Mental Health

The cost of mental health conditions (and related consequences) is projected to rise to $6 trillion globally by 2030, from $2.5 trillion in 2010, according to a study published by the World Economic Forum and the Harvard School of Public Health. That would make the cost of poor mental health greater than that of cancer, diabetes, and respiratory ailments combined. Now, as people around the world contend with stress and social restrictions related to COVID-19, mental health has become a particular area of concern for policy-makers and health professionals.

Mental Health: Neuroscience

Many pressing questions raised by advances in the field have yet to be answered

Breakthroughs in molecular biology, electrophysiology, and computing have boosted interest in neuroscience - reflected in the growing amounts being invested in related research and technology by governments, academic institutions, and the private sector. The human brain and its 86 billion neurons can be analysed in myriad ways, and the field is correspondingly vast. It draws on disciplines as diverse as cellular biology and the philosophy of mind, as it seeks to answer fundamental questions about how billions of component parts can come together to establish behaviour, what changes can lead to disease, how far we should go beyond fixing problems to enhancing ourselves, and what the ethical and legal implications are of investigating - and possibly altering - peoples' thoughts. Foundational techniques such as "polymerase chain reaction" (used to quickly produce DNA samples in the billions) and genomic sequencing are being advanced through optogenetics and chemogenetics - which enable a more precise mapping of the cells present in the brain, and a deeper, more accurate understanding of how genes affect the structure and function of these cells in relation to neurological disorders such as dementia.

Our understanding of the ways cells talk to one other and form neuronal circuits has benefitted from similar breakthroughs, courtesy of initiatives like the Human Connectome Project - which is attempting to construct a complete map of the brain's structural and functional connections. While a fuller picture of these connections (supported by other multi-modal maps) will improve our collective understanding of the brain, related breakthroughs are forcing ethicists and legal scholars to confront new questions; these include how to make the best use of algorithms that can translate neural activity into images, and whether thoughts read by a machine should be considered self-incrimination if used in a legal proceeding. In addition, companies may be crossing a line by attempting to use "neuromarketing" to more precisely target advertisements, and there are serious ethical issued related to creating "cerebral organoids" (mini-brains grown in labs with human tissue) and human-animal chimeras (mixtures of animal and human brain cells) for research purposes. Ultimately, contemporary neuroscience is a dynamic field that mixes cutting-edge

science with pressing philosophical questions - many of which have yet to be fully answered.

Sub-topics

Biotechnology, values, Future of Health and Healthcare, Entrepreneurship, Agile Governance, Global Health, Science, Precision Medicine, Innovation

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Mental Health: Mental Health in the Workplace

Employees who are more susceptible to mental health problems are more likely to see their work suffer

At any point, nearly one in five members of the working-age population in the UK has a mental health problem, according to a report prepared for the UK government by the RAND Corporation in 2014, and more than 40% of sickness benefit claims in the country cite a mental or behavioural disorder as a primary condition. However, a subsequent RAND Corporation report published in 2018 identified a number of potential wellbeing interventions related to mental health in the workplace, based on standards developed by the innovation and social-policy-intervention foundation Nesta (ranging from a "1" for articulating a clear logic, to a "5" for showing evidence of consistent, reliable results). For example, Be Mindful, a four-week online course that involves mindfulness meditation audio and video-led sessions aimed at reducing stress, depression and anxiety (and received a rating of "3"), had been implemented in 17 organizations for about 11,000 people annually, and showed statistically significant beneficial effects. In general, however, the tools and practices in place for occupational mental health, as well as the degree of access to mental health support in the workplace, remain insufficient.

In response, in 2017 the World Economic Forum's Global Agenda Council on Mental Health published a set of seven steps that people can take to foster a healthier workplace. These include exploring ways to modify existing workplace practices in a way that could promote better mental health (keeping in mind that every workplace is unique), taking the time to learn from leaders and employees who have been successful in promoting better mental health in the past, borrowing successful models from other firms (the council provided case studies from companies including Bell Canada and British Telecom Group), making an effort to better understand the opportunities and mental health needs of your colleagues, building the internal and external partnerships needed to provide educational material and training necessary for successful mental health initiatives, and creating a culture where colleagues will not hesitate to ask for help (and will know exactly where to direct their questions).

Sub -Topics

Innovation, Workplace and employment, Digital Economy and new value creation, United Kingdom, Digital Communication, Family Business, and Leadership

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Mental Health: Poor Mental Health as an NCD

Mental health is increasingly seen as both a non-communicable disease and a related risk factor

Non-Communicable Diseases such as cancer and diabetes are becoming increasingly prevalent in both the developed and developing world - and poor mental health is receiving increasing scrutiny for its ties to NCDs. According to an estimate published by the World Health Organization, as of 2015 more than 300 million people, or more than 4% of the world's population, suffered from depression, while more than 3% of the population suffered from a range of anxiety disorders. Mental health problems are linked to an increased risk of mortality due to associated physical health issues such as cardiovascular disease and cancer, according to an article published in The Lancet in August 2017; depression, for example, is tied to behaviour such as drinking alcohol to excess and smoking, which in turn lead to increased risk of NCDs. However, according to the article, written by researchers from the Sorbonne, the French National Institute of Health and Medical Research and other institutions, the state of evidence on mental health as a contributor to the burden of disease has lagged behind that of physical health - mainly due to stigma, underfunding, and complexity.

The number of people with common mental disorders is increasing, particularly in lower-income countries, according to the WHO; that is because populations are growing in these places, and more people there are living to the age when depression and anxiety most commonly occur. The WHO has estimated that in 2015 alone, 788,000 people died due to suicide - which accounted for nearly 1.5% of all deaths worldwide that year. According to an editorial published in the British Journal of Psychiatry, the fact that life expectancy for men continued to be 20 years less than life expectancy for the general population, and 15 years less for women suffering from mental illness, reflected a disregard for mental health problems that could be viewed as a violation of the UN's Covenant on Economic, Social and Cultural Rights. Globally, the majority of people in need of mental health care lack access to high-quality services, according to an article published in the journal Current Psychiatry Reports in 2017 - due to factors including stigma and human resource shortages. That is true even though common mental disorders are responsible for the largest proportion of the global disease burden, according to the article.

Sub-topics

Values, Future of Health and Health Services, Global Health, Workforce and Employment, Future of Economic Progress, Global Governance, Aging and Longivity, Systemic Racism

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Mental Health: Destigmatizing Mental Health
The general population must become more willing to openly address mental illness

As much as 85% of the people living in in low- and middle-income countries who suffer from mental disorders, and as much as half of the people suffering from these disorders in high-income countries, receive no related treatment, according to the World Health Organization. Stigma and discrimination can result in a lack of access to care and services related to mental health, according to WHO fact sheet published in 2018, and people with psychosis are at high risk of exposure to human rights violations including long-term confinement in institutions. The stigma attached to mental illness functions in the same way as racism or sexism, according to a co-author of Ending Discrimination Against People with Mental and Substance Use Disorders: The Evidence for Stigma Change, a report published by the National Academies Press in 2016. According to the report, examples of institutionalized stigma in the US include limits on people with mental illness when it comes to serving on a jury or running for public office. People with mental disorders are also overrepresented in the US criminal justice system (both a consequence and a source of stigma), according to the report.

Most people who have to live with mental illness have at some point been blamed for their condition, according to the National Alliance on Mental Illness; their symptoms have been dismissed as a "phase," and they have been discriminated against in violation of the law. The NAMI recommends several ways of fighting mental health stigma: talking openly about mental health; educating yourself and others about peoples' experiences with mental illness; being conscious of the language used to talk about mental illness; encouraging people to equate mental illness with disease; showing compassion for those with mental illness (for example by engaging with homeless people struggling with mental illness); choosing empowerment over shame; being honest about the treatment received for mental illness; avoiding "self stigma" (by being as productive a member of society as possible), and by letting the media know when they have stigmatized mental illness via storylines or ignorant comments. In 2015, researchers from the University of Florida published results of a study on mental health de-stigmatization showing that negative perceptions based on a lack of information often fuel a fear of mental illness sufferers. These negative perceptions often came from negative portrayals of mental illnesses suffers in the media, according to the study.

Sub-topics

Education, skills and Learning, Civic Participation, Role of Religion, Justice and Law, Future of media, entertainment and Sport

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Mental Health: Open Science
While data sharing can help address mental illness, it also raises ethical questions

The Psychiatric Genomics Consortium, founded in 2007, has now amassed genomic samples from more than 900,000 people diagnosed with attention-deficit hyperactivity disorder, bipolar disorder, schizophrenia, eating disorders, and other conditions that can now be pored over by investigators from 38 countries. The consortium bills itself as the largest biological experiment in history. According to a former director of the National Institute of Mental Health in the US, the PGC is an example of a successful bid to collect the large amount of data that are needed in order to find a statistically significant genetic signal associated with disease; in a post written in 2013, former NIMH Director Thomas Insel wrote that in 2011, the PGC was able to use 9,000 cases to identify five genetic variants associated with schizophrenia. While none of these variants alone are likely to be genetic causes for schizophrenia, he wrote, they define an "architecture of risk" and could be useful for identifying biological contributions to the illness. An article published in the journal World Psychiatry noted that by 2014, the PGC had used data from about 35,500 cases to identify 128 independent genetic associations with schizophrenia; the PGC now states on its website that more than 140 variants have been identified.

Understanding - even at a basic level - exactly how neural circuits underpin our subjective experience and behaviour remains an enormous challenge for neuroscientists. One response to this has been the creation of open repositories for data like the PGC. Other private and public organizations around the world are also investing in such publicly-available resources. As they proliferate, however, these resources raise questions about standardization and curation. There are also privacy and intellectual property issues to consider. Informed consent is a good start, but oftentimes patients may not understand what rights they are signing away, while researchers may later see a more constructive use for data not previously considered, but which lacks the requisite level of consent in order to be used to pursue potentially game-changing research. Patients, researchers, and lawmakers should work together to highlight the benefits of open data and open science, while putting mechanisms in place that proactively educate patients about their data rights.

Sub-topics

Justice and Law, Fourth Industrial Revolution and Artificial Intelligence

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Mental Health: Consumerization of Mental Health
Digital tools are helping people make more informed decisions about their care

People everywhere are suffering in silence from depression, addiction, and other mental illnesses due to a fear of social stigma - or because they are simply unable to obtain care. Even in a relatively wealthy nation like the US, millions of people live in areas that suffer from severe shortages of mental health providers. The economic burden is significant; according to a study published by scholars from Pennsylvania State University and Texas A&M University at Galveston in 2018, the global cost of mental illness is expected to exceed $16 trillion over the next 20 years, with more than half of that cost to be incurred in high-income countries. In the US alone, according to the study, which was published in The Review of Regional Studies, the

annual cost of poor mental health is as much as $62 billion - similar to the amount of productivity loss incurred due to failing transportation infrastructure - while for those employed in the US poor mental health can reduce their individual annual income by as much as $6,000.

Digital platforms that combine technology and a human touch could provide a means for patients to receive the care they need, by helping to grant them a transparent view of pricing options and the quality of care providers, according to a report published by the World Economic Forum's Global Agenda Council on Mental Health in 2016. Studies have shown that the more engaged patients are, the more they can lower their costs by eliminating unnecessary procedures or readmissions. Digital tools can help patients manage their own behaviour; mobile phone-based mental health apps can provide continuous, convenient access to help, and some have been developed in the form of games. This gamification can more intuitively engage patients, and potentially create better odds that beneficial behaviour will become self-sustaining (while the promise of gamified interventions is significant, to date there is relatively little clinical-quality evidence to support their use). Apps designed to address mental health needs that are currently available include What's Up, a tool for tracking habits in the interest of helping cope with depression, anxiety, or stress, and Mind Shift, which is designed to help teens deal with anxiety.

Sub-topics

Retail Consumer Goods and Lifestyle, United States, Internet of Things, Inclusive Design, and Future of Consumption

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Mental Health: Continuous Monitoring
A lack of coordinated care can negatively impact mental health treatment

At a 2010 roundtable on evidence-based medicine, Harvard University's Dr. Ashish Jha presented evidence showing that in the US, there are billions of dollars in avoidable healthcare costs every year due to the unnecessary escalation of treatment and the recurrence of disease. More coordinated care could help alleviate this problem. According to a report published in 2016 by the World Economic Forum's Global Agenda Council on Mental Health, remote wearable sensors - including fitness trackers, smartphones, and smart skin patches used to monitor body chemistry - could help to improve health by enabling patients to more easily collect behavioural information. That collected data can in turn be transmitted to doctors, allowing for better monitoring of patient condition and treatment compliance, and even potentially increasing access to care in remote locations. In addition, because people with serious mental illnesses (including schizophrenia and mood disorders) are less physically active than the general population, the ability of wearable devices and smartphone apps to promote more active lifestyles is particularly valuable, according to an article published in the journal Mental Health and Physical Activity in 2016.

When it comes to a doctor's treatment of mental and neurological disorders, patient states often fluctuate significantly over time - though doctors are only able to assess their condition based on a snapshot view during an office visit. In addition, access to any care can be difficult to obtain; in the US, for example, nearly half of the 60 million adults in the country living with mental health conditions go without any treatment, due to factors including high rates of denials of care by insurers and high out-of-pocket costs, according to a report published in 2017 by the National Alliance on Mental Illness. More reliable and continuous monitoring by a doctor could help provide a more complete and accurate picture of a patient's health, improve the effectiveness of care, or even help anticipate when care will be needed. Meanwhile remote sensors could help contribute to the gathering of more accurate patient data - which is often self-reported, and can therefore be incomplete or biased. Before this can become a reality, however, sensor developers must ensure that devices can deliver clinical-grade data that can be meaningfully and safely used in medical decision-making.

Sub-Topics

Fourth Industrial Revolution, Internet of Things, Future of Consumption, Insurance, and Behavioural Science

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Mental Health: Mental Health and Machine Learning
Technological advances are helping scientists to monitor and predict adverse mental health episodes

The possibilities presented by machine learning (an application of artificial intelligence where programmes self-learn how to predict patterns using complex data), have multiplied in recent years - not least in terms of brain health research. According to a report published by the World Economic Forum's Global Agenda Council on Mental Health in 2016, there is a possibility that machine learning could be used to identify signals of disease risk and treatment response, using massive amounts of amassed biological and behavioural data. Machine learning algorithms are also being developed that could use behavioural data to detect at an early stage when patients might deteriorate due to conditions such as bipolar disorder, depression, and psychosis. Other technologies enabled by machine learning include improved speech recognition software that could facilitate new methods of patient interaction, according to the report. However, some are uneasy about the prospect of machine-derived decisions replacing human expertise and judgment. These concerns must be properly addressed, in order to realize true potential of machine learning in the field of mental health.

The need for new tools based on artificial intelligence that have the potential to boost mental wellness is particularly pressing in the US, which faces a mental health epidemic, according to an article published in Harvard Business Review in 2018. Nearly one in five adults in the country suffers from a form of mental illness, suicide rates are at an all-time high, and 115 people die every day from opioid abuse,

according to the article; at the same time, the country is faced with a critical shortfall of psychiatrists and other mental health specialists (more than 60% of US counties are without a single psychiatrist). While there are concerns about the impersonal nature of digitized mental health services, in some cases these techniques could benefit patients embarrassed to reveal problems to a therapist they have never met before, according to the article, which cites the company Ginger.io, a provider of an app that enables chatting with an "emotional health coach," as an example of a potentially effective digital solution. A year-long survey found that among Ginger.io users, 72% reported clinically significant improvements in symptoms of depression, according to the article.

Sub-topics

Fourth Industrial Revolution, Artificial Intelligence, United States, Internet of Things, Behavioural Science, Virtual and Augmented Reality and Future of Computing

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Mental Health: Genomics and Mental Health

Genomics and advanced imaging can provide insight into the causes of mental illness

Scientists are increasingly looking to genomics - the study of the function and structure of genetic material - in order to better understand the causes of conditions like autism, schizophrenia, mood disorders, and Alzheimer's disease. Advances in technology have sharply reduced the cost of sequencing a genome in recent years, and now researchers must figure out how to best acquire, store, analyse, and distribute a growing amount of valuable information. Researchers have estimated that the computing resources needed to adequately handle genome data will exceed that required to run Twitter and YouTube; identifying signals for genetic risk in brain-related disorders requires both enormous amounts of data (made possible only relatively recently by technical advances), and the collaboration of a large community of scientists from around the world. In order to continue to advance our understanding of the relationship between genes and clinical traits, scientists need to gain increasingly accurate descriptions of symptoms, treatment outcomes, physiology, and behaviour.

In recent decades, there has also been mounting interest in using imaging technology to visualize the brain - with the aim of identifying biomarkers (physical indicators of a disease state) that can help accurately predict a person's risk of disorders such as Alzheimer's disease, addiction, schizophrenia, and other conditions. As with genomics, the challenges involved in imaging are significant; identifying meaningful signals that may indicate risk through the noise of the normal variation of human brain development and function can be daunting. For both genetics and imaging, cloud computing is easing the difficulty of storing and sharing the enormous amount of data required. Until relatively recently, it was a real challenge to be able to store and transfer just a few genomes, which sometimes required the physical delivery of hard drives. Now, cloud computing and on-demand

delivery and pricing can make it a routine task for scientists to access huge datasets - securely, and collaboratively. The results of a 2017 survey of hospitals, academic medical centres, and other healthcare-related respondents published by the Healthcare Information and Management Systems Society showed that 65% reported using the cloud or cloud services, with much of that use focused on clinical application and data hosting, and data recovery and backup.

Sub-topics

Future of Computing, Internet Governance, Biotechnology , Future of Health and healthcare, and Precision Medicine