incomplete. Diagnostic criteria shift and sway like in no other area of medicine and named mental health conditions appear and disappear with a disturbing frequency. Alongside these factors is the troubling awareness of the frequent overlap of symptoms across formal diagnostic entities. It seems trite to point out, for example, that people with depression sometimes hear voices, or that people with bipolar disorder may suffer from anxiety.

When I first worked in psychiatry in the 1980s, I was struck by the extent to which drugs were prescribed outside their license. The most common prescription I saw was for amitriptyline combined with chlorpromazine; the latter prescribed for anxiety and insomnia. Treatment of choice for alcohol withdrawal was thioridazine, a drug previously only known to me as an antipsychotic. This was also a time when antipsychotics were prescribed to almost everyone with behavioral disturbances associated with dementia.

Over the years since then, my experience and observations of prescribing decision-making have been fairly uniform. Rarely is a firm diagnosis arrived at before prescribing and, perhaps more tellingly, rarely do prescribers know the precise licensed indications for every drug they prescribe. So, antipsychotics tend to be prescribed for psychotic and manic symptoms, and antidepressants tend to be prescribed for symptoms of low mood. Lithium is prescribed for mood fluctuations. Benzodiazepines are prescribed for pretty much everything. Never, in over 25 years in psychiatry, have I observed prescribers make any noticeable attempt to match a diagnosis with the licensed indication of a drug. I, for my part, would not now think to point out to a prescriber that, say, valproate has no label for prophylaxis in bipolar disorder.

These informal observations are backed-up by published data. In the US, off-label prescribing of antipsychotics amounted to 74% of all prescriptions in 1995 and 60% (nine million prescriptions) in 2008¹. In the UK, 63% of risperidone prescribing in primary care was for unlicensed conditions in the period from 2007 to 2011². Even in secondary care, where prescribing is often more tightly controlled by local protocols, off-label prescribing is common – in my own unit we recorded off-label prescribing rates of 11% for risperidone long-acting injection³, 23% for oral aripiprazole⁴ and 33% for depot paliperidone⁵. In each case these figures represent off-label prescribing in consecutive patients during the first few months or years after the introduction of the drug or formulation. Prescribers' willingness to prescribe outside a license is thus not solely a consequence of

positive experiences of prescribing for specific off-label indications – it starts straightaway.

This is not necessarily poor practice: some of the most effective medicines in a particular condition do not have a license for that condition. Fluoxetine may be the most effective selective serotonin reuptake inhibitor in generalized anxiety disorder (GAD)⁶, but is not labeled for this condition. Sertraline is recommended as first line treatment for GAD by the National Institute for Health and Care Excellence (NICE) in the UK, but it too has no license for this indication. Quetiapine is licensed in most countries for schizophrenia, schizoaffective disorder, mania, bipolar depression and unipolar depression, but it is also effective in other conditions such as GAD⁷; its range of actions is such that diagnosis becomes almost irrelevant.

The example of quetiapine encapsulates the issue in question. We may call it an antipsychotic but it is much more than that, because it has multiple pharmacological actions and numerous active metabolites⁸. The nonsense of current nomenclature – which is closely aligned with labeling – is well recognized, and other systems have been suggested. For example, neuroscience-based nomenclature classifies drugs according to their pharmacological profile rather than their primary or initial therapeutic indication⁹.

The classification of mental health conditions gives us a false sense of order and a crude system for prescription reimbursement. It has little or no relevance to psychotropic drug action and as a consequence an accurate diagnosis is not required for optimal prescribing.

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Rising suicide rates: an under-recognized role for the Internet?

According to recent data from the Centers for Disease Control and Prevention, the age-adjusted suicide rate increased by 24% in the US from 1999 to 2014, after a period of consistent decline from 1986 to 1999¹. The increase, whose pace rose after 2006, occurred in males, females, and the entire 10 to 74 age range, but was more pronounced among females aged 10

to 14 and males aged 45 to 64. Several explanations have been proposed in the wide coverage that the data received: the black-box warning issued by the Food and Drug Administration in 2004 linking antidepressants and suicidality; the advancing age of puberty; inadequate health insurance coverage; stressors related to the Great Recession; the rising rate of

divorce; and the increased use of heroin and opiate drugs. Another possible contributor has received much less attention: the Internet, which dominated the period covered by the data, may have played a facilitating role.

The Internet may have become the first stop for many individuals contemplating suicide. There, pro-suicide sites account for over 11% of suicide-related search results according to one study². Whether they support the freedom to commit suicide for everyone or focus on “death with dignity” for the terminally ill, pro-suicide sites often relay information on how to successfully commit suicide. They do so by “perfecting” well-known means that employ easily procurable ingredients, or introducing obscure new methods that, before the age of the search engine, would have required highly specialized knowledge and access (e.g., suicide by inhaling helium or ether, extracting and drinking nicotine, drinking excessive quantities of water). Beyond the informational aspect, the suicide-positive attitude of some sites can appeal to lonely sufferers desperate to commune with like-minded individuals. One effect may be to transform suicidal planning from a solitary choice widely seen as pathological into a shared experience, normalized by a supportive community that encourages the behavior. Extreme examples include online suicide pacts, group suicides and “live” suicides, where death is streamed spectacle-like to an abetting audience.

Why might an at-risk individual faced with such online content be more likely to pass to the act? The answer may partially lie in the interplay between impulsivity as a well-known trait in self-harm and impulsivity as a defining feature of the online experience.

Several studies have linked impulsivity with self-harm. One, conducted in 215 subjects with bipolar disorder, showed that impulsivity significantly increased the risk of suicidal acts³. Behavioral and neuroimaging data lend support to the suicidality-impulsivity link. Suicidal ideation has been associated with impairment on behavioral challenges that capture impulsive decision-making, such as the Iowa gambling and go/no-go tasks⁴. In neuroimaging studies, self-harm has been linked to diminished reward signal in areas that have been associated with impulse control⁵.

Impulsivity, then, appears to be an important feature of suicide. It is also a defining feature of the online experience. Impulsive and disinhibited online behavior was described early in the Internet era. And, when disordered Internet use was considered as a possible new psychopathology, it was partly conceptualized as an impulse control disorder, with the definitions for “problematic Internet use” borrowing from diagnostic criteria for pathological gambling disorder, then categorized as an impulse control disorder in the DSM-IV⁶.

A look at how other impulse-driven behaviors have been affected by the Internet may help explain how online content can influence a suicidal individual. Pathological gambling and compulsive buying have long been conceptualized as impulse control disorders, and data suggest Internet-mediated exacerbations of these behaviors.

Early calls for controlling online gambling stemmed from concerns about an online gambler’s ability to go undetected and uninterrupted for long periods of time and the lack of the usual “fail safes” that can protect vulnerable users offline. Subsequent online gambling prevalence data suggest that these worries were justified. While many studies are limited by their online design and reliance on self-selected samples, one used a weighted approach to analyzing data from an international sample of 12,521 gamblers⁷. Among Internet gamblers, only 39.9% were not problem or at-risk gamblers compared to 82.1% of non-Internet gamblers.

Similarly, it was initially thought that the Internet would diminish compulsive buying by facilitating comparisons, protecting against in-store marketing, and obviating the need to go to a physical store thereby saving time. Instead, preliminary research seems to suggest a negative effect. For example, in a study of 314 customers of an online retail store, 17.7% met criteria for compulsive buying behavior⁸. This prevalence rate is considerably higher than those seen in studies that were conducted before the arrival of online retail or that did not focus exclusively on it.

The Internet may similarly make self-harm more impulsive, automatic and difficult to resist by diminishing the “obstacles” faced offline, teaching about methods, and providing an encouraging environment. Formal data on the influence of the Internet on suicidal behavior, including suicidal impulsivity, mostly consist of case reports. Still, some studies that compared Internet search trends with population-level data have yielded troublesome results. For example, in a Japanese study, searches for “hydrogen sulfide”, “hydrogen sulfide suicide” and “suicide hydrogen sulfide” correlated with the incidence of suicide 11 months following the search, and “suicide by jumping” correlated with suicide six months later⁹.

Such data make formal research into the potential pro-suicide effects of new technologies an important public health matter. But research into the Internet as a *prevention* tool cannot be ignored. While adequate control of pro-suicide, impulse-promoting content may be somewhat unrealistic in the difficult-to-govern online world, more can be done to make education, support and prevention sites more accessible, appealing and effective. Meanwhile, educating mental health professionals about the need to incorporate suicide-related online behavior in the assessment of at-risk patients would seem like a well-justified strategy. “Have you been googling suicide lately?” has become a requisite question in the thorough suicide evaluation.

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