香港社會醫學學院
HONG KONG COLLEGE OF COMMUNITY MEDICINE
founder College of the Hong Kong Academy of Medicine
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ADMINISTRATIVE MEDICINE

Part I Examination

Wednesday 5 June 2024

10:30 – 13:00 (2½ hours)

Paper IA

Candidates must answer all parts of these questions

Style, clear grammatical English and legibility will be taken into consideration by the Examiners. Answers should be written in a form appropriate to the audience specified in the question.
The weighting of marks for each part of the question is shown in parentheses.

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1. In 2011, an epidemiological study of 3000 workers from different manual labor jobs (including mine workers) was conducted to investigate whether exposure to asbestos would increase the risk of lung cancer. The workers were classified as either exposed or non-exposed according to their occupational records in 1990. Their health status during 1990 and 2010 was tracked through linkage to the electronic medical records of hospitals. The results are shown in the 2x2 table below.

	Developed lung cancer	Did not develop lung cancer
Exposed to asbestos	40	960
Not exposed to asbestos	20	1980

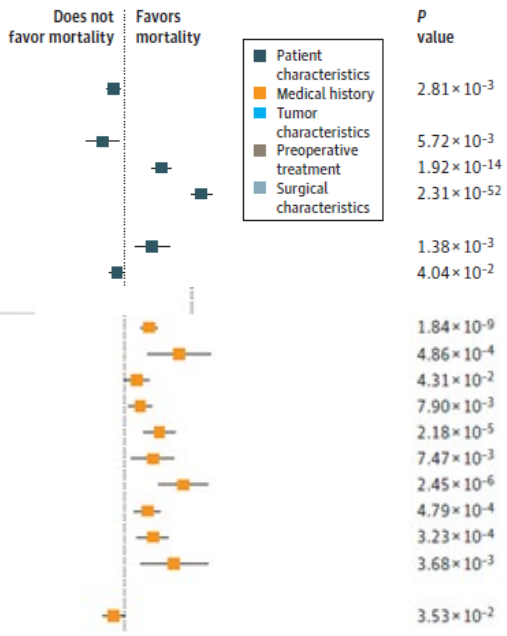
1) What type of specific study design was used? **(1 mark)**
2) State one advantage and one disadvantage of this type of study. **(2 marks)**
3) State the type of disease frequency measure for calculation in this study. **(1 mark)**
4) Calculate the risk ratio and interpret it (with reference to the numerical result you get). **(2 marks)**
5) Calculate the risk difference and interpret it (with reference to the numerical result you get). **(2 marks)**
6) Name one potential confounder in this study and name one method that can be used to control it. **(2 marks)**

QUESTION CONTINUES

2. Resection of colorectal cancer is a frequently performed surgical procedure with a moderate incidence of complications. These complications are associated with patient burden and increased health care use.

   A retrospective analysis was carried out to investigate the risk of patients undergoing colorectal cancer surgery. Figure 1 below shows part of the result of the multivariable logistic regression model, with 30-day mortality as the outcome variable.

Covariate	Odds ratio (95% CI)	*P* value
Sex		
Female	0.83 (0.74-0.94)	2.81×10^{-3}
Age, y[a]		
<60	0.69 (0.54-0.90)	5.72×10^{-3}
70-80	1.80 (1.55-2.10)	1.92×10^{-14}
≥80	3.45 (2.93-4.05)	2.31×10^{-52}
BMI[b]		
<18.5	1.56 (1.18-2.05)	1.38×10^{-3}
>25-30	0.88 (0.78-0.99)	4.04×10^{-2}
Comorbidities		
COPD or asthma	1.48 (1.30-1.69)	1.84×10^{-9}
History of lung surgery or transplantation	2.42 (1.46-3.99)	4.86×10^{-4}
Transient ischemic attack	1.22 (1.00-1.49)	4.31×10^{-2}
Cerebrovascular attack	1.28 (1.06-1.55)	7.90×10^{-3}
Parkinson disease or dementia	1.75 (1.34-2.27)	2.18×10^{-5}
Schizophrenia, major depressive disorder, or psychosis	1.57 (1.12-2.21)	7.47×10^{-3}
Liver disease or failure (cirrhosis or hepatitis)	2.56 (1.72-3.80)	2.45×10^{-6}
Chronic kidney disease (creatinine >110 µmol/L)	1.44 (1.17-1.77)	4.79×10^{-4}
Current untreated malignant neoplasm	1.57 (1.22-2.02)	3.23×10^{-4}
Other types of cancer	2.22 (1.28-3.83)	3.68×10^{-3}
Past surgical history		
History of bladder, prostate, uterine, or ovarian surgery	0.83 (0.70-0.98)	3.53×10^{-2}



[a]Reference, 60-70 years. [b]Reference, 18.5-25.

(Source: van den Bosch T, Warps AK, de Nerée tot Babberich MPM, et al. Predictors of 30-Day Mortality Among Dutch Patients Undergoing Colorectal Cancer Surgery, 2011-2016. JAMA Netw Open. 2021;4(4):e217737. doi:10.1001/jamanetworkopen.2021.7737)

QUESTION CONTINUES

1) State the reasons of fitting a multiple logistic regression model instead of a simple or linear regression model in this study. **(2 marks)**

2) Explain what a confounder is. Use an example to illustrate your explanation. **(2 marks)**

3) What is odds ratio? Interpret the odds ratio for liver disease or failure (cirrhosis or hepatitis) and make a conclusion for the observation. **(3 marks)**

4) The area under the ROC curve of the model is 0.81. What does ROC stand for? What is a ROC curve? Comment on the goodness-of-fit of the model built. **(3 marks)**

QUESTION CONTINUES

3. A recent local 1 year study of frequent users (FU- defined as 4-9 visits per year) and high intensity users (HIU-defined as > 10 visits per year) for 3 busy public hospital A&E (Emergency Department) attendances, showed that these 2 groups represented 9% of all ED users, and 27% of all ED visits.

   1) Describe the likely demographic, economic and health status characteristics of these 2 groups of ED users. **(5 marks)**

   2) Identify possible interventions which could deliver improved health care in these groups and support reduction of attendances in local busy A&E Departments. **(5 marks)**

QUESTION CONTINUES

4. You are a senior executive with a decision-making role on introducing new and expensive medications in public hospitals.

   For infantile and childhood-onset spinal muscular atrophy, the standard treatments have been lifelong usage of Nusinersen and Risdiplam, two medications that have been proven efficacious in improving patients' functions and life expectancy.

   Gene therapy has been newly used as standard treatment overseas as an alternative for infantile-onset and pre-symptomatic patients. This is a few-hour one-time injection of a medication (Onasemnogene Abeparvovec, a "normal gene") leading to production of a normal protein which enables children to stand and breathe independently for more than seven years.

   The media reported what an expert said, "with this new treatment, patients only need a single injection and do not need to be hospitalized regularly. I believe this will be very helpful for patients and their families". However, this one-time one-patient treatment costs what 25,000 general out-patient attendances incur.

QUESTION CONTINUES

1) Describe how you will assess scientifically whether the gene therapy is to be adopted as a standard treatment for spinal muscular atrophy in public hospitals. **(4 marks)**

2) Apart from the above scientific considerations, what other factors will you address before making decision on introducing gene therapy as standard treatment? **(4 marks)**

3) Cost-effectiveness analysis and the incremental cost-effectiveness ratio are important concepts underlying the decision. Write short notes on:
   (i) Cost-effectiveness analysis **(1 mark)**
   (ii) Incremental cost-effectiveness ratio **(1 mark)**

QUESTION CONTINUES

5. Please answer the following questions:

1) Describe the 'Advanced Medical Directive' (AMD) in the local settings. **(8 marks)**

2) What is the difference between AMD and Enduring Power of Attorney (EPA) in Hong Kong? **(2 marks)**

QUESTION CONTINUES

6. **Context**

Hong Kong's Health System is facing daunting sustainability challenges arising from, [a] escalating demand from an ageing population associated with a rising prevalence of preventable chronic diseases, [b] sub-optimal public investments in primary healthcare for better continuity of care and [c] a segmented and fragmented healthcare system with the public sector as the predominant provider of specialist and hospital care and conversely the private sector as the predominant provider of primary outpatient care, creating barriers in coordination for integrated care.

Elderly Healthcare Voucher Scheme

Recognising the underinvestment in primary healthcare, in preference to expanding public primary healthcare services, the government launched an Elderly Healthcare Voucher Scheme in January 2009, initially as a pilot for all elderly persons aged 70 and above. The objective of the annual conditional cash transfer of $250 is to incentivise elderly persons to seek and establish a closer relationship with a private doctor of their choice for their health needs including preventive care. There have been many changes to the voucher scheme which has been converted to a recurrent program. The voucher entitlement has been increased to $2,000 and the age of eligibility lowered to 65. 10 categories of health professionals are eligible to be enrolled as service providers, with whom the elderly person is free to seek healthcare they perceive is needed. There is no cap to the charges [except a cap of $2,000 every 2 years for optometry services imposed in 2019 in response to an unacceptably high claim amount] the practitioner can make as long as there is a sufficient voucher balance or if the patient agrees to a co-payment. The expenditure for the voucher has increased from 40 million in 2009 to 3,280 billion in 2023. [Public expenditure for

QUESTION CONTINUES

primary healthcare in the General Outpatient Services in 2023 is 3.45 billion.] (Figure 1)

During the period 2009 to 2023 the principal reason for voucher use has been for acute episodic condition (from 69% to 41%), follow by follow-up of long-term chronic conditions (from 21% to 33%) and preventive care (from 7% to 20%).

In a study evaluating the elderly healthcare voucher scheme in 2019, the research found that regarding their choice of public or private doctors, more of the elderly (i) consulted private doctors after the voucher use, compared with the period prior to voucher use, 80% vs 71%, (ii) consulted public doctors, 78% vs 73% and (iii) both public and private doctors, 61% vs 49% (Figure 2). Fewer of the elderly consulted private doctors only, 17% vs 24 % and public doctors only 17% vs 24%. Linked administrative data from the Hospital Authority showed no difference in general outpatient attendances between voucher users and non-voucher users (Figure 3). A continuity of care indicator showed a corresponding decline over the period 2009-2017 (Figure 4). In the qualitative interviews, some of the elderly were unaware of the scope of primary care services especially for allied health services.

A voucher is a form of consumer-led/ demand-side financing tool, more effective if targeted at a specific group for a specific health service that is well-defined and time-limited, in particular those services which are under-utilised. The research recommended government to consider voucher re-design: (i)

QUESTION CONTINUES

designated voucher for preventive care for early detection and treatment; (ii) designated voucher for chronic disease for those screens to have chronic disease.

The government has evaluated the elderly healthcare voucher informed by the above research findings and has proposed an addition of the Pilot Reward Scheme.

Elderly Health Care Voucher Pilot Reward Scheme

To promote primary healthcare, the Government will provide rewards in a three-year Elderly Health Care Voucher Pilot Reward Scheme to eligible Hong Kong elderly persons aged 65 or above to encourage their use of Health Care Vouchers ("Voucher") for receiving designated primary healthcare ("PHC") services such as: a) health assessment, chronic disease screening and management provided by private healthcare service providers; b) health assessment and chronic disease management by Chinese Medicine Practitioner; c) dental treatment; d) chronic disease co-care pilot scheme; and e) chronic disease management program in the district health centre. Once an elderly person has accumulated Voucher spending of HK$1,000 or above on designated PHC services within the same year, the eHealth System (Subsidies) will automatically allot HK$500 reward to his/her Voucher account (Figure 5).

QUESTION CONTINUES

Question

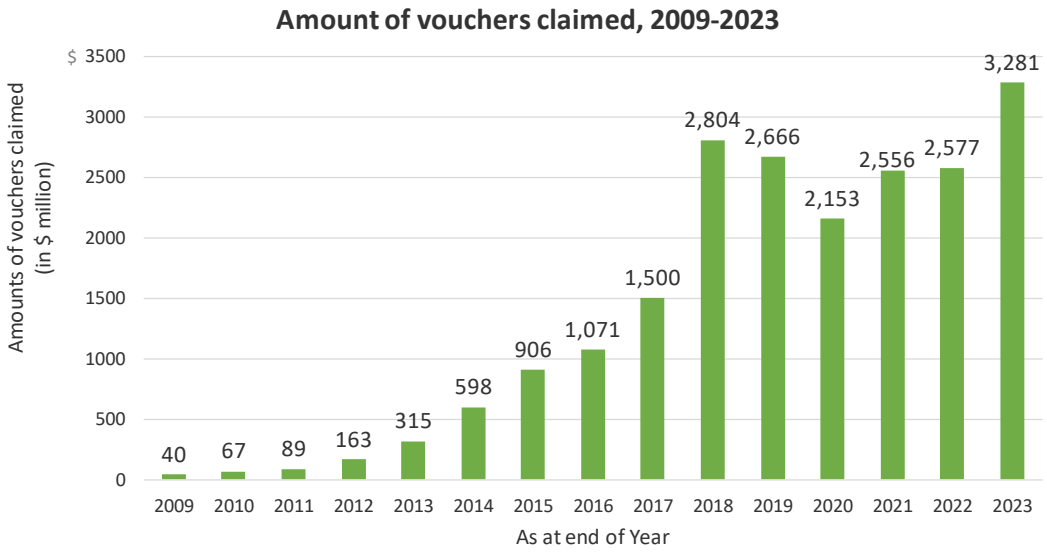
In the context of the sustainability challenges of Hong Kong's Health System:

1) (a) Describe two supply side options, one in the public sector and a second in a private sector as alternatives to the demand side voucher which should be considered for the substantial investments in primary care; and **(3 marks)**

   (b) What factors will facilitate the decision in the choice of the public and private supply side option you have described? **(3 marks)**

2) How would you evaluate the output, outcome and impact of the Pilot Rewards Scheme? **(4 marks)**

Figure 1



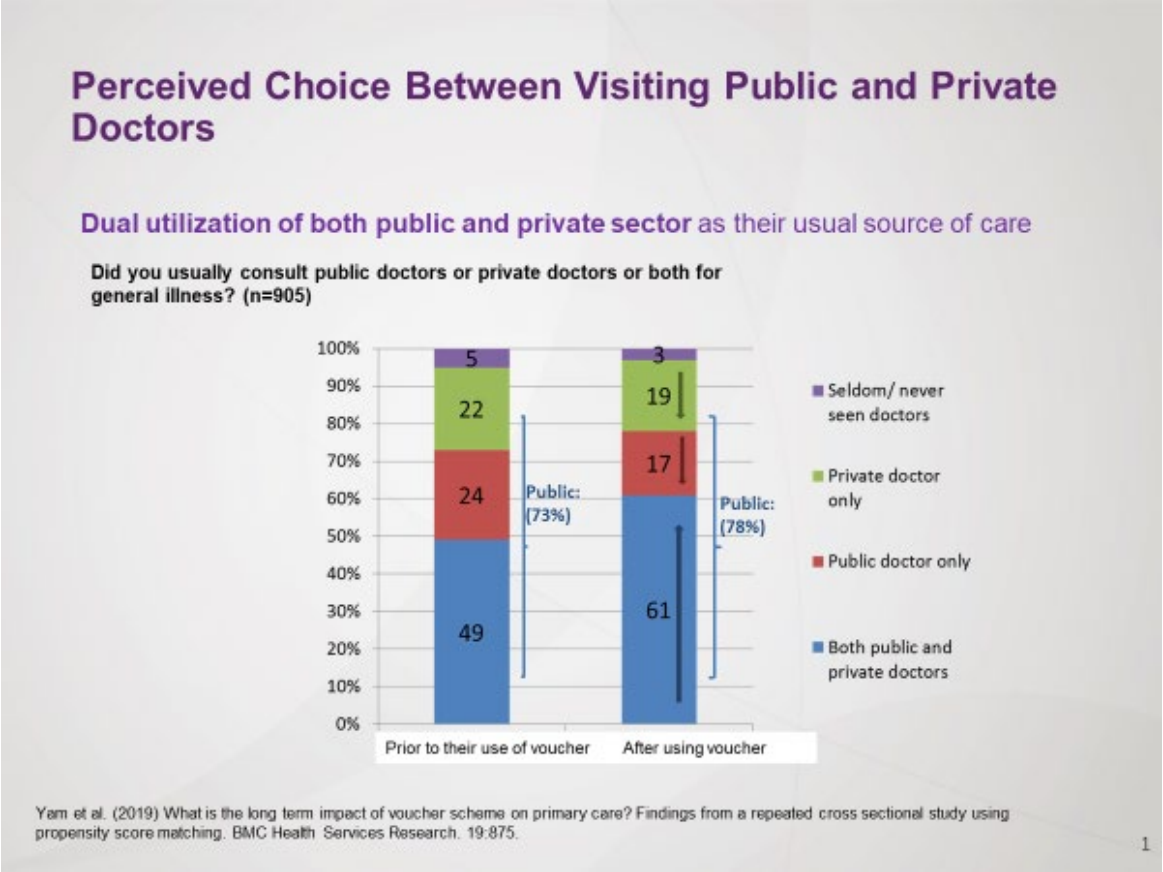
Data from 2009 – 2018: Food and Health Bureau & Department of Health. Report on the review of the elderly healthcare voucher scheme (March 2019)

Data from 2019 – 2023:

https://www.healthbureau.gov.hk/download/legco/replies/240417_sfc/hhb-e.pdf

QUESTION CONTINUES

Figure 2



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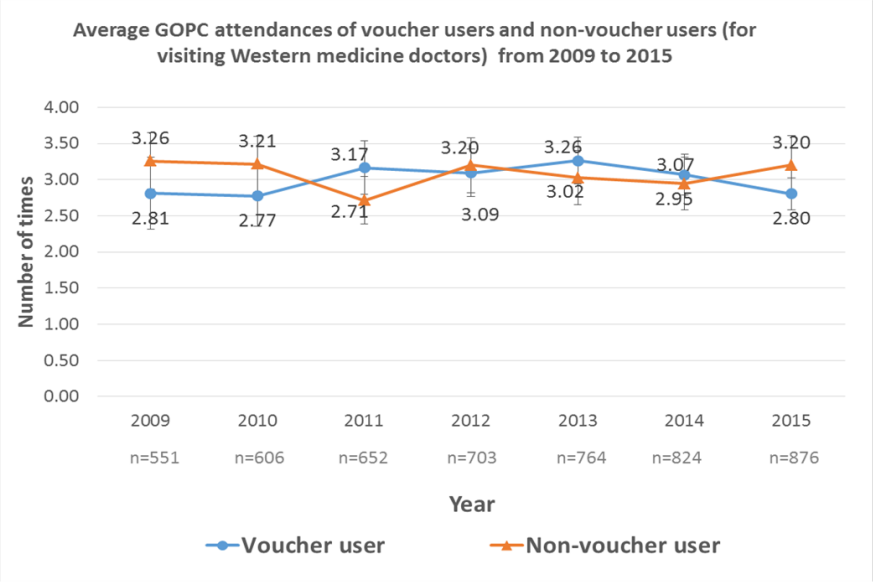
QUESTION CONTINUES

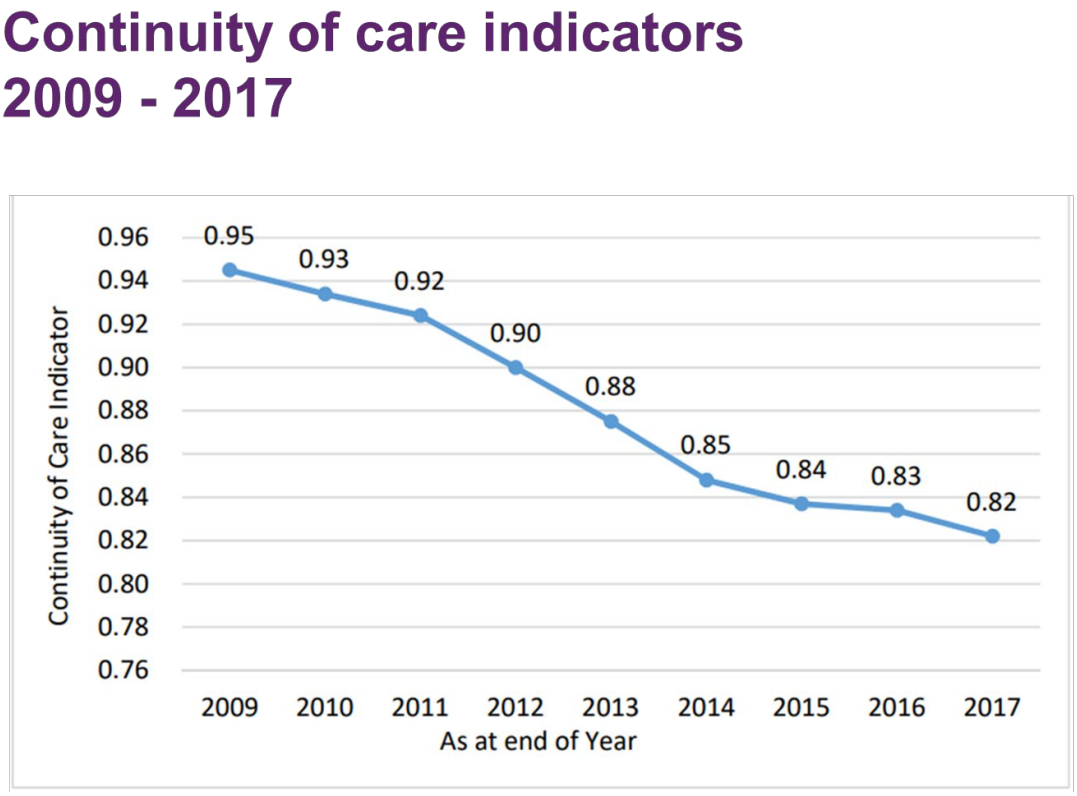
Figure 3

No significant differences in the GOPC attendances between voucher users and non-users in each of the years



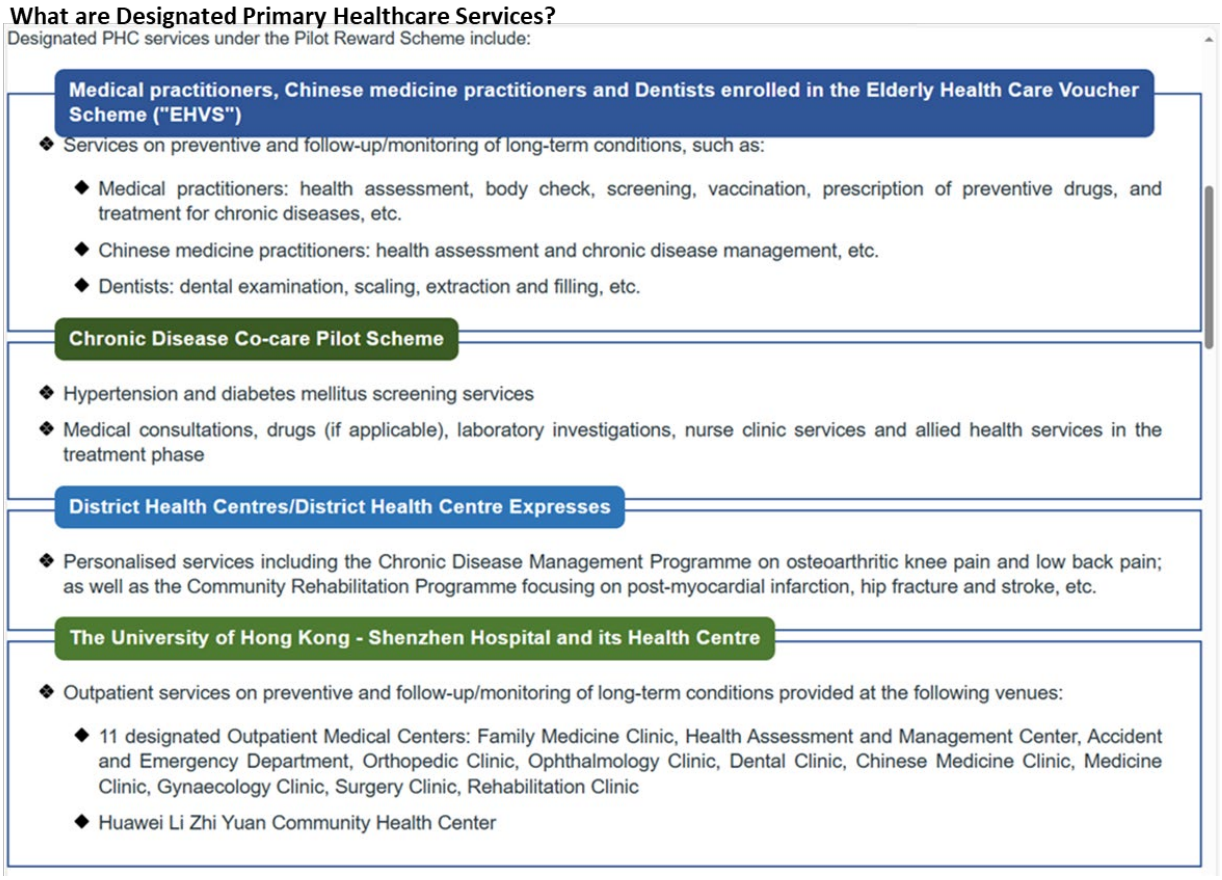
EK Yeoh. Improving Elderly Healthcare Voucher Scheme to Incentivise Primary Care in Hong Kong: How has Health Service Utilisation changed? [HMRF Study: 12130651, (2018)]

Figure 4



QUESTION CONTINUES

Figure 5



https://www.hcv.gov.hk/en/use_of_vouchers/pilot_reward_scheme.html

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