

## Hospital Based Smoking Cessation: A Review of the Literature

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### Abstract

The United States Surgeon General described smoking as one of the most preventable causes of death. In spite of the clear links between smoking and numerous adverse health effects, it has been estimated that 29% of Canadians over the age of 15 were smokers in 1997. Physicians are well poised to have substantial influence on the smoking habits of their patients, yet relatively few physicians engage in nicotine counseling. This despite the fact that the Canadian Task Force on the Periodic Health Examination has given smoking counseling interventions an A rating. To this end, there has been a recent interest in hospital based in-patient smoking cessation interventions. The studies done to date show great promise. We conducted a literature search for appropriate studies of such programs. Articles were initially retrieved through MEDLINE with MeSH terms "smoking cessation", "inpatients", "cardiac patients", and "counseling". Additional articles were retrieved by cross-referencing bibliographies of retrieved articles. The results of five such studies done on general hospital in-patients had 12 month abstinence rates ranging from 13.5% to 27%. Similar studies done on hospital in-patients suffering from various cardiovascular diseases show even greater promise with 12 month abstinence rates as high as 70%. In this article we review the current literature on hospital-based smoking cessation programs, with a focus on those studies done on cardiovascular in-patients. We also put forth some possible explanations for the high success rates of such programs in the cardiovascular subgroup.

### Introduction

Smoking is one of the most preventable causes of death.<sup>1</sup> Indeed, smoking kills three times more Canadians than car accidents, suicides, drug abuse, murder and AIDS combined.<sup>2</sup> Many studies have documented the health consequences of tobacco smoke. Chief among these are an increased risk of atherosclerotic cardiovascular disease (hypertension, CAD, stroke, and

peripheral vascular disease),<sup>2</sup> respiratory disease (COPD),<sup>3</sup> and various cancers of the oral cavity, esophagus, lung, cervix, pancreas, kidney, and stomach.<sup>4</sup> Smoking cessation consult services are an efficient and effective means to decrease the mortality and morbidity of smoking. The Canadian Task force on the Periodic Health Examination gives smoking cessation counseling an A rating, stating that there is good evidence to support counseling for smokers during their periodic health examination.<sup>5</sup> Fisher writes of the great benefits of smoking cessation counseling by physicians, stating that it can help almost all smokers move in their thinking towards quitting by increasing awareness and stimulating thought.<sup>6</sup>

The current health care system provides very few opportunities for medical students and residents to learn addiction medicine, particularly in the area of smoking cessation. As a result studies have shown that physicians are not adept at recognizing and treating tobacco, alcohol, and drug problems.<sup>7</sup> This is unfortunate, as physicians are well positioned to have enormous positive impacts on the smoking habits of their patients. Consider that individuals who quit smoking and received advice from their physician are less likely to relapse than those smokers who quit without physician advice.<sup>8</sup> Yet, the number of physicians that actually take advantage of this fact is small. It is estimated that some 43-50% of patients have never been advised by their physician to quit or decrease their smoking.<sup>5</sup>

Smoking cessation is especially important in patients with ischemic heart disease as the effects of cigarette smoke on the cardiovascular system put these patients at a higher risk for a smoking related death.<sup>9</sup> A study by Krumholz *et al.* found a gain of approximately 1.7 years in patients who quit smoking compared to those who continued.<sup>10</sup> A recent meta-analysis of cohort studies by Wilson *et al.* consistently found that patients who quit smoking after a myocardial infarction (MI) had lower mortality rates than those who did not quit.<sup>11</sup> Mortality rates were found to be 4%-37% in smokers who quit compared to 8%-54% in those who continued to smoke.<sup>7</sup> Thus smoking cessation is of great importance to patients recovering from cardiovascular related illness.

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To this end, there has been a recent interest in hospital based smoking counseling and the studies completed to date have demonstrated the effectiveness of these programs. Our purpose here is to review the current studies on hospital based smoking cessation programs, with a focus on studies done on cardiovascular inpatients.

### Cessation Programs in Hospital Inpatients

Although it may seem obvious that during a health crisis presents a good opportunity for health care professionals to introduce smoking intervention strategies to a smoker, there have been very few studies looking at the effectiveness of smoking cessation programs in hospitalized patients who smoke. Among the studies that have been performed, special attention has been given to patients hospitalized as the result of cardiovascular complications. These studies consistently reveal that in-hospital smoking cessation programs are most effective in this population. Here we will examine the literature in both the general inpatient population and in the cardiovascular subgroup. Table 1 is a comparison of the studies to be discussed in this review.

#### A) Cessation Programs in the General Inpatient Population

There have been few studies performed looking at inpatient smoking cessation programs in non-cardiac patients.<sup>12</sup> Table 1 compares five studies which were completed on general hospital inpatients.<sup>13-17</sup>

The RCT published by Miller *et al.* determined the smoking cessation rate in patients hospitalized for various conditions including non-cardiac diseases.<sup>13</sup> The 12-month smoking cessation rate in this study was 27% for the intensive intervention group and 22% for the minimal care group. Minimal care consisted of consultation with a nurse while in hospital and one

post discharge telephone call. Nicotine replacement therapy was offered. The intervention group received the same intervention as the minimal care group but with four follow-up phone calls.

In 1996 Taylor *et al.* performed a study evaluating the effectiveness of a nurse-managed intervention program on smokers in the general inpatient population.<sup>12</sup> At one year the intervention group was found to have a cessation rate of 31% while the usual care group had a cessation rate of 21%. The intervention consisted of a negative smoking message from a doctor followed by a one hour counseling session with 3 nurses including a 16 minute video, an audiotape and workbook. Nicotine replacement therapy was offered to those having withdrawal symptoms. The intervention group received phone calls from a nurse 48 hours, 7 days, 21 days, and 90 days after discharge, and they were offered a one-hour counseling session with a nurse if relapse occurred. Members of the usual care group received a standardized quit smoking message from their doctor and were given a pamphlet on quitting smoking.

Simon *et al.* published a RCT to test the effectiveness of an inpatient cessation program on non-cardiac patients.<sup>15</sup> In this study the self-reported quit rates of the intervention group was 27% while that of the usual care group was 13%. The intervention group in this study received 30-60 minutes of counseling with a health educator, a 10 minute video on relapse prevention, self-help literature, nicotine replacement therapy, and 3 months of telephone follow up (30 minutes each, 1 per week for the first month and then 1 per month).

A similar study by Rigotti *et al.* found the cessation rates 6 months after hospital discharge to be 17.3% for the intervention group and 14% for the usual care group.<sup>16</sup> The interven-

**Table 1**  
**A Comparison of Inpatient Smoking Cessation Studies**

	Self-help Materials	Face to Face Counseling	Post-discharge phone calls		Physician advice	Video	Nicotine replacement	12 month cessation rate	
			Number of calls	Duration (min)				Maximum intervention group (%)	Minimum intervention group (%)
<b>General Inpatients</b>									
Miller et al. <sup>13</sup>		✓	4	-	✓			27	22
Taylor et al. <sup>12</sup>		✓	4	10	✓	✓	✓	31	21
Simon et al. <sup>15</sup>	✓	✓	5	30		✓	✓	27	13
Rigotti et al. <sup>16</sup>	✓	✓	3	5-10	✓			17.3*	14*
Stevens et al. <sup>17</sup>	✓	✓	2	5		✓		13.5	9.2
<b>Cardiovascular Inpatients</b>									
Dornelas et al. <sup>18</sup>	✓	✓	7	-		✓		70	40
Johnson et al. <sup>19</sup>	✓	✓	6	5-60				46	30.8
DeBusk et al. <sup>20</sup>	✓	✓	8	-	✓			70	53
Taylor et al. <sup>21</sup>	✓	✓	6	-			✓	61	32

\* 6 month smoking cessation rate

tion in this study consisted of counseling by a research assistant, self-help materials, a prompt on patients' charts encouraging doctors to advise the patient with respect to smoking cessation, and a 5-10 minute phone call at weeks 1, 2, and 3 post discharge.

Finally, the RCT by Stevens *et al.* found a smoking cessation rate of 13.5% at one year follow-up for the intervention group compared to 9.2% for the group receiving usual care.<sup>17</sup> In this study intervention consisted of a 20 minute counseling session by a master's degree level smoking cessation counselor, a 12 minute video and a variety of self-help materials (cinnamon sticks, chewing gum, etc.). After the members of this group were discharged from the hospital they received two 5 minute phone calls, one at one week post-hospital and one at two weeks. Follow-up mailings consisting of self-help materials and six issues of a bimonthly newsletter were also part of the intervention.

#### B) Inpatient Cessation Programs for Cardiovascular Patient Populations

Four major studies on cardiovascular inpatients are compared in Table 1.<sup>18-21</sup>

The Hartford Study by Dornelas *et al.* is the most recent randomized control trial that determined the effectiveness of smoking cessation counseling in patients post-MI.<sup>18</sup> The intervention group received twenty minutes of counseling from a psychologist while in hospital and brief telephone follow-up was carried out at 1,4,8,12,16,20, and 26 weeks after discharge. The control was a minimal care group whose treatment consisted of watching a video tape. Nicotine replacement therapy was offered to those in need of it in both groups. The 1-year smoking cessation rate in the maximal intervention group was 70% as compared to 40% for the minimal intervention group.

Another study, published in 1999 by Johnson *et al.* consisted of nurse-delivered smoking cessation counseling in patients with cardiac diagnoses.<sup>19</sup> It was a RCT with similar maximal and minimal intervention groups as the Hartford study. The intervention group had an abstinence rate of 46% as compared to 30.8% for the control group. Intervention consisted of two in-hospital interventions including a 19 minute video, questions on the video, and a question and answer period. The patients also were left with a brochure on the benefits of a smoke-free life. Following discharge the maximal intervention group received six phone calls from the same nurse who gave them counseling in the hospital, with one call each week for the first month and then one each month after that. The usual care group received no formal intervention apart from occasional advice to quit from the health care staff.

In a study conducted by DeBusk *et al.*, the 12 month smoking cessation rates were calculated as 70% for the maximum intervention group and 53% for the minimal intervention group.<sup>20</sup> The intervention consisted of a two minute counseling session with a physician, a nurse-delivered relapse prevention talk, an audio tape and various brochures. Post-discharge phone calls from nurses occurred at 48 hours, one week, and then monthly

for six months. The usual care group received the same short physician counseling session and had the option of joining an outpatient cessation program at a cost of \$50.

In 1990, a study was performed by Taylor *et al.* in which a nurse-managed smoking cessation program was offered to a randomized group of patients who were hospitalized for acute MI.<sup>21</sup> The program focused on relapse prevention in an attempt to combat the high rates of resumption of cigarette smoking seen in other studies. The smoking cessation rates after one year were 61% for the intervention group and 32% for the usual care group. While in hospital, the intervention group received nurse counseling and were given an 18 page manual about identifying and coping with high-risk relapse situations. The group took two audio tapes on relapse prevention and progressive relaxation home with them, and they received phone calls from a nurse once a week for the first 2-3 weeks after discharge and then monthly for the next four months. This group was also prescribed nicotine gum if they experienced strong withdrawal symptoms or urges. Patients in the intervention group who relapsed met with a nurse for counseling in an outpatient clinic and were told to concentrate on the unpleasant aspects of smoking by saving their cigarette butts in a water-filled jar; they also set a date to quit and signed an intention-to-quit contract. Patients in the usual care group were offered the standard stop-smoking classes in the hospital, of which less than 10% of the group attended. They were not offered nicotine gum.

#### Why is the Cardiovascular Population Different?

A quick glance at Table 1 clearly shows that the intervention groups had higher cessation rates compared to control groups. Furthermore, studies performed on cardiovascular patients showed higher cessation rates ranging from 46% to 70%. Indeed, even within the minimal care groups, the CVD inpatient population showed smoking cessation rates well above the 7.33% reported in the general population.<sup>14</sup> Clearly, an acute cardiovascular event is a strong motivating factor to quit smoking. What is it about CVD that motivates individuals to quite smoking? There are several possible explanations.

First, traumatic events, like a MI or cancer, have been shown to increase adherence to smoking cessation interventions.<sup>22</sup> In fact, Ockene *et al.* (1992) found an association between the severity of the health problem experienced and cessation rates in an inpatient cessation program.<sup>23</sup> The more severe the disease the greater the cessation rates, with patients having had an MI having the highest cessation rates. One explanation for these findings is that an acute coronary event can be considered a "developmental event" in Prochaska's stages of change. Consistent with Prochaska's theory, such a catastrophic event causes a person to move upwards in the stages of change model, allowing the patient to make life-saving changes.<sup>24</sup> Indeed, several studies have shown that moving upwards in the stages of change model is associated with a higher smoking cessation rate.<sup>7,9</sup> It is for this reason that counseling at this particular point in the lives of these patients may be highly effective.

Second, most people are familiar with the link between smok-

ing and heart disease. For many, the logical step after an MI is to quit smoking. This was demonstrated in a study by Sciamanna *et al.* which found smoking cessation rates to be independently associated with the belief that the current illness is caused by smoking.<sup>25</sup>

Third, these patients are in the CCU of a hospital where smoking is prohibited. This mandatory abstinence (usually a period of several days) may be the necessary 'jump-start' to a future of abstinence.<sup>19,26</sup> Teaching patients the skills to avoid relapse while they are nonsmokers in the hospital has been found to be an effective mode of smoking cessation intervention.<sup>21</sup> In a multivariable analysis, Rigotti *et al.* found smoking abstinence during hospitalization to be the strongest independent predictor of continued smoking cessation after discharge.<sup>27</sup> Hospitalized patients who managed to smoke while in hospital were five times more likely to not quit after discharge.<sup>27</sup>

Finally, hospitalization is a pivotal time when patients are more attune to the teachings of physicians. Post-MI, the medical team treating the patient has considerable authority and hence their advice is taken more seriously than it would otherwise be.<sup>19</sup> Johnson refers to periods of hospitalization as "teachable moments" in which patients are particularly amenable to smoking cessation interventions.<sup>19</sup>

### Conclusions

In 1992, 28% of Canadians over 18 years of age were smokers.<sup>5</sup> This has major health implications, especially in light of the fact that so many adverse health effects of smoking are well documented and studied in the literature. The question of smoking cessation is complex and has been a major issue for health care providers for years. Certainly, one plan of action will not fix this multifactor, dynamic problem overnight. However, after reviewing the current literature on smoking cessation programs in hospital inpatients, it seems that implementing these programs in hospitals may be a step in the right direction. Although there has not been a great amount of research into the effectiveness of these programs, the literature that does exist points to a need for intensive in-hospital smoking consultations with patients who have been hospitalized and especially for those hospitalized for cardiovascular diseases. Dramatic increases in the 12 month abstinence rates are seen as a result of these programs.

Efforts need to be made to encourage physicians to engage in smoking counseling on a regular basis with all of their patients, especially those hospitalized for acute coronary events. We have explored the fact that this subgroup of patients is especially amenable to smoking cessation consults while in-hospital. The studies presented here provide real objective data to support this. Although the smoking cessation rates were not as dramatic as in the cardiovascular population, formal smoking cessation programs did help the general inpatient population quit smoking. A cessation rate of 31% was achieved in the study by Taylor *et al.*<sup>21</sup> and a 27% cessation rate was achieved in the studies by Miller *et al.* and Simon *et al.*<sup>13,15</sup> These studies show that inpatient cessation programs do have an impact. It should be noted that even the groups

receiving the "usual care" in these studies had cessation rates of 9.2% to 22%, both of which are above the 7.33% cessation rate found in the general population.<sup>14</sup> Considering the fact that one of the most common reasons for wanting to quit smoking is being concerned about one's health, the higher cessation rates amongst hospitalized smokers is most likely due to the large increase in motivation to quit associated with a health crisis that requires hospitalization. Therefore, it is useful to implement smoking cessation programs for general inpatients who are smokers. However, it must be reiterated that the implementation of smoking cessation programs amongst the CV in-patient population produces a major impact on the quit rates of these patients. These programs have been proven to be cost effective and easy to implement.<sup>10,19</sup> Indeed, to not utilize such programs is to miss out on a "golden opportunity".

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