Abstract of thesis entitled

“An Evidence-based Protocol for
Smoking Cessation Services among Cardiac Out-patients”

Submitted by

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for the degree of Master of Nursing

at the University of Hong Kong

in July 2016

Providing smoking cessation services in out-patient setting for cardiac patients is currently inadequate in Hong Kong. Nowadays, some cardiac patients are referred to smoking cessation service during hospitalization and telephone follow-ups will be arranged to patients after discharged. However, cardiac patients who do not require hospital admission are not covered by smoking cessation service referral.

Smoking is common among cardiac patients and it is one of the major root causes of cardiac disease. If smoking prevalence cannot be reduced, the recurrence rate of cardiac disease will not be diminished. Therefore, there is a need to identify active smokers in cardiac out-patient clinic.

After reviewing and critiquing six research studies, an updated evidence-based protocol is developed based on the evidence found in the research studies. It is hoped that the protocol is effective in helping cardiac out-patients to quit smoking successfully.
Evidence-based Protocol for
Smoking Cessation Services among Cardiac Out-patients

By

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A thesis submitted in partial fulfilment of the requirements
for the Degree of Master of Nursing

at the University of Hong Kong

July 2016
Declaration

I declare that this thesis represents my own work, except where due acknowledgement is made, and that it has not been previously included in a thesis, dissertation or report submitted to the University or to any other institution for a degree, diploma or other qualification.

Signed

Wan Ka Lok Ringo
Acknowledgement

I would like to give my heartfelt thanks to my supervisor, Dr. Kelvin Wang. He gave me support and guidance to my dissertation. His valuable suggestions and advice led me to the correct path in the dissertation.

I would also like to thank my family and friends for their encouragement and support in my pursuit of the Master’s Degree, especially in completing this dissertation.
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Chapter 1: Statement of the Problem

1.1 Background of the problem

Every year, cardiovascular disease causes death of 16.7 million people worldwide, with coronary heart disease (i.e. equivalent to ‘heart attack’) being the greatest contributor of killing more than 7.4 million people (World Health Organization (WHO), 2015). Many risk factors contribute to heart disease and smoking is one of the risk factors. Since 1960s, the first Surgeon General’s report has already stated that smoking can cause heart disease and affect a person’s health (U.S. Department of Health and Human Services, 2014). The chemicals inside a cigarette damage blood vessel’s endothelium lining, forming cholesterol plaques thus leading to atherosclerosis. Alongside, nicotine can increase heart rate and blood pressure (WHO, 2015). Therefore, quitting smoking can reduce the chance of coronary heart disease.

Statistics showed 65.7% of people in Hong Kong aged 40 or above are daily cigarette smokers (Census and Statistics Department, 2013). In another statistic issued in 2012, it revealed that the prevalence of heart disease is about 30.3% for people in the age group of 45 or above. Quitting smoking can reduce the recurrence of cardiac disease and is of particular importance for this group of people because they are prone to developing heart disease easily. Therefore, if recurrence of cardiac disease can be prevented, the hospital readmission rate will be reduced. To increase the successful rate of smoking cessation among cardiac out-patients, it is necessary to review current design of smoking cessation service for non-hospitalized cardiac patients.

With respect to economy, an estimated amount of US $200 billion was spent every year to treat smoking-related illnesses in 1994 globally (WHO, 2015). According to a survey conducted in Germany, US $82000 was used to manage heart disease per case in 1996 (WHO, 2015). In Hong Kong, smoking contributed US$532 million economic loss including
the direct medical costs, long-term care and productivity loss. Hence, economic burden can be reduced by promoting smoking cessation.

In 2001, Tobacco Control Office was established in Hong Kong to promote smoking cessation. Smoking cessation clinics and telephone hotlines were also set up afterwards. These services help smokers quit smoking on a voluntary basis. Currently, physicians and nurses refer cardiac patients to smoking cessation nurse during patients’ hospitalization. Several studies have shown in-patient smoking cessation services were effective (Thomson & Rigotti, 2003). Most of the cardiac patients required follow-up in cardiac specialized out-patient clinics (SOPC) after being discharged and the smoking cessation service provision is limited. Thus, it is a good opportunity to initiate smoking cessation service in SOPC.

Numerous research studies have investigated the effectiveness of smoking cessation in out-patient settings and proven to be effective. It will be beneficial to conduct a literature review on this aspect to examine the effectiveness of smoking cessation service among cardiac out-patients.

1.2 Affirming the Need

Quitting smoking, is beneficial to a person’s health, especially to patients with cardiac disease. Researches showed that the mortality rate of patients suffering myocardial infraction has dropped 35% among the smokers who have successfully quitted smoking. And the recurrence rate of myocardial infraction has dropped 36% after quitting smoking. (van Berkel, Boersma, Roos-Hesselink, Erdman, & Simoons, 1999).

Despite the implementation of government policies on anti-smoking, the percentage of daily cigarette smokers only reduced from 14.9% in 1993 to 10.7% in 2012 in Hong Kong. The percentage of ex-daily cigarette smoker was 5.8% in 2012 and 2.7% in 2002. The percentage of smokers aged 40 or above increased from 62.8% in 2010 to 65.7% in 2012 (Census and Statistics Department of Hong Kong, 2013). Middle-aged smokers are prone to
developing cardiac disease. Among the current daily cigarette smokers, 53.9% of them had never tried and did not want to quit smoking. Among 244, 600 smokers who failed to quit smoking before, 62% of them stated that cigarette smoking had become a habit already. This group of patients can be labeled as “hard-core” smokers (Ip et al., 2012). These figures are alarming because these groups of smokers may develop cardiac disease in the future. This will in turn increase the economic burden.

Risk factors of coronary heart disease include hyperlipidemia, hypertension, smoking, diabetes mellitus, high heart rate and low level of physical activity. However, smoking is a low-cost modifiable risk factor and quitting smoking can prevent coronary heart disease. Male patients, who are hyperlipidemia and smokers, have a higher risk of ST-elevation myocardial infarction (STEMI) than non-STEMI, as well as sudden death (Mannsverk et al., 2015). In the United States, the national preventable fractions of cardiovascular mortality associated with smoking for people aged 45 to 79 accounted for 36.4% (95% CI: 23.9 to 48.3) and 17.4% (95% CI: 7.1 to 28.3) in male and female respectively (Patel, Winkel, Ali, Narayan, & Mehta, 2015). This showed that smoking is a major cardiovascular risk factor. Hence, smoking cessation is a critical success factor in reducing the complications and mortality rate of cardiac disease.

Currently, patients who are smokers are referred to smoking cessation nurse during hospitalization in Cardiac Care Unit (CCU) or general wards. Smoking status of patients will be assessed and bedside brief advice will be given by nurses. The brief advice includes explanation of smoking risks and advising them to quit. After discharged, the patients will be contacted by the smoking cessation nurse for further counseling. In addition, nicotine replacement therapy (NRT) will be provided if necessary. However, this in-patient service cannot reach all the patients in need. Patients will not be covered if they do not require
hospital admission and only attend follow-ups in SOPC. They may not receive smoking cessation service in the SOPC as there is no screening for smoking status in SOPC.

Some patients may have failed attempts to quit smoking before. This group of “hard-core” smokers required extra support after discharged. Because of the high nicotine-dependence (Hajek, Taylor, & Mills, 2002), they are likely to smoke again within one year after heart attack.

Several research studies have examined the effectiveness of smoking cessation service in out-patient department. However, no systemic review has done to assess the effects. In spite of that, systemic reviews have already proved the effectiveness of nurse-led in-patient smoking cessation service. (Rice, Hartmann-Boyce, & Stead, 2013). Thus, there is a room for discussion of out-patient smoking cessation service.

There are several advantages of implementing smoking cessation service in the cardiac out-patient clinics in Hong Kong. Details will be discussed below. By general observation, patients need to wait for more than one hour in the lobby before seeing their doctors in each SOPC follow-up. Under this situation, clients may default the follow-ups due to the extended waiting period. It is expected that the patients’ satisfaction and compliance rates will be increased if the smoking cessation counselling can be provided during the waiting period. After the first visit, regular telephone follow-ups will be arranged to patients. This can ensure better compliance to quit smoking.

Hence, a well-structured and intensive smoking cessation service should be established in the SOPC for cardiac patients. In this literature review, several studies conducted in Hong Kong, China and Europe were analyzed. Currently in Hong Kong, there is no smoking cessation service initiated by cardiac nurses in the cardiac SOPC. This service is only provided by hospital’s smoking cessation team. The compliance rate of attending the
smoking cessation clinics by cardiac patients is low by general observation. A new intervention is therefore being proposed.

It is a nurse-led smoking cessation service among cardiac out-patients. Smoking status of cardiac patients attending the cardiac SOPC will be assessed. Nurses provide face-to-face counseling and monthly telephone follow-up to current smokers. A follow-up will be arranged in the sixth month.

Through nurse-led smoking cessation service in SOPD, it is expected to lower the smoking prevalence among cardiac patients, and would therefore reduce the risk of recurrent cardiac disease. Reduction of recurrent cardiac disease would expect to improve patients’ quality of life and relieve the disease burden of health system.

1.3 Objectives

This study aims to establish an evidence-based protocol for smoking cessation service among cardiac out-patients. The objectives are as follows:

1. A PICO format was used to set the research question.
   b. Intervention: Smoking cessation service includes face-to-face counseling by nurses, monthly telephone follow-ups, optional use of NRT and self-help materials
   c. Comparison: No specific smoking cessation intervention.
   d. Outcome: Self-reported 7-day point-prevalence abstinence (PPA) rate of smoking with optional biochemical validation of testing exhaled Carbon Monoxide (CO) level.

2. To review current literature to select studies based on smoking cessation service for cardiac out-patients.

3. To perform critical appraisals to selected studies to justify the quality of the studies.
4. To summarize and synthesize the findings from selected studies.

5. To develop an evidence-based practice guideline on smoking cessation service for cardiac out-patients.

6. To examine the satisfaction of arranging smoking cessation service to patients during the waiting hour before seeing cardiac doctors in the cardiac SOPC.

7. To assess the level of knowledge, beliefs, attitudes and confidence relate to smoking cessation before and after smoking cessation training.

8. To build an implementation plan for the new guideline.

9. To constitute an evaluation plan for the new guideline.

1.4 Significance

Controlling the modifiable lifestyle risk factors can prevent coronary heart diseases. In addition, more than 60% of the smokers aged 40 or above. They have a higher risk of developing cardiac disease. Therefore, smoking cessation is important. The risk of recurrent myocardial infraction is still high for cardiac patients after cardiac interventions, since they are not fully recovered from cardiac disease. Nonetheless, they would not be admitted to hospital unless obvious signs and symptoms of heart attack develop. Therefore, this group of patients can be easily neglected for smoking cessation counselling.

Moreover, instead of being admitted to hospital, most patients only have cardiac out-patient follow-ups. Hence, this evidence-based protocol is necessary to promote smoking cessation among this group of patients. It is believed that more patients can be reached in the out-patient setting.

Chapter 2: Review of Evidence

2.1 Search and Appraisal Strategies
2.1.1 Inclusion and exclusion criteria of this review:

1. Only randomized controlled trials (RCT) of studying the effectiveness of smoking cessation services among cardiac out-patients were included.
2. All participants in each study were smokers.
3. All participants were recruited in out-patient clinics.
4. All studies were conducted between year 2005 and 2015.
5. Smoking cessation interventions used were mainly by face-to-face or phone counselling, with subsequent telephone follow-ups. The use of NRT was optional.
6. Studies recruiting hospitalized patients were excluded.
7. Studies on smoking cessation interventions given during hospitalization were excluded.

2.1.2 Search strategy. Studies were based on searching electronic databases, scanning reference lists of articles and consultation with the smoking cessation nurses in hospitals. A systemic review of English and non-English articles were also adopted. This search applied to PubMed (2004 to present), SAGE Journals (2004 to present), European Journal of Preventive Cardiology (2004 to present) and Cochrane Controlled Trials Register (2004-2015). This search was performed from 1st September 2015 to 5th September 2015.

Search terms included randomized controlled trial (RCT), “smoking”, smoking cessation, cardiac, out-patients, tobacco abstinence, cardiovascular, myocardial infarction, telephone and follow-up. Boolean operator “AND” and “OR” were used to narrow down the search results to fit the inclusion criteria. Please refer to Appendix 1 for details of search strategy.

Six RCTs met the inclusion criteria (Bredie, Fouwels, Wollersheim, & Schippers, 2011; Chan et al., 2012; Hanssen, Nordrehaug, Eide & Hanestad, 2007; Jennings et al., 2014; Wiggers et al., 2006; Zhao et al., 2013). The title and abstract of the studies were filtered
according to the inclusion and exclusion criteria. Full text articles were then retrieved to assess if the articles fulfill the aforementioned inclusion and exclusion criteria. Letters to the editor, comments and editorials were excluded.

A PRISM flowchart was used to report the number of records identified, included and excluded and also the reasons for exclusions (Moher, Liberati, Tetzlaff, Altman, & The PRISMA Group, 2009). The flowchart was attached below.

**PRISM Flowchart**
2.1.3 **Appraisal strategy.** All the six selected studies were appraised by Scottish Intercollegiate Guidelines Network (SIGN) methodology checklist on randomized controlled trials. SIGN was established in 1993 for the National Health Service in Scotland to develop evidence based guideline. PICO format was adopted in this guideline to form one structured key question. Randomized controlled trials (RCT) were rated with different levels of evidence, namely 1++, 1+ and 1-. These three ratings represent high quality RCTs with a very low risk of bias, well-conducted RCTs with low risks of bias and RCTs with a high risk of bias respectively. Please refer to Appendix 2 for the summary of the critical appraisal (Scottish Intercollegiate Guidelines Network (SIGN), Harbour, & Forsyth, 2011).

2.2 **Results**

2.2.3 **Search result.** Data and evidence were extracted from each study to form a table of evidence. The table of evidence includes 1) bibliographic citation; 2) study type; 3) sample characteristics (patient’s demographics information and site of recruitment); 4) intervention (smoking cessation services given to the experimental group and its sample size); 5) comparison (smoking cessation services given to the control group and its sample size); 6) length of follow-up (duration of the programme and time for evaluation; 7) outcome measures (self-reported tobacco abstinence rate) and 8) effect size (percentage difference between intervention and control groups and odd ratios, 95% confident interval and p-value were reported if available). The tables of evidence of the selected six studies were attached in Appendix 3.

All 6 selected studies were carried out in Hong Kong, Mainland China and Europe. The selected studies examined the effectiveness of nurse-led smoking cessation services among cardiac out-patients.

One of the selected studies on PubMed was in Chinese. The original article was published in Zhonghua Xin Xue Guan Bing Za Zhi and this journal was found from the
electronic resources located in the website of Yu Chun Keung Medical Library of the University of Hong Kong. The abstract of this article was in English. The findings of the study were included in the English abstract. Therefore, this study was eligible to be included. However, another suitable study was excluded because it was written in Korean.

2.2.4 Describe your table of evidence. Details of the table of evidence of selected studies are described below.

**Bibliographic citation.** Six selected studies were RCTs, which were conducted in Hong Kong (Chan et al., 2012), Netherlands (Bredie et al., 2011; Wiggers et al., 2006), Italy, Spain, Netherlands, United Kingdom (Jennings et al., 2014), Norway (Hanssen et al., 2007) and China (Zhao et al., 2013).

**Study type.** Two studies were multi-centred study (Chan et al., 2012; Jennings et al., 2014). The remaining studies were single-centred study.

**Sampling characteristics.** All sampled participants were active smokers with cardiac disease at the time of recruitment. They were recruited in cardiovascular or cardiac out-patient clinics in all studies. The mean age ranged from 50 to 60 in all studies except one which has a mean age of 47.5 to 49.5 (Zhao, 2013). Only two studies measured patients’ Fagerstrom test for nicotine dependence. The score ranged from 2.51 to 3.30 (Bredie et al., 2011; Chan et al., 2012). One study reported the nicotine dependency ranged from 39.7% to 61% in the control group (Wiggers et al., 2006). Years of smoking and daily consumption of tobacco were mentioned in five studies (Bredie et al., 2011; Chan et al., 2012; Hanssen et al., 2007; Jennings et al., 2014; Wiggers et al., 2006).

**Intervention.** The sample size of the intervention groups ranged from 46 to 938. Baseline assessments were performed to assess participants’ smoking status. Face-to-face counseling sessions related to smoking cessation were conducted by nurse or physician. Multiple telephone follow-ups after the first visit at clinic were arranged at different time
intervals in four studies (Bredie et al., 2011; Chan et al., 2012; Hanssen et al., 2007; Zhao et al., 2013). The duration of each phone call ranged from 15 to 30 minutes. Additional smoking cessation counseling was given if necessary, depending on patients’ progress and response. Information of NRT was given in one study conducted in Hong Kong, but no drug was provided (Chan et al., 2012). Two studies provided free NRT to participants (Jennings et al., 2014; Wiggers et al., 2006). Only one study sent short-text-message (SMS) as a reminder to quit smoking (Zhao et al., 2013). Self-help materials related to smoking cessation were provided in two studies (Jennings et al., 2014; Zhao et al., 2013).

Comparison. The sample size of the comparison groups ranged from 42 to 922. Baseline assessments were performed to assess participants’ smoking status. All the selected studies did not provide smoking cessation services to participants in the out-patient clinics. They only received counselling on healthy diet (Chan et al., 2012) or education about preventive measures of coronary heart disease (Zhao et al., 2013). Patients were advised to see their own general practitioners (GP) for smoking cessation services in one study (Jennings et al., 2014). The smoking status was assessed at the end of the study to compare with the intervention group.

Length of follow-up. The length of follow-up varied from 3 months to 12 months. Only one study assessed the smoking status at multiple intervals (i.e. 3, 6 and 12 months respectively) (Chan et al., 2012). One study assessed after 3 months (Bredie et al., 2011). One study assessed after 4 months (Jennings et al., 2014). Two studies assessed after 6 months (Hanssen et al., 2007; Zhao et al., 2013). And the remaining study assessed after 12 months (Wiggers et al., 2006).

Outcome measures. The six studies measured the self-reported abstinence of smoking as the primary outcome. Three studies adopted a self-reported 7-day PPA as an indicator to determine the quit rate and the result was further validated with exhaled CO level (Chan et
al., 2012; Jennings et al., 2014; Wiggers et al., 2006). This indicator was not mentioned in the remaining three studies.

For the secondary outcome, one study measured the quit attempt rate (Chan et al., 2012) and some studies measured the cigarette consumption reduction rate (Chan et al., 2012; Jennings et al., 2014; Zhao et al., 2013). Those outcomes were irrelevant to smoking cessations and were thus excluded from this review.

**Effect size.** All studies reported a positive effect size of smoking abstinence rate among all the intervention groups.

**2.2.5 Summarize the Appraisal Results.** Critical appraisal was performed on the selected studies using SIGN checklist. Four studies were rated as high quality RCTs (Bredie et al., 2011; Chan et al., 2012; Hanssen et al., 2007; Wiggers et al., 2006). One study was rated as acceptable (Jennings et al., 2014) and one was rated as low quality (Zhao et al., 2013).

All studies stated the research questions clearly and with all components of PICO. Adequate randomization for the subject assignment was done in all studies. Only one study did not mention the concealment method and only a computerized system was used to allocate patients into different groups (Zhao et al., 2013). All studies were either single or double-blinded about the treatment allocation.

All studies reported the baseline characteristics with the level of significance (p-value) calculated. Three studies showed p-value greater than 0.05, which were insignificant (Bredie et al., 2011; Chan et al., 2012; Wiggers et al., 2006). The interventions implemented in the selected studies have been mentioned earlier.

Only one study did not report the measurement method of smoking status and only the number of smokers and non-smokers at different time points were provided (Zhao et al., 2013). The remaining studies measured the outcome in a standard and valid way by using
self-reported smoking status. Biochemical validation was carried out by measuring exhaled CO level or the nicotine/cotinine/thiocyanate level in urine or saliva (Chan et al., 2012; Hanssen et al., 2007; Wiggers et al., 2006).

Five studies mentioned the concealment methods (Bredie et al., 2011; Chan et al., 2012; Wiggers et al., 2006; Jennings et al., 2014; Hanssen et al., 2007). All studies have randomized the group assignment of the participants and the investigators were blinded about treatment allocation.

Four studies reported the dropout rate, which ranged from 10.2% to 25% (Bredie et al., 2011; Chan et al., 2012; Wiggers et al., 2006; Jennings et al., 2014). The number of patients died during follow-up and the number of unreachable patients after 12 months were mentioned in one study (Wiggers et al., 2006). One study did not report any dropout rate, and the number of participants before and after the study were the same (Zhao et al., 2013).

Intention to treat analysis was used among all the subjects in the six selected studies. The results were comparable for all multi-centred studies (Chan et al., 2012; Jennings et al., 2014; Wiggers et al., 2006).

For Chan (2012), this study was rated as high quality because of its low dropout rate. As it is a multi-centred study, some of the out-patient clinics may provide additional brief advice on smoking cessation to patients which may affect the outcome. In addition, the low percentage of participants tested with biochemical validation may also affect the validity of result.

For Bredie et al. (2011), this study was rated as high quality because this study was double-blinded, and fulfilled all the criteria of a RCT. The dropout rate was 25%. The limitation of this study was that some smokers may have changed their motivation or even quitted smoking before randomization. And the sample size of this study was small.
For Wiggers (2006), this study was rated as high quality because it fulfilled all the criteria of a RCT. However, this study required patients to save their morning urine for biochemical validation by themselves at home. It was likely that some patients failed to save the morning urine but saved in the afternoon. In addition, not all participants were tested with biochemical validation. All these affected the results.

For Jennings (2014), this study is acceptable because bi-weekly health promotion workshops were offered but details were not mentioned. This study measured the outcome at four months, which was shorter than the standard measurement of six months.

For Hanssen et al., (2007), this study was rated as high quality because it has a low dropout rate. But the study requested patients in control group to seek advice from GP, and thus, patients may have received smoking cessation advice from the GP. Thus, it may affect the smoking cessation rate in the control group. In addition, biochemical validation was not performed in this study.

Zhao (2013) was rated as a low quality RCT because the study design has a possibility of bias. There was no concealment method mentioned. And the detail of the outcome measurement was not reported. However, this study was included because it fulfilled all the inclusion criteria of this review. And the study population was Chinese, which provided an evidence to support the feasibility of this service among the Chinese community.

2.3 Summary and Synthesis

The selected six studies examined smoking cessation rate of cardiac out-patients. Self-reported 7-day PPA rate was measured at 4-, 6- and 12-month interval respectively (Chan et al., 2012; Jennings et al., 2014; Wiggers et al., 2006). Another two studies measured self-reported quit smoking at 3-month interval (Bredie et al., 2011; Hanssen et al., 2007) and one study measured at 6-month interval (Zhao et al., 2013). The significant findings will be discussed below. The effect size mentioned below is showed in percentage.
By comparing the effect size of the intervention groups of the selected studies, the percentage of 7-day PPA rate ranged from 21% to 48.6% in three studies. And the percentage of quit smoking rate (not based on 7-day PPA rate) ranged from 21% to 60% among the remaining three studies. By comparing the differences of quit smoking rate between the intervention and comparison groups, the differences ranged from 4% to 28.6% among all the selected studies.

In the study of Bredie (2011), it showed the effect size was +19% (26% vs 7%), p-value: 0.017 in the self-reported quit smoking status at 3-month interval. Although the result was significant, this study was only a single-centred study with limited number of sampled patients. Therefore, it may affect the effect size of the intervention.

In the study of Chan (2012), which was conducted in Hong Kong, indicated that the difference between the intervention and control group of 7-day PPA rate was +6.1% (27.8% vs 21.7%), p-value: < 0.05 with adjusted OR=1.28 (CI: 1.03-1.59). This finding was significant due to the effects of subsequent telephone follow-up after the first appointment, which can remind patients to quit smoking.

In the study of Hanssen (2007), the difference of the effect size between the intervention and control groups of self-reported quit smoking rate at 6-month interval was +19% (60% vs 40.8%), with a borderline p-value: 0.055. However, this significant result may be inaccurate due to the high dropout rate among the intervention and control groups (28.8% vs 22.7%).

In the study of Jennings (2014), it has a significant effect of the 7-day PPA rate as the intervention group has 28.6% abstinence rate higher than the control group (48.6% vs 20%) (OR: 2.0-8.0). This study has a significant treatment effect because patients with high motivation of quitting smoking were recruited and the optional use of varenicline or NRT was offered. These help patient quit smoking more easily.
In the study of Wiggers (2006), the 7-day PPA rate in the intervention group was only 4% higher than the control group (21% vs 17%). The small effect size may be caused by the prolonged evaluation period of the 7-day PPA rate as this is the only study to measure the 7-day PPA rate at 12-month interval.

In the study of Zhao (2013), it showed a significant effect size of self-reported quit smoking rate at 6 months which was +28.5 (34.2% vs 5.7%), p-value: <0.01. The higher quitting rate was the result of extra SMS services provided compared with other studies.

All studies included face-to-face counseling session conducted by nurse or physician. The duration ranged from 15 to 30 minutes. Frequency of the counseling sessions varied from one time only to every two weeks or follow-ups upon request.

With respect to the sample size of the selected studies, studies conducted by Chan (2012) and Jennings (2014) had a larger sampling size, 938 and 342 in the intervention groups respectively, when compared with the other four studies. Thus, the results of these two studies are more convincing and reliable.

Jennings (2014) and Zhao (2013) provided self-education materials to patients, which might improve the smoking cessation rate because it served as a reminder to patients to enhance their motivation. Moreover, patient’s family could also read the handbook and thus offer mental support and monitor patient’s progress.

The study of Chan (2012) examined the self-reported 7-day PPA at month 3, 6 and 12. Measurement at 6 months achieved the highest PPA rate when compared with 12 months. Therefore, 6-month is the optimal time interval for evaluation of smoking status. The length of smoking habit may not affect the smoking abstinence rate as supported by studies (Bredie et al., 2011; Chan et al., 2012; Jennings et al., 2014).

Both studies conducted by Chan (2012) and Wiggers (2006) offered face-to-face counselling and telephone follow-ups with information of NRT. Two studies showed similar
odd ratio when comparing the biochemical validation at 12 months, which were 1.26 and 1.23 respectively. Therefore, the adoption of C-MIS or stage-matched approaches did not make a big difference in the smoking abstinence rate at 12 months.

However, the number and frequency of follow-ups have obvious effects on the compliance and quit rate. Study of Chan (2012) offered two telephone follow-ups after the first clinic visit and have a higher effect size but Wiggers (2006) offered one telephone follow-up at week two only. Studies conducted by Hanssen (2007) and Zhao (2013) provided the greatest number of telephone follow-ups among the six selected studies. They provided eight and six follow-ups respectively. Study by Zhao (2013) showed a p-value: < 0.01 for self-reported abstinence after 6 months. Therefore, a higher frequency of follow-ups may be more effective on the abstinence rate.

The effect size is higher after 6 months in the study of Zhao (2013), it may due to the additional SMS reminders.

In the study conducted by Hanssen (2007), the findings on smoking abstinence at 3 months and 6 months were not significant. The p-values were 0.254 and 0.055 respectively. The content of the telephone follow-up was not fully related to smoking cessation. Therefore, it affects the quit rate.

All in all, smoking cessation services are effective among cardiac out-patients. First, the interventions must consist of a face-to-face counselling by a nurse or physician on quit smoking advice. And a baseline assessment for the smoking habits, Fagerstrom nicotine dependency score and stage of readiness to quit must be done prior to giving advice. The smoking cessation programme should include a series of telephone follow-ups. According to the selected studies, the suggested timeframe for follow-ups would be 1 week after the first clinic visit and on a monthly basis afterwards. Information of NRT should be given too. However, patient’s condition should be considered to avoid medication interaction.
Moreover, self-help materials should be distributed to patients for information about smoking cessation. Self-reported 7-day PPA rate should also be measured at 6 months with optional exhaled CO level for biochemical validation. Lastly, nurses will play an important role in promoting smoking cessation among cardiac out-patient.

Chapter 3: Implementation of Potential and Clinical Guideline

The systemic review of the six selected studies showed that smoking cessation service among cardiac out-patients is effective. Pilot & Beck (2004) suggested considering the transferability of the innovations, feasibility of implementation and cost-benefit ratio of the innovation when assessing the implementation potentials.

3.1 Transferability of the Findings

Although the proposed innovation is effective in research studies, these interventions cannot be transferred into local setting directly due to different study designs. Therefore, analysis and amendment of the innovation design is needed before implementing into the suggested clinical setting.

3.1.2 Types of target client. The innovation will be implemented in the SOPC of one acute hospital in the Hong Kong East Cluster (HKEC). This medical SOPC serves more than 100,000 patients in 2012 and 2013 (Hospital Authority (HA), 2014). This innovation includes establishing a guideline to assist recruited cardiac SOPC patients, who are active smokers, to quit smoking. “Active smoker” is defined as tobacco consumption in the previous 7-day. The cardiac SOPC will be running twice a week. All patients attending the cardiac SOPC have a history of heart disease or high risk of developing heart disease.

By general observation, the waiting time for a patient to see the doctor is around 1 hour in cardiac SOPC. Based on experience, more than 70% of them were willing to receive smoking cessation counseling while waiting.

A few cardiac Medical Officers (MO) expressed that their patients continue to smoke
even after cardiac events. They supported to recruit patients to smoking cessation service in the cardiac SOPC as some of them may not be able to receive counseling during their hospital stay due to various reasons. For instance, some patients’ conditions may be unstable for education and counselling at bedside during hospitalization. The hospital smoking cessation nurse may not be able to visit patients before discharged.

Therefore, new referrals for cardiac SOPC appointment will be screened to recruit active smokers in the cardiac SOPC. A project team consists of a cardiac Nurse Specialist (NS), a cardiac Advanced Practice Nurse (APN) and a cardiac nurse from CCU (all of them have completed cardiac post-registration certificate course (PRCC)) will be formed to collaborate with hospital smoking cessation team for counseling training. The project team will receive two sessions of smoking cessation training workshops provided by hospital smoking cessation nurse, each session would last for 60 minutes.

Based on the six eligible studies reviewed, all recruited patients were smokers with cardiac disease, with a mean age ranged from 47.5 to 60. In addition, they were all from the cardiac out-patient units and received smoking cessation counselling. Telephone follow-ups and evaluation of smoking status were done as well. Although local SOPC statistics are not available, the above information can still be adopted in the proposed innovation, as the study of Chan (2012) was conducted in Hong Kong with significant finding on smoking cessation among cardiac out-patients.

3.1.3 **Philosophy of care.** This innovation aims to promote the quality of health and increase smoking cessation rate among cardiac patients. These are all in line with the objectives of HA and The Nursing Council of Hong Kong, which aim to promote people health and provide safe and competent practice (The Nursing council of Hong Kong, 2015).

3.1.4 **Benefits to target patients.** More than 60% of current smokers aged 40 or above, and more than 30% of people aged 45 or above are at risks to develop heart disease.
Therefore, by reducing the number of smokers in this age group, the chance of heart attack is expected to be reduced. Furthermore, in the medical SOPC of the proposed hospital, there are more than 100,000 attendances annually. As advised by the Department Operation Manager (DOM) of SOPC, the average number of new cases of cardiac SOPC was about 160 every month. The estimated number of smokers who are new cases is around 100 per month. There are sufficient patients fulfilling the criteria of this pilot programme and to establish this evidence-based practice (EBP) guideline.

3.1.5 Duration of implementation and evaluation. This EBP guideline will be divided into 5 phases. First, it will start with two months of programme preparation after project team formation. Then, they will prepare the materials required for this programme. Smoking cessation training will be conducted in the first month. Then, recruitment of patients from the cardiac SOPC will be performed within one month. Afterwards, the pilot programme will be implemented for three months and evaluation of smoking status will be done at the end of this phase. After that, evaluation of the programme will be done based on comments from different parties. After the pilot study, the innovation will be implemented for another six months. As the smoking status of patients will be re-assessed six months after the first appointment, the project team will evaluate the effectiveness of the intervention from the seventh month onwards on a monthly basis.

3.2 Feasibility

The following factors will be discussed: availability of staff, method, organizational climate and availability of resources.

3.2.1 Availability of staff. The project team will be responsible for implementing this innovation and reviewing the effectiveness. If the outcome is unsatisfactory, they can modify the guideline or even terminate it. Besides, feedback from the project team, SOPC clerks, SOPC nurses and cardiac MO will be obtained as well.
This nurse-initiated EBP guideline is new, which offers a chance to promote nursing autonomy and professionalization. Staff availability is not an issue because no extra manpower is required.

Hospital’s smoking cessation nurse will organize two workshops for the project team. Smoking cessation methods, skills, counseling techniques and experience sharing will be introduced. The assessment method will be stage change model and Fagerstrom test for nicotine dependence assessment. The smoking cessation counseling will be more efficient after training. The cardiac MO will provide a brief information about the drug interaction between NRT and cardiac medications too.

The SOPC clerks have to distribute the questionnaire for smoking status assessment (Appendix 11). Relevant guideline will be given to the clerks, such that they can help distribute the questionnaire to new cases and collect the completed questionnaires for the recruitment process.

As this innovation is meaningful to patients and contributive to our health care system, it is believed that staffs will support this programme and achieve the goal together.

3.2.2 Method. The project team will be responsible for implementing the whole programme. The NS has the authority to terminate this programme if the outcome is not in line with expectation during implementation. The NS will receive feedbacks from patients and staffs to modify the guideline if necessary.

After the training session, the project team will design a questionnaire to assess patient’s smoking status and distribute it during the registration of new case appointment. And then the project team will start to run the smoking cessation clinic in the cardiac SOPC.

The project team will finally evaluate the effectiveness of this innovation by comparing the smoking cessation rate with the estimation from the research studies after counselling for six months. The estimation of smoking cessation rate will be discussed in details below. They
will also provide feedback to improve the guideline. During the preparation, recruitment and evaluation phases, the project team will have weekly meetings to update the guideline, process the client’s data, and monitor the programme.

With the recent promotions of a few RNs to APN in CCU, and more rotations of RNs into CCU. These all will minimize the interference and additional workload to existing nurses. Furthermore, this programme only runs twice a week after the preparation phase. Thus, it is feasible to form the project team with current manpower by rearranging of the job duties. It will not affect the quality of current healthcare services. Therefore, no extra manpower and cost will be incurred.

3.2.3 Organizational climate. The implementation of this EBP guideline will be reviewed and approved by the DOM of both medical and SOPC department first. Moreover, advice and supports will be obtained from the cardiac MO to design a smoking cessation programme for cardiac out-patients. As majority of smoking cessation referrals are made during patient’s hospitalization, there is a lack of smoking cessation services for cardiac SOPC attendants. Therefore, it is necessary to establish an EBP guideline in out-patient clinics to promote smoking cessation. The administrators should support this innovation due to the following reasons.

In the medical unit, several evidence-based practices were tested previously, including the use of alternative assistive devices for wound healing after cardiac procedures, which would shorten the wound healing time and allow patients to be discharged earlier. Secondly, preventing hospital readmission is a key goal of the hospital management team. As evidence already showed that the proposed innovation is effective in smoking cessation, the recurrence of heart disease, and thus the burden on the hospital service will be reduced. Thirdly, this nurse-led service can promote nursing professionalization and promote the morale of nursing staffs. It is believed that the department and the hospital administrators will support the
innovation and the organizational climate is conducive to research utilization. There is no resistance which will affect the innovation.

In addition, besides the involvement of medical and SOPC departments, the hospital smoking cessation team will provide training to project team for smoking cessation counseling. The SOPC clerks will help distribute and collect the patient’s smoking status questionnaires. The project team will then analyze the questionnaires. Therefore, there is no extra cost and manpower burden to the hospital smoking cessation team after the training workshop.

On the surface, the job duties of hospital smoking cessation team and the newly proposed innovation overlap. However, the interventions provided by the project team is more effective as they will provide tailor-made smoking cessation counseling to cardiac out-patients, which is not currently offered by the hospital smoking cessation team.

3.2.4 Availability of resource. In the proposed innovation, the nurses in the project team are current manpower. Therefore, it is unnecessary to recruit extra nurses. For the facilities required, one of the interview rooms located in the medical SOPC will be used for smoking cessation counseling, which is available when cardiac SOPC runs. Another room located in CCU will be used to store two laptop computers for electronic records, education pamphlets on smoking cessation for cardiac patients, questionnaires and some stationaries. Inside the interview room of the SOPC, a telephone has already been installed and can be used for phone counseling afterwards.

Options of using NRT will be discussed during the interview too. Due to the possible drug interaction with cardiac medication, the use of NRT will be decided by cardiac MO.

In the sixth month, an evaluation of patient’s smoking abstinence rate will be performed by two methods: self-reported 7-day PPA, followed by optional biochemical validation, by measuring exhaled CO level using a machine called Smokerlyzer if patients agree. These
evaluation methods are valid and accurate and have been adopted by other recent research studies.

Therefore, this EBP guideline is feasible to implement in the proposed clinical setting.

3.3 Cost-benefit of the innovation

After identifying the transferability and feasibility of the new innovation, cost-benefit is another issue to be discussed.

3.3.1 Risk and benefits of the innovation. All the six research studies show no risk to patients during the interventions.

3.3.2 Potential Benefits. The potential benefits of this innovation will be discussed in different aspects. For cardiac patients who are current smokers, quitting smoking can reduce the chance of recurrent cardiac disease and thus mortality rate. The smoking cessation counseling will be carried out before seeing cardiac MO at follow-up appointment. It can ensure high compliance rate, as most of the patients must come back for follow-up. And utilizing the waiting period for smoking cessation intervention can improve patient’s satisfactory rate as prolonged waiting can cause anxiety.

For the healthcare system, lower recurrence of cardiac disease can reduce the economic burden on healthcare system by reduced hospital readmission. The resources can be utilized by developing more services to promote the quality of life of citizens. This service can reach more potential patients in out-patient setting as not all of them require hospital admission.

For nursing professionals, this nurse-led innovation can promote nursing professionalization, improve staff’s satisfactory and nursing autonomy. It is a good starting point for developing more nurse-led services in future.

If this innovation is not implemented, cardiac patients may continue to smoke after cardiac events, leading to increased recurrence and mortality rate. According to the study of Chan (2012) conducted in Hong Kong, the estimated smoking cessation rate is 7 % higher
than those without receiving any smoking cessation counseling at 6 months. This proportion of patients is significant to our healthcare system.

3.3.3 Cost calculation. The cost of implementing this innovation can be divided into material cost and non-material cost.

Material Cost. The required materials of this innovation are two laptop computers with access to the Computer Management System (CMS) to assess electronic patient’s record (EPR). The printing materials will be provided by the hospital. A biochemical validation machine, Smokerlyzer, will be ordered to measure the exhaled CO level. Details of the material cost are attached in Appendix 4.

Operational Costs. As telephone is already installed in the interview room, it is unnecessary to pay extra money for telephone service. Cardiac MOs will decide the need of NRT in this innovation. Therefore, no cost calculation can be estimated at this stage.

Non-material Cost. For the labor cost, three nurses will be assigned to implement this innovation. The details of the labor cost are attached in Appendix 5.

3.3.4 Cost of not implementing intervention. According to McGhee (2006), tobacco costs $5.3 billion each year in Hong Kong. Active smokers contributed USD $7,193 million in total live lost annually in 1998. Every year, USD $19 million are spent in SOPC. The cost of public hospital stay is USD $169 million, but the cost of SOPC follow-up is only USD $19 million. Therefore, by reducing the smoking cessation rate, the economic burden on treating current smokers and readmission rate will be lowered.

If this innovation is not implemented, the cardiac SOPC cannot provide smoking cessation intervention to cardiac patients who are active smokers. This increases the risk of recurrence cardiac disease of patients. And those patients may not seek for help to quit smoking. Hence, the risk factor of cardiac disease cannot be eliminated.

3.3.5 Set-up cost and running cost per year. The whole programme lasts for 20
months. The estimated set-up cost including purchase of laptop computers, holding workshop, preparation and evaluation is $80,419.2. The total estimated running cost for 12 months is $72,0230.4. For an estimated annual expenditure, it is calculated based on the salary of nurses. The estimated cost is $78,0249.6.

3.4 Evidence-Based Practice Guideline

To develop the EBP guideline, research findings from the six selected studies were summarized and synthesized (Bredie et al., 2011); (Chan et al., 2012); (Hanssen et al., 2007); (Jennings et al., 2014); (Wiggers et al., 2006); (Zhao et al., 2013). All the studies were graded by SIGN checklist and share similar sampling characteristics and interventions. The literature review showed positive effect of this intervention. Therefore, this innovation is suitable to implement in the suggested local setting. The EBP guideline is attached in Appendix 6.

Chapter 4: Implementation Plan

4.1 Communication Plan

As demonstrated in previous chapters, this innovation has been proven to be transferable, feasible and cost-effective. Stakeholders should be identified so that this guideline can be implemented in the suggested clinical setting at different levels (Pilot & Beck, 2004). Good communication among the organization staffs can enhance the efficiency of performance. Therefore, a good communication plan should be made before implementation.

4.1.2 Stakeholders. Stakeholders include hospital staffs at different levels, who are administrators, managerial and operational staff.

The administrators include Chief of Service (COS), Department Operative Manager (DOM), Ward Manager (WM) of both CCU and cardiac Specialist Out-Patient Department (SOPD), as well as the director of hospital smoking cessation team. Hospital administrators will be responsible for guideline approval, provision of resources, implementation support
and recommendation for modification on the guideline. The smoking cessation team will provide training to the project team of this innovation.

Managerial staffs include one nurse specialist (NS), one APN and one registered nurse (RN) from the CCU. The DOM of medical department will select nurses from CCU to form the project team. The project team will allocate the resources, prepare guideline for promotion, and the hospital smoking cessation team will assign one nurse to conduct training session to the project team. And finally, implement the guideline.

Non-healthcare professionals, SOPD clerks, will be responsible for distributing the questionnaire to new cardiac cases to collect information on patient's smoking status.

Finally, the cardiac patients attending the cardiac SOPC will be recruited if they are current smokers according to the returned survey. This programme helps them quit smoking and reduce the risk of recurrent heart disease.

The ward nurses in the medical department and SOPC department are not the stakeholders because this guideline will be conducted in the cardiac SOPC only.

4.1.3 Communication Plan. As suggested by Pilot (2004), a top-down organizational support should be adopted for implementation. The communication process will be divided into 5 phases. In the first phase, approval of implementation of this guideline will be obtained from administrators before running this guideline. The WM of the CCU will be informed and allocate the manpower. After forming the project team, approval will be obtained from COS and DOM of the medical department for using manpower from the CCU to run this guideline. The significance, transferability, feasibility, cost-effectiveness and clinical outcome of running this evidence-based guideline will be presented to the administrators mentioned above.

Meanwhile, approval from the director of the hospital smoking cessation team will be obtained to provide smoking cessation training to the project team.
After that, phase 2 will begin. Approval will be obtained from the DOM of the SOPC for implementation of the guideline in the cardiac SOPC. Subsequently, the managerial staffs will be informed in phase 3. The significance and details of this guideline will be introduced to the project team. They will have weekly team meeting to review and update the guideline, process the client’s data and evaluate the programme outcome. They will receive smoking cessation training in cooperation with the hospital smoking cessation team.

In phase 4, the project team will approach the DOM of SOPD to discuss the implementation of this guideline by utilizing the waiting period before patients seeing cardiac doctors. Cardiac SOPC clerks will be instructed to deliver the smoking status questionnaire to new cardiac cases when they come to make new appointment, and to collect the completed questionnaires for the project team for processing.

In phase 5, this guideline will be presented in the weekly DOM and WM meeting and monthly nurse meeting and submitted to hospital’s quality and safety committee for approval.

To sustain the change process, the project team will be responsible for monitoring the whole programme and solve any problems encountered during the implementation phase.

They have to evaluate the programme and report the effectiveness to the administrators mentioned above for further resources allocation. If the hospital management team supports this programme, it will become a regular service in the SOPC eventually.

4.2 Pilot Study Plan

A pilot study helps evaluate and modify the guideline before implementation. It is the first stage in exploring the intervention and refining the programme before full-scale implementation. (Leon, Davis & Kraemer, 2011; Hulley, Cummings, Browner, Grady & Newman, 2013). Project team can gain experience from the pilot test.

The total duration of the pilot plan is 7 months (Appendix 7). After forming the project team, in the first two months, they will prepare the relevant materials and pre-test for the
level of knowledge, beliefs, attitudes and confidence of smoking cessation (Appendix 9).

Then, 1 month will be used for patient recruitment in the cardiac SOPC. After that, smoking cessation service will be provided to cardiac patients who are active smokers in the cardiac SOPC while they are waiting for the follow-up. Face-to-face smoking cessation counseling will be conducted in the interview room with patients. During the counselling, Stages of Readiness for Change and Fagerstrom Nicotine Dependency will be assessed.

The Stage of readiness to quit is a process of quitting (DiClemente, Prochaska, & Gilbertini, 1985; DiClemente et al., 1991). It involves 5 stages including pre-contemplation, contemplation, preparation, action and maintenance. In the stage of pre-contemplation, smokers do not consider quitting. The project team will advise patients to quit smoking and tell them the harmful effects of smoking.

Smokers who belong to the contemplation phrase start to consider quitting in the near future and receive information about smoking. Hence, counselling will be given during the first follow-up appointment to strengthen their motivation to quit smoking.

Next, in the stage of preparation, smokers have decided to quit and are ready to quit smoking. The project team help them to set quit date and stop smoking.

Afterwards, smokers try to stop smoking and this stage usually lasts for 6 months. To quit smoking successfully, smokers require more supports in this phrase. Therefore, regular telephone follow-ups are provided in this phrase.

In the final stage, quitters do not smoke again and start to handle temptations to smoke.

This stage of readiness to quit will be assessed during the first follow-up and final follow-up at 6-month.

Subsequent telephone follow-ups will be conducted one week after the interview and then monthly onwards. As it is a pilot test, it is not a must to measure the quit rate at the end of pilot study.
After the implementation phase, evaluation of the pilot test will be done for one month. Feedback (via satisfaction survey) will be collected from the clients at the final follow-up visit (Appendix 10), as well as from the staff of cardiac SOPC including cardiac physicians, nurses and clerks.

Subsequently, the feedback will be used to refine the guideline for clinical implementation. After that, the refined clinical guideline will be reported to the DOM of medical and SOPC departments respectively for final approval. And then the new clinical guideline will be implemented.

4.3 Evaluation Plan

Evaluation is necessary to determine the effectiveness of the guideline. The details are as follows.

4.3.1 Intervention outcomes. The outcomes will be categorized into patients, nurses and cardiac SOPC.

Smoking cessation among cardiac out-patients is the major objective of this innovation. Therefore, evaluation will be done by assessing the self-reported 7-day PPA of tobacco after receiving face-to-face and telephone counselling for six months in the cardiac SOPC.

The knowledge of smoking cessation among the project team will be assessed by using a pre-test and post-test method.

The satisfaction of utilizing the waiting period in the cardiac SOPC will be examined. Survey will be distributed to the clients in the last follow-up appointment at month six.

4.3.2 Outcome measurements. The self-reported PPA of tobacco will be assessed at 6-month since the service is established. Furthermore, an optional biochemical validation will be performed by measuring patient’s exhaled CO level.

The knowledge and confidence level relate to smoking cessation skills of the cardiac nurses in the project team can be assessed using pre- and post-tests before and after training.
Identical assessment material will be used for the tests (Appendix 9). The assessment will be done at month 0 and 6 respectively (Appendix 8).

The satisfaction of clients about the arrangement of counseling sessions during the waiting period in the cardiac SOPC will be surveyed. A questionnaire will be designed and distributed to clients in the final appointment in month six. The clients will be required to return the questionnaire immediately (Appendix 10).

**4.3.3 Nature and number of clients involved.** The clients involved in this innovation are active smokers with new appointment in cardiac SOPC. These inclusion criteria are the same as the targeted population mentioned earlier in the selected six studies. Convenience sampling method will be applied to acquire enough participants.

**4.3.4 Sample size calculation.** The calculation of the sample size is necessary to estimate the number of subjects required to achieve a significant, ethical and reliable result.

Statistical data in this local setting were obtained from the DOM of SOPC, which were not published publicly. The estimated self-reported smoking cessation rate was 20% in the cardiac SOPC.

The tobacco abstinence rate of the usual care group at six months reported in three of the selected studies were 21.7%, 40.8% and 5.7% respectively (Chan et al., 2012; Hanssen et al., 2007; Zhao et al., 2013).

In the other three studies (Bredie et al., 2011; Jennings et al., 2014; Wiggers et al., 2006), the quitting rate of usual care group were 7% at three months, 20% at four months and 17% at 12 months respectively.

By considering the different clinical settings of these studies, the assumed abstinence rate of the usual care group at six months is 20%. This assumption is based on the study conducted by Chan (2012) because it is the only study conducted in Hong Kong among the six selected studies. The high quitting rate in the study of Hanseen (2007) may be the result
of smoking cessation advice provided by patient’s private general practitioners. The low quitting rate in the study of Zhao (2013) may be due to cultural difference in the Mainland China.

The differences in the quitting rate at six months between the intervention and control groups of the six selected studies ranged from 6.1% to 28.6% (Bredie et al., 2011; Chan et al., 2012; Hanssen et al., 2007; Jennings et al., 2014; Wiggers et al., 2006; Zhao et al., 2013).

It is expected that the difference of quitting rate at six months is 7%. It is estimated based on the study conducted in Hong Kong (Chan et al., 2012). Therefore, it is reasonable to estimate the abstinence rate after the proposed intervention to be \(20\% + 7\% = 27\%\).

Java Applets for Power and Sample Size was used for sample size calculation. Test of one proportion was adopted for analysis. The level of significance and power were set to 0.05 and 80%. The null value and actual value were set as 20% and 27%. Calculation of sample size was done and 274 subjects are needed.

**4.3.5 Data collection.** The patients will receive and complete a smoking status questionnaire upon making new appointment (Appendix 11). The project team will analyze the questionnaires and recruit eligible patients into this project.

When the recruited patients attend the cardiac SOPC, the project team will provide an interview session during the waiting period in the cardiac SOPC on the day of follow-up. The interview session will last for 30 minutes including baseline assessment. Patient’s Stages of Readiness for Change and Fagerstrom Nicotine Dependency will be assessed. And staged-matched counselling will also be provided to patients. After that, the project team will contact patients for telephone counseling after one week and then monthly till month six.

At month six, patient’s self-reported 7-day PPA of tobacco will be assessed during follow-up visit. And optional biochemical validation based on exhaled CO level will be
carried out if patients agree. Meanwhile, the Stages of Readiness for Change and Fagerstrom Nicotine Dependency will be assessed again to compare with the baseline assessment.

The effectiveness of client outcomes will be reviewed starting from month 15 since the implementation of this programme.

Patient’s satisfaction of utilizing waiting period during follow-up will be assessed by a survey. The survey will ask patients to score the satisfaction of arranging smoking cessation interview during the waiting period (Appendix 10). On the final follow-up in the smoking cessation clinic (i.e. month 5 and month 14-19), patients will be asked to rate their satisfaction level from one to ten (i.e. one means extremely unsatisfied and ten means extremely satisfied).

Thirdly, identical pre-test and post-test methods will be used to assess project team’s knowledge, beliefs, attitudes and confidence relate to smoking cessation. A self-administered questionnaire with 51 items and written in English will be used (Abdullah et al., 2006). This questionnaire consists of questions relate to knowledge, beliefs, attitudes and confidence level. A scoring system will be developed and categorized respondents into low-level and high-level group (Appendix 9). The test will be done twice, which is Day 0 (on the day of the project team formation) and Month 6 (after the pilot test).

4.3.6 Data Analysis. Data analysis will be performed using SPSS software. The objective of the evaluation is to assess the effectiveness of conducting smoking cessation programme in cardiac SOPC at month six. Analysis of the smoking cessation rate will be done by $x^2$-test for one sample with setting 0.05 as the level of significance (alpha).

Patient’s satisfaction outcome will be evaluated based on returned survey. The survey results will be reported to the DOM of medical department and SOPC department. The satisfaction rate of utilizing the waiting period will be reviewed. More hospital services can be considered to provide to patients.
Pretest-posttest designs will be used to analyze the difference and evaluate the effectiveness of smoking cessation training in view of the project’s team level of knowledge and confidence by using a scoring test attached in Appendix 9. The scoring system will categorize respondents into higher level and lower level group by comparing with the mean score of the nurses being tested.

4.4 Basis for Implementation

4.4.1 Criteria for effectiveness. There are three criteria. 1) To increase the smoking abstinence rate among cardiac out-patients; 2) To improve patient’s satisfaction of waiting period on follow-up; 3) To improve project team’s smoking cessation technique.

4.4.2 Client outcomes. The literature review mentioned above showed that patient’s smoking cessation rate will be increased if face-to-face counselling and regular telephone follow-ups were done. More importantly, research findings support to recruit patients in the out-patient clinics.

As discussed above, the difference of quitting rate between the intervention and control group ranged from 4% to 28.6%. And the study conducted by Chan (2012) can provide reliable research findings due to similar sampling characteristics. Therefore, an assumption of 7% was made based on the research findings and statistics of “hard-core” smokers in Hong Kong. This innovation is considered to be effective if there is 7% increase of quit rate after six month of smoking cessation counselling conducted by the project team.

4.4.3 Other outcomes. Apart from the primary outcome, it is expected that the patients will have a higher satisfaction rate than before because the waiting period can be utilized. Moreover, the staff’s level of knowledge, beliefs, attitudes and confidence can be enhanced after smoking cessation training session.
Conclusion

To conclude, nurses play an important role in assisting patient in smoking cessation. Helping cardiac patients in cardiac out-patient clinics is a growing trend in the world. It is hoped that this proposed intervention could expand the scope of smoking cessation service currently provided in HK and to reach more patients. Through reducing the number of smokers, it is expected that recurrence rate of cardiac disease could be reduced.
Appendix 1

Search strategy: PubMed

1. (("outpatients"[MeSH Terms] OR "outpatients"[All Fields])
2. AND ("smoking cessation"[MeSH Terms] OR ("smoking"[All Fields] AND "cessation"[All Fields]))
3. OR "smoking cessation"[All Fields]))
4. AND ("cardiovascular system"[MeSH Terms] OR ("cardiovascular"[All Fields] AND "system"[All Fields]) OR "cardiovascular system"[All Fields] OR "cardiovascular"[All Fields])
5. AND Randomized Controlled Trial[ptyp]

Items: Total: 9 No. 2,3,4 were selected
Appendix 2

SIGN checklists

Table of internal validity of the selected studies

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<tbody>
<tr>
<td>1.1 The study addresses an appropriate and clearly focused question.</td>
<td>Yes PICO has been stated</td>
<td>Yes PICO has been stated</td>
<td>Yes PICO has been stated</td>
<td>Yes PICO has been stated</td>
<td>Yes PICO has been stated</td>
<td>Yes</td>
</tr>
<tr>
<td>1.2 The assignment of subjects to treatment groups is randomized.</td>
<td>Yes Smokers were randomized equally by the trial coordinator</td>
<td>Yes The allocation sequence was generated sequentially by the project coordinator based on simple random sampling procedure using MS Excel.</td>
<td>Yes Simple randomization procedure using a computer-generated list of random numbers</td>
<td>Yes Participants were randomized using an access database programme.</td>
<td>Yes Computerized balanced randomization programme</td>
<td>Yes Random sequence number was used.</td>
</tr>
<tr>
<td>1.3 An adequate concealment method is used.</td>
<td>Yes Allocation sequence was used.</td>
<td>Yes A serially numbered sealed and opaque envelope</td>
<td>Yes Group allocation in sealed opaque envelopes</td>
<td>Yes Access database programme.</td>
<td>Yes Nurse randomly assigned patients into groups while</td>
<td>Can’t say</td>
</tr>
</tbody>
</table>
While patients completed their baseline questionnaire, and signed a written informed consent, nurses randomly assigned them containing printed instructions on the specific group was used. prepared by the research was used. patients completed their baseline questionnaire, and signed a written informed consent.

| 1.4 | The design keeps subjects and investigators ‘blind’ about treatment allocation. | Yes Double-blinded. | Yes Single-blinded. | Yes Single-blinded. | Yes Single-blinded. | Yes Patients received a letter containing withheld information, not informed about the behavioral intervention before enrollment, in order to avoid a “Hawthorne effect”. Follow-up was blind to allocation. | Yes |

| 1.5 | The treatment and control groups are similar at the start of the trial. | Yes All the p-value of the baseline characteristics are >0.05, so no | Yes Similar age, education level, marital status, Fagerstrom Nicotine | Yes | Yes Baseline characteristics were compared, but the p-value | Yes All the p-value of the baseline characteristics are >0.05, so no | Yes

Most of the baseline characteristics
<table>
<thead>
<tr>
<th>1.6</th>
<th>The only difference between groups is the treatment under investigation.</th>
<th>Yes</th>
<th>Control: self-reported lifestyle questionnaire</th>
<th>Intervention: self-reported lifestyle questionnaire and counseling.</th>
<th>Yes</th>
<th>Can’t say</th>
<th>Yes</th>
<th>Only C-MIS was studied.</th>
<th>Yes</th>
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<tr>
<td></td>
<td>Significant difference.</td>
<td>Yes</td>
<td>Dependence Score, Daily cigarette consumption.</td>
<td>was not calculated.</td>
<td>significant difference.</td>
<td>were compared, similar.</td>
<td>But the gender ratio was big.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.7</td>
<td>All relevant outcomes are measured in a standard, valid and reliable way.</td>
<td>Yes</td>
<td>Self-reported 7-day point prevalence of tobacco abstinence at 3 months.</td>
<td></td>
<td>Yes</td>
<td>Self-reported smoking status and urine or saliva samples.</td>
<td></td>
<td>Can’t say</td>
<td>Did not mention the tools for evaluation of results</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Yes</td>
<td>Self-reported 30-day point prevalence of tobacco abstinence at 3 months.</td>
<td></td>
<td>Yes</td>
<td>Self-reported smoking status and urine or saliva samples.</td>
<td></td>
<td>Can’t say</td>
<td>Did not mention the tools for evaluation of results</td>
</tr>
<tr>
<td>1.8</td>
<td>What percentage of the individuals or clusters recruited into</td>
<td>Yes</td>
<td>The initial dropout percentage was about 25%, so 10.2% did not receive any telephone counseling after</td>
<td>10% dropout at each time point, so 200 participants are</td>
<td>A dropout rate of 25% in each group</td>
<td>Patients with incomplete follow-up were considered to be</td>
<td>Did not mention and the number of samplings were the same</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>each treatment arm of the study dropped out before the study was completed?</td>
<td>the total number of included participants needed was estimated to be 120.</td>
<td>the initial counseling session.</td>
<td>needed to remain at 6 months</td>
<td>persisting smokers</td>
<td>One withdrawal due to cognitive problems, 8 deaths during follow-up not included in analyses. 45 not reached by mail or phone at 12 months. Included in ITT. More unmarried patients lost.</td>
<td>before and after the study period</td>
<td></td>
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</tr>
<tr>
<td>1.9</td>
<td>All the subjects are analyzed in the groups to which they were randomly allocated (often referred to as intention to treat analysis).</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.1</td>
<td>Where the study is carried out at more than one site, results are comparable for all sites.</td>
<td>Does not apply</td>
<td>Yes</td>
<td>Does not apply</td>
<td>Yes</td>
<td>Yes</td>
<td>Does not apply</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### Section 2: Overall assessment of the study

<table>
<thead>
<tr>
<th>2.1</th>
<th>How well was the study done to minimize bias?</th>
<th>++</th>
<th>++</th>
<th>++</th>
<th>+</th>
<th>++</th>
<th>-</th>
</tr>
</thead>
<tbody>
<tr>
<td>(++): High quality</td>
<td>(+: Acceptable quality</td>
<td>(-): Low quality</td>
<td>Reject 0: Unacceptable</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### 2.1 How well was the study done to minimize bias?

- **++**: High quality
- **+**: Acceptable quality
- **-**: Low quality
- **Reject 0**: Unacceptable

<table>
<thead>
<tr>
<th>How well was the study done to minimize bias?</th>
<th>++</th>
<th>++</th>
<th>++</th>
<th>+</th>
<th>++</th>
<th>-</th>
</tr>
</thead>
<tbody>
<tr>
<td>(++): High quality</td>
<td>(+: Acceptable quality</td>
<td>(-): Low quality</td>
<td>Reject 0: Unacceptable</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**2.1** How well was the study done to minimize bias?

**++**

#### 2.2 Taking into account clinical considerations, your evaluation of the methodology used, and the statistical power of the study, are you certain that the overall effect is due to the study intervention?

- **Yes, the difference between the intervention and control groups is the intervention given. However, there is a possibility that the identified smokers may have quitted smoking or changed their motivation to quit smoking before randomization.**

- **Some cardiac out-patient clinics provided cardiac rehabilitation programmes such as health talks or brief advice on smoking cessation as their usual care. It may affect intervention effectiveness. Unclear Bias. But the evaluation methods are valid. And intension-to-treat**

- **The control group received usual care, asked them visit to general practitioner. The study did not mention it specifically. As the GP can provide advices on smoking cessation.**

- **The sample size is big enough as this study was performed across different European countries. In this study, participants can join an optional workshop. Therefore, it may affect the effect of the intervention and the abstinence rate.**

- **Yes, this RCT has fulfilled the entire requirement. And the baseline characteristics are similar in each group. However, errors could be occurred in the self-reported biochemical validation. The urine may be saved in a wrong time.**

- **This study didn’t mention the evaluation tools for assessing patient’s lifestyle habits. And did not include a table of result for the smoking cessation successful rate. This study did not mention the statistical power and its estimation.**

- **This study didn’t mention the evaluation tools for assessing patient’s lifestyle habits. And did not include a table of result for the smoking cessation successful rate. This study did not mention the statistical power and its estimation.**

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- **This study didn’t mention the evaluation tools for assessing patient’s lifestyle habits. And did not include a table of result for the smoking cessation successful rate. This study did not mention the statistical power and its estimation.**
2.3 Are the results of this study directly applicable to the patient group targeted by this guideline?

<table>
<thead>
<tr>
<th>Yes</th>
<th>Yes</th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>The result is significant in the intervention group.</td>
<td>Some of the results are significant (p-value: &lt;0.05 and &lt;0.01.)</td>
<td>However, this programme consists of multiple outcomes, and smoking abstinence is one of them. The results are applicable.</td>
<td>This study shows that C-MIS is not effective to quit smoking for cardiac patients.</td>
</tr>
</tbody>
</table>

2.4 Notes.
Summarize the authors’ conclusions. Add any comments on your own assessment of the study, and the extent to which it answers your question and mention any areas of uncertainty raised above.

| The sample size of this study is small, affecting the accuracy of the findings. And this was a single-centred study. And the motivation of participants to quit smoking was different, affecting the final outcome. | This study examines the effect of smoking cessation counseling on the intervention group and the control group received no counseling related to smoking cessation. But there is uncertainty relate to the cardiac rehabilitation | The sample size is not big enough, and the drop rate was higher than expected. The smoking status was self-reported, no biochemical method to validate. Therefore, it may not be true. | This study performed in several countries, cultural differences may affect the effectiveness of the intervention. However, the abstinence rate is high. This study only recruited patients who were willing to make a quit attempt of smoking, therefore it may affect the successful rate of This abstinence rate may have errors, as patients did not collect morning urine for biochemical validation. And some patients may not report the true smoking status, therefore, affecting the results of this study. Different parties can affect the effectiveness of C-MIS. The counseling skills of the counselor; |

This study shows the intervention is significant. However, the study design has uncertainties. No concealment method was mentioned. And the result was not verified by biochemical methods.
advice to the usual care groups in some of the clinics. This study also includes an adjusted odd ratio and 95% confidence interval for more accurate comparison. Therefore, the result represents the effect of the intervention.

abstinence. This study measured the primary and secondary outcomes at 4 months, which is different from the recommended 6 months in assessing the abstinence rate of smoking. 91% of patients in the intervention group used Varenicline, but the number of users was not reported in the control group. In the control group, patients were advised to find local smoking cessation services, which may vary across different countries. This may affect the smoking status of patients.

the education level of patients; and the self-efficacy of patients.

And the absence of additional control group for usual care only, the use of NRT may affect the results.

Limited biochemical validation because not all populations were examined.
Appendix 3

Table of evidence

<table>
<thead>
<tr>
<th>Bibliographic citation</th>
<th>Study type</th>
<th>Sample characteristics</th>
<th>Intervention</th>
<th>Comparison</th>
<th>Length of follow-up</th>
<th>Outcomes measures</th>
<th>Effect Size</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bredie et al. (2011)</td>
<td>Double-blind</td>
<td>Current smokers</td>
<td>- Computerized self-report lifestyle questionnaire (LSQ) on smoking behavior, alcohol intake, dietary habits and physical activity first</td>
<td>- Same Computerized LSQ</td>
<td>3 months</td>
<td>Primary outcome: 1) Self-reported tobacco abstinence at 3 months</td>
<td>Intervention-Control (%)</td>
</tr>
<tr>
<td>Netherlands</td>
<td>Randomized controlled trial (RCT)</td>
<td>Patients with cardiovascular disease</td>
<td>- Fagerstrom Test is used to assess smoking habit</td>
<td>- Fagerstrom Test is used to assess smoking habit</td>
<td>(N=42)</td>
<td>1) +19% (p-value: 0.017)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Elevated cardiovascular risk</td>
<td>-5-minute physician consultation to advise patient to quit smoking</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Vascular out-patient unit of internal medicine</td>
<td>- First 30-minute nurse counselling with Fagerstrom Test</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>Mean age: 50.0 (Intervention) 52.2 (Comparison)</td>
<td>- Motivational interviewing technique was used</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>(Intervention)</td>
<td>- Second 30-minute nurse counselling, set quit date and discuss NRT</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>52.2 (Comparison)</td>
<td>- 10-minute phone follow-up (2-4 times maximum in 3 months)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Years of smoking 29.5 (Intervention) 24.6 (Comparison)</td>
<td>(N=46)</td>
<td></td>
<td></td>
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</tbody>
</table>


<table>
<thead>
<tr>
<th>Bibliographic citation</th>
<th>Study type</th>
<th>Sample characteristics</th>
<th>Intervention</th>
<th>Comparison</th>
<th>Length of follow-up</th>
<th>Outcomes measures</th>
<th>Effect Size</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chan et al. (2012)</td>
<td>-Single-blinded</td>
<td>-Chinese smokers -Cardiac patients attending cardiac out-patient clinic -Mean age: 58.0 (intervention) 58.6 (Comparison) -Fagerstrom nicotine dependence score 2.62 (Intervention) 2.51 (Comparison) -Years of smoking 38.9 (Intervention) 39.8 (Comparison) -Daily cigarette consumption 12.0 (Intervention) 11.6 (Comparison)</td>
<td>-30-minute face-to-face counselling on smoking cessation -Matched to stage of readiness to quit -15-minute telephone calls at 1 week and 1 month by nurse counsellor -Reassess the stage and counselling according to the stage -Counselling on NRT (no drug will be provided) (N=938)</td>
<td>-15-minute face-to-face counselling on healthy diet -A one-page A4-sized leaflet about the importance of a healthy diet for cardiac patients -No telephone counselling was given (N=922)</td>
<td>At 3, 6 and 12 months</td>
<td>Primary outcome At 12 months: 1) Self-reported 7-day point prevalence abstinence (PPA) rate 2) Self-reported 30-day PPA Secondary outcomes (Self-reported 7-day PPA) 3) At 3 months 4) At 6 months (Self-reported 30-day PPA) 5) At 3 months 6) At 6 months 7) Biochemically validated tobacco abstinence at 12 months by exhaled CO level 8) At least one quit attempt lasting at least 24 hours in 12 months (quit attempt rate) (Reduction in cigarette consumption by at least 50% compared to baseline) 9) At 3 months 10) At 6 months 11) At 12 months</td>
<td>Intervention- Control (%) (Adjusted Odd Ratio (OR); 95% Confidence Interval (CI)) 1) +1% (0.95; 0.77-1.18) 2) +1.2% (0.96; 0.77-1.19) 3) +5.1% (1.22; 0.97-1.55) 4) +6.1% (1.28; 1.03-1.59; P-value: &lt;0.05) 5) +4.3 (1.19; 0.93-1.53) 6) +5.5 (0.87; 0.70-1.07) 7) +1.7% (1.26; 0.85-1.87) 8) +10.2% (1.62; 1.22-2.17; p-value: &lt;0.001) 9) +8.2% (1.21; 0.92-1.60) 10) +3.1% (1.20; 0.91-1.57) 11) 5.9% (1.18; 0.97-1.43)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Bibliographic citation</th>
<th>Study type</th>
<th>Sample characteristics</th>
<th>Intervention</th>
<th>Comparison</th>
<th>Length of follow-up</th>
<th>Outcomes measures</th>
<th>Effect Size</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hanssen et al. (2007)</td>
<td>Single-blinded -Prospective randomized controlled trial</td>
<td>Current smokers -Acute myocardial infarction patients -Mean age: 59.5 (Intervention) 60.9 (Comparison) -Daily smoker: 49.4% (Intervention) 46.6% (Comparison)</td>
<td>Visit to a physician at the out-patient clinic 6-8 weeks after discharge from the hospital -Telephone follow-up: Week 1, 2, 3, 4, 6, 8, 12 and 24 -Open telephone line: Telephone slot times open 2 days a week, 3 hours each time (N=156)</td>
<td>Visit to a physician at the out-patient clinic 6-8 weeks after discharge from the hospital -Visits to general practitioner. (N=131)</td>
<td>6 months</td>
<td>Primary outcome: 1) Health-related quality of life using the 36-item Short Form Health Survey. Secondary outcome: 2) Stopped smoking at 3 months’ follow-up 3) Stopped smoking at 6 months’ follow-up</td>
<td>Intervention-Control (%) 1) Not related to smoking cessation 2) +11.5% (p-value: 0.254) 3) +19.2% (p-value: 0.055)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Bibliographic citation</th>
<th>Study type</th>
<th>Sample characteristics</th>
<th>Intervention</th>
<th>Comparison</th>
<th>Length of follow-up</th>
<th>Outcomes measures</th>
<th>Effect Size</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jennings et al. (2014)</td>
<td>-Single-blinded&lt;br&gt;-Multi-centre&lt;br&gt;-Parallel group randomized controlled trial (RCT)</td>
<td>-Persistent smokers, want to make a quit attempt&lt;br&gt;-Patients with vascular disease or at high cardiovascular risk&lt;br&gt;-20 General practitioners in the studied countries&lt;br&gt;-Mean age: 59.6 (intervention) 60.4 (Control)&lt;br&gt;-Smoking year: 39.7 (Intervention)&lt;br&gt;-Daily cigarette consumption: 19.6 (Intervention)</td>
<td>-Baseline assessment&lt;br&gt;-Set quit date&lt;br&gt;-Give self-monitoring and educational family support pack&lt;br&gt;-12-week treatment plan for optional varenicline or NRT was discussed and commenced at patient’s request&lt;br&gt;-Review and/or titrate cardio-protective medicines if needed&lt;br&gt;-Follow-up every 2 weeks&lt;br&gt;-Optional health promotion group workshops provided&lt;br&gt;Final assessment at 16 weeks (N=342)</td>
<td>-No baseline assessment&lt;br&gt;-Advised to see their general practitioners, or other smoking cessation services&lt;br&gt;-Final assessment at 16 weeks (N=341)</td>
<td>4 months</td>
<td></td>
<td>Intervention-Control (%)&lt;br&gt;(Odd ratio; 95% Confidence interval)&lt;br&gt;1) +32.4% (4.52; 3.20-6.39)&lt;br&gt;2) +30.3% (3.94; 2.83-5.48)&lt;br&gt;3) +28.6%</td>
</tr>
</tbody>
</table>

<table>
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<tr>
<th>Bibliographic citation</th>
<th>Study type</th>
<th>Sample characteristics</th>
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<th>Comparison</th>
<th>Length of follow-up</th>
<th>Outcomes measures</th>
<th>Effect Size</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wiggers et al. (2006)</td>
<td>-Single-blinded Randomized controlled trial (RCT)</td>
<td>-Current Smokers -Patients with peripheral artery disease or coronary artery disease -Out-patient department of vascular surgery, cardiology and vascular medicine. -Mean age: 59 (Intervention) 58 (Control)</td>
<td>-8 weeks of free NRT (transdermal nicotine patches) -15-30 minutes counselling session by nurses using “Minimal Intervention Strategy” for cardiology patient (C-MIS) -1 phone call 2 weeks after counselling -Additional behavioural counselling session on request -Assess dependency and motivation, barriers, set quit date for motivated patients (N=168)</td>
<td>-No additional motivational counselling or self-help materials. (N=163)</td>
<td>12 months</td>
<td>Primary outcome: 1) Self-reported 7-day PPA rate at 12 months 2) Self-reported 7-day PPA rate at 12 months with lost to follow-up 3) Urine or saliva nicotine/cotinine/thiocyanate validation at 12 months 4) Daily cigarette consumption at 12 months</td>
<td>Intervention- Control (%) (Odd Ratio (OR); Confidence Interval (CI)) 1) +4% (1.30; 0.75-2.25; p-value: 0.20) 2) +5% (1.44; 0.83-2.50; p-value: 0.17) 3) +4% (1.23; 0.71-2.13; p-value: 0.30) 4) 21 to 15 (Intervention) 21-14 (Comparison) (p-value&lt;0.001)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Bibliographic citation</th>
<th>Study type</th>
<th>Sample characteristics</th>
<th>Intervention</th>
<th>Comparison</th>
<th>Length of follow-up</th>
<th>Outcomes measures</th>
<th>Effect Size</th>
</tr>
</thead>
<tbody>
<tr>
<td>Zhao et al. (2013) Zhengzhou, China (-)</td>
<td>Single-blinded Randomized controlled trial</td>
<td>Current Chinese smokers Cardiovascular out-patient department Coronary heart disease patients Mean age: 47.5 (Intervention) 49.5 (Comparison)</td>
<td>-Assess smoking habit, explain harmful effects of smoking and provide information about smoking cessation methods at the first clinic visit by physician. -Distribute Self-smoking cessation handbook to participants. -At week 1, telephone follow-up to assess participant’s condition, progress and remind participants to quit smoking. -Send 1 to 3 Short-text-message (SMS) to remind them to quit smoking weekly. -Send follow-up visit reminders every 2 weeks for participants having condition changes. -Telephone contacts every 4 weeks to assess condition and provide advice. -Assess smoking status at 6-months. (N=70)</td>
<td>-Explain the preventive measures of coronary heart disease. -Assess smoking status at 6-months. (N=70)</td>
<td>6 months</td>
<td>Primary outcome: 1) Self-reported abstinence after 6 months</td>
<td>Intervention-Control (%) 1) +28.5 (P-value: &lt;0.01)</td>
</tr>
</tbody>
</table>
Appendix 4

Summary of material costs

Table of estimated material cost

<table>
<thead>
<tr>
<th>Items</th>
<th>Calculation</th>
<th>Cost (HK Dollars)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Laptop computer</td>
<td>$6000 X 2</td>
<td>$12000</td>
</tr>
<tr>
<td>Printing materials</td>
<td>Hospital provision</td>
<td>$0</td>
</tr>
<tr>
<td>Smokerlyzer Package</td>
<td>$6500 X 1</td>
<td>$6500</td>
</tr>
</tbody>
</table>

Total number of nurses recruited to form the project team: 3

Total number of RN from hospital smoking cessation team: 1

Table of nurse’s salary

<table>
<thead>
<tr>
<th>Post</th>
<th>Monthly Salary</th>
<th>Daily Salary</th>
<th>Hourly Salary</th>
</tr>
</thead>
<tbody>
<tr>
<td>RN</td>
<td>$37940.5</td>
<td>$1940</td>
<td>$216</td>
</tr>
<tr>
<td>APN</td>
<td>$54388</td>
<td>$2781.2</td>
<td>$309</td>
</tr>
<tr>
<td>NS</td>
<td>$54388</td>
<td>$2781.2</td>
<td>$309</td>
</tr>
</tbody>
</table>
### Appendix 5

**Summary of estimated non-material costs**

<table>
<thead>
<tr>
<th>Items</th>
<th>Calculation</th>
<th>Cost (HK dollars)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Labor cost of a RN to give training workshop (2 Hours)</td>
<td>$216 X2 hours</td>
<td>$432</td>
</tr>
<tr>
<td>Labor cost of the project team to attend training workshop (2 Hours)</td>
<td>($216+$309+$309) X2 hours</td>
<td>$1468</td>
</tr>
<tr>
<td>Labor cost of running the smoking cessation service in cardiac SOPC (12 months)</td>
<td>($1940+$2781.2+$2781.2) X2 days X4weeks X12 months</td>
<td>$720230.4</td>
</tr>
<tr>
<td>Labor cost during the preparation phase, recruitment phase and evaluation phase (2 months)</td>
<td>($1940+$2781.2+$2781.2) X4 weeks X2 months</td>
<td>$60019.2</td>
</tr>
</tbody>
</table>
Appendix 6

Evidence-based guideline

XXX Hospital
Department of Medicine and Department of Specialist Out-patient Clinics

Evidence-based guideline

An evidence-based protocol for smoking cessation services among cardiac out-patients

Background of the clinical issue:

Cardiovascular disease causes 16.7 million of people died every year in the world and more than 7.4 million of people died due to coronary heart disease (“The tobacco atlas,” 2002). In Hong Kong, there are 65.7% of daily cigarette smokers aged 40 years or above (Census and Statistics Department, 2013). And 30.3% of people aged 45 years or above have a history of heart disease (Census and Statistics Department, 2012). In our current practice, there is in-patient smoking cessation service for patients staying in hospital. Beside assessment and counseling were done during patient’s hospitalization. However, it is not enough to promote smoking cessation to all patients who are active smokers because in-patient referrals to smoking cessation services will be missed easily. Therefore, it is important to promote smoking cessation among cardiac out-patients.

Aims and Objectives:

- Summarize the clinical evidence for the smoking cessation services among cardiac out-patients.

- Formulate clinical practice instructions for smoking cessation services among cardiac out-patients based on the best evidence available.

- Streamline and standardize the smoking cessation services among cardiac out-patients in the cardiac specialist out-patient clinic (SOPC).

- Target users:
One cardiac Nurse Specialist (NS), one cardiac Advanced Practice Nurse (APN), one cardiac Registered Nurse (RN), SOPC clerks.

**Target group:**

Cardiac patients with who have a cigarette consumption in the past 7-day and have new appointment in cardiac SOPC.

**Intervention and practices considered:**

The intervention includes face-to-face counseling in cardiac SOPC before cardiac MO appointment. Stage of readiness or change and Fagerstrom nicotine dependency will be assessed. Regular telephone follow-ups on smoking cessation will be provided to patients on a monthly basic.

**Major outcomes considered:**

Under the intervention, the smoking cessation rate at 6-months follow-up is more than 7%.

**Evidence-based recommendations:**

**Recommendation 1:** Recruit patients in cardiac out-patient clinics and the recruited patients are active smokers.

*Grade of recommendation: A*

*Evidence:* All eligible studies showed that out-patient smoking cessation service is effective. Their findings showed a positive effect size. (Bredie, Fouwels, Wollersheim & Schippers, 2011) [1++] ; (Chan et al., 2012) [1++] ; (Hanssen, Nordrehaug, Eide & Hanestad, 2007) [1++] ; (Jennings et al., 2014) [1+] ; (Wiggers et al., 2006) [1++] ; (Zhao et al., 2013) [1-].

**Recommendation 2:** Conducting individual face-to-face interview for smoking cessation counseling by a nurse or physician.

*Grade of recommendation: A*
Evidence: All studies adopted face-to-face counseling by nurses or physicians during follow-up appointment. And the smoking cessation rate among the selected studies were high. (Bredie, Fouwels, Wollersheim & Schippers, 2011) [1++]; (Chan et al., 2012) [1++]; (Hanssen, Nordrehaug, Eide & Hanestad, 2007) [1++]; (Jennings et al., 2014) [1+]; (Wiggers et al., 2006) [1++]; (Zhao et al., 2013) [1-].

Recommendation 3: Obtain patient’s smoking habit by conducting a baseline assessment using Fagerstrom test and stage change model (Pre-contemplation, contemplation, preparation, action) to assess patient’s stage of readiness to quit smoking.

Grade of recommendation: B

Evidence: All studies conducted baseline assessment before giving smoking cessation counseling. (Bredie, Fouwels, Wollersheim & Schippers, 2011) [1++]; (Chan et al., 2012) [1++]; (Hanssen, Nordrehaug, Eide & Hanestad, 2007) [1++]; (Jennings et al., 2014) [1+]; (Wiggers et al., 2006) [1++]; (Zhao et al., 2013) [1-].

Fagerstrom test is a tool to access patient’s nicotine dependence level (Bredie, Fouwels, Wollersheim & Schippers, 2011) [1++]; (Chan et al., 2012) [1++]).

The stage change model is a tool to assess smoker’s stage of readiness to quit smoking. It can help the project team to provide optimal counseling and intervention to aid patients to quit smoking. (Chan et al., 2012) [1++]; (Wiggers et al., 2006) [1++].

Recommendation 4: Telephone follow-ups should be done after one week since the first clinic visit, and arrange it monthly afterwards. The duration should be at least six months.

Grade of recommendation: A

Evidence: Five studies have provided telephone follow-ups to patients after the first clinic visit. And the first telephone follow-up was done after one week since the first visit. (Bredie, Fouwels, Wollersheim & Schippers, 2011) [1++]; (Chan et al., 2012) [1++].
Subsequent telephone follow-ups should be made monthly for not less than six months. With more frequent telephone follow-ups, the smoking cessation rate is higher.

**Recommendation 5:** Evaluation of self-reported 7-day Point Prevalence Tobacco Abstinence should be measured 6 months after the baseline assessment. Optional biochemical validation using exhaled Carbon Monoxide level can be used.

*Grade of recommendation:* A

*Evidence:* Three studies have evaluated patient’s smoking status at 6 months.

(Hanssen, Nordrehaug, Eide & Hanestad, 2007) [1++]; (Zhao et al., 2013) [1-].

Three studies have provided optional biochemical validation method to evaluate the smoking status. It is not compulsory as it is an expensive test, and not all patients were willing to perform this test.

(Hanssen, Nordrehaug, Eide & Hanestad, 2007) [1++]; (Jennings et al., 2014) [1+]; (Wiggers et al., 2006) [1++].
## Appendix 7

### Pilot study time frame (total duration: 7 months)

<table>
<thead>
<tr>
<th>Month</th>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
</tr>
</thead>
<tbody>
<tr>
<td>Phase</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Preparation of pilot study</td>
<td>Recruitment of patients</td>
<td>Smoking cessation counseling</td>
<td>Self-reported smoking status at the end of the month</td>
<td>Pilot study evaluation + Project team posttest + Preparation for programme implementation</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Project team Pretest</td>
<td>Researcher</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
## Appendix 8

**Programme time frame (total duration: 13 months)**

<table>
<thead>
<tr>
<th>Month</th>
<th>Phase</th>
<th>Recruitment of patients</th>
<th>Smoking cessation counseling (face-to-face counselling on first visit and monthly telephone follow-ups) (6 Months for each patient)</th>
<th>Self-reported smoking status (For patients completed 6 months counselling service) + Telephone follow-ups for patients not yet complete 6 months counselling service + Programme evaluation</th>
<th>Recruitment of patients</th>
<th>Self-reported smoking status (For patients completed 6 months counselling service) + Programme evaluation</th>
</tr>
</thead>
<tbody>
<tr>
<td>7</td>
<td>8</td>
<td>9</td>
<td>10</td>
<td>11</td>
<td>12</td>
<td>13</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td><strong>Smoking cessation counseling (face-to-face counselling on first visit and monthly telephone follow-ups) (6 Months for each patient)</strong></td>
<td><strong>Self-reported smoking status (For patients completed 6 months counselling service) + Telephone follow-ups for patients not yet complete 6 months counselling service + Programme evaluation</strong></td>
<td><strong>Recruitment of patients</strong></td>
<td><strong>Self-reported smoking status (For patients completed 6 months counselling service) + Programme evaluation</strong></td>
</tr>
</tbody>
</table>
Appendix 9

Pretest and posttest on knowledge, beliefs, attitudes and confidence in smoking cessation (Abdullah et al., 2006).

### A. Knowledge (Correct/agree: 1; Incorrect/uncertain/disagree: 0)

<table>
<thead>
<tr>
<th>Prevalence of smoking in Hong Kong (1 item)</th>
<th>□ &lt;10% □ 11–12% □ 15–16% □ 20–25% □ 26–30% □ &gt;30%</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Prevalence of adult smokers in Hong Kong is</td>
</tr>
</tbody>
</table>

#### Knowledge on treatment of nicotine dependency (2 items)

<table>
<thead>
<tr>
<th></th>
<th>□ Agree □ Unsure □ Disagree</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>Nicotine replacement therapy (e.g. patch, gum, inhaler) can improve smokers’ chance of stopping</td>
</tr>
<tr>
<td>3</td>
<td>Bupropion (e.g. Zyban) is effective in helping people quit smoking</td>
</tr>
</tbody>
</table>

#### Risks associated with passive smoking (5 items)

<table>
<thead>
<tr>
<th></th>
<th>□ Agree □ Unsure □ Disagree</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>Neonatal death is associated with passive smoking</td>
</tr>
<tr>
<td>5</td>
<td>Maternal smoking during pregnancy increases the risk of sudden infant death syndrome</td>
</tr>
<tr>
<td>6</td>
<td>Passive smoking increases the risk of lung disease in non-smoking adults</td>
</tr>
<tr>
<td>7</td>
<td>Passive smoking increases the risk of heart disease in non-smoking adults</td>
</tr>
<tr>
<td>8</td>
<td>Paternal smoking increases the risk of lower respiratory tract illnesses such as pneumonia in exposed children</td>
</tr>
</tbody>
</table>

#### Knowledge on smoking cessation services available in Hong Kong (2 items)

<table>
<thead>
<tr>
<th></th>
<th>□ Agree □ Unsure □ Disagree</th>
</tr>
</thead>
<tbody>
<tr>
<td>9</td>
<td>Are there any smoking cessation clinics in HK?</td>
</tr>
<tr>
<td>10</td>
<td>Are there any smoking cessation Quit lines in HK?</td>
</tr>
</tbody>
</table>

### B. BELIEFS (Strongly agree: 5; Agree: 4; Unsure: 3; Disagree: 2; Strongly disagree: 1)

<table>
<thead>
<tr>
<th></th>
<th>□ Strongly agree □ Agree □ Unsure □ Disagree □ Strongly disagree</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Patient’s chances of quitting smoking are increased if a health professional advises him/her to quit</td>
</tr>
</tbody>
</table>
Nicotine replacement therapy should be made available on all hospital authority prescriptions □ Strongly agree □ Agree □ Unsure □ Disagree □ Strongly disagree

Health professionals should routinely ask about their patients’ smoking habits □ Strongly agree □ Agree □ Unsure □ Disagree □ Strongly disagree

Health professionals should routinely advise their patients to quit smoking □ Strongly agree □ Agree □ Unsure □ Disagree □ Strongly disagree

Smoking in enclosed public places (such as restaurants, bars, shopping malls) should be prohibited □ Strongly agree □ Agree □ Unsure □ Disagree □ Strongly disagree

Health professionals should routinely advise patients who smoke to avoid smoking around children □ Strongly agree □ Agree □ Unsure □ Disagree □ Strongly disagree

C. ATTITUDES

Level of preparation (Very well prepared: 2; Somewhat prepared: 1; Not at all prepared: 0)

1. How well prepared do you feel you are when counseling patients on how to stop cigarette smoking? □ Very well prepared □ Somewhat prepared □ Not at all prepared

Need for guidelines (Yes: 2; Don’t know: 1; No: 0)

2. Do you think there is a need for guidelines on smoking cessation in Hong Kong? □ Yes □ No □ Don’t know

3. Do you think that guidelines would be helpful in managing your smoking patients? □ Yes □ No □ Don’t know

D. CONFIDENCE (Strongly agree: 5; Agree: 4; Unsure: 3; Disagree: 2; Strongly disagree: 1)

Perceived knowledge and skills

1. My current knowledge is sufficient for helping patients to stop smoking □ Strongly agree □ Agree □ Unsure □ Disagree □ Strongly disagree

2. I can explain the risks attributed to smoking in detail to patients □ Strongly agree □ Agree □ Unsure □ Disagree □ Strongly disagree

3. My current skills are sufficient for helping patients to stop smoking □ Strongly agree □ Agree □ Unsure □ Disagree □ Strongly disagree

Confidence level in real practice

4. I know how to prescribe medication (nicotine replacement therapy/bupropion) to treat tobacco dependency □ Strongly agree □ Agree □ Unsure □ Disagree □ Strongly disagree

5. I can assess a smoker’s different stages of readiness to quit □ Strongly agree □ Agree □ Unsure □ Disagree □ Strongly disagree

6. I can assess a smoker’s level of nicotine dependency using the Fagerstrom score □ Strongly agree □ Agree □ Unsure □ Disagree □ Strongly disagree
A simple Likert scoring system was adopted to generate a composite score. The scores for each question have been stated in each section. Respondents scoring a mean score or above were categorized as having better level of knowledge/beliefs/attitudes/confidence and those scoring below the mean were categorized as having lower level.
### Appendix 10

**Satisfaction survey about utilization of waiting period to provide smoking cessation services in cardiac SOPC**

1) Considering only your smoking cessation interview sessions experience to be arranged during your waiting period in this cardiac SOPC, how satisfied are you with this arrangement? (1: extremely unsatisfied; 10 extremely satisfied)

Please put a tick ✓ into box of your choice

<table>
<thead>
<tr>
<th>1 Extremely unsatisfied</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10 Extremely satisfied</th>
</tr>
</thead>
<tbody>
<tr>
<td>2)</td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>

2) What did we do really well?


3) What can we do to be even better?

4) What is your gender?

M

F

5) How old are you?

15-19
20-29
30-39
40-49
50-59
≥60
Appendix 11
Tobacco smoking status questionnaire
(Global Adult Tobacco Survey Collaborative Group, 2011)

Name: _____________
ID: ________________
Gender: ____________

1) Current tobacco smoking status

Do you currently smoke tobacco on a daily basis, less than daily, or not at all?

Daily ☐

Less than daily ☐

Not at all ☐

Don’t know ☐

2a) Past daily smoking status

Have you smoked tobacco daily in the past?

Yes ☐

No ☐

Don’t know ☐

2b) Past smoking status

In the past, have you smoked tobacco on a daily basis, less than daily, or not at all?

If you have done both “Daily” and “Less than daily” in the past, check “Daily”.

Daily ☐

Less than daily ☐

Not at all ☐

Don’t know ☐

END of Questionnaire, please return to the SOPC clerk
References

Abdullah, A. S., Rahman, A. S., Suen, C. W., Wing, L. S., Ling, L. W., Mei, L. Y., ...


Hong Kong, Hospital Authority, Statistics and Workforce Planning Department. (2014). Hospital Authority Statistical Report 2012-2013. Hong Kong: Hospital Authority.


