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Viability of the Health Protection Account in Hong Kong

頤康保障戶口在香港的可行性

Objective. To evaluate the viability of the Health Protection Account proposed by the Hong Kong Special Administrative Region Government.

Design. Retrospective study.

Setting. The Hospital Authority of Hong Kong.

Materials and methods. Data were obtained from hospital and specialist out-patient clinic admissions. The expected health cost for each patient from the age of 65 years to the average age of life expectancy (83 years) was estimated, as was the contribution to these health costs from the Health Protection Account.

Results. If individuals contribute 1% of their salary to the Health Protection Account from age 40 to 65 years, the Account can only cover 4% of the actual health costs.

Conclusion. The Health Protection Account, as proposed, does not ease the financial burden of increasing health care costs in the elderly. Increasing the contribution rate or reducing the age at which contributions to the scheme are started are possible viable options for making the scheme sustainable. However, the current economic situation is such that the public would not favour either of these alternatives. It is envisaged that the Government will need to continue to finance the health care of its citizens by taxation. A gradual increase in user charges might be the only future option for controlling government health expenditure.

目的：評估由香港特別行政區政府提議的頤康保障戶口之可行性。

設計：回顧性研究。

安排：香港醫院管理局。

資料與方法：根據醫院管理局和專科門診部的應診數據，推算每名市民(平均預期壽命為 83 歲)從 65 歲開始的醫療開支，以及頤康保障戶口所能夠提供的保障。

結果：假設每名市民從 40 歲開始將收入的 1% 投入其頤康保障戶口，預期到 65 歲時該帳戶僅能支付 4% 的實際醫療費用。

結論：建議中的頤康保障戶口並不能減輕日益膨脹的老人醫療財政負擔。增加個人供款或降低該計劃起始年齡是使其仍可實施的可行選擇。然而，在目前的經濟狀況下，這些方案是得不到市民支持的。最後要正視的是，政府仍需要繼續以稅收來津貼市民的醫療費用。逐步增加使用者收費可能是控制未來公共醫療開支的唯一選擇。

Key words:

Delivery of health care;

Health care costs;

Health expenditures;

Hong Kong

關鍵詞：

醫護實施；

醫護成本；

衛生開支；

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Introduction

The Hong Kong Special Administrative Region (SAR) Government recently proposed a Health Protection Account (HPA) scheme as a way of reducing the financial burden of medical costs for future generations.¹ To ensure the long-term financial sustainability of the account, this scheme proposes all working individuals aged 40 to 65 years be required to contribute 1% to 2% of their monthly income to the HPA. The account would cover the costs of future medical needs for both the individual and his or her spouse.¹ All benefits derived from HPA contributions would be preserved and the contributor of the savings would not be permitted to withdraw his or her contributions from the account until they reached the age of 65 years.¹ Upon withdrawal, the savings would be used to pay for health care expenses at public sector rates, or would be used to purchase medical insurance from private insurers.¹ A safety net would be established to protect

low-income groups and patients with chronic diseases. This would ensure that everybody in the local community had equitable access to health care practitioners in Hong Kong.¹ The HPA would thus act as the principal supplementary funding source for the public health care system.

Currently, income from the fees of hospital users covers only 2.5% of the cost. The Government subsidises the remaining 97.5%.¹ In the 2000-2001 financial year, HK\$32.4 billion (11.62% of total public expenditure) was allocated to public sector health care.² However, the future long-term sustainability of the current health care system is uncertain.^{1,3} Based on a 3% annual growth rate in gross domestic product (GDP), annual public health care expenditure is expected to increase to 28.4% of total annual expenditure by the year 2016.³ Any increase in government spending on health care displaces other budgeted public spending (eg infrastructure, education, and housing). Consequently, the Government would need to raise tax rates or cut other government spending as the proportion of health expenditure increases. This is a major concern. The main reason for suggesting the HPA is to reduce the financial impact of future health costs on the Government.¹ The financial pressure of health costs on the Government is immense, and is further aggravated by the increasing size of the ageing population as well as a continuous increase in the expectations of users of the local health care system.^{1,4}

The aim of this paper is to use actuarial and demographic methods to assess the viability of the HPA scheme. This account would cover the true cost of access to health care for all members of the community from the age of 65 years. The current user fees for health care services are heavily subsidised by the Government from general revenue,¹ and do not fully reflect the economic value of the public health care services in Hong Kong. As these rates cover only 2.5% of the cost of running the health care service, they should not be used to assess the actual economic burden on the Government.¹ If the Government is trying to unload the ever-increasing burden of medical costs, the effect of the HPA should be measured against the 'real' anticipated medical costs rather than against the heavily subsidised public sector rates.

Data and methods

Morbidity and life expectancy data for the year 1999 were made available by the Hospital Authority^{5,6} (HA) and the Census and Statistics Department⁷ (CSD) of Hong Kong. Improvement in health has led to an increase in life expectancy. The average number of years that men are expected to live after the age of 65 years has increased from 14.17 in 1981 to 16.82 in 1999. For women the respective rates are 17.47 and 20.21 years.^{7,8} The expected need for health care services and the cost of health care for men and women from the age of 65 to 83 years were examined in order to assess the long-term sustainability of the HPA scheme. The

average life expectancy of both men and women in Hong Kong is 83 years.

Health care needs

There are two main factors that should be considered when quantifying health costs. These are in-patient hospital services and specialist out-patient services (SOPS).^{5,6} General out-patient services were not included. As long time-series data sets on health care service admissions were not available, we used currently observed event rates (cross-sectional data) to determine the number of days in hospital and the number of SOPS attendances needed for a hypothetical person from the age of 65 to 83 years. Yip and Law⁴ have shown that there were no significant changes in the hospitalisation pattern for the period 1996-2000. This suggests that cross-sectional morbidity data are as reliable as time-series data.

The actual length of hospital stay for a 65-year-old person in 2000 and the data of SOPS attendance in 1999 were used as the starting point for projection of needed health care. It was assumed that the age-specific morbidity rates would remain unchanged in this study. The projected hospital bed-days and SOPS attendances for each age after 65 years could thus be determined. Projected hospital bed-day numbers were determined by multiplying the interpolated age-specific hospitalisation rate by the corresponding average length of stay per patient. The SOPS attendances for each specific age were determined by multiplying the SOPS utilisation rates by the average number of SOPS attendances for each patient. Finally, the total projected health care needs were calculated by summing the projected annual hospitalisation and SOPS needs for each of the years from age 65 to 83 years.

Medical expenditure

In a HA-managed hospital, the current non-subsidised cost of one hospital bed-day is HK\$3622 (US\$465) and that of one SOPS attendance is HK\$549 (US\$70).⁹ Using the current health cost as the baseline, the future cost was projected using the historical inflation-adjusted growth rate of the public health expenditure in Hong Kong. It is worth noting that the inflation-adjusted cost of health care is not fixed, but increases continuously with time. Data from the CSD show that public medical expenditure in Hong Kong has risen noticeably since the early 1990's.^{2,10} The rapidity of Hong Kong's increasing public medical expenditure is similar to that of other well-established market economies in the world.¹¹ The rising cost of health care is a global trend and it should be factored into this assessment. To estimate the average annual inflation-adjusted health cost growth rate, we first calculated the annual nominal growth rate in health spending for the period 1993-2000. The nominal growth is equal to the relative change of the health expenditure between two consecutive years. The real growth rate was determined by dividing the nominal growth rate by the Composite Consumer Price Index.^{2,10} Finally, the projected age-specific health cost for the future health care of the

Assumptions on which the value of the Health Protection Account is estimated

- The contributor who reaches the age of 40 years on 1 January 2000 makes the first mandatory contribution at the end of January
- The statutory retirement age is 65 years¹
- The health cost of the elderly after retirement will be reimbursed from the accumulated savings¹
- Term to maturity=300 months (25 years)¹
- Monthly average salary is HK\$11 288 (US\$1 447) in 2000¹²; according to the employment data made available by the Census and Statistics Department
- Secular wage growth=real gross domestic product growth rate=3% per annum: according to Harvard's consultation report³
- Health Protection Account contributions are 1% of the average monthly salary¹
- The inflation-adjusted investment rate of return of the account is $r\%$ per annum* and the balance of the account would be compounded on a monthly basis
- The account is the only source of funds for covering the costs of the required health care. The Government has the responsibility to guarantee the account and to subsidise the entire deficit once the balance falls below zero

* r is defined as the variable annual inflation-adjusted rate of return of the account

elderly was determined by multiplying both the projected age-specific hospital bed-days and the SOPS attendances with the corresponding health cost for each year within the age span 65 to 83 years.

The Government has repeatedly emphasised that it has no intention of reducing its financial commitment to public health care services in the future. However, we cannot predict the level of future Government subsidisation of public health care costs if there is a shortfall in funding of the HPA. Below are three scenarios of future government subsidisation levels of elderly patient health care services:

- (1) there is no government intervention; hence the users have to bear the entire cost for health care;
- (2) 30% of the projected health cost is subsidised and users are required to bear the remaining proportion through HPA financing; and
- (3) 70% of the projected cost is subsidised and users are required to bear the remaining proportion through HPA financing.

The Health Protection Account contribution

In this section, we estimate the value of the HPA by following the standard procedure for time valuation of money. However, several assumptions need to be made (Box).

Two key methods were used to assess the long-term financial sustainability of the HPA scheme for each scenario

and to decide whether or not it should be accepted for inclusion in the health care financing reforms. These were net present value (NPV) and internal rate of return (IRR).¹² We explain below how each ranking criterion is calculated. How well the HPA scheme performs for each scenario is evaluated in the following section of this paper.

- (1) Net present value—the NPV is defined as the difference between the present value of the projected health cost and the future value of the HPA contribution. This is discounted, and compounded at the defined investment rate of return when the contributor attains the age of 65 years.¹² If the NPV is positive, the accumulated saving would be able to cover the health cost for the elderly. If the NPV is negative, the scheme would be financially unsustainable, and the Government would have to subsidise the remaining cost of the needed health care from general revenue.
- (2) Internal Rate of Return—the IRR is defined as the discounted rate when the present value of the scheme's expected cash outflows is equal to the future value of the scheme's contribution.¹² The discounted rate is defined as the prevailing interest rate for the whole period of assessment. If the IRR exceeds the market risk-free interest rate, the HPA scheme will be financially unsustainable and a burden will be imposed on taxpayers. If the IRR is less than the market risk-free interest rate, the scheme will be viable and a surplus will remain after paying for the entire health cost. This surplus would then accrue for future generations. More details about the NPV and IRR can be found in the book written by Brigham et al.¹²

Results

Table 1 shows the trend in public medical expenditure and the consumer price index in Hong Kong for the period 1993-2000. The average rate of increase in real public sector health cost was 5% per annum for the period 1993-2000. This 5% increment in health cost was used in the assessment of future costs.

According to HA data on age-specific hospitalisation and use of SOPS clinics, it is estimated that between the ages of 65 and 83 years, each person spends 100 days in hospital and attends 41 SOPS clinic services. The projected cash flow schedule of HPA for the age span 40-83 years is given in Tables 2a and 2b. The total cash inflow into the HPA is estimated to be about HK\$49 400 (US\$6300).

Table 1. Nominal/real growth rate of public medical expenditure, Hong Kong, 1993-2000

Year	1993-1994	1994-1995	1995-1996	1996-1997	1997-1998	1998-1999	1999-2000	1993-2000
Nominal medical expenditure	18 457*	19 701	24 285	25 163	27 982	31 400	32 319	25 615.29
Rate of change	-	6.74%	23.27%	3.62%	11.20%	12.21%	2.93%	10.00%
CCPI†	85.9	93.4	101.9	108.3	114.7	117.9	113.2	-
Real medical expenditure	21 487	21 093	23 832	23 235	24 396	26 633	28 550	24 175.14
Rate of change	-	-1.83%	12.99%	-2.51%	5.00%	9.17%	7.20%	5.00%

* All figures are in HK\$ million

† CCPI composite consumer price index (October 1994-September 1995=100)

Table 2a. Schedule of projected cash inflow for the Health Protection Account scheme, 2000-2024

Year	Age	Monthly income	Annual contribution
2000	40	11 288	1355
2001	41	11 627	1395
2002	42	11 975	1437
2003	43	12 335	1480
2004	44	12 705	1525
2005	45	13 086	1570
2006	46	13 478	1617
2007	47	13 883	1666
2008	48	14 299	1716
2009	49	14 728	1767
2010	50	15 170	1820
2011	51	15 625	1875
2012	52	16 094	1931
2013	53	16 577	1989
2014	54	17 074	2049
2015	55	17 586	2110
2016	56	18 114	2174
2017	57	18 657	2239
2018	58	19 217	2306
2019	59	19 794	2375
2020	60	20 387	2446
2021	61	20 999	2520
2022	62	21 629	2595
2023	63	22 278	2673
2024	64	22 946	2754
Total contribution (HK\$)			49 384

The corresponding cash outlay for the health cost for each elderly person under scenario 1 is approximately HK\$2 314 000 (US\$296 700).

Before constructing a NPV profile for the HPA scheme, it is important to note that at zero discounting the NPV is simply the total sum of the scheme's undiscounted cash-flows. Thus, at zero discounting, the NPV of the scheme would be a deficit of HK\$2 264 600 (US\$290 300). In other words, the total sum of the HPA contribution would only cover 2.13% of the projected health cost and the Government would need to subsidise the remaining 97.87%. For scenario 2 the deficit would be HK\$1 570 400 (US\$201 300)

and for scenario 3, the deficit would be HK\$644 800 (US\$825 700).

Figure 1 shows the future value of the HPA contribution and the present value of the health cost for each of the three scenarios at different discounted rates for the patient who starts the HPA contribution in the year 2000 when aged 40 years and attains the age of 65 years in 2025. The discounted rate is defined as the overall interest rate for the whole period of assessment. It is used to calculate the present or future value of the projected cash flows in this study.¹² The gap between these two curves represents the NPV of the scheme. The NPV of the scheme increases as the discounted rate increases. This suggests a greater return when interest rates rise. For scenario 1, the curves intersect at the discounted rate of 15.7%. This is the IRR the account must achieve to break even. If all other factors remain constant, the NPV of the scheme will become zero only when the discounted rate is maintained at 15.7%. The required IRR under scenarios 2 and 3 are 14.2% and 10.7%, respectively. These results show that the HPA scheme is financially unsustainable, as for the past 20 years Hong Kong has had an annual average risk-free discounted rate (inflation-adjusted bank savings rate) of about 2%.^{2,10,13,14} Since the IRR is much higher than the market risk-free discounted rate, the account would be in deficit and requires government support.

Figure 2 illustrates the relationship between the projected financial sustainability of the scheme and the discounted rate. The proportion of health expenditure subsidised by the Government declines at an increasing rate as the discounted rate increases.

Discussion

Compared with other developed countries in the world, Hong Kong has among the best health system performance and

Table 2b. Schedule of projected cash outflow for the Health Protection Account scheme, 2025-2043

Year	Age	Patient days*	Number of specialist out-patient services attendances†	Annual health cost
2025	65	2.48	1.5	33 252
2026	66	2.70	1.5	37 681
2027	67	2.92	1.94	43 472
2028	68	3.15	1.94	48 847
2029	69	3.38	1.94	54 705
2030	70	3.61	1.94	61 085
2031	71	3.84	1.94	68 027
2032	72	4.09	2.22	76 321
2033	73	4.46	2.22	86 961
2034	74	4.85	2.22	98 773
2035	75	5.26	2.22	111 862
2036	76	5.69	2.22	126 341
2037	77	6.12	2.49	143 209
2038	78	6.62	2.49	161 868
2039	79	7.14	2.49	182 463
2040	80	7.67	2.49	205 163
2041	81	8.22	2.49	230 149
2042	82	8.79	2.42	257 333
2043	83	9.34	2.42	286 597
Total		100.33	41.09	2 314 109

* The number of patient days is calculated by multiplying the age-specific hospitalisation rate with the corresponding age-specific expected length of stay per patient in year 2000

† The number of specialist out-patient service clinic attendances is calculated by multiplying the age-specific specialist out-patient service utilisation rate with the corresponding expected attendances per patient in year 2000

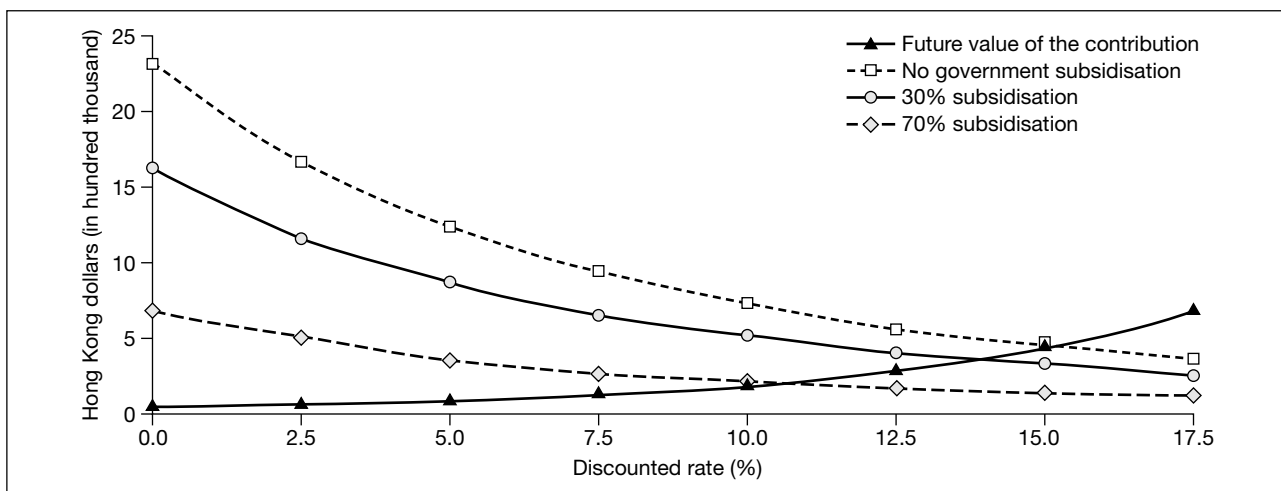


Fig 1. The value of the Health Protection Account contribution and health costs (under different scenarios) at different discounting rates, 2025

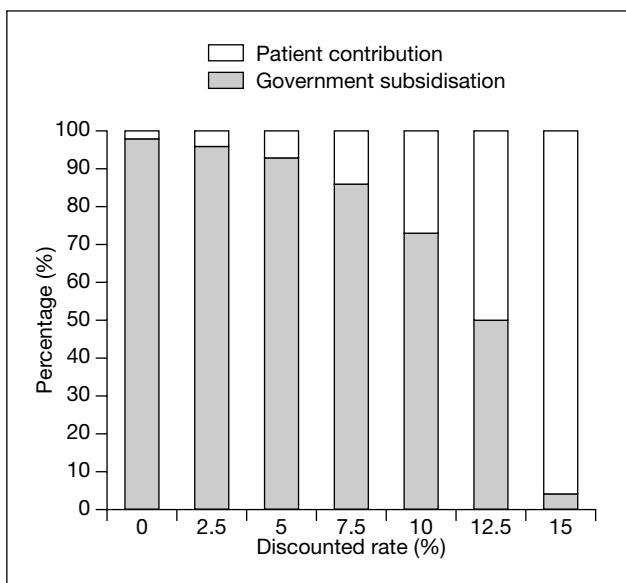


Fig 2. Proportion of contribution and subsidisation for various discounting rates, 2025

the most cost-effective health care system. Hong Kong is also a region that has one of the longest life expectancies in the world. The average life expectancy is 76 and 82 years for males and females, respectively.^{7,15} In addition, the infant mortality rate is 3 per 1000,^{10,16} which is one of the lowest in the world. According to health data compiled by the CSD² and the Organisation for Economic Cooperation and Development¹¹ (OECD), the total health care expenditure in 1999 was less than 4% of Hong Kong's GDP.² The corresponding figure for the OECD countries was up to 10%.^{11,17} This highlights that our existing health care system is highly competitive and efficient.

In view of the rapidly increasing size of the ageing population,^{18,19} however, the long-term financial sustainability of the present health care system is uncertain. With the rapid increase in the elderly population, there comes an increasing demand for health care service, infrastructure, and welfare. On its own, reducing health costs and raising

productivity would never be able to overcome the increasing cost due to the increase in the elderly population. The increase in the elderly population alone is expected to increase the total number of hospital patient bed-days by 80% to 150.1 million days by the year 2029.⁴ The social cost for satisfying the corresponding increase in needed health care for the elderly would subsequently be inflated. The current financing framework is based on inter-generational subsidisation. As the size of the working population reduces in relation to that of the ageing population, future generations will have difficulties meeting the changing and increasing health care needs of the community.

Any saving scheme designed to pay for medical and health care services should be able to reduce the share of contribution from the Government. However, the proposed account is not able to do this. This account, which is designed to assist individuals to pay their medical needs at public sector rates after retirement, will never be able to relieve the financial burden on future generations.

It is evident from the experience of many well-developed countries that Government intervention in health care system financing is necessary to ensure universal health insurance coverage for all.²⁰ It also aims to protect the high-risk poor from catastrophic financial risk and allows equalisation of contributions among members, regardless of their financial ability. No one should be denied treatment because they cannot pay.²⁰ However, our current fee structure does not discriminate the rich from the poor. This might affect our ability to allocate resources to areas of greatest need in the community.²⁰ In addition, the Government is the only entity that can establish a centralised pooling system for taking advantage of economies of scale in administration, preventing imbalance among resources, and reducing inefficient use of existing resources (efficiency loss).²⁰

There is some support for the proposal that the Government continues to finance the public health care system

through taxation; and that public funds should be channelled into assisting low-income groups and patients with high financial risks.¹ We also need to consider whether subsidisation influences inappropriate use of public sector health care services. Taking these factors into consideration we suggest increasing the weight of HPA financing in order to reduce the load on taxpayers. Patients should bear their own health cost if they can afford to pay although it may be difficult to determine who cannot afford to pay in practice. Nevertheless, a means test on the financial status of the applicants similar to that for public housing and comprehensive social security assistance eligibility may be acceptable to the community.

From the findings of the study, it seems that the HPA scheme is not financially viable as it requires an annual rate of return of 15.7% to equate the discounted cash outlay with the accumulated savings. This would not be achievable by investing in risk-free assets in Hong Kong. Financial viability could be achieved if the contribution rate was increased or the time to maturity prolonged. The study examines these two suggestions in the following paragraphs.

Increased contribution rate

For the HPA scheme to fully fund the medical needs of the elderly after retirement, the mandatory saving rate would need to be increased. Our results show that a contribution rate of 1% of the average income would only be able to cover 4% of the projected health cost, given that the annual risk-free discounted rate is 2.5%. To make the scheme sustainable, everyone over the age of 40 years would need to pay 25% of their earnings into the HPA, (about HK\$2800 a month based on the average Hong Kong salary). This 25% contribution would only be necessary if individuals were required to bear the total cost of health after they reach the age of 65 years. If the Government was absorbing some of the cost, the share of contribution could be smaller but the Government would have to increase the tax rate to finance this.

In the short term, however, this suggestion would have a major impact on the economic growth of Hong Kong. A high saving rate would slow down consumption demand, thus reducing aggregate expenditure and, consequently, GDP.² There may also be resistance to such a high level of savings as the Mandatory Provident Fund²¹ (MPF) has just been set up. This is a compulsory retirement saving scheme in which each employee has to contribute 5% of their salary to the Fund.²¹ In the present economic climate and with the current high unemployment rate (the unemployment rate of Hong Kong was 7.1% for the period February 2002 to April 2002²²), it is unlikely such a high level of mandatory saving would be accepted.

Prolongation of term to maturity

Reducing the starting age of mandatory contributions from 40 to 30 years is an alternative means of improving the

viability of the scheme. This would increase the time to maturity from 300 months (25 years) to 420 months (35 years). If all other factors remained the same and the inflation-adjusted rate of return was 2.5% per annum, the future value of the account would be increased from HK\$65 900 to HK\$122 300. The major drawback is that more people in the community would be affected by the mandatory contribution scheme and this would further retard economic growth and discourage consumption in the economy.

Conclusion

With the recent introduction of the MPF and public opinion against another deduction from individual's income, it is envisaged that public health care costs will continue to be funded from general taxation. Payments from users would only contribute a minor proportion of the Hong Kong public health care costs. As far as the Government is concerned, there are not many options. With a sluggish economy, the choices are further limited. At the same time, the existing system with the present financial commitment by the Government seems to work and the services provided are generally satisfactory. The Government has repeatedly emphasised that the HPA is not intended to completely relieve it from its financial support of public health care services. However, we have shown that the scheme does very little to relieve the burden. We should then ask the question why should the community support this HPA scheme at all? It is politically unfriendly and not economically viable. Using more cost-effective measures to reduce expenditure and a gradual increase of user fees may be the only present options for the Government in its efforts to control health expenditure.

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