

## Smoking Cessation: A Case Study of a Pilot Integrated Programme in Qingdao, China

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### Abstract

**Background:** China is the largest producer and consumer of tobacco. A cost-of-illness study suggested that the healthcare cost and productivity loss incurred to the society due to smoking was US\$28.9 billion in 2008. The government is increasingly aware of the long-term social and economic impact of smoking in recent years. Hence, various tobacco control measures have been implemented nationwide since 2009. Tobacco dependence management is an evidence-based intervention, recommended by the WHO as a way to increase cessation rates. However, the high cost of treatment might deter smokers from enrolling into the program.

**Objectives:** The aim of this paper is to share our pilot experience in designing and implementing an integrated tobacco dependence management program in 2014 in Qingdao, and to provide preliminary results of the program.

**Method:** In order to effectively improve uptake of the intervention and overall treatment outcomes, a pilot integrated tobacco dependence management program was conducted in Qingdao with 6 key initiatives namely: 1) new collaborative model across different government agencies, 2) partnership strategy between government and the private sector, 3) funding mechanism of the program, 4) introduction of new payment method, 5) development of electronic medical records, and 6) management of associated medical risk and fraud. To evaluate the outcomes of this integrated program, 1000 participants were interviewed and follow-up visited for 6 times. Various indicators had been collected for assessment on tobacco dependence management, including spending on smoking, nicotine dependence grade and carbon monoxide concentration after dependence treatment.

**Results:** The primary results of the pilot study found that of the completed follow-up cases (828), more than 60% of the study participants quit smoking successfully. From the societal perspective, there are long-term cost-savings from an integrated tobacco dependence management program in China.

**Keywords:** Smoking cessation; Healthcare; Tobacco; Pilot program

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### Introduction

Tobacco use is one of the major public health priorities worldwide. As the world's largest producer of cigarettes, China consumes around 38% of the worldwide cigarette production. It was estimated that 2 million smokers died every year in China due to smoking-related diseases by 2020 [1]. According to a study published by Yang et al. [2], the cost of management of smoking-

induced diseases in China in 2008 was US\$6.2 billion, which was 1.7 times higher than the costs incurred in 2003 [2].

In China, the daily work of tobacco dependence management mainly accounts for health related department (such as health and family planning commission and centre of disease control). However tobacco control is supposed to be an integrated project involving multiple sectors and need effective collaboration across

governments' agencies and private stakeholders. Interventions such as self-help manuals, counselling, pharmacological therapies, telephone help lines and other community-based programs are available in many countries [3,4]. However, whilst more than 70% of current smokers were aware of the existence of smoking cessation medications, less than 6% had used the medication, and only 48.2% ever received quitting smoking advice [5]. The low efficiency of cross-department cooperation under current policy framework and low utilization of tobacco dependence treatment and services in China may be attributed to high treatment costs and lack of incentives to practitioners in providing high quality of care.

In order to effectively improve uptake of the intervention and overall treatment outcomes, an integrated tobacco dependence management program was piloted and assessed in 2014 with the local government of Qingdao; which was later honored with the WHO Health Cities Best Practice Recognition Award.

The aim of this paper is to share our pilot experience in designing and implementing an integrated tobacco dependence management program in Qingdao, and to provide preliminary results of the program.

### Policy content of the integrated program

The pilot program was initiated by the local Qingdao government with the support of the private sector. The government organizations involved in the project were Qingdao Municipal Centre for Disease Control, Qingdao Municipal Labour and Social Security Bureau and Laoshan City Council. The aforementioned public organizations were in charge of development, promotion, management and monitoring of district health service providers. The private companies participating in the program were pharmaceutical and insurance companies, who funded smoking cessation medications, delivery services, personnel for training and promotion of the program and services.

An overview was given on the key structural changes within the current healthcare system namely: 1) new collaborative working model across government agencies, 2) partnership strategy between governments and the private sector, 3) funding mechanism of the program, 4) introduction of new payment method, 5) development of electronic medical records (EMRs), and 6) management of associated medical risk and fraud.

### New collaborative working model across government agencies

The new collaborative working model across government agencies was one of the important features of this pilot program; particularly the cooperation between Qingdao Municipal Bureau of Human Resource and Social Security (HRSS) and Qingdao Municipal Health and Family Planning Commission (HFPC). In China nationwide, smoking-related health issues have been managed by HFPC without the involvement of HRSS whose main role is to list and reimburse therapies in formularies. As a result, tobacco dependence treatment costs were not covered in any public health insurance scheme. The collaboration between HFPC and HRSS ensured that there was sufficient finance available for the provision of the program on a common understanding of

the long-term savings and contribution to a more sustainable health insurance system. In addition, HFPC also took part in the supervision and monitoring of the public hospitals providing the tobacco dependence management program.

### Partnership strategy between government and the private sector

Another feature of the pilot study was the cooperation between government and industry stakeholders. Collaborative arrangements between public and private sectors in the promotion and implementation of tobacco dependence management programs have been adopted in many countries [6-8]. Such partnerships not only alleviate the financial burden of the public providers, but also offer opportunities to fulfill corporate social responsibility. The established relationships in the pilot study can then be leveraged in the adoption of similar integrated approach model for managing other chronic diseases in China.

### Funding mechanism of the program

In addition to financial support and medication, relevant services such as training for clinicians, program promotion, management and technical assistance in developing EMRs were provided free-of-charge by private pharmaceutical and insurance companies through closed collaboration with the relevant local authorities. For full-scale implementation, it was proposed that the main funding source of the program be HRSS; with co-contribution by HFPC and individuals receiving the treatment. Centralized procurement of the pharmaceuticals and related services using a bidding system was recommended to secure competitive purchasing prices. Additionally, evidence generated from analyzing the data in the EMRs could be used by the HRSS to support the pricing negotiation. While an increase in reimbursement can improve the uptake of the program and result in a higher quit rate of smoking [9,10], it might also induce moral hazard issue that could be reduced by setting a minimum co-payment by patients [11]. Furthermore, tobacco tax could serve as an additional funding source in the future while increases in tax and price have been shown to effectively increase the quit rate and reduce the uptake of smoking among youths [12-14].

### Introduction of new reimbursement/payment method

China's current healthcare system reimburses healthcare services on a fee-for-service (FFS) basis. However, this method has been shown to potentially incentivize provision of unnecessary medical services [15]. Other than the case-based payment method which has been used as a tool to address high costs of healthcare [16], pay-for-performance has been adopted in various countries as a means to improve the quality and efficiency of healthcare [15,17]. Based on the existing evidence, the payment method introduced in the pilot program was a mixture of both case-based and pay-for-performance methods [18]. The participating institutions received 1,000 RMB for each educational event held and physicians were paid 100 RMB for each completed follow-up case. However, our experience in the pilot program suggested that in order to better motivate clinicians to provide better quality of care and be more proactive in the recruitment

of patients, HRSS could consider instead contracting the program to individual clinicians in primary care, who will directly receive payment based on both the volume and quality of the service they provide.

### Development of electronic medical record (EMR) system

One of the major components of the project was the use of an EMR system that contains individuals' medical history including diagnosis, treatment record, follow-up session and referrals. These can not only be used in the management of tobacco dependence but also other chronic diseases management in future. With detailed treatment history available in the EMR system, clinicians can have a longitudinal overview of patients' health conditions and develop individually tailored treatment strategy while monitor the progression of the disease, quality and health outcomes of the treatment, especially when patients are receiving treatments from more than one healthcare professional. The data can also be used for quality control purposes and as a basis for pay-for-performance payment by HRSS. With an EMR system in place, third-parties such as payers can review the resource utilization data and reduce unnecessary or duplicate medical procedures, which could improve the efficiency in healthcare delivery [19].

In the full roll-out stage, the system could be expanded to capture individuals' overall medical history beyond the current scope of the pilot project. We recommend that the EMR data could also be linked with existing Hospital Information Systems (HIS) in different hospitals, forming a regional or national health information network to provide full medical history of individuals who may seek medical assistance from different providers.

### Management of associated medical risk and fraud

The medical risk associated with management of tobacco dependence was also considered during development of the program. A well-structured referral system enables patients receiving optimal care at the appropriate level of care [20]. In the pilot program, in the events such as adverse reactions that primary care/ community health centers have no capacity or specialized equipment to deal with, patients would be referred to specialists or secondary care for immediate attention with the assistance of EMR system to prevent or minimize potential medical risks to patients. Additional measures were also adopted to reduce the risk of over-consumption of health care resources and potential fraudulent claims. For example, the National Health Insurance Administration (NHIA) of Taiwan set a cap of two tobacco dependence management programs per patient per year, with a maximum of eight consultations and eight weeks of medication supply in each program. Subsequent participation in the program will be on full self-pay basis [21].

### Assessment on the Pilot Program

During the implementation of this tobacco dependence management program in Qingdao, 1000 participants were interviewed and follow-up visited for 6 times within 3 month. To assess the outcomes of the program, various indicators were

collected for participants by answering the questions or being tested on spending on smoking, nicotine dependence grade and carbon monoxide concentration after medicine treatment. Addition to policy initiatives, of the 830 completed follow-up cases, 806 people received varenicline treatment plus consultation and 22 people opted for consultation only. The criterion of successful smoking cessation was defined as "daily spending on smoking is 0 RMB".

From the baseline characteristics of the pilot study participants, the majority were male (96.98%), with an average age of 44.94 and 23 years of smoking history. While about 60% of the study participants have had experience of trying to quit smoking, none of them succeeded. The monthly household income was averagely 4869 RMB while their spending on smoking was 564 RMB per month.

### Preliminary Results

The primary result of the pilot study found that the self-reported quit rate of 63.03% and 31.82% for 806 people received varenicline plus consultation and 22 people opted for consultation only, respectively. According to the analysis for 262 people received varenicline treatment, the nicotine dependence grade has dropped by 6.19( $\pm 1.63$ ) after successfully quit smoking. Similar to this result, the decrease of carbon monoxide concentration (carbon monoxide concentration after varenicline treatment-before varenicline treatment ) got 10.02( $\pm 6.55$ ).

In addition, a conservative approach was adopted in the estimation of the total program costs incurred to the HRSS in Qingdao. In a simulation, by reimbursing 70% of the program cost for those who smoked more than 15 cigarettes per day, the total budget for HRSS providing the program in Qingdao was around 35 to 40 million RMB per year. However, the integrated smoking cessation program was also expected to be cost saving from both the public and patient perspectives in the long-run when the complications of smoking is taken into account.

### Discussion and Conclusion

In China, the focus on tobacco control is still at the early stage. Without sufficient system and effective smoking cessation treatment, only 3 ~ 5% person could quit smoking and the majority of smokers cannot get rid of tobacco dependence or have high relapse rate [22].

It needs a more effective framework to enhance collaboration of related departments and stakeholders in China. In addition to public health initiatives, social insurance is reported as a crucial part in disease control, which could help to prospectively build management on health related risk factors [23]. In some developed and developing countries, such as America and Australia, tobacco dependence already has been covered by reimbursement system as disease entity. Local practitioners in China have been exploring the new working model for tobacco dependence management in some area, however it still lacks of successful experience or case for bringing tobacco dependence treatment to reimbursement scheme. Numbers of problems need be addressed further, including "how to evaluate the financial

impact to introduce treatment on tobacco dependence treatment to reimbursement system?”, “how to improve the efficiency of collaboration between government health agencies and social insurance department in tobacco dependence management”, “how to leverage the efforts from pharmaceutical industry and other private sectors in tobacco control” and so on.

Our pilot study of an integrated smoking cessation program in

Qingdao provided us with successful experience to build new working model across multiple sectors and performed an effective management on tobacco dependence with high smoking quit rate and reduction on other dependence indicators. Through involving payers, providers and industries, this pilot program offered a cost saving and sustainable system in the long-run for a consideration of full scale implementation in China.

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