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# The Hong Kong Mental Morbidity Survey: Background and Study Design

## 香港精神健康调查：背景和研究设计

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### Abstract

Mental disorders are highly prevalent conditions with immense disease burden. To inform health and social services policy formulation, local psychiatric epidemiological data are required. The Hong Kong Mental Morbidity Survey is a 3-year population-based study in which 5700 community-dwelling Chinese adults aged between 16 and 75 years were interviewed with the aim of evaluating the prevalence, co-morbidity, functional impairment, physical morbidity, and social determinants of significant mental disorders in the population. This paper describes the background and design of the survey, and is the first territory-wide psychiatric epidemiological study in Hong Kong.

**Key words:** Asian continental ancestry group; Health surveys; Mental disorders / epidemiology

### 摘要

精神障碍非常普遍，且对社会造成巨大的疾病负担。收集本地精神病流行病学资料，对计划相关的卫生及服务政策至为重要。香港精神健康调查是一个为期3年，以人口为基础的大型研究，透过对5700名介乎16岁至75岁之华裔市民进行精神健康评估，检视重要的精神障碍的现患率、共病、功能障碍、身体疾病以及社会决定因素。本文阐述这项首个全港大型精神病流行病学研究的背景和设计。

**关键词：**亚洲大陆血统群、健康调查、精神障碍 / 流行病学

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### Rising Burden of Mental Disorders

Globally, mental disorders have emerged as an important health care challenge. It is well documented that people with severe mental illnesses (SMI) such as schizophrenia are associated with significant disability if appropriate treatment is not provided.<sup>1</sup> Patients with SMI also suffer from increased morbidity and mortality.<sup>2,3</sup> They are more

vulnerable than the general population to nutritional and metabolic diseases, cardiovascular diseases, viral diseases, respiratory tract diseases, musculoskeletal diseases, sexual dysfunction, pregnancy complications, stomatognathic diseases, and possibly, obesity-related cancers.<sup>3</sup> The average life expectancy of people with SMI is 25 years shorter than that of the general population.<sup>2</sup>

Adverse health and social outcomes are not limited to SMI. Common mental disorders (CMD) like anxiety disorders and depressive disorders also lead to significant personal, social, and economic loss. Evidence shows that these conditions are associated with significant psychosocial disability,<sup>4</sup> functional impairment, loss of productivity,<sup>5,6</sup> and poor quality of life.<sup>7,8</sup> Patients with CMD also have considerably increased risk of mortality. In a recent meta-analysis of 10 prospective cohort studies involving 68,222 adults living in England, participants experiencing anxiety or depression had a shorter life expectancy than the general population.<sup>9</sup> The association between psychological distress and mortality demonstrated a strong dose-response effect.<sup>9</sup> The increased risk in mortality persisted after adjusting for age, gender, alcohol consumption, smoking, and social class.

Overall, mental disorders constitute one of the major causes of disease burden worldwide. Neuropsychiatric disorders explain 13.5% of disability-adjusted life years (DALYs), thus surpassing the burden due to cancer and cardiovascular disease.<sup>10</sup> In the latest estimation of worldwide disease burden, which measured DALYs for 291 causes in 187 countries, the global DALYs were found to be reduced by 0.5% over the past 20 years. However, DALYs caused by mental and behavioural disorders have increased by 37.6%.<sup>11</sup> Of all the mental disorders, depressive disorders accounted for 2.5% of DALYs, followed by anxiety disorders (1.1%), drug-use disorders (0.8%), alcohol-use disorders (0.7%), and schizophrenia (0.6%).<sup>11</sup> It is estimated that the disease burden caused by mental disorders will continue to rise, and unipolar depressive disorders will emerge as the non-communicable disease leading to the greatest DALYs by 2030.<sup>12</sup>

## Psychiatric Epidemiology

Considering the immense burden associated with mental disorders, there is a rising need for psychiatric epidemiological data. Large-scale community studies of mental morbidity provide valuable information for effective policy formulation, health and social services planning, generating hypotheses, and monitoring disease trends.<sup>13</sup>

Traditionally, the prevalence of mental disorders was estimated from a number of sources, such as psychiatric hospital admission and attendance data, local case registers, statistics of consultations in general practice, and local community surveys.<sup>13</sup> However, these sources are often bound by methodological limitations, making the data less generalisable to areas that were not surveyed. The past few decades have seen a revolution in how psychiatric epidemiological surveys were conducted. The development

of fully structured diagnostic interviews like Diagnostic Interview Schedule (DIS),<sup>14</sup> Composite International Diagnostic Interview (CIDI),<sup>15</sup> and Revised Clinical Interview Schedule (CIS-R)<sup>16</sup> have made ascertainment of psychiatric diagnoses by trained lay interviewers possible. The refinement of community survey methodologies also contributes to the growth in the number of international large-scale psychiatric epidemiology studies in recent years.

One of the most notable examples is the Adult Psychiatric Morbidity Survey (APMS) conducted in the UK in 1993, 2000, and 2007. In the latest APMS,<sup>17</sup> multi-stage stratified probability sampling design was used and a representative population of more than 7000 adults aged  $\geq 16$  years residing in private households in England was interviewed. The survey adopted a 2-phase design. In Phase 1, CIS-R was administered to generate an overall score and diagnosed 6 types of CMD. A sub-sample of participants interviewed in Phase 1 was further interviewed in Phase 2, when psychiatric disorders, like psychosis, were assessed. In addition to estimating the prevalence of various psychiatric conditions, APMS in 2007 also examined the trends in psychiatric morbidity by comparing the data with those from studies performed in 1993 and 2000.

## Prevalence of Mental Disorders in Hong Kong

Evidence shows that the prevalence of mental disorders is not uniform across the globe. The World Health Organization's World Mental Health Survey Initiative,<sup>18</sup> one of the largest cross-national epidemiological surveys so far, estimated the prevalence of mental disorders in 17 countries across Europe, America, Africa, Middle East, and Asia. The survey found that the prevalence of mental disorders varied widely across countries. The lifetime prevalence of any anxiety disorder ranged from 4.8 to 31.0% in different parts of the world. The prevalence of mood disorder (3.3-21.4%), any impulse control disorder (0.3-25.0%), and any substance use disorder (1.3-15.0%) also differed widely. Therefore, assumptions about the prevalence of mental disorders in Hong Kong based on overseas data may not be appropriate.

While it is essential to have local epidemiological information, there is a paucity of updated psychiatric prevalence data in Hong Kong. To date, the only large-scale community survey is the Shatin Community Mental Health Survey conducted by Chen et al<sup>19</sup> between 1984 and 1986. A total of 7229 respondents residing in Shatin were interviewed. In Phase 1, they were screened with Self-Reporting Questionnaire, and DIS version III was adopted to establish psychiatric diagnosis in Phase 2. The commonest DSM-III diagnoses were tobacco dependence (male vs. female, 26.56% vs. 1.43%), generalised anxiety disorder (7.77% vs. 11.11%), alcohol abuse / dependence (8.86% vs. 0.62%), all phobias (1.28% vs. 3.73%), and dysthymic disorder (1.25% vs. 2.83%).

Since the completion of Shatin Survey,<sup>19</sup> there have been important changes in diagnostic nomenclature in mental health. The DSM-III criteria were replaced by

DSM-IV then DSM-5, and ICD-9 criteria by ICD-10. These were accompanied by the development of corresponding diagnostic instruments such as CIS-R and CIDI, and advancement in the psychiatric epidemiological research methodology. In addition, socio-demographic characteristics of the local population have changed significantly over the past 30 years.<sup>20</sup> The population of Hong Kong has been rapidly increasing (total population of 4.99 million in 1981 to 7.07 million in 2011) and ageing (median age from 26.0 years in 1981 to 41.7 years in 2011).<sup>20</sup> Gender distribution has also changed remarkably since 1980. In 1981, 52.2% of the local population comprised men, which dropped to 46.7% in 2011.<sup>20</sup> The participants residing in Shatin back in the 1980s are, therefore, very different from the local population nowadays. Furthermore, substance abuse practices in Hong Kong have also changed significantly over the past few decades. According to the latest Central Registry of Drug Abuse report,<sup>21</sup> the number of abusers taking psychotropic substances is higher than that using traditional drugs or opiates since 2007. Besides, ketamine, the most commonly abused psychotropic substance today, was virtually unheard of in the 1980s. These data warrant an updated and territory-wide community survey of mental disorders in Hong Kong.

## Hong Kong Mental Morbidity Survey

### Objectives

The Hong Kong Mental Morbidity Survey (HKMMS) is a 3-year project funded by the Food and Health Bureau (FHB) of Hong Kong SAR Government. It commenced in 2010 and was completed in 2013. It was proposed by local researchers and mental health specialists from The Chinese University of Hong Kong, The University of Hong Kong, Kwai Chung Hospital, Castle Peak Hospital, and Kowloon Hospital, and experts from the UK and the Netherlands with the aim of achieving the following objectives:

1. to estimate the prevalence of significant mental disorders among community-dwelling Chinese adults in Hong Kong;
2. to estimate the functional impairment associated with significant mental disorders;
3. to identify the relationship between significant mental disorders and social factors;
4. to identify the relationship between significant mental disorders and physical morbidity;
5. to evaluate the extent and nature of service use in relation to significant mental disorders;
6. to characterise psychosis risk states and the associated risk factors in a community sample;
7. to study co-morbidity between significant mental disorders; and
8. to collect information on potential protective factors for mental wellbeing.

### Study Design

In preparing for the present study, methodologies for

epidemiological survey of mental morbidity were reviewed. There were 2 standard designs which involved either a single- or 2-phase approach. The current study adopted the 2-phase design represented by the APMS. Three APMSs have been conducted to evaluate the psychiatric morbidity among adults living in private households in the UK (1993, 2000, and 2007).<sup>17</sup> An alternative, but much more costly single-phase approach was represented by a series of studies employing the CIDI,<sup>18</sup> which is a fully structured interview schedule designed for use by trained lay interviewers. This instrument assesses a broad spectrum of mental disorders according to the ICD-10 and DSM-IV criteria. The studies employing CIDI assume elaborative single-phase methodology yielding information covering a wide array of psychiatric diagnoses; but substantial financial, technical, and professional support is required for single-phase assessment. The APMS assumes a more focused and less costly approach addressing only specific mental disorders which have significant impact on service planning. Considering the resource implications and specific aims of the proposal of HKMMS, the research team referred to the methodology of the APMS performed in England in 2007.

### Study Population and Recruitment

The study population of HKMMS consists of 5700 Chinese adults aged between 16 and 75 years, representative of community-dwelling population in Hong Kong. This sample size was chosen as it is large enough to enable us to look into the means and 95% confidence intervals for prevalence of CMD, psychotic experience, substance<sup>22</sup> and alcohol misuse, as well as suicidal behaviours in related epidemiological surveys (Table 1).<sup>17,23</sup> Sample size estimates for CMD were derived by referring to the more prevalent anxiety and depressive disorders. The sample size for psychotic experience was calculated based on the prevalence of psychotic symptoms (at-risk mental states) reported in APMS.<sup>17</sup> We also acknowledged biases of under-reporting in community surveys and gender differences in substance misusers. For suicidal behaviours, sample size estimates were derived from 1-year prevalence data of suicide attempts from surveys conducted in England and Hong Kong. Sample size requirements for the above 4 conditions were estimated separately. We decided to adopt the estimate for 1-year prevalence data of suicide attempt for the overall requirement for this study.

With the assistance of the Census and Statistics Department of the Hong Kong SAR Government, a multi-stage sampling design was used. The sampling frame consisted of randomly selected addresses, which were stratified according to geographical districts and the nature of premises. This multi-stage stratification first followed the distribution of residential premises in different geographical districts, and the relative proportion of private versus public housing units. Samples of geographical areas representative of the residential distribution in Hong Kong were selected, followed by subsequent stages of geographical sampling

(e.g. estates within districts, blocks within estates, households within blocks).

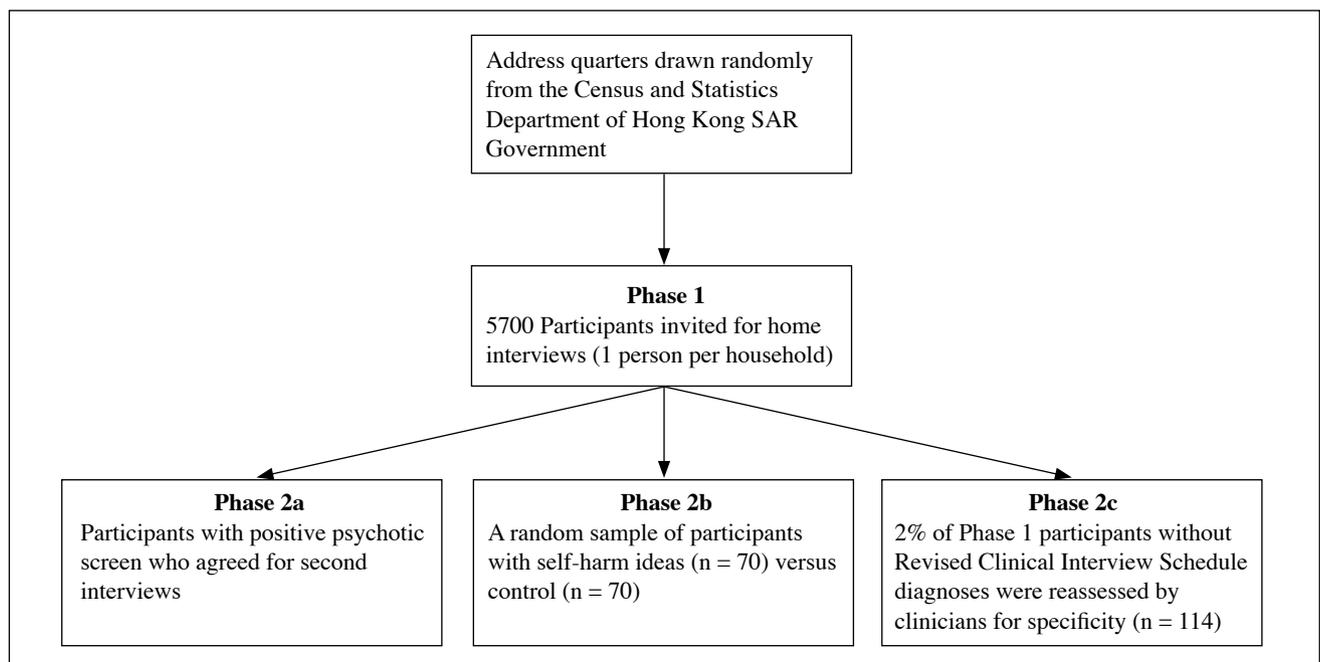
Invitation letters were sent to each selected address, in advance, to introduce the survey. At least 1 on-site visit was conducted to addresses where entry to the building was allowed to seek permission for interview. A telephone hotline was established to address queries and refusals. Only 1 adult per household was invited to participate to reduce the inter-dependency of the observations due to clusters of mental disorders that might run in families. To avoid introduction of any bias, the household member with birthday closest to the day of interview was selected for assessment. Inclusion criteria included age between 16 and 75 years inclusive, Chinese ethnicity, birthday closest to the date of first selected interview, and consent for participation. Exclusion criteria were age < 16 years or > 75 years, non-Chinese ethnicity, and non-satisfaction of

the closest birthday criteria. For subjects who were willing to participate, but were unavailable or unable to provide full information (e.g. intellectual disability or sensory impairments), proxy information from first-degree relatives was obtained and the data were specified as proxy. It is recognised that the mental health population survey should include community-dwelling citizens of different ethnicities. The HKMMS aimed to provide basic information about global mental health status of the Hong Kong community. After the current study, it is envisaged that the protocol and assessment materials will be adapted for an extension study including non-Chinese participants in Hong Kong.

At least 3 letters were sent in advance to each household until responses were obtained. For households which declined to participate, the address was counted as refusal with no substitution allowed. For addresses where residence were not eligible or addresses where home visits

**Table 1. References for estimation of sample sizes.**

	Adult Psychiatric Morbidity Survey in England <sup>17</sup>		China survey (urban cities) <sup>23</sup>	
	Prevalence (95% confidence interval)	Sample size estimates	Prevalence (95% confidence interval)	Sample size estimates
Common mental disorders	16.5 (15.2-17.2)	2401	Mood disorders: 5.66 (4.80-6.68)	Mood disorders: 2717
Mixed anxiety and depressive disorder:	6.9 (6.0-7.9)	2661	Anxiety disorders: 6.86 (5.42-8.65)	Anxiety disorders: 921
Positive psychotic screen	4	4268	-	-
Alcohol misuse	24.2 (23.0-25.4)	1668	5.24 (4.15-6.59)	1614
One-year suicidal attempts	5.6 (5.0-6.3)	5683	-	-



**Figure. Flowchart of Assessment Schedule for the Hong Kong Mental Morbidity Survey**

were not permitted with undetermined eligibility, another address from the same area and housing type was generated as a replacement.

**Field Work**

Before commencement of HKMMS, preparatory studies were performed to validate the instruments in the local population. Phase 1 of HKMMS estimated the community prevalence of CMD, and the associated risk factors and impacts. In this phase, participants were interviewed with a structured interview schedule serving diagnostic criteria for CMD, and screening instruments for psychotic disorders, substance misuse, and suicidal behaviours. The demographic data were recorded, and the everyday functioning, 1-year service utilisation for mental health problems, and associated risk factors were evaluated. Phase 1 interviews were conducted by trained research assistants.

The second phase of HKMMS comprised 3 studies conducted by clinicians. Phase 2a and Phase 2b studies were targeted at conditions of special significance to public health and early interventional efforts. Phase 2a study measured the prevalence of psychotic disorders and psychosis risk states (well-defined at-risk states for developing psychosis). Optimal management of psychotic disorders is a core priority for the public mental health services. Information from this study will be critical for the development of early detection and preventive intervention efforts. Phase 2b study measured self-harm ideations and behaviour, and the relationship of these with other mental health disorders and risk factors. Such information will be important to formulate a range of preventative and interventional strategies to contain suicide rates in the population. In addition, 2% of the participants who were screened negative at Phase 1 were invited to take part in Phase 2c study. They were interviewed with Structured Clinical Interview for the DSM-IV (SCID) by psychiatrists to check the specificity of Phase 1 diagnostic instruments. The Figure depicts an overview of the assessment schedule for the HKMMS.

**Interview Schedules**

Assessment instruments adopted at different phases of HKMMS are listed in Table 2.

**Phase 1 Studies**

Instruments for Phase 1 study consisted of the following:

1. Questionnaires on basic demographic information, general health and wellbeing, physical illness checklist, social support, and health service use for the past year. In addition, participants' psychosocial functioning was evaluated with Social and Occupational Functioning Assessment Scale, an assessment from the DSM-IV-TR of an individual's level of social and occupational functioning.<sup>24</sup> This instrument considers social and occupational functioning on a continuum from excellent functioning to grossly impaired functioning. It evaluates impairments in functioning due to physical limitations as well as mental disorders. In addition, the

presence of life events was assessed with Life Event Checklist, a 17-item checklist of exposure to stressful life events and has been demonstrated to correlate with psychological distress.<sup>25</sup>

2. Common mental disorders were diagnosed with CIS-R<sup>16</sup> which is a structured psychiatric assessment interview schedule tapping non-psychotic symptoms in the week prior to interview. It consists of 14 symptom group sections including somatic symptoms, fatigue, concentration and forgetfulness, sleep problems, irritability, worry about physical health, depression, depressive ideas, worry, anxiety, phobias, panic, compulsions, and obsessions. The sum of the key area scores generates a total score, a measure of non-psychotic psychiatric morbidity. The symptom clusters and scores were amalgamated to form ICD-10 diagnoses of 6 groups of CMD including generalised anxiety disorders, mixed anxiety and depressive disorder, depressive episode, phobias, obsessive-compulsive disorder, and panic disorder.
3. Psychosis Screening Questionnaire (PSQ) assessed psychotic symptoms in the past year. It has 5 probe questions (plus secondary questions) enquiring about mania, thought insertion, paranoia, strange experiences, and hallucinations.<sup>26</sup>

**Table 2. Assessment instruments included in Hong Kong Mental Morbidity Survey.**

<p><b>Phase 1</b></p> <ol style="list-style-type: none"> <li>1. Basic demographic information</li> <li>2. 12-Item Short-Form Health Survey</li> <li>3. Cumulative Illness Rating Scale</li> <li>4. Life Event Checklist</li> <li>5. Multidimensional Scale of Perceived Social Support</li> <li>6. Social and Occupational Functioning Assessment Scale</li> <li>7. Service use for mental health problems in the past year</li> <li>8. Revised Clinical Interview Schedule</li> <li>9. Psychosis Screening Questionnaire</li> <li>10. Beck Scale for Suicide Ideation</li> <li>11. Beck Hopelessness Scale</li> <li>12. Questionnaire on substance misuse and dependence</li> <li>13. Alcohol Use Disorders Identification Test</li> <li>14. Community version of the Severity of Alcohol Dependence Questionnaire</li> </ol> <p><b>Phase 2a</b></p> <ol style="list-style-type: none"> <li>1. Structured Clinical Interview for the DSM-IV</li> <li>2. Comprehensive Assessment of At-Risk Mental State</li> </ol> <p><b>Phase 2b</b></p> <ol style="list-style-type: none"> <li>1. The External Entrapment and Defeat Scale</li> <li>2. The Life Events and Difficulties Schedule</li> <li>3. The Means-End Problem Solving Tasks</li> <li>4. The Impact of Events Scale</li> <li>5. Depressive Rumination Scale</li> </ol>
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4. Suicidal ideas and behaviours were evaluated by the Beck Scale for Suicide Ideation (BSS),<sup>27</sup> Beck Hopelessness Scale,<sup>28</sup> and questions listed in the CIS-R.
5. Drug misuse and dependence was assessed by a questionnaire on substance misuse and dependence. Besides, alcohol misuse was assessed by Alcohol Use Disorders Identification Test<sup>29</sup> and Community version of the Severity of Alcohol Dependence Questionnaire (SADQ-C).<sup>30</sup> The former evaluates hazardous drinking; it takes into consideration the year before the interview as a reference period, consists of 10 items, and covers areas including hazardous alcohol consumption, harmful alcohol consumption, and symptoms of dependence. The other instrument, SADQ-C, is developed specifically for use in the general population. It is composed of 20 items, covering a range of dependence symptoms, with the 6 months before the interview as the reference period.

### Phase 2 Studies

Instruments for Phase 2 study consisted of the following:

1. Phase 2a: Phase 1 participants who were screened positive with PSQ were assessed by psychiatrists with the Hong Kong Chinese version of SCID<sup>31,32</sup> to establish psychiatric diagnoses. In addition, they were interviewed by Comprehensive Assessment of At-Risk Mental States,<sup>33</sup> which identifies participants with an ultra-high risk of transition to psychosis.
2. Phase 2b: A randomly selected sample of Phase 1 interviewees (n = 70) with a score of 1 or 2 in item 4 (desire to make active suicide attempt) or item 5 (passive suicidal desire) of the BSS (cases) was recruited into the Phase 2b of the study. A control group (n = 70) comprising subjects who scored 0 in item 4 or item 5 of the BSS were selected from the survey participants. To identify the psychosocial risk factors of suicidal ideas and behaviours, they were interviewed with the External Entrapment and Defeat Scale,<sup>34</sup> Life Events and Difficulties Schedule,<sup>35</sup> Means-End Problem Solving Tasks,<sup>36</sup> Impact of Events Scale,<sup>37</sup> and Depressive Rumination Scale.<sup>38</sup>
3. Phase 2c: 2% of the participants who were screened negative were invited for a SCID interview by psychiatrists to check the specificity of Phase 1 diagnostic instruments.

### Conclusion

Modelling after overseas psychiatric epidemiological studies, HKMMS is the first territory-wide study in Hong Kong designed to examine the prevalence of mental disorders in a representative sample of the local population. It also evaluates functional and physical morbidity, social factors associated with mental disorders, and assesses co-morbidity and service utilisation patterns. In addition, psychosis risk states and potential protective factors for mental wellbeing were examined. The results of this study

will be submitted to the FHB of the Hong Kong SAR Government and published as a series of scientific papers. We believe that findings of the HKMMS will have important implications for mental health policy formulation, health and social care manpower planning, as well as medical, nursing, and allied health professional education in Hong Kong. Understanding the epidemiological data pertaining to the most significant and most common mental disorders, their respective risk factors and at-risk states will also facilitate planning of early detection and interventional services and future preventive strategies. To monitor the mental health status of the Hong Kong community, the HKMMS should be repeated at regular intervals so that service plans can be revised according to the changing needs of the population.

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## Declaration

The authors declared that there is no conflict of interest in this study.

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