

# Monitoring socioeconomic inequalities in health in Hong Kong: insights and lessons from the UK and Australia

Gary Ka-Ki Chung,<sup>a</sup> Mark Robinson,<sup>b,c</sup> Michael Marmot,<sup>a,d,g</sup> and Jean Woo<sup>a,e,f,g,\*</sup>

<sup>a</sup>CUHK Institute of Health Equity, The Chinese University of Hong Kong, Hong Kong, China

<sup>b</sup>Institute for Social Science Research, University of Queensland, Indooroopilly, Queensland, Australia

<sup>c</sup>Institute of Health and Wellbeing, University of Glasgow, Glasgow, UK

<sup>d</sup>UCL Institute of Health Equity, Research Department of Epidemiology and Public Health, University College London, London, UK

<sup>e</sup>CUHK Institute of Ageing, The Chinese University of Hong Kong, Hong Kong, China

<sup>f</sup>Department of Medicine & Therapeutics, Faculty of Medicine, The Chinese University of Hong Kong, Hong Kong, China

## Summary

In many developed countries such as the UK and Australia, addressing socioeconomic inequalities in health is a priority in their policy agenda, with well-established practices and authorities to collect and link selected health and social indicators for long-term monitoring. Nonetheless, the monitoring of socioeconomic inequalities in health in Hong Kong remains in a piecemeal manner. Also, the common international practice to monitor inequalities at area level appears to be unsuitable in Hong Kong due to its small, compact, and highly interconnected built environment that limits the variation of neighbourhood deprivation level. To enhance inequality monitoring in Hong Kong, we aim to draw reference and lesson from the UK and Australia to explore the feasible steps forward regarding collection of health indicators and contextually appropriate equity stratifiers with strong implication on policy actions, and discuss potential strategies to promote the public awareness and motivations for a more comprehensive inequality monitoring system.

**Copyright** © 2022 The Author(s). Published by Elsevier Ltd. This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

**Keywords:** Health inequality; Socioeconomic; Monitoring; Data collection; Hong Kong; United Kingdom; Australia

## Introduction

Social determinants of health are well established and extensively documented all over the world.<sup>1,2</sup> While inequalities in the social determinants of health have also been documented by academic research in Hong Kong,<sup>3-6</sup> resulting health inequalities are seldom featured in government policies or civil society discourse, nor have they been incorporated into health and social care systems as a performance measure. A possible explanation for such a low awareness may be due to the over-reliance on life expectancy as an overarching indicator of health. As Hong Kong has the longest total life expectancy at birth<sup>7,8</sup> with 82.9 years for males and 88.0 years for females in 2020,<sup>9</sup> policymakers tend to focus on the health achievement but overlook the presence of social and health inequalities in society. It is worth noting that Hong Kong has a wide income gap with a pre-tax and social transfer Gini coefficient of 0.539 in 2016,<sup>10</sup> which has been among the greatest in major developed world economies.<sup>11</sup> In addition, local

academic studies consistently report apparent socioeconomic inequalities in health in Hong Kong,<sup>3</sup> not only in terms of self-rated health but also other health outcomes such as obesity and cardiometabolic risks, multimorbidity, and frailty.<sup>12-17</sup> A recent age-period-cohort analysis also showed the widening socioeconomic inequalities in mortality risks across generations over the past decades, suggesting that the health improvement during rapid socioeconomic development in Hong Kong was not equally shared across the socioeconomic ladder.<sup>18</sup> Apart from physical health, deterioration in mental and social support has been observed especially over the past years following the massive anti-extradition bill social movement and the on-going COVID-19 pandemic,<sup>19,20</sup> with a greater extent of deterioration among the socioeconomically disadvantaged groups.<sup>20-25</sup> Nonetheless, despite the recent evidence in the academic field, the awareness and appreciation of this phenomenon as a matter of social injustice by the general public and policymakers remain relatively low in Hong Kong.

In addition to prolonging life, are government policies, the health and social care systems, and the civil society in Hong Kong doing well in mitigating the health impact on socially vulnerable groups, as well as in addressing the social determinants of health and the

\*Corresponding author. Department of Medicine & Therapeutics, Faculty of Medicine, The Chinese University of Hong Kong, Hong Kong SAR, China.

E-mail address: [jeanwoowong@cuhk.edu.hk](mailto:jeanwoowong@cuhk.edu.hk) (J. Woo).

<sup>§</sup>Full professors.



The Lancet Regional Health - Western Pacific  
2023;31: 100636  
Published Online 11 November 2022  
<https://doi.org/10.1016/j.lanwpc.2022.100636>

associated socioeconomic gradient of health in the whole population? In order to examine this in greater detail, health inequality indicators other than total life expectancy need to be documented for health inequality monitoring. In this viewpoint article, we draw reference and lesson from the UK and Australia, as the exemplars with relatively well-established systems for health inequality monitoring across the globe, to discuss and explore the potential health indicators that can readily be monitored on a regular basis, as well as the equity stratifiers that can be evaluated with implications on policy actions. Specifically, we aim to promote action on health inequality monitoring in Hong Kong based on feasible and contextually appropriate indicators that may also be comparable to other world regions, so as to raise the awareness of socioeconomic inequalities in health and the need for health and social policies that aim to prevent and mitigate them.

### The policy agenda on addressing health inequality

As mentioned above, addressing health inequality has rarely been a priority issue of the policy agenda in Hong Kong. Despite the existence of general social welfare schemes (e.g., the Comprehensive Social Security Assistance, Working Family Allowance), policymakers in Hong Kong tend to adopt a fragmented approach to tackling social and health issues. Specifically regarding health inequality, the policy that “no one in Hong Kong should be denied medical care due to lack of means” adopted by the Food and Health Bureau<sup>26</sup> may be one of the very few explicit examples on the policy agenda in Hong Kong. In general, policymakers in Hong Kong tend to rely heavily on poverty alleviation and financial accessibility to services for particular disadvantaged groups, rather than acknowledging and addressing the socioeconomic gradient in health driven by inequitable distribution of a much broader range of social determinants of health (e.g., living environment, working condition, social capital and support, and other more upstream socio-environmental factors).

In contrast to Hong Kong, addressing health inequality has long been an explicit feature of policies and systems in the UK. Over the past decades, health inequality forms the basis of UK government reports (e.g., the Black Report, the first Marmot Review and its follow-up Marmot Review 10 Years On in England,<sup>27,28</sup> Equally Well,<sup>29</sup> and the reports on long-term monitoring of health inequalities in Scotland<sup>30,31</sup>). They also form a prominent strand in UK policies, healthcare settings, and professional bodies. For example, the Royal College of Physicians in the UK convenes the Inequalities in Health Alliance,<sup>32,33</sup> which includes over 200 organizations to campaign for a cross-government strategy to reduce health inequalities. To raise the

public awareness on health inequalities and advocate for ‘health in all policies’, the alliance asks members to contribute real life examples of patients whose health has been negatively affected by the social determinants of health including poor housing, air pollution, deprivation or not being able to afford a healthy diet. There are also examples of local government initiatives and measures to tackle health inequalities inspired by the Marmot Reviews. For instance, the Coventry City Council decided to become a “Marmot City” and pursue the policy objectives recommended in the first Marmot Review,<sup>34</sup> whereas more recently the combined authority in the Greater Manchester explored the necessary steps to reduce social determinants of health and associated health inequalities for building up a fairer society in the post-pandemic era according to the Marmot City Region approach.<sup>35</sup> The impact of such initiatives on health inequality in the UK can be evaluated through regular monitoring of relevant data, usually in terms of health outcomes by relative deprivation at the neighbourhood level, by a government body—the Office of National Statistics (ONS).<sup>36,37</sup>

In Australia, reducing inequalities in health is high on the political agenda. A priority focus is on the unfair health inequalities that exist between Indigenous and non-Indigenous Australians. The National Agreement on Closing the Gap was developed in partnership between Australian governments and a coalition representing Aboriginal and Torres Strait Islander organisations.<sup>38</sup> The National Agreement requires all States and Territories in Australia to implement plans to achieve a set of overarching outcomes, including parity in health and the social determinants of health between Indigenous and non-Indigenous Australians. Addressing socioeconomic inequalities in health is also a priority in the recently published National Preventive Health Strategy (NPHS), which includes as an overarching aim that “health equity is achieved for priority populations”.<sup>39</sup> Among the priority populations are those living with socioeconomic disadvantage. There are also examples of health inequality strategies at the subnational level. For example, in Victoria, the *Fair Foundations: The VicHealth framework for health equity* was developed to provide a planning tool for health promotion policy and practice.<sup>40</sup> The framework explicitly recognises the social determinants of health inequalities and provides suggested potential entry points for action by different stakeholders. In Queensland, a state-wide Equity Framework is being developed by the public health agency, Health and Wellbeing Queensland, which aims to guide state-wide policy, practice and investment, and drive system change to reduce inequity across government, non-government, private sector, and communities.<sup>41</sup> Importantly, the Queensland Equity Framework cuts across all areas of public policy, not just health, which aligns with a recent call for Australia to develop a national equity strategy.<sup>42</sup>

## The current practices of health inequality monitoring

Regular monitoring should be conducted by government organizations using available data that are routinely being collected. Nonetheless, the data collection practices, the choice of indicators of health inequalities, together with a responsible government unit that collects them, would vary between regions. In this section, we reviewed the existing practices in the UK, Australia, and Hong Kong.

### The case of the UK

With the support of ONS, the so-called ‘Marmot indicators’ are collected and widely used on regular basis to monitor population health and health inequalities. The indicators, which correspond to the recommendations in Fair Society, Healthy Lives,<sup>27</sup> led by Professor Sir Michael Marmot, cover health indicators such as total and health life expectancies, life satisfaction, work-related illness, as well as the social determinants of health including employment status, education performance, poverty, allowance status, the utilization of outdoor space for health purpose.<sup>43</sup> Specifically in Scotland, the approximately annual reports on long-term monitoring of health inequalities also cover a wide range of health outcomes in terms of healthy life expectancy, all-cause mortality and premature death, self-rated health and mental well-being, disability, birthweight, and hospital admissions or deaths related to cancer, stroke, and use of alcohol and drugs.<sup>31</sup> Comparisons of these health indicators are made using small geographic areas known as Lower Super Output Areas in England and Wales, and datazones in Scotland, which can be aggregated to larger geographic areas. If data on health outcomes and health determinants are available at the level of these geographical areas, inequalities can be measured within and between larger geographical areas.

With the well-established and regularly updated Index of Multiple Deprivation,<sup>44</sup> the relative deprivation level of neighbourhoods is calculated and widely used for health inequality monitoring in the UK. For example, the Marmot Review in England revealed that people living in the wealthiest neighbourhoods live seven years longer on average than those living in the poorest neighbourhoods.<sup>27</sup> In addition, data from NHS Health Scotland also showed that life expectancy in men reduces by two years for each successive station along the Glasgow trainline, whereas a 10.9-year difference in male life expectancy was observed between Bankhead and Balgreen which are just 2 miles apart in Edinburgh.<sup>45</sup> Similar patterns applied to females as well.<sup>45</sup> In addition to absolute differences, other recommended measures of health inequalities—the relative index of inequality (RII) and the slope index of inequality (SII)—

are also calculated for life expectancies as well as other above-mentioned indicators of health and the social determinants of health to assess the extent of inequalities. Overall, the consistent use of indicators and inequality measures in the UK enables long-term monitoring and valid comparisons over time.

### The case of Australia

In Australia, socioeconomic inequalities in health and health determinants are commonly reported using the Index of Relative Socio-Economic Disadvantage (IRSD),<sup>46</sup> which is one of four indexes included as part of the Socio-Economic Indexes for Areas (SEIFA) product developed by the Australian Bureau of Statistics. Akin to those used in the UK, the IRSD is an area-based measure that classifies individuals according to the socioeconomic characteristics of the small geographical area in which they live, defined using the census. In Australia, the smallest statistical areas—SA1s—generally have a population of 200–800 people. The IRSD scores SA1s by summarising area-based attributes, including household income, educational attainment and employment. If necessary, IRSD scores can be calculated for larger geographies using a population weighted average of the SA1 scores that are coterminous with the larger geographical area. This area-based approach is used extensively in the biennial ‘Australia’s health’ report published by the Australian Institute of Health and Wellbeing,<sup>47</sup> which presents socioeconomic inequalities in health outcomes at the national level using the latest available health data covering the incidence, hospitalization, mortality, and disability-adjusted life years of major chronic conditions, as well as self-rated physical and mental health status. Trends in the social determinants of health such as lifestyle behaviours, exposure to psychosocial distress, and access to healthcare and medications are also presented. At subnational levels, inequalities in health by socioeconomic position also tend to use the IRSD, presenting data by IRSD quintiles, deciles, or ‘low’ and ‘high’ deprivation categories. Routine reporting of trends in socioeconomic inequalities in health, however, particularly using recommended indices such as the RII and SII, is lacking. Indeed, it has been noted that “while a huge amount of data are collected, there are substantial gaps, a lack of integration and sporadic use”.<sup>48</sup> This is supported by the NPHS which calls for improved use, interpretation and reporting on health inequalities.<sup>39</sup> Flavel et al. also recently emphasised the need for individual data to better understand the complex pathways through which health inequalities arise, and to explore the intersection with socioeconomic inequalities in health within disadvantaged groups, such as Indigenous peoples, people living with a disability, and ethnic minority groups.<sup>49</sup>

## The case of Hong Kong

Health inequality monitoring has long been in a piecemeal manner in Hong Kong. There is no single government unit or official report specifically documenting the situation of health inequality on a regular basis, let alone a well-defined set of health inequality indicators. The Population Census, as the most comprehensive survey of the whole Hong Kong resident population, has not covered any health data since 1981.<sup>50</sup> As a result, the current Census data are suitable only for social inequality monitoring but not for health inequality monitoring. In addition, surveys related to health or social determinants of health have been commissioned by different government departments at irregular time intervals, where comparisons by a few selected socioeconomic measures may be occasionally reported. For example, the Population Health Surveys initiated by the Department of Health is arguably the best available series of population-wide household surveys on health-related topics including cardiometabolic risk factors, mental health, health-related behaviours, and preventive health practices. However, it is not conducted on a regular basis—the time interval between the first survey in 2003/04 and the second survey in 2014/15 was 11 years, while it took around 6 years to have the third survey in 2020. Also, although the data covered a range of demographic and socioeconomic factors that could serve as potentially useful equity stratifiers, the relevant inequality findings were rarely presented in the official reports except a few simple tables by income levels. As for some other topics such as child well-being and long-term care needs of older adults, there were only one or two surveys over the past 20 years, making trend analyses difficult. As for the administrative healthcare data, although the Hospital Authority of Hong Kong has a comprehensive electronic record of clinical outcomes and healthcare service utilization of inpatients and outpatients, only the status of the government Comprehensive Social Security Assistance (i.e., whether or not receiving a means-tested allowance scheme for the disadvantaged), as an equity stratifier, is routinely documented in the healthcare system, which limits the assessment of the socioeconomic gradient of healthcare outcomes. While there are some local population-based cohorts in the academia, only a few of the published studies focused primarily on the socioeconomic inequalities in selected health outcomes depending on researcher's interests and data availability,<sup>17,51–53</sup> which may add value on a specific research area rather than a comprehensive and systematic assessment of health inequality. Also, the recent local evidence have thus far rarely been translated into policy attention and concrete actions in Hong Kong, unlike the case of gradual policy changes in the UK in response to the continuous research effort and advocacy via the ground-breaking Whitehall studies and subsequent large-scale population cohort research over the

past decades.<sup>54</sup> In short, the fragmented and irregular health and social data collection in Hong Kong hinders a comprehensive and long-term monitoring of health and health inequality.

## The applicability of equity stratifiers in Hong Kong

The choice and consistency in the use of equity stratifiers are important for health inequality monitoring, which have been an active research area in recent years.<sup>55,56</sup> Ideally, equity stratifiers that are common between countries have an advantage of enabling comparison, a potentially important factor in motivating improvements. Such indicators should reflect the fundamental causes of poor health, be easy to understand by the lay public, and imply potential policy entry points.

Conceptually, it is easier to raise a sense of the social injustice of health inequalities by comparing geographic variations such as deprived versus non-deprived neighbourhoods, like the cases in the UK and Australia. However, in Hong Kong, while we acknowledge that people with lower income tend to be clustered in certain districts, contextual neighbourhood differences are not apparent with no areas particularly deprived of community amenities and services given the compact urban planning as a small city. Specifically, Hong Kong is a highly urbanized small territory with an approximate size of 1110 square kilometres, and about 40% of the land comprises protected country parks; its population of about 7.5 million is concentrated in merely about 25% of the land that has been developed.<sup>57,58</sup> As the majority of the Hong Kong population live in high-rise accommodation where types of housing are mixed, access to shops, transport, and healthcare facilities are fairly equal with few particularly unsafe neighbourhoods. In addition, the Government also played an important role in the provision of essential services such as wet markets, libraries, parks, and hospitals owned by Hospital Authority, which makes access to services more equitable. A recent local study also supports the notion that access to services is not necessarily poorer in the disadvantaged areas in Hong Kong.<sup>59</sup> In other words, the highly interconnected built environment in Hong Kong enhances inter-area accessibility and thus reduces social segregation across communities. The above observations lend support for the 'compositional effect' (i.e., socioeconomic characteristics of individuals within in a region) rather than the 'contextual effect' (i.e., the influence of the environment)<sup>60</sup> for the neighbourhood differences in health in Hong Kong. Although a few neighbourhood-level social deprivation index and district income inequality index have previously been constructed based on Census data on the aggregate measures of demographic and socioeconomic factors in regional areas in Hong Kong,<sup>61–63</sup> their applicability on

health inequality monitoring on outcomes other than mortality may be limited due to the relatively small contextual variations across areas and the lack of health data at small area level in Hong Kong. Therefore, raising societal awareness on health equity by highlighting geographic variations in health may not be the most appropriate approach in Hong Kong.

One possible alternative equity stratifier that reflects the living condition and environment, as a proxy measure of neighbourhood deprivation, could be the level of household crowding which is broadly defined as the number of occupants exceeding the capacity of the available dwelling space in terms of rooms or floor area.<sup>64</sup> In the Population Census or By-census of Hong Kong, data on the number of rooms or bedrooms and floor area of accommodation have been collected since 2001 and 2016, respectively,<sup>50</sup> making estimation on household crowding possible with the routinely collected data on household size. Given the scarcity of land and the extraordinarily high flat price in Hong Kong,<sup>65,66</sup> household crowding may be a particularly relevant equity stratifier as living space per person is highly sensitive to the socioeconomic position and economic resources of a household. Unlike educational attainment which more effectively captures one's knowledge, skills, and cognitive functioning despite being an important proxy determinant of one's occupation and income in later life, housing-related indicators such as household crowding are deemed as a multifaceted socioeconomic measure that mainly reflects one's material circumstances, not only in terms of income but also asset. As suggested by Galobardes et al.,<sup>67</sup> housing is generally *"the key component of most people's wealth, and accounts for a large proportion of the outgoings from income"*. In terms of the health impact of household crowding, a systematic review published in the WHO Housing and Health Guidelines concluded that individuals living in a crowded household are at elevated risks of infectious diseases and mental health problems.<sup>64</sup> Local studies also showed that household crowding is associated with adverse health outcomes such as hypertension, anxiety, and stress in Hong Kong,<sup>68,69</sup> supporting the link between household crowding and health inequality.

Relatedly, other potential housing-related indicators readily available in the Census are the type and tenure of accommodation. Given the severe housing unaffordability issue in Hong Kong,<sup>66</sup> whether living in private housing or public rental housing and other subsidized housing, and whether the flat is rented or owned, are particularly relevant to one's social standing and neighbourhood living environment. These indicators may supplement the household crowding measure as the living standard and environment are likely to be different across types and tenure of accommodation even if having the same living space.<sup>70</sup> Indeed, overcrowding and household ownership are two of the four

measures included in the Townsend Deprivation Index in the UK, calculated using census small area statistics.

Nonetheless, the major limitation of type and tenure of accommodation is that they are context-specific to the variations in housing systems (e.g., type and tenure of accommodation), hindering cross-regional comparison.<sup>67</sup> Instead, the use of household crowding as an equity stratifier is straight-forward and could be consistently adopted across regions. More importantly, household crowding per se carries political implications to motivate policy actions, given that the housing crisis has remained unresolved despite being constantly highlighted as the top priority in the policy addresses in recent years. Also, in the latest speech marking the 25th anniversary of the city's handover from Britain to China, Chinese President Xi made an explicit call for bigger and more affordable homes for Hong Kong people and a greater state role in addressing the long-standing housing issue. Hence, if the link between household crowding and health could be established in the general public, the overall high awareness and political agenda on the overcrowding and housing unaffordability issues in Hong Kong could be leveraged on for a better positioning of advocacy for addressing socioeconomic inequalities in health in the community.

## The lessons for Hong Kong

### Regular and consistent health data collection

The major reasons for the inadequate health inequality monitoring in Hong Kong are the irregular launch of health surveys and sporadic use of health indicators. As mentioned above, in the UK there is a well-established set of health indicators (i.e., the 'Marmot indicators') that are consistently collected and regularly compared over years. In Australia, although the data collection is not as regular as in the UK, a specific section on health inequalities based on the latest available data on health and the social determinants of health has been incorporated into the biennial 'Australia's health' reports. Nonetheless, none of these approaches were adopted in Hong Kong. Therefore, a regular and consistent health data collection is the first and foremost step to enhance health inequality monitoring in Hong Kong. In addition, a greater focus on inequalities should be attached in the reports of any future health surveys.

### Data linkage across databases

Related to the above recommendation, it is crucial to enable data linkage of health and socioeconomic indicators collected from different sources. Currently, health data collection is scattered across different government departments (e.g., Department of Health, Hospital Authority, Social Welfare Department). As most of these data sources are independent and can hardly be merged or linked in the absence of unique



personal identifiers, fragmentation is the inevitable result as such datasets are not necessarily territory-wide, do not contain both socioeconomic and health data for inequality assessment, and lack consistency in the choice of equity stratifiers for valid comparison of the extent of inequalities across health outcomes.

### **The use of household crowding as a major equity stratifier**

As a remnant of colonial government policy, particularly deprived neighbourhoods do not really exist in Hong Kong, unlike the UK and Australia, due to the inclusive urban planning and public housing clustered with transport terminus, fresh food markets, health clinics, open spaces, walkable environment, and safe environment. The common practice that incorporates small-area identifiers into health and social datasets for neighbourhood-level health inequality monitoring in Hong Kong may not be as useful as in other world regions. Instead, the level of housing crowding (i.e., living space per person), as a proxy measure of relative neighbourhood deprivation that approximately reflects living conditions and environment, is recommended for health inequality monitoring in Hong Kong, which could be operationalized and compared to the international measures of crowding as summarized in the WHO Housing and Health Guidelines.<sup>64</sup> The rationale and corresponding arguments are presented above.

### **Potential health inequality indicators for considerations**

A number of indicators of health and the social determinants of health deserve to be routinely collected for health inequality monitoring, including but not limited to the type and number of chronic diseases; health behaviours; healthcare access; mental health and social support; dependency in self-care; being a carer and associated caregiving stress; or even a simple question about unmet health needs.<sup>15–17,21,71–73</sup> Indicators at different life course stages should continue to be collected by the Department of Health, that have been described in the WHO Handbook: Maternal and child health; childhood vaccinations; provision of school health and school dental health service; and tertiary education health service.<sup>74</sup> Within the workplace, organizations can monitor sickness absences among different category of staff, with a view to inform health promoting management policies.<sup>75</sup> For older adults, automated collection of unmet needs can be constructed and administered through the territory wide network of community centres, such the system evolving from the eHealth Care project initiated by the Hong Kong Jockey Club Charities Trust.<sup>76,77</sup> This localized approach allows mitigating measures to be developed according to neighbourhoods. Nonetheless, to narrow down the

scope and enhance international comparison, a common set of health inequality indicators is necessary to facilitate a more comprehensive and comparable health inequality monitoring system. While the indicators adopted in the UK and Australia are good references in general, the 'Marmot Indicators' appear to be the most well-established list of multi-dimensional indicators that could be universally adopted for health inequality monitoring across countries, especially on the absolute inequalities in both total and healthy life expectancies in both genders as recommended by Professor Sir Michael Marmot in 2017.<sup>78</sup>

### **Feasible way forward**

Despite the above recommendations on the ideal practices of health inequality monitoring, we also acknowledge that it may be unrealistic to expect policymakers in Hong Kong to make a drastic and immediate change. Even under a strong political commitment, changes in policies and data collection practice usually take place gradually, especially given the lack of data and fragmentation of data collection in Hong Kong. As the first step towards a more comprehensive health inequality monitoring, health variables could be incorporated into the regular Census exercise, which already contain details regarding socioeconomic position as well as household crowding and other housing-related indicators. If we were allowed to add one question into the Census, a single-item question on self-rated health status would probably be our pick as the addition will directly enable the estimation of healthy life expectancy, a key single measure that take into account both mortality and health beyond the conventional focus on total life expectancy. As mentioned above, healthy life expectancy is routinely adopted for health inequality monitoring in the UK and data on both life expectancy and self-rated health are available in Australia; therefore, the addition of self-rated health in Hong Kong will also facilitate international comparison in the inequalities in healthy life expectancy. The obstacle that may be encountered is whether extra questions will be accepted by the Census given the limitation of survey length. The Census runs consultations to all stakeholders to ask for suggestions, and what is finally included depends on a list of criteria: whether this is considered to be useful, whether respondents are willing to answer, whether the enumerators can understand, whether such data exist elsewhere, and the processing effort.<sup>50</sup> We believe that the addition of self-rated health status does not appear to be an insurmountable obstacle if the importance of monitoring health inequalities is accepted by society.

Another feasible way forward, perhaps as a medium-term goal, is to start incorporating household crowding and related housing-related indicators into future health and social surveys as well as the healthcare records. Indeed, variables such as floor area of accommodation

and whether or not living in sub-divided flats were not collected in the Census until 2016, meaning that the Census has recently taken a good start in recognizing the importance of these housing-related indicators in understanding the Hong Kong population. We would therefore recommend other government departments and the Hospital Authority to follow the initiative of the Census and make household crowding one of the consistently collected equity stratifiers in Hong Kong, so as to enhance data mapping across datasets and health inequality monitoring in the not-too-distant future.

Meanwhile, to further promote the public awareness of socioeconomic inequalities in health and enhance the motivations for monitoring and actions on health inequality among policymakers, additional effort and strategies are warranted. From our point of view, the overall low awareness of health inequalities in Hong Kong is probably not due to a lack of sense of social injustice among the public and policymakers, but more likely an issue of how the concept and problem are presented. To this end, the strategy of world rankings could be effective, making use of the psychology of comparison in motivating governments and society towards improvement. Rankings of schools and universities are good examples. For the tertiary education sector, the characteristics being included that constitute final ranking has driven universities to focus on and improve specific areas.<sup>79,80</sup> Also, the Gini index has been widely adopted to compare and rank the extent of income inequality across regions, whereas a health-related example of the ranking strategy is the construction of the Global Age Watch Index by HelpAge International in drawing attention to the overall wellbeing of older people, where 96 countries were ranked.<sup>81,82</sup> A press conference announcing that Hong Kong ranked first in physical health but 79 in psychological health aroused much interest, and serves to confirm what many field workers in the health and social care sector have observed.<sup>82,83</sup> Likewise, selection of some health inequality indicators that can be compared with other countries (e.g., comparison of a consistent list of major health indicators by common socioeconomic measures such as education, relative household income, and perhaps housing-related indicators) could be an effective strategy for raising awareness on health inequality with a view to improvement. In addition, apart from quantitative presentations, the use of case studies may also be an effective strategy. This is frequently used in Reports by the World Health Organizations and the United Nations on different topics, as illustrations. Lastly, during naturally occurring disasters, the media frequently highlights examples of health inequalities in stories of adverse outcomes for vulnerable groups. Taking the COVID-19 pandemic as an example, evidence in Hong Kong unveiled the deeply entrenched inequalities that are further exacerbated by COVID-19 and its associated containment measures. Specifically, the socially

vulnerable groups are at higher risk of massive COVID-19 outbreaks,<sup>84</sup> severe COVID-19 if being multimorbid before infection,<sup>85</sup> and worsening of physical and psychosocial well-being via pandemic-related economic concerns.<sup>24,25</sup> Despite the predicaments, the onset of disasters may present an opportunity to draw the public and policymakers' attention to the underlying inequalities in a society.

Last but not least, we bear in mind that the presence of a comprehensive health inequality monitoring system does not necessarily lead to policy actions. For example, despite a leading health inequality monitoring system in the UK, the existing health inequalities still exert a substantial impact on the population health. The effort on addressing the social determinants of health and associated health inequalities depends not only on the commitment of local governments but also that of the civil society. As suggested by Friel et al.,<sup>86</sup> the civil society plays a pivotal role both in advocating for relevant data collection and in using the collected data to engage different stakeholders and build the political will for concrete policy actions. To this end, the active contribution by the civil society has been a strength in Hong Kong as the local non-governmental organisations and charitable sector are passionate to provide social assistance and support to the less advantaged in the community. For example, the Hong Kong Jockey Club Charities Trust has donated an average of 4.5 billion annually to support a wide range of projects with a strong focus on healthy ageing, children and youth development, as well as promoting healthy community in terms of both physical and mental well-being.<sup>87</sup> Also, many other non-governmental organizations have made continuous effort on filling the unmet health needs in the community.<sup>71</sup> In other words, once a comprehensive health inequality monitoring system is in place in Hong Kong, the unveiled socioeconomic gradient of different aspects of health will be useful in guiding a better resource allocation and more targeted actions by the well-established civil society, in addition to the government, to address the social determinants of health and mitigate the existing health inequalities.

### Summary

When compared to the UK and Australia, health inequality monitoring in Hong Kong remains immature and in a piecemeal manner. Regular data collection, consistent use of health inequality indicators, and data linkage across datasets are crucial for a more comprehensive health inequality monitoring. Apart from neighbourhood relative deprivation, housing-related indicators, especially the level of household crowding, appear to be the contextually appropriate equity stratifier for Hong Kong, which enables meaningful comparison across regions and informs potential policy actions on urban and housing planning. Advocators should

continue to explore different strategies to engage the civil society and illustrate the underlying inequalities, in order to arouse the public awareness on health inequality monitoring and motivate policy actions on addressing the socioeconomic inequalities in health.

#### Contributors

GKC wrote the initial draft of manuscript. All authors contributed to content development with input of contextual information in each region, and also critically appraised and revised the manuscript.

#### Role of the funding source

No external funding was used for this research.

#### Declaration of interests

MR declares that his institution has a contractual research and evaluation partnership with Health and Wellbeing Queensland, an organisation whose work is cited in the article. He leads multiple funded projects as part of this partnership and was an advisor on a recent project to support preliminary work to inform their development of a Queensland Equity Framework, which is mentioned in the article. Health and Wellbeing Queensland has had no involvement in the inception, development or submission of this article. GKC, MM, and JW declare no competing interests.

#### Acknowledgement

GKC acknowledges the Research Grants Council for its support over his Postdoctoral Fellowship (Ref. No.: PDFS2122-4H02).

#### References

- Marmot MG, Wilkinson RG. *Social determinants of health*. 2nd ed. Oxford: Oxford University Press; 2006.
- Siegrist J, Marmot MG. *Social inequalities in health: new evidence and policy implications*. Oxford: Oxford University Press; 2006.
- Chung RY, Wong SYS. Health inequality in Hong Kong. *China Rev*. 2015;15(2):91–118.
- Woo J, Goggins W, Sham A, Ho SC. Social determinants of frailty. *Gerontology*. 2005;51(6):402–408.
- Wang MP, Viswanath K, Lam TH, Wang X, Chan SS. Social determinants of health information seeking among Chinese adults in Hong Kong. *PLoS One*. 2013;8(8):e73049.
- Tan JHI, Goh AX, Yi H. Health inequity and social determinants of healthcare utilization in the disadvantaged community of Hong Kong. *Health Promot Int*. 2021;daab195.
- Ni MY, Canudas-Romo V, Shi J, et al. Understanding longevity in Hong Kong: a comparative study with long-living, high-income countries. *Lancet Public Health*. 2021;6(12):e919–e931.
- Chung RY, Marmot SM. People in Hong Kong have the longest life expectancy in the world: some possible explanations. *NAM Perspect*. 2020. <https://doi.org/10.31478/202001d>.
- Centre for Health Protection. Life expectancy at birth (male and female), 1971 - 2020. <https://www.chp.gov.hk/en/statistics/data/10/27/111.html>. Accessed May 31, 2022.
- Census and Statistics Department. 2016 *population by-census thematic report: household income distribution in Hong Kong*. 2017.
- Oxfam Hong Kong. *Hong Kong inequality report*. Hong Kong: Oxfam Hong Kong; 2018.
- Department of Health. *Report of population health survey 2014/15*. Hong Kong: Department of Health; 2017.
- Chung GK, Lai FTT, Yeoh EK, Chung RY. Educational inequality in physician-diagnosed hypertension widened and persisted among women from 1999 to 2014 in Hong Kong. *Sci Rep*. 2019;9(1):14361.
- Chung GK, Lai FTT, Yeoh EK, Chung RY. Gender-specific trends of educational inequality in diagnosed diabetes from 1999 to 2014 in Hong Kong: a serial cross-sectional study of 97,481 community-dwelling Chinese adults. *Popul Health Metr*. 2021;19(1):37.
- Chung GK, Lai FT, Hung H, Yeoh EK, Chung RY. Differential educational patterning of cardiometabolic risks between women and men among community-dwelling Chinese adults in Hong Kong: the mediating role of obesity. *Public Health Nutr*. 2021;24(13):4245–4256.
- Chung RY, Mercer S, Lai FT, Yip BH, Wong MC, Wong SY. Socioeconomic determinants of multimorbidity: a population-based household survey of Hong Kong Chinese. *PLoS One*. 2015;10(10):e0140040.
- Yu R, Tong C, Leung J, Woo J. Socioeconomic inequalities in frailty in Hong Kong, China: a 14-year longitudinal cohort study. *Int J Environ Res Public Health*. 2020;17(4):1301.
- Chung RY, Lai FT, Chung GK, Yip BH, Wong SY, Yeoh EK. Socioeconomic disparity in mortality risks widened across generations during rapid economic development in Hong Kong: an age-period-cohort analysis from 1976 to 2010. *Ann Epidemiol*. 2018;28:743–752.
- Ni MY, Yao XI, Leung KSM, et al. Depression and post-traumatic stress during major social unrest in Hong Kong: a 10-year prospective cohort study. *Lancet*. 2020;395(10220):273–284.
- Hou WK, Lee TM, Liang L, et al. Civil unrest, COVID-19 stressors, anxiety, and depression in the acute phase of the pandemic: a population-based study in Hong Kong. *Soc Psychiatry Psychiatr Epidemiol*. 2021;56(8):1499–1508.
- Chan SM, Lam LC-W, Law W-Y, et al. Inequalities in psychiatric morbidity in Hong Kong and strategies for mitigation. *Int J Environ Res Public Health*. 2022;19(12):7095.
- Chung RY, Marmot M, Mak JK, et al. Deprivation is associated with anxiety and stress. A population-based longitudinal household survey among Chinese adults in Hong Kong. *J Epidemiol Community Health*. 2021;75(4):335–342.
- Lai FTT, Hall BJ, Liang L, Galea S, Hou WK. Socioeconomic determinants of depression amid the anti-extradition bill protests in Hong Kong: the mediating role of daily routine disruptions. *J Epidemiol Community Health*. 2020;74(12):988–994.
- Chung RY, Chung GK, Chan SM, et al. Socioeconomic inequality in mental well-being associated with COVID-19 containment measures in a low-incidence Asian globalized city. *Sci Rep*. 2021;11(1):23161.
- Chung RY, Chung GK, Marmot M, et al. COVID-19-related health inequality exists even in a city where disease incidence is relatively low. A telephone survey in Hong Kong. *J Epidemiol Community Health*. 2021;75:616–623.
- Food and Health Bureau. *Health reform – second stage public consultation*. Hong Kong: Hong Kong Special Administration Region Government; 2010.
- Marmot M. *Fair society, healthy lives: strategic review of health inequalities in England post 2010*. London: Marmot Review; 2010.
- Marmot M. Health equity in England: the Marmot review 10 years on, 2020.
- Scottish Government. Equally well: report of the Ministerial Task Force on health inequalities, 2008.
- Department of Health and Social Security. *Inequalities in health: report of a research working group*. London: Department of Health and Social Security; 1980.
- Scottish Government. Long-term monitoring of health inequalities. <https://www.gov.scot/collections/long-term-monitoring-of-health-inequalities/>; 2022. Accessed May 5, 2022.
- Royal College of Physicians. Inequalities in health alliance. <https://www.rcplondon.ac.uk/projects/inequalities-health-alliance>; 2022. Accessed May 5, 2022.
- Goddard A. The road to the inequalities in health alliance. *Future Healthc J*. 2021;8(1):9–11.
- UCL Institute of Health Equity. *Coventry Marmot city evaluation 2020*. London: Institute of Health Equity; 2020.
- Marmot M. *Build back fairer in Greater Manchester: health equity and dignified lives*. London: Institute of Health Equity; 2021.
- Office for National Statistics. Health inequalities. <https://www.ons.gov.uk/peoplepopulationandcommunity/healthandsocialcare/health-inequalities>; 2022. Accessed May 5, 2022.
- Barr B, Higgerson J, Whitehead M. Investigating the impact of the English health inequalities strategy: time trend analysis. *BMJ*. 2017;358:j3310.
- Australian Government. National agreement on closing the gap. <https://www.closingthegap.gov.au/national-agreement>; 2022. Accessed June 8, 2022.
- Australian Government Department of Health. *National preventive health strategy 2021–2030*. 2021.



- 40 Victorian Health Promotion Foundation. Fair foundations: the VicHealth framework for health equity. <https://www.vichealth.vic.gov.au/media-and-resources/publications/the-vichealth-framework-for-health-equity>; 2015. Accessed June 8, 2022.
- 41 Reddel T, Curry M, Shekari Soleimanloo S, Porter D. *Resource to support the towards a Queensland equity framework*. Institute for Social Science Research: The University of Queensland; 2021.
- 42 Friel S, Price S, Goldman S, et al. *Australian COVID-19 policy responses: a health equity report card*. Menzies Centre for Health Governance; 2021.
- 43 UK Government. Marmot indicators for local authorities. <https://fingertips.phe.org.uk/profile-group/marmot/profile/marmot-indicators>; 2016. Accessed May 5, 2022.
- 44 UK Government. English indices of deprivation 2019. <https://www.gov.uk/government/statistics/english-indices-of-deprivation-2019>; 2019. Accessed May 5, 2022.
- 45 Molony E, Duncan C. Income, wealth and health inequalities - a Scottish social justice perspective. *AIMS Public Health*. 2016;3(2):255–264.
- 46 Australian Bureau of Statistics. The index of relative socioeconomic disadvantage (IRSD). <https://www.abs.gov.au/ausstats/abs@.nsf/Lookup/by%20Subject/2033.0.55.001~2016~Main%20Features~IRSD~19>; 2022. Accessed June 8, 2022.
- 47 Australian Government Australian Institute of Health and Welfare. *Australia's health 2020*. <https://www.aihw.gov.au/reports-data/australias-health>; 2020. Accessed June 8, 2022.
- 48 Australian Government Productivity Commission. *Shifting the dial: 5 year productivity review (Inquiry Report No. 84)*. Canberra: Commonwealth of Australia; 2017.
- 49 Flavel J, McKee M, Freeman T, et al. The need for improved Australian data on social determinants of health inequities. *Med J Aust*. 2022;216(8):388–391.
- 50 Hong Kong Government. *2016 population by-census technical report*. 2017.
- 51 Kwok MK, Subramanian SV, Leung GM, Schooling CM. Household income and adolescent blood pressure in a Chinese birth cohort: “Children of 1997”. *Soc Sci Med*. 2015;144:88–95.
- 52 Lai ETC, Ho HC, Ho SC, Woo J. Socioeconomic status, physical functioning and mortality: results from a cohort study of older adults in Hong Kong. *J Am Med Dir Assoc*. 2022;23(5):858–864.e5.
- 53 Chen X, Woo J, Yu R, Chung GK, Yao W, Yeoh EK. Subjective social status, area deprivation, and gender differences in health among Chinese older people. *Int J Environ Res Public Health*. 2022;19(16):9857.
- 54 Clark P. ‘What else can you expect from class-ridden Britain?’: the Whitehall studies and health inequalities, 1968 to c.2010. *Contemp Br Hist*. 2021;35(2):235–257.
- 55 Dirksen J, Pinilla-Roncancio M, Wehrmeister FC, et al. Exploring the potential for a new measure of socioeconomic deprivation status to monitor health inequality. *Int J Equity Health*. 2022;21(1):56.
- 56 Ichihara MYT, Ramos D, Reboucas P, et al. Area deprivation measures used in Brazil: a scoping review. *Rev Saude Publica*. 2018;52:83.
- 57 Hong Kong Government. *Hong Kong: the facts, country parks and conservation*. [https://www.gov.hk/en/about/about/hk/factsheets/docs/country\\_parks.pdf](https://www.gov.hk/en/about/about/hk/factsheets/docs/country_parks.pdf); 2020. Accessed May 5, 2022.
- 58 Hong Kong Government. *Land usage distribution in Hong Kong*. [https://www.cedd.gov.hk/filemanager/eng/content\\_954/Info\\_Sheet2.pdf](https://www.cedd.gov.hk/filemanager/eng/content_954/Info_Sheet2.pdf); 2020. Accessed May 5, 2022.
- 59 Guo Y, Chang S-S, Chen M, Yip PSF. Do poorer areas have poorer access to services in Hong Kong? A small-area analysis based on multiple spatial accessibility indicators. *Soc Indic Res*. 2018;138(1):1–21.
- 60 Pickett KE, Pearl M. Multilevel analyses of neighbourhood socioeconomic context and health outcomes: a critical review. *J Epidemiol Community Health*. 2001;55(2):111–122.
- 61 Wang K, Law CK, Zhao J, et al. Measuring health-related social deprivation in small areas: development of an index and examination of its association with cancer mortality. *Int J Equity Health*. 2021;20(1):216.
- 62 Wong CM, Ou CQ, Chan KP, et al. The effects of air pollution on mortality in socially deprived urban areas in Hong Kong, China. *Environ Health Perspect*. 2008;116(9):1189–1194.
- 63 Wong MYH, Wong SH-W. Income inequality and political participation: a district-level analysis of Hong Kong elections. *Soc Indic Res*. 2022;162(3):959–977.
- 64 World Health Organisation. *WHO Housing and Health Guidelines*. <https://www.ncbi.nlm.nih.gov/books/NBK535289/>; 2018. Accessed October 10, 2022.
- 65 Demographia. *16th Annual Demographia International Housing Affordability Survey*: 2020. <http://www.demographia.com/dhi.pdf>; 2021. Accessed May 17, 2021.
- 66 Chung RY, Chung GK, Gordon D, et al. Housing affordability effects on physical and mental health: household survey in a population with the world's greatest housing affordability stress. *J Epidemiol Community Health*. 2020;74(2):164–172.
- 67 Galobardes B, Shaw M, Lawlor DA, Lynch JW, Davey Smith G. Indicators of socioeconomic position (part 1). *J Epidemiol Community Health*. 2006;60(1):7–12.
- 68 Sarkar C, Lai KY, Ni MY, Kumari S, Leung GM, Webster C. Liveable residential space, residential density, and hypertension in Hong Kong: a population-based cohort study. *PLoS Med*. 2021;18(11):e1003824.
- 69 Chan SM, Wong H, Chung RY, Au-Yeung TC. Association of living density with anxiety and stress: a cross-sectional population study in Hong Kong. *Health Soc Care Community*. 2021;29(4):1019–1029.
- 70 Rolfe S, Garnham L, Godwin J, Anderson I, Seaman P, Donaldson C. Housing as a social determinant of health and wellbeing: developing an empirically-informed realist theoretical framework. *BMC Public Health*. 2020;20(1):1138.
- 71 Marmot M, Alexander M, Allen J, et al. *Build back fairer: reducing socioeconomic inequalities in health in Hong Kong*. London: Institute of Health Equity; 2021.
- 72 Chan SM, Chung GK, Kwan MH, Woo J. Mitigating inequalities in community care needs of older adults with dementia: a qualitative case study of an integrated model of community care operated under the proportionate universalism principle. *BMC Prim Care*. 2022;23(1):244.
- 73 Chung GK, Dong D, Wong SY, Wong H, Chung RY. Perceived poverty and health, and their roles in the poverty-health vicious cycle: a qualitative study of major stakeholders in the healthcare setting in Hong Kong. *Int J Equity Health*. 2020;19(1):13.
- 74 World Health Organization. *Handbook on health inequality monitoring: with a special focus on low- and middle-income countries*. 2013.
- 75 National Health Service. *NHS health and wellbeing framework: strategic overview*. <https://www.england.nhs.uk/publication/nhs-health-and-wellbeing-framework/#heading-1>; 2021. Accessed May 5, 2022.
- 76 Yu R, Leung G, Leung J, et al. Prevalence and distribution of intrinsic capacity and its associations with health outcomes in older people: the Jockey Club Community eHealth Care Project in Hong Kong. *J Frailty Aging*. 2022;11(3):302–308.
- 77 Yu R, Tong C, Woo J. Effect of an integrated care model for pre-frail and frail older people living in community. *Age Ageing*. 2020;49(6):1048–1055.
- 78 UCL Institute of Health Equity. *Marmot indicators release 2017*. <https://www.instituteofhealthequity.org/about-our-work/marmot-indicators-release-2017>; 2017. Accessed October 10, 2022.
- 79 Quacquarelli Symonds. *QS World University Rankings*. <https://www.topuniversities.com/>; 2022. Accessed May 5, 2022.
- 80 Times Higher Education. *Times Higher Education World University Rankings*. <https://www.timeshighereducation.com/>; 2022. Accessed May 5, 2022.
- 81 Woo J, Leung D, Yu R, Lee R, Wong H. Factors affecting trends in societal indicators of ageing well in Hong Kong: policies, politics and pandemics. *J Nutr Health Aging*. 2021;25(3):325–329.
- 82 CUHK Jockey Club Institute of Ageing. *Report on AgeWatch index for Hong Kong 2015*. Hong Kong: CUHK Jockey Club Institute of Ageing; 2017.
- 83 The Chinese University of Hong Kong. *CUHK Jockey Club Institute of Ageing Ranks Hong Kong as 24th in the world in terms of elderly wellbeing*. <https://www.cpr.cuhk.edu.hk/en/press/cuhk-jockey-club-institute-of-ageing-ranks-hong-kong-as-24th-in-the-world-in-terms-of-elderly-wellbeing/>; 2015.
- 84 Chung GKK, Chan SM, Chan YH, et al. Socioeconomic patterns of COVID-19 clusters in low-incidence city, Hong Kong. *Emerg Infect Dis*. 2021;27(11):2874–2877.
- 85 Chung GK, Chan SM, Chan YH, et al. Differential impacts of multimorbidity on COVID-19 severity across the socioeconomic ladder in Hong Kong: a syndemic perspective. *Int J Environ Res Public Health*. 2021;18(15):8168.
- 86 Friel S, Townsend B, Fisher M, Harris P, Freeman T, Baum F. Power and the people's health. *Soc Sci Med*. 2021;282:114173.
- 87 The Hong Kong Jockey Club. *The Charities Trust*. <https://charities.hkjc.com/charities/english/charities-trust/index.aspx>; 2022. Accessed October 3, 2022.