shape of Training Review* [8] with implementation in autumn 2022.

There are nine **Generic Professional Capability** domains:

1. Professional values and behaviours
2. Professional skills
3. Professional knowledge
4. Health promotion and illness prevention
5. Leadership and team-working
6. Patient safety and quality improvement (QI)
7. Safeguarding vulnerable groups
8. Education and training
9. Research and scholarship

Each domain is shaped by a 'why, what, how' model – higher learning outcomes (HLO) provide the 'why', key capabilities (KC) provide the 'what', and illustrations provide the 'how'. The domains are supported by a separate updated illustrations document. The new curriculum framework aims to provide a flexible and adaptable approach to training, and the broad capabilities will ensure that trainees draw on a breadth of experience to achieve them. The curricula continue to be outcome based and capability focused.

Implementation of the Curricula in Psychiatry

Training in psychiatry, as in all areas of medicine, is explicitly experiential, learning through doing. Supervised 'workplace based' learning is the keystone to developing safe practice, and this is blended with the expectation that psychiatrists develop a wide and deep theoretical knowledge base from a range of perspectives. Doctors progressing through psychiatric training progress through a blend of completing work in real workplace settings, undertaking workplace-based assessments with experienced supervisors, developing a portfolio demonstrating their working practice – including feedback from others – and testing their theoretical knowledge via examinations.

Since the second edition of *Seminars in General Adult Psychiatry,* the health, wellbeing and service delivery

landscapes in the UK have evolved significantly. This is reflected in the revised curricula by some existing themes becoming more prominent and the introduction of some new themes into the training and assessment programmes for core and higher trainees. Going forward, the following themes are fundamental to the practice of modern psychiatry; they will enhance the delivery of person-centred care and treatment for patients of all ages:

- A values-based and evidence-based clinical approach
- Multi-disciplinary model of person-centred care
- Shared responsibility and shared decision-making
- Integration of social psychology developments and interventions, with biological advances and interventions, particularly in neuroscience
- Integrating approaches to addressing the physical and mental health needs of patients
- Ensuring safe, effective prescribing of medicines and other interventions
- Developing sustainable approaches to health and health care
- Developing a sophisticated understanding of their duties as a doctor and a psychiatrist and the rights and duties of the people with whom they work
- Developing a sophisticated understanding of how medicine and psychiatry impact on and interact with society and how systems impact on individuals, including psychiatrists
- The need to develop psychiatrists and others, including people who use services, to adapt and shape developments in the service and future legal landscapes

Two themes in particular merit highlighting as they have significant implications for future training and will impact positively on the delivery of person-centred care in clinical practice.

The core values and principles that are outlined in *Core Values for Psychiatrists* (CR204)[5] underpin the therapeutic relationship between the patient and the doctor, which in turn influences the quality of recovery. This key thread is embedded into the revised curricula and training, ensuring the balance of a values-based and evidence-based approach to clinical practice. Domain 1 (HLO 1)[1]: 'Demonstrate the professional values and behaviours required of a medical doctor in Psychiatry, with reference to *Good Medical Practice*[4] and *Core Values for Psychiatrist* (CR204)'.[5]

Shared decision-making is a model of consent mandated by the *Montgomery* ruling[8] and is clarified in the updated GMC guidance *Decision Making and Consent*[9]. Shared decision-making and consent is a collaborative process, based on the evidence and values through which a doctor supports a person to reach a decision about their treatment. In person-centred care, alongside the relevant evidence, this process requires advanced communication skills to support a dialogue with the patient and to identify and manage any values conflicts that may arise. The dialogue should include explaining the outcome of the assessment and discussing the patient's ideas, values, concerns and expectations as well as informing the patient of the material risks and benefits of available treatment options. Domain 2 (HLO 1)[1]: 'Consistently use active listening skills and empathic language which respects the individual, removes barriers and inequalities, ensures partnership and shared decision-making and is clear, concise, non-discriminatory and non-judgemental'.

How Does This New Edition of *Seminars* Fit with the Continued Development of Training in Psychiatry?

This edition of *Seminars in General Adult Psychiatry* aims to describe some of the practical aspects of general adult psychiatry blended with the theoretical background for the main conditions found in its practice, particularly within a UK context. In the spirit of quality improvement, it is intended as a 'work in progress'. It seeks to synthesise the knowledge of experienced academics with the practical experience of people with the lived experience of the conditions described and people with experience in delivering and developing services. As such, we hope it will provide a readable and helpful manual to aid the present and coming cohorts on their journey.

Person-centred care is the principle at the heart of good medicine and psychiatry; this is demonstrated through the professional values and behaviours shown by practitioners. Like all crafts, experience and skill are gained over time. The blend of supervised broad practical experience, theoretical knowledge across the domains and personal reflection enables psychiatrists to acquire the necessary values, behaviours, knowledge and skills through their training. The process of learning, however, never reaches an end point as psychiatrists are dealing with complexity and uncertainty. They are always in a state of 'incomplete knowledge', and good psychiatry requires the humility to recognise this. With the right support and training, psychiatry provides an unequalled opportunity for a career in which the holistic person-centred approach to the care of people with mental illness can bring the greatest of rewards.

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Chapter 1

Clinical Epidemiology*

James B. Kirkbride and Annie Jeffery

Introduction

Epidemiology is typically defined as the study of the *frequency*, *distribution* and *determinants* (causes) of health-related states and events in a defined population. These may include disease, disorder, symptoms, wellbeing, causes of death, behaviours and the provision and utilisation of health services.[1] Unlike most other branches of medical science, it is chiefly concerned with understanding and improving the health and disease status of populations rather than individuals, though public health interventions to prevent disease or promote wellbeing may be targeted at a variety of levels, including the individual (e.g. smoking cessation programmes, early detection services for people at risk of psychosis), familial (e.g. parenting interventions for mental, emotional and behavioural problems in children and young people) or societal levels (fluoridation of water supplies to reduce dental caries, folic acid fortification in non-wholemeal wheat flour to reduce birth defects in children).

The concept of *epidemics* – from the Greek *epi*', meaning 'upon'; *demos*, meaning 'people' and *ic*, meaning 'pertaining to' (literally 'pertaining to what is upon the people') – dates back at least to Hippocrates's writings in 400 BCE,[2] who described the relation of the seasons to various diseases occurring in the population at the time. However, the study or discourse – *logos*, in Greek – of epidemics – that is, epidemi*ology* – first arose in the nineteenth century following the identification of bacteria and subsequent observations that epidemics were strongly associated with infectious diseases. Indeed, the study widely credited to be the first epidemiological inquiry of its kind – *On the Mode of Communication of Cholera* – famously saw Dr John Snow remove the pump handle from the Broad Street pump in Soho, London, on 8 September 1854, following a groundbreaking investigation that helped prove cholera was transmitted via contaminated water and not through the air – the prevailing theory at the time.[3]

It soon became clear that many of the methods used for tracking infectious diseases, such as accurate case identification and determining precisely when and where cases had occurred, as well as their frequency in different settings, had a far wider application across population health, extending to our understanding of non-communicable diseases including mental health problems.

Cooper and Morgan[4] provide a brief overview of the history of psychiatric epidemiology, and they credit Émile Durkheim, the French sociologist, as among the first to apply epidemiological methods in psychiatry, in his studies of suicide. Durkheim examined successive five-year average suicide rates in different European countries and showed these were remarkably constant within each country but differed widely between countries, with the Protestant North European countries having rates that were three to four times higher than the Mediterranean and presumably Catholic countries such as Italy. To test his hypothesis further, Durkheim investigated how suicide rates varied within just one country, Germany, where some provinces were strongly Catholic while others were predominantly Protestant. He showed that the Protestant provinces (less than 50% Catholic) had a relatively high mean suicide rate, of 192 per 100,000 population, while the rate for provinces with 90% or more Catholics had rates less than half this, at 75 per 100,000. Those provinces that were 50–90% Catholic fell between these values, with 135 suicide deaths per 100,000 population. Durkheim conducted similar analyses comparing suicides rates between married and divorced people or between those who were fertile against those who were childless and, even without the help of modern statistical tests, found large differences between these different social groups. This led him to conclude that suicide, as a phenomenon, was a collective act, in that it was related to societal forces, and that the Catholic religion in some way appeared to offer a degree of protection.

Although the epidemiology of suicidality is complex and multifaceted,[5] (for a comprehensive introduction), recent evidence confirms that suicide rates are influenced by societal and cultural factors. For example, in Sweden, Hollander et al.[6] have observed that rates of suicides amongst first-generation migrants were over 60% lower than in the Swedish-born comparison population, after taking into account differences in age, natal sex and family income. This suggests that migrants import a range of protective factors that lower their risk of death by suicide, including sociocultural and religious beliefs, behaviours and customs and attitudes to suicide. Most strikingly, however, in this study, rates of suicide in migrants were dependent on the length of time lived in Sweden; no deaths by suicide were reported in migrants living in Sweden

* We are grateful to Matthew Hotopf for allowing us to revise a previous edition of this chapter.

for less than five years, while rates then began to increase in a dose-response manner, with no differences in suicide rates observed for those who had lived in Sweden for over 21 years. These findings lend further evidence to suggest that societal forces to which people are exposed can influence risk of suicide (and potentially other adverse health outcomes[7]), as Durkheim first suspected in the nineteenth century.

In the early twentieth century, in the southern United States, there was an alarming rise in the prevalence of pellagra, a debilitating neuropsychiatric disease presenting with neurasthenic symptoms, occasionally psychoses and dementia, as well as skin rashes. It was thought the cause was a specific communicable disease, possibly because of its known association with unsanitary conditions. In 1914, the US public health authority appointed Joseph Goldberger to investigate the cause of pellagra. Goldberger first observed that, in institutions where pellagra was rife, all the cases seemed to occur only among the inmates, and none of the staff were affected. He wrote that 'this pattern seemed to be no more comprehensible on the basis of an infection than is the absolute immunity of the asylum employees'.[8] Furthermore, new cases seemed to occur among inmates who had been there for a long time and who had little contact with the outside world rather than amongst new arrivals who had recent contact with the outside world. In a more detailed survey of an orphanage in Jackson, Mississippi, Goldberger found that the pellagra cases seemed to be confined to those aged 6–12 years. He noted that the younger children (below 6 years old) received a daily ration of fresh milk, while most of those aged 12 years or over were sent out to work on the farms, where they received supplementary food. Meanwhile, those aged 6–12 years subsisted only on the orphanage diet. To confirm his hypothesis that a dietary deficiency was responsible, Goldberger then conducted a dietary survey of households in seven villages in South Carolina, where the prevalence of pellagra was known to be very high. There were no cases of pellagra in households consuming more than 19 quarts of fresh milk per fortnight, but there was a 22.5% rate among households consuming less than one quart per fortnight. A similar pattern was found for the consumption of fresh meat.

This simple but well-designed survey, based only on good case identification and the ascertainment of the age and occupational distribution of cases and non-cases followed by a basic dietary survey, led to the identification of the probable cause of pellagra as a specific dietary deficiency. The disease was then easily prevented by ensuring an adequate supply of fresh milk and meat protein, and all this was clarified long before laboratory scientists had isolated vitamin B6 and identified its deficiency as the definitive biochemical cause of pellagra.

There are two main branches of epidemiology. The first branch provides a framework to *describe* diseases (or, more correctly for psychiatry, disorders, syndromes or dimensions) as they arise in the population. This branch encompasses studies that characterise the *frequency* and *distribution* of disorders such as psychotic disorders, anorexia or depression, or suicide rates as in Durkheim's studies. It is important to know whether disorders are on the increase or in decline and whether they vary dramatically between countries or regions. Having this knowledge allows services to be planned but also helps develop hypotheses about possible causes. Further, it is especially important for patients and their families that their clinical team is able to describe the prognosis of disorders. How many people with first-episode psychosis make a full recovery and never require psychiatric treatment again? How many will develop severe symptoms and require psychiatric care for the rest of their lives?

The second main branch of epidemiology deals with identifying and establishing the *determinants* of a disorder, using *analytic* study methods. It is centrally concerned with establishing whether a putative risk (or protective) factor is causally related to changes in the risk of experiencing a disorder or disease characteristic under study at the population level. Does removal or prevention of exposure to a given risk factor, such as high-potency cannabis, reduce the risk of a disorder, such as psychosis? The studies by Goldberger on pellagra described earlier are one early example of analytic studies in epidemiology. Such analytic studies test hypotheses that exposures (or risk factors) cause disorders or, once the disorder is established, examine whether the exposure (such as different forms of health care or treatment interventions) causes better or worse outcomes. As such, randomised controlled trials, which primarily assess whether an intervention (typically a therapeutic intervention but sometimes extending to social interventions) improve health outcomes, are a special type of analytic study design used in epidemiology. These *experimental* study designs (see 'Randomised Controlled Trials (RCTs)' later in the chapter) are differentiated from *observational* studies in epidemiology based on how the exposure is assigned to the population under study. In experimental designs, the investigator assigns the exposure (often randomly); in all other observational designs, the exposure is not assigned by the investigator, who instead observes what has occurred (or will occur) in the population under study. Inferring causal effects from observational studies requires great care, because of hidden differences that are often present between those who are, and are not exposed to a given risk factor under study. We will explore this critical issue in greater detail throughout this chapter.

As common to many scientific disciplines, analytic epidemiology is centrally concerned with establishing whether an association between two measured variables (typically referred to as exposures and outcomes) is causal. As in all quantitative disciplines, such associations are estimated statistically, but as the old adage goes, correlation does not imply causation, and special *causal inference* techniques are required to evaluate the likelihood that any given relationship is causal. While a vital issue for all analytic studies, causal inference is a particular challenge in observational epidemiology due to the inherent limitations of different study designs along with the (often hidden) roles played by various *biases*, which can nullify or even reverse apparently causal relationships between a risk factor and disorder. Later in this chapter, we provide an

overview of both *traditional* and *contemporary* causal inference methods in epidemiology that can be used to investigate causality. The last two decades have seen an explosion in the development and application of contemporary causal inference methods (for an excellent primer, see for example, Hernan & Robins[9]), which – under certain (strong) assumptions – can be applied to observational data to strengthen the plausibility that a given association between an exposure and outcome is causal (see 'Causation', later in this chapter).

Exposures and Outcomes

In most studies, investigators measure three main things:

- Exposures
- Outcomes
- Potential confounders, which are other factors that may influence both the exposure and the outcome

The term 'exposure' encompasses a wide range of different factors that might be important in the aetiology of a disorder. These can include simple demographic variables such as age and gender; biological entities such as genotype, intra-uterine infection and brain abnormalities; psychological variables such as experiences of parenting; or social factors such as life events, deprivation and income inequality. Clearly, these exposures may be measured in many different ways, but the methodological principles behind linking exposure to outcome are essentially similar.

The term 'outcome' is also used broadly – to psychiatrists, the most obvious outcomes are diagnostic categories such as schizophrenia, depression or anorexia nervosa. While some researchers may choose to 'split' psychiatric categories into diagnostic groups as defined in ICD-11[10] or DSM-V, others may 'lump' together broad categories (e.g. 'psychotic disorders', 'common mental disorders' or 'eating disorders'). Increasingly, it is common in both clinical practice and in research to investigate the *dimensions* underlying different presentations, recognising that there are continua of experiences in the population (from no mental health symptoms to mild, moderate or severe symptoms) and that there is often phenomenological overlap in symptom dimensions across traditional categorical diagnostic boundaries. Further, in some countries, clinical practice increasingly seeks to avoid formal diagnoses in the early stages of mental illness to avoid stigma (particularly as most psychiatric conditions begin in adolescence) and allow a clear clinical presentation to unfold. The latest iteration of the *Diagnostic and Statistical Manual*, DSM-V[11], explicitly recognises dimensional approaches to mental illness. Thus, depending on the research question, investigators may choose to study clinical disorders, sets of psychiatric conditions or dimensions of psychopathology.

Potential *confounders* are described in more depth later but are essentially any variable that may present alternative explanations for the observed relationship between exposure and outcome; in causal language, they are referred to as common causes of the exposure and outcome.

Development of Measures: Reliability and Validity

All quantitative research involves the measurement of variables, which may be outcomes or exposures. In physical science, there are often objective criteria on which to base measurement (weight, length, electrical resistance, etc). In psychiatry (and much of medicine besides), such objective, external measures are lacking, and our measurement is therefore particularly prone to error. In developing questionnaires, rating scales or diagnostic interviews, it is necessary to assess their reliability and validity.

Reliability

There are two main types of reliability: inter-rater reliability and test–retest reliability. The term is also used, though, to describe the 'internal' integrity of an instrument – that is, inter-item reliability.

Inter-rater Reliability

Inter-rater reliability indicates whether two or more researchers using the same measure on the same subject will gain similar answers. The measurement of inter-rater reliability depends on the type of variable generated by the questionnaire. If it generates a binary outcome, such as the presence or absence of a specific diagnosis, reliability could be described as the *percentage agreement* between the two researchers. However, this would not take into account agreements that happened just by chance. Instead, *Cohen's kappa* takes into account that some of the observed agreements would be expected by chance. Kappa can vary anywhere between –1 and +1, where positive values indicate above-chance agreement (1 indicates perfect agreement) and negative values indicate below-chance agreement.

If the measure generates an ordered categorical outcome – for example, levels of certainty about the presence of a diagnosis (definite, probable, possible, absent) – a *weighted kappa* can be used. This gives more emphasis to serious levels of disagreement between raters than to trivial ones.

If the measure is a continuous variable, such as a symptom score, the *intraclass correlation coefficient* may be used, which will take a value between 0 and 1, with 1 again indicating perfect agreement.

Test–Retest Reliability

Test–retest reliability involves the same rater using the same measure to assess the same subject twice over an interval of time. The same parameters can be used as for inter-rater reliability. Test–retest reliability is important for measures that assess stable psychological traits, such as personality or intelligence, but is less useful for gauging the reliability of psychological symptoms, as these fluctuate over time.

Inter-item Reliability

Split-half reliability describes the integrity or coherence of a questionnaire and assesses whether the questions assess the same underlying construct. It can be measured by calculating a correlation between the scores of the first and second half of the questionnaire or between odd-numbered versus even-numbered questions. Alternatively, Cronbach's α can be used, which provides the average correlation between all possible ways of splitting the items.

Validity

Validity refers to the extent to which an instrument (which in this context usually means a questionnaire or interview) *actually* measures what it sets out to measure. There are three main types of validity:

- *Content validity* (which includes 'face validity') refers to the degree to which the measure covers what it is meant to cover – for example, one would expect a measure of depression to include items on low mood, anhedonia and fatigue.
- *Construct validity* is a more abstract term meaning the degree to which results from a measure fit with underlying theoretical constructs pertaining to that measure. For example, if the phenomenon under study changes with age, one would expect the results of the test to reflect this.
- *Criterion-related validity* (*concurrent* or *predictive*) is the degree to which the measure compares with an alternative criterion. In concurrent validity, the measure is compared with a 'gold standard', and the results are summarised as the sensitivity and specificity of the measure (these are discussed further in the chapter). Predictive validity is assessed by how well the measure is able to *predict* a subsequent outcome that fits into the construct being examined – for example, an IQ test used in children should go some way to predict future academic performance, or a measure of suicidal ideas should be able to predict future suicide attempts to some extent.

Concurrent Validity: Sensitivity and Specificity

Table 1.1 gives the overall framework for calculating a range of common parameters for assessing the concurrent validity of an instrument against a gold standard, including *sensitivity* and *specificity*.

Table 1.1 Definitions of sensitivity and specificity

		Gold standard		
		Positive	**Negative**	**Total**
Our instrument	**Positive**	a	b	a + b
	Negative	c	d	c + d
	Total	a + c	b + d	a + b + c + d

The formula for these measures are given below:

$$Sensitivity = \frac{a}{a+c}$$

$$Specificity = \frac{d}{b+d}$$

$$Positive\ predictive\ value = \frac{a}{a+b}$$

$$Negative\ predictive\ vale = \frac{d}{c+d}$$

$$Likelihood\ ratio\ (LR)\ of\ positive\ result = \frac{sensitivity}{(1-specificity)}$$

$$Pretest\ odds\ of\ disorder = \frac{a+c}{b+d}$$

$$Post\ test\ odds\ of\ disorder = \frac{a+c}{b+d} \cdot LR$$

$$Post\ test\ probability\ of\ disorder = \frac{Post\ test\ odds}{(1+post\ test\ odds)}$$

It will be easiest to define and discuss sensitivity and specificity in relation to an example and some actual numbers. Say a general practitioner (GP) decided to screen all attenders with the 12-item General Health Questionnaire (GHQ-12) to improve their detection of common mental disorders. It would be important to know the concurrent validity of the questionnaire – in other words, how it performs against a 'gold standard' psychiatric interview. The GP might therefore compare the results of the GHQ-12 with those on the 'gold standard' Revised Clinical Interview Schedule (CIS-R), which is a structured diagnostic interview. It is then possible to give the sensitivity and specificity of the GHQ-12 (in relation to the CIS-R). Say the doctor uses both measures on 49 patients, and the results are as shown in Table 1.2.

Note, first, that the frequency of psychiatric disorders rated on the CIS-R is high (nearly half the patients score positive). Note also that the frequency of patients who are positive on the GHQ-12 is higher still – this is usually the case when a questionnaire is being used to detect possible cases and indicates that at least some of the 'positives' on the questionnaire are false positives. *Sensitivity* is a measure of the ability of an instrument to pick up genuine cases – in this instance, the sensitivity is close to one (0.96, see below), indicating that the GHQ-12 identifies nearly all those who are true cases.

Table 1.2 Example calculations of sensitivity and specificity for a sample of 49 patients

		CIS-R (Gold standard)		
		Positive	**Negative**	**Total**
GHQ-12	**Positive**	23	9	32
	Negative	1	16	17
	Total	24	25	49

Specificity is a measure of the ability of an instrument to identify correctly those who are free from the disorder. Here the specificity is much lower (0.64), indicating that the GHQ-12 was performing less well. There is a play-off between sensitivity and specificity: the more sensitive a measure is, the more likely it is to also pick up false positives, and *vice versa*. The positive predictive value (0.72) describes the chances that an individual scoring positive on the test will actually have the disorder when the gold standard is applied. Similarly, the negative predictive value (0.94) is the chance that an individual who tests negative will be free from the disorder. Note that the positive and negative predictive values are sensitive to the frequency of the disorder under study. If the disorder is very rare, it is likely that a higher proportion of those who test positive will not have the disorder compared with when it is very common.

$$Sensitivity = \frac{23}{24} = 0.96$$

$$Specificity = \frac{16}{25} = 0.64$$

$$Positive\ predictive\ value = \frac{23}{32} = 0.72$$

$$Negative\ predictivevale = \frac{16}{17} = 0.94$$

The Odds, the Likelihood Ratio and Proportion

The GP knows from past experience that a high proportion (in fact, 49 per cent) of his patients have a psychiatric disorder. How much of a difference does the test make? The likelihood ratio of a positive value gives us an idea of the 'added value' that the test makes, but to use it, we also have to calculate the *odds* of a patient having a disorder. As per the formulae above, this leads to the following values:

$$Likelihood\ ratio\ (LR)\ of\ positive\ result = \frac{0.96}{0.36} = 2.67$$

$$Pretest\ odds\ of\ disorder = \frac{24}{25} = 0.96$$

$$Post\ test\ odds\ of\ disorder = 0.96 \cdot 2.67 = 2.56$$

Note that the odds are different from the probability, and the odds are calculated as the proportion with the disorder divided by the proportion without a disorder (here, 24/25=0.96). The *likelihood ratio* of a positive test is defined as the amount by which a positive test result increases the odds of a patient having the disorder – in this case, 2.67. If a patient scores positive on the GHQ-12, the odds that they have a disorder now increases by 2.67-fold to 2.56. What does this mean in terms of proportions? As above, we now use the formula for the post-test probability of disorder, given as:

$$Post\ test\ probability\ of\ disorder = \frac{2.56}{3.56} = 0.72$$

Hence, the positive test result on the GHQ-12 has changed the probability that the patient has a disorder from 49% to 72%.

Measures of Disorder Frequency: Prevalence and Incidence

One of the basic functions of epidemiology is to describe the frequency of disorders in the population. Knowledge about the burden of disorders in a given population should be the founding principle on which clinical and public health resources are based. There are two main measures of frequency: *prevalence* and *incidence*.

Prevalence

Prevalence is the total number of individuals with the disorder divided by the population from which they are drawn:

$$Prevalence = \frac{Total\ cases}{Total\ population}$$

Prevalence estimates will include some patients who have had the disorder for many years and others who have only just developed it. Prevalence is therefore a function of the number of new cases developing the disorder over a given time period (i.e. the incidence rate) and the average chronicity of the disorder (i.e. its average duration). It is worth noting, therefore, that the prevalence of the disorder will be affected by both recovery and death rates as a result of the disorder – two pertinent and pernicious issues in psychiatry; a higher recovery rate (fewer cases) would reduce prevalence as, paradoxically, would a higher death rate as a result of the disorder (fewer cases).

Two subtypes of prevalence exist: *point prevalence*, which is the proportion of the population who have the disease at the point in time when it is measured, and *period prevalence*, which is the proportion of the population who have experienced the disorder over a defined interval. In psychiatry, there are advantages to using period prevalence as many disorders relapse and remit, and a point prevalence may not reflect the true proportion of the population who have been affected by the condition under study. The two most common timescales for estimating period prevalence in psychiatric epidemiology are annual and lifetime prevalence.

Lifetime prevalence is the proportion of people in the total population who have ever experienced a disorder in their lifetime. There has been considerable controversy over the accuracy of lifetime prevalence estimates when obtained from psychiatric interviews. The problem with such estimates is that they depend on the recall of clusters of symptoms (e.g. for depression: low mood, anhedonia, sleep disturbance) many years before. Recall of such complex information is likely to be very inaccurate. Alternative sources – such as prospectively recorded cases in case registers – may be free from issues of recall bias (see 'Bias') but may still lead to underestimates of lifetime prevalence if case identification is based purely on clinical contact and diagnosis.

Lifetime prevalence is frequently confused with morbid risk of a disorder. Lifetime prevalence is an estimate of the total proportion of people alive at a given point in time (or at a