

**FACTORS ASSOCIATED WITH OUTCOMES OF QUIT ATTEMPTS
AMONG SMOKERS IN AN INDUSTRIAL WORKPLACE IN THE
VAAL AREA OF GAUTENG PROVINCE**

**Submitted in partial fulfillment of the requirements for the award
of the degree of Master of Family medicine, faculty of health
sciences, University of the Witwatersrand.**

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DECLARATION

I ANDEMBUTOP JOSIAH ANDEZAI declare that this research is my original work. It is being submitted for the degree of Master of Family Medicine (MMED), at the University of the Witwatersrand, Johannesburg.

Part or whole of this report has not been submitted for any other degree at the University of the Witwatersrand or any other University for any purpose. Neither do I intend to do so in the future. All the sources I have used or quoted have been appropriately acknowledged by means of complete referencing.

.....day of2016

DEDICATION

I wish to dedicate my work to my parents, Mr. and Mrs. JA Shamaki who both encouraged and supported me read medicine.

ACKNOWLEDGEMENTS

I wish to express my sincere gratitude to my family, friends, colleagues too numerous to mention who in one way or the other contributed to my success through the programme.

In particular I would like to express my gratitude especially to the following:

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Abstract

Background

The implementation of smoking regulations in South Africa has led to reductions in smoking prevalence in the general population. However, the industrial work place is a physically demanding and manual-labour-intensive work environment, and may promote continued smoking as part of coping mechanisms for workers. Outcomes of quit-attempts in the industrial setting may therefore be different from those obtainable in the general population. The current study determined the outcomes of quit-attempts among ever-smokers in a multi-national industrial steel company and compared successful quitters with those who continue to smoke, in order to determine factors significantly associated with successful quit-outcome.

Methods

In a cross sectional comparative study, a structured questionnaire developed de novo, was administered on 230 consecutively sampled ever-smokers. This questionnaire collected information on participants' socio-demography, smoking patterns, motivations and treatments used during quit-attempts and outcome of quit attempts. Data was analyzed using Epi-Info. Analysis included descriptive statistics, chi-square test, t-test, analysis of variance and logistic regression. Main outcome measures included: the proportions of participants who had ever made a quit-attempt, the proportions who have been successful (abstinent in the past 6 months) or not (continues smoking) in their quit-attempts, and the factors that are significantly associated with being successful.

Results

A total of 230 participants completed the questionnaire. Of these, most participants were: White (71.3%), men (82.2%), had grade 12 or more education (81.3%), married / co-habiting (70.9%), permanently employed (65.2%) and field-based or manual labourers (73.9%). Participants'

mean age was 37 years and they smoked an average of 19.8 cigarettes per day. All participants had made at least a quit-attempt of which only 52 (22.6%) reported being successful.

On group comparison, participants who reported being successful at quit attempts were significantly more likely to be older (43.5 Vs 35.8 years; $p = 0.00$), married ($p = 0.01$), permanently employed ($p = 0.02$), have had grade 12 education or more ($p=0.01$), smoke their first cigarette of the day after 30 minutes of being awake ($p = 0.00$) and made a quit-attempt for reasons other than concerns for their family and friends ($p = 0.00$).

On logistic regression, reporting receipt of social support from family or friends (OR = 9.0; CI: 2.0-40.0; $p = 0.01$), the use of varenicline (OR = 4.0; CI: 2.0-9.0; $p = 0.00$) were significantly associated with success at quit attempt. However, patch use was found to significantly reduce the odds of successful quit-attempts (OR=0.2; 95% CI: 0.1-0.7; $p=0.01$), contrary to the literature that nicotine patch use increases the chances of quitting even when used in isolation.

Conclusion

The vast majority of smokers in this industrial workplace make attempts to quit smoking. However less than a quarter reported being successful. The receipt of social support from families and friends, and the use of tobacco treatment aids such as varenicline and NRTs appear crucial in assisting smokers to successfully quit in this industrial setting.

DEFINITION OF TERMS

For the purposes of this study, key terms are defined as follows:

Tobacco smoking: Act of using tobacco in the form of inhaled combusted cigarette synonymous with (smoking)

Quitting smoking or smoking cessation: Giving up the act or habit of smoking cigarette

Treatment / cessation aid: Any substance or intervention used to assist smokers during the quit process.

Policies: A course or principle of action adopted³⁰

Legislation: the action of enacting laws³⁰

Shebeens: An unlicensed establishment or private house selling alcoholic drink

ACRONYMS

CPD- Cigarette per day

SADHS- South African Demography and Health Survey

CDC- Centre for Disease Control and Prevention

COPD- Chronic Obstructive Pulmonary Disease

CVD- Cardiovascular Disease

FTQ- Fagerstrom Tolerance Questionnaire

FTND- Fagerstrom Test for Nicotine Dependence

TDS- Tobacco Dependence Screener

HSI- Heaviness of Smoking Index

NRT- Nicotine Replacement Therapy

NHS- National Health Service

EU- European Union

EDL- Essential Drug List

US- United States

TB- Tuberculosis

IHD- Ischaemic Heart Disease

OR- Odds ratio

RR- Relative Risk

CI- Confidence Interval

SR- Slow Release

Ach- Acetylcholine

HCW- Health Care Worker

NIOH- National Institute for Occupational Health

SCC- Safety Critical Components

HREC- Human Research Ethics Committee

SANCA- South African National Council on Alcoholism and Drug Dependence

FEDHASA- Federated Hospitality Association of South Africa

VAT- Value Added Tax.

P- p value

TRIP- Turning Research Into Practice

WHO- World Health Organization

PHC- Primary Health Care

TA- Temporary Abstinence

CBI- Cognitive Behavioural Intervention

EDL- Essential Drug List

FDA- Food and Drug Administration

TABLE OF CONTENTS

Cover page.....	i
Declaration.....	ii
Dedication.....	iii
Acknowledgement.....	iv
Abstract.....	v-vi
Definition of terms and Acronyms.....	vii-viii
Table of Contents.....	ix-xiii

Chapter one

1.0 Introduction, rationale and motivation for the study.....	1-3
---	-----

Chapter two (Literature Review)

2.1 Introduction.....	4
2.2 Epidemiology of smoking.....	4-8
2.3 Smoking cessation.....	8-9
2.3.1 Factors associated with smoking cessation.....	9
2.3.1.1 Tobacco use pattern and nicotine dependence.....	9
2.3.1.2 Legislation and price increase.....	9-10
2.3.1.3 Socio-demographic characteristics.....	10-11
2.3.1.4 Previous quit-attempts.....	11
2.3.1.5 Level of personal motivation and reasons for making quit-attempts.....	11-12

2.3.1.6 Smoking cessation interventions.....	12
2.3.1.6.1 Non- Pharmacological treatments.....	12
2.3.1.6.1.1 Self-help.....	12
2.3.1.6.1.2 Cessation advice from a healthcare professional.....	12-13
2.3.1.6.1.3 Counseling.....	13
2.3.1.6.1.4 Hypnotherapy.....	13
2.3.1.6.1.5 Acupuncture.....	14
2.3.1.6.2 Pharmacological treatment.....	14
2.3.1.6.2.1 Nicotine replacement therapy.....	14-15
2.3.1.6.2.1.1 Nicotine gum.....	15
2.3.1.6.2.1.2 Nicotine patch.....	16
2.3.1.6.2.1.3 Nicotine spray.....	16
2.3.1.6.2.1.4 Nicotine inhaler.....	16
2.3.1.6.2.1.5 Nicotine lozenges.....	16-17
2.3.1.6.2.2 Non- Nicotine replacement therapy.....	17
2.3.1.6.2.2.1 Varenicline.....	17
2.3.1.6.2.2.2 Bupropion.....	17-18
2.3.1.6.2.2.3 Nortriptyline.....	18
2.4 Conclusion.....	18-19

Chapter three (Methodology)

3.0 Methods.....	20
3.1 Aims and objectives.....	20
3.2 Study design.....	20-21
3.3 Study setting.....	21
3.4 Study population.....	22

3.5 Sample size and sampling methods.....	22
3.5.1 Sample size.....	22
3.5.2 Sampling methods.....	22-23
3.5.3 Inclusion criteria.....	23
3.5.4 Exclusion criteria.....	23
3.6 Measuring tools and instruments.....	23-24
3.7 Data collection.....	24
3.8 Data analysis.....	24-25
3.9 Pilot study.....	25
3.10 Ethics.....	25-26

Chapter four (Results)

4.0 Introduction.....	27
4.1 Participants.....	27
4.2 Socio-demographic characteristics.....	27-28
4.3 Comparison of outcomes groups.....	28-32
4.4 Treatment aids.....	33-35
4.5 Varenicline.....	36
4.6 Other results of test of association between Socio-demographic variables and outcomes of Quit-attempts.....	36-37
4.7 Results of logistic regression model.....	37-38

Chapter five (Discussion)

5.0 Introduction.....	39
5.1 Socio-demographic characteristics.....	39-41

5.2 Smoking pattern.....	41-42
5.3 Outcomes of quit-attempts.....	42-43
5.4 Motivations for making quit-attempts.....	43-45
5.5 Treatments used during quit-attempts.....	45-47
5.6 Sources of bias and limitations of the study.....	47-48

Chapter six (Conclusion and Recommendations)

6.1 Conclusions.....	49
6.2 Recommendations.....	49-50

References.....	51-73
------------------------	--------------

LIST OF TABLES

Table 1: Demographic profiles of the participants.....	28
Table 2: Total participants that made quit attempt sub-divided into 2 groups.....	29
Table 3: Mean ages of the participants sub-divided into groups.....	29
Table 4: Types of cigarettes smoked by the participants sub-divided into groups....	30
Table 5: Cigarettes smoked per day by the participants sub-divided into groups.....	31
Table 6: Time to first cigarette with quitting sub-divided into groups.....	31-32
Table 7: Motivation to quit smoking by outcomes of quit attempts.....	32
Table 8: Non-pharmacological treatment aids used by the outcomes of quit attempts.....	33
Table 9: Proportion of the participants that used nicotine replacement drugs.....	34
Table 10: Different types of nicotine replacement drugs used by the participants	

sub-divided into groups.....	35
Table 11: Proportion of the participants sub-divided into groups that used	
varenicline.....	36
Table 12: Socio-demographic factors and outcome of quit attempts.....	
	37
Table 13: Final logistic regression model to determine variables which predict	
successful quit attempts.....	38
 List of Appendices	
Appendix 1: Questionnaires.....	74-80
Appendix 2: Invitation and information sheet for prospective participants.....	81
Appendix 3: Consent form.....	82
Appendix 4: Permission to conduct study letter at Arcelor Mittal Steel	
Company.....	83-84
Appendix 5: HREC approval certificate.....	85

CHAPTER ONE

1.0 INTRODUCTION

According to the World Health Organization (WHO) report of 2009, 5 million deaths are attributable to tobacco annually worldwide, a figure expected to grow to 8 million by 2030.¹ In South Africa, 8 to 9% of all deaths are attributable to tobacco use, ranking third among 17 risks for premature mortality.² The South African Social Attitude Survey report states that an estimated 33% and 9.5% of men and women respectively smoked cigarettes in the year 2007.³

Smoking prevalence in South Africa varies according to population group and gender.⁴ Rates are highest among coloured males and females, rates for black African females are much lower for black African males, and the white community has intermediate rates.^{5,6} Prevalence has decreased most rapidly among males, black Africans, coloureds, young people aged 16-24 years, and low income earners.^{7,8} Groups that experienced moderate or no decreases in smoking prevalence include women, whites, Indians and people aged 50 years and older.⁴

Between 1990 and 1999, per capita cigarette consumption in South Africa decreased by approximately 40%.^{9,10} The decrease was ascribed mainly to substantial increases in the real retail price of cigarettes, the passing of anti-smoking legislation, and greater public awareness of the health impact of smoking.¹¹ Compared with the rapid increases in cigarette consumption during the 1970s and 1980s, this decrease represents a significant trend change.⁷

Smoking causes many diseases, including lung cancer, other cancers, Chronic Obstructive Pulmonary Disease (COPD) and Cardiovascular diseases (CVD), with lung cancer having the strongest association and CVD accounting for the majority of tobacco-attributable deaths in developed countries.¹² Recent studies in developing countries such as China^{13,14}, India^{15,16} and South Africa^{2,17} suggest that the causes of tobacco-attributable mortality may differ in developing countries, with chronic respiratory diseases accounting for a larger proportion of

deaths than in developed countries, and tuberculosis accounting for a significant number of deaths.

The Vaal area is the southernmost part of Gauteng province and is one of the cosmopolitan province's industrial hubs. Situated in this area is Arcelor Mittal Steel Company, one of the biggest steel industries in the country.¹⁸ Although a major source of environmental and occupational pollution, this industry is also an important employer. A recent study conducted in Vaal area primary health care clinics established smoking prevalence amongst men and women at 37.7% and 7.5% respectively.¹⁹ Consequently, smokers in workplaces in this setting are at significant risk for diseases attributable to cigarette smoking.²⁰ Considering the environmental pollution already associated with the steel industry, the high prevalence of smoking makes the promotion of smoking cessation a priority health imperative, especially given that the complete cessation of tobacco use in all forms reduces the health risks associated with tobacco use.²¹ However, high physical demands placed by the steel industry on manual labour could play a role in perpetuating smoking, leading to both a reduced number of attempts to quit and lower success levels in quitting among smokers in this industry.

On the other hand, smoking restrictions associated with the implementation of a comprehensive tobacco control policy (implemented in South Africa since the 1990s) have been shown to reduce smoking prevalence in the general population^{15, 22} and may prompt more smokers to attempt quitting while increasing the level of success during such attempts. Consequently, it is necessary to weigh the effects of implementing smoking regulations against the need to continue smoking due to the stressful physical manual-labour demands of the steel industry. As a result, it was reasoned that the high physical demands of manual labour and the concurrent implementation of smoking regulations in this steel industrial workplace may result in fewer and less successful quit attempts than for the general

population. Regrettably, very little is known about the effects of these interactions in the context of the South African industrial workplace. Most smokers find it difficult to stop smoking due to the addictive nature of nicotine and the unpleasant experience of withdrawal symptoms during quit attempts.²³ Survey data showed that more than two-thirds of smokers reported wanting to quit, but only a small percentage actually do so.²³ The Centre for Disease Control and Prevention (CDC) has also reported that more than half of adult smokers have made at least one quit-attempt in the previous year, but the overall prevalence of recent smoking cessation was just 6.2%.²⁴ Personal characteristics and other factors associated with smokers influence their attempts to quit and eventually stop smoking.²⁵⁻²⁸ For example, some smokers cite high stress levels as perpetuating continuous smoking. Stress may also result in relapse among those who have attempted to stop smoking or succeeded in doing so.²⁹ Other factors such as smokers' demographics, concerns about the effects of smoking on one's health, and the availability of support groups as well as support from family and friends have also been cited as influencing smoking cessation in other settings. These factors need to be identified in the current research setting and used to maximize the chances of success among smokers attempting to quit. In addition, other factors associated with successful quit-attempts are also unknown in this workplace setting. The current study therefore aims to determine the outcomes of quit-attempts and the factors that are associated with successful outcomes among smokers in this industrial setting. It is hoped that the knowledge of these factors can be used to maximize the probability of smoking cessation among smokers in this and similar industrial contexts.

CHAPTER TWO

LITERATURE REVIEW

2.1 INTRODUCTION

The following literature review involves the recognition, retrieval and synthesis of relevant information in order to situate the current study within the body of current knowledge and provide context for the particular reader.³⁰

The literature in this chapter was searched for using Google Scholar, PubMed and PubMed Clinical Queries, Cochrane database, TRIP (Turning Research into Practice) and Up-to-date. Search words used included: “smoking,” “smoking cessation”, and “factors”. The yield of the initial search was enormous, with some articles dating back more than ten years. The search was then modified and limited to recent studies done within the past ten years, especially in South Africa. The chapter starts with a review of literature on the epidemiology of smoking and extends to cover tobacco use and nicotine dependence, factors associated with smoking cessation, effects of legislation and cessation treatments.

2.2 EPIDEMIOLOGY OF SMOKING

Reports have shown that the prevalence of smoking has not changed significantly since the mid-1990s.³¹ The number of smokers and cigarettes smoked worldwide has, however, increased from 721 million in 1980 to 967 million and 4.96 billion to 6.25 billion respectively in 2012; this increase has been attributed to population growth.³¹ The prevalence of smoking is five times higher among men than in women³²⁻³⁴ and about 20% of teenagers smoke cigarettes worldwide, according to a report in 2002.³⁵ Half of these teenagers who started smoking during their adolescent years are projected to continue smoking for about 15 to 20 more years.

Recent reports have shown that smoking rates for both men and women in developed countries have peaked and begun to decline.³⁶

Worldwide, it is estimated that 31% of men and 8% of women are smokers.³⁷ While the proportion of adult smokers has declined, population growth has led to an increase in the overall number of people smoking and number of cigarettes smoked since 1980.³⁷

Globally, over the past 30 years, smoking prevalence among men has declined by about 10%, although there is considerable variation worldwide.³⁸ The greatest reductions have been in high-income countries, but prevalence has also fallen in some low- to middle-income countries (LMICs). However, many LMICs have made only slight reductions or have experienced increased smoking prevalence. Most of these countries are in southern and central Asia, Eastern Europe and Africa.³⁸ China alone has one third of all male smokers worldwide.³⁸ Because Africa's population is rising faster than the rest of the world, Africa will see a much higher number of male smokers in the future unless additional tobacco control measures are implemented.³⁹ Smoking among women decreased in several African and Asian countries from 1980 to 2013; in many countries in these regions, female cigarette smoking remains uncommon.³ However, recent increases in female smoking prevalence have been reported in Cambodia, Malaysia and Bangladesh, and female smoking is predicted to double between 2005 and 2025.⁴⁰

Whilst the disparity between male and female smoking rates has been attributed to cultural traditions and gender inequalities, the low prevalence of smoking among women is exploited by the tobacco industry.³⁹ For example, cigarette packs resembling lipstick or perfume packs, ultra-thin cigarettes, colourful designs, free promotional offer packs and targeted marketing campaigns have all been used in an effort to attract women.^{41,42,43} Research shows that children in developing countries are also influenced by tobacco industry marketing.³⁹ A 2013 study showed that the majority of young children in low- and middle-income countries could correctly identify cigarette brand logos⁴⁴, and nearly a third of children in India reported that they want to smoke when they grow up.⁴⁵

In Africa, more girls and women are taking up the habit of smoking.⁴⁶ Smokers will increase in number for several reasons: (i) increase in population in the Third World, from 4.5 billion to 7.1 billion by 2025;^{47,48} (ii) increase in smoking prevalence, especially in the young, and especially in towns, initially amongst the better educated, and owing to intensive tobacco marketing and a slackening of the social taboo on smoking for women;⁴⁹ (iv) ignorance of the health risks, particularly among the rural and uneducated, but even among health professionals;⁵⁰ (v) lack of funding for control measures and the difficulty in implementing these, especially in rural areas; and (vi) above all, intensive and ruthless marketing by multinational tobacco companies.⁴⁹

However, a recent WHO report stated that while smoking rates in the developed world have decreased, more than 1 billion of the world's estimated 1.22 billion smokers reside in developing or transitional economies where burdens such as premature death associated with smoking are acutely felt.⁵¹ Another WHO report stated that out of the estimated 58.8 million mortalities that occurred in 2004 globally, tobacco-related deaths accounted for some 5.4 million and 4.9 million in 2007.⁵² Studies conducted in Western countries have found that smoking is more prevalent among populations with problems related to mental health, alcohol and drugs, crime, and homelessness.⁵³

Smoking in South Africa

Data from the Tobacco Atlas has shown that in 2013, 22.2% of men and 9% of women used tobacco daily in South Africa.⁵⁴ In 1992, it was found that a third of the adults (≥ 18 years) in South Africa were smokers (52% male, 17% female).⁵⁵ Only 10% of African women were smokers compared with 27% of white and 59% of coloured women.⁵⁵ Average annual consumption of manufactured cigarettes per adult (15 years and older) rose from 1340 in 1970–72 to 1720 in 1990–92.⁵⁶ Factors associated with smoking

included psychological distress,⁵⁷ lower socio-economic conditions, abuse and little formal education.^{58,59} Other factors also include male gender⁶⁰ and overweight females, who were more likely, however, to report that they started smoking for dietary reasons.⁶¹

In South Africa, smoking prevalence among adults decreased from 31.7% in 1993 to 24.1% in 2003.⁷ Even though the adult population grew by 24% between 1993 and 2003,⁸ the estimated number of smokers decreased sharply from 7.9 million to 7.4 million over that period.⁸ The decrease in the number of smokers was particularly pronounced in the period 2001 to 2003.⁸ Approximately 52% of South African males smoked in 1993, decreasing to about 39% in 2003.⁸ Smoking prevalence among females was only 13% in 1993 and decreased to 10% in 2003.⁸ Between 1993 and 2003, the “prevalence gap” between males and females decreased from about 39% to 29%.⁸ South African empirical evidence shows that smoking prevalence among young adults (aged 16-24) decreased from about 24% in 1993 to 17% in 2003.⁸ Smoking prevalence among whites is higher than among Indians and Africans, with a much higher average number of cigarettes than any other race group.⁸ The high smoking intensity of whites is not unexpected, given the fact that their average income is so much higher than any other race group.⁸ Smoking intensity is positively related to age, i.e. average cigarette consumption per smoker increases with age.⁸ Given that younger people generally have less disposable income than middle-aged and older people, young smokers are generally less dependent than older smokers.⁸

The highest smoking prevalence is found in the more affluent provinces and those with a relatively high proportion of coloured people: the Western Cape, Northern Cape and Gauteng. Provinces with the lowest smoking prevalence percentages are Limpopo, Eastern Cape and KwaZulu-Natal – poor provinces with a high proportion of African people.⁸

A recent report from a study conducted in a primary health care clinic (PHC) in the Vaal found that 37.7% of men and 7.5% of women are current smokers.⁶² Smoking prevalence can be decreased either through a reduction in smoking initiation or an increase in smoking cessation.⁶³ Available reports have shown a decline in tobacco use in South Africa from 1993 to 2003, with a fall in cigarette use from 1.8 billion to 1.2 billion within the same period.^{63,64} According to South African Advertising and Research Foundation surveys, daily adult smoking rates fell by a fifth from 30.2% in 1995 to 24.1% in 2004.⁶⁵

2.3 SMOKING CESSATION

Smoking imposes an enormous disease burden on smokers and the population at large. The need to decrease smoking prevalence has therefore become an important public health issue.⁶⁶ The workplace provides access to a large group of people in a confined space and can be used to facilitate participation during smoking cessation programmes.⁶⁶ Quitting smoking is hard and may require several attempts.^{67,68} People who stop smoking often start again because of withdrawal symptoms.^{67,68,69} Nicotine withdrawal symptoms may include stress, weight gain, feeling irritable, angry, or anxious, having trouble thinking, craving tobacco products and feeling hungrier than usual.^{67,69}

Only about 4% to 7% of people are able to quit smoking on any given attempt without medicines or other help.⁷⁰ Studies in medical journals have reported that about 25% of smokers who use medicines can stay smoke-free for over six months.⁷⁰ Counselling and other types of emotional support can boost success rates higher than medicines alone.⁷⁰ There is also early evidence that combining certain medicines may work better than using a single drug.⁷⁰

Smoking cessation research is a dynamic field where new guidelines have been suggested.⁷¹ For example, it is now known that smokers can use nicotine replacement therapies (NRT) while still smoking with a view to cutting down as a prelude to

quitting.^{72,73} It is also now known that NRT can be used beyond the recommended duration (usually between 8 to 12 weeks) for as long as the desire to quit is there and the individual is in need of help to quit.⁷⁴ It has also been noticed that NRT can be continued to promote recovery of abstinence even after smoking has lapsed.⁷⁵ It is also now clear that in highly dependent smokers, administering higher doses of NRT has shown positive effects and combining more than one form of NRT is even more effective.⁷⁶

2.3.1 FACTORS ASSOCIATED WITH SMOKING CESSATION

2.3.1.1 Tobacco use patterns and nicotine dependence

In a report from the National Cancer Institute that compared smokers' relative chances of success in quitting, success was more likely among those smoking fewer cigarettes, especially fewer than five cigarettes per day.⁷⁷ Another review that examined nicotine dependence using the Fagerstrom Test for Nicotine Dependence (FTND), the Tobacco Dependence Screener (TDS) and the Heaviness of Smoking Index (HSI) found that higher dependence was associated negatively with making a quit attempt.⁷⁷

2.3.1.2 Legislation and price increase

In South Africa, cigarette consumption declined after the government introduced the tobacco control programme in the 1990s. This Act provided for the control of smoking in enclosed public areas and prescribed the labelling of tobacco packages and advertisements with health warnings and nicotine and tar content. In addition to imposing higher excise taxes, it also prohibited the sale of tobacco products to children under the age of 16.⁷⁸ Smoking prevalence has declined from 34% in 1993 to 21.4% in 2003.^{78,79} This decrease has, however, been attributed to the high cost of factory-made cigarettes, effective anti-smoking legislation and especially increased public awareness of the dangers associated with continued smoking.^{80,81} Numerous economic studies in peer-reviewed journals have documented that cigarette tax or price increases reduce both adult

and underage smoking.^{82,83,84} In South Africa, at the beginning of 1994, the introduction of the Tobacco Products Control Act (Act 83 of 1993) mandated that health warnings must be printed on all tobacco product packaging.⁷⁸ Subsequent to the implementation of this Act and tax increases, the prevalence of smoking in the general South African population decreased from 32.6% in 1993 to 28.5% in 1998 amongst males and females respectively.⁸¹ The Act was however amended in 1999 to what has been considered as one of the most progressive tobacco control legislations worldwide, including amongst others a ban on tobacco advertising and smoking restrictions in enclosed and public places. These measures led to a decrease in smoking prevalence in the general population to 27.1% in 2000.⁷⁸

Smoke-free policies or rules seem to encourage smokers to give up or reduce their cigarette consumption.⁸⁵ Smokers employed at workplaces that enforce higher levels of smoking restrictions have been found to smoke fewer cigarettes during the periods they are at work; however, no difference in their smoking habits were noticed during days off from work. Workplaces with no such enforcement in place show no difference in smoking habits between workdays and non-workdays.⁸⁶

2.3.1.3 Socio-demographic characteristics

Available reports show that about 10% of cigarette smokers report successfully stopping.⁸⁷ A study conducted on demographic and physical variables associated with smoking found that women were less likely to attempt quitting smoking than men due to their different responses to nicotine as well as a lack of social support, fear of weight gain, depression and hormones.⁸⁸ Marital status, age and level of education were examined in four studies, with inconsistent results. While one study found that individuals with higher levels of education and older age were more likely to succeed in quitting, the others found reverse association or no association.⁸⁹ The relationship between income or social class

and smoking cessation has also been investigated, and with the exception of one study that found making a quit attempt to be most common among the least affluent smokers, none of the other studies found an association.⁸⁹

2.3.1.4 Previous quit-attempts

A past attempt at stopping smoking predicts another, as shown by the review of six studies which showed that those attempting to quit in the previous year were more than twice likely to make a subsequent attempt.⁹⁰ This review also showed that achieving a smoking cessation of six months or more was associated positively with making a cessation attempt in all these studies.

2.3.1.5 Level of personal motivation and reasons for making quit-attempt

Motivations for quitting smoking are diverse and include concerns about future and current health, physical appearance, cost of cigarettes and athletic performance.^{25,26} However, available data showed that smokers are more likely to be motivated to quit if they smoke fewer cigarettes, with any form of physician-diagnosed tobacco-related chronic diseases, and endorse health risk or quitting-related health benefits in their child.^{27,91} Other studies have found that motivation to quit, higher confidence in quitting and concerns about the effects of smoking on one's health are predictors of quit attempts.^{28,92,93}

Motivational interviewing or its variants are all widely used to help people that are highly motivated to stop smoking.⁹⁴ This behavioural change model tries to steer people towards choosing to abandon behaviors that are not beneficial and to encourage their self-belief in making healthier choices.⁹⁴ In this model, people move through a series of behavior stages from pre-contemplation to maintenance, progressing through the stages in short steps with the benefit of some advice.^{95,96} The majority of smokers are not in the action

stage, and it is estimated that 50%-60%, 30%-40% and 10%-15% are in the pre-contemplation, contemplation, and preparation stages respectively.⁹⁷

In achieving long-term maintenance, it is estimated that smokers make an average of three to four quit attempts over a period of 7 to 10 years.⁹⁵

2.3.1.6 Smoking cessation interventions

There is strong evidence that individual and group counseling and pharmacological agents are effective treatment aids in helping smokers to overcome nicotine addiction and increase their likelihood of achieving smoking cessation.²³

2.3.1.6.1 Non-pharmacological treatments

2.3.1.6.1.1 Self-help

Interventions in the form of books, brochures and manuals as well as electronic formats such as CDs and online programs have been reported to help smokers quit without assistance from healthcare practitioners. However, comparison with those who did not use these materials revealed relatively insignificant effects on cessation rates.⁹⁸

2.3.1.6.1.2 Cessation advice from a healthcare professional

Irrespective of their discipline, health care professionals play a vital role in advising and supporting smokers during smoking cessation attempts.⁹⁹ As such they should be readily accessible to offer smokers advice and treatment assistance at every opportunity.^{100,101}

A study that assessed brief cessation advice from a health care professional concluded that receiving advice from a doctor was a key factor in motivating smokers to engage in cessation attempts. It also found that those who received advice from their doctor were 30% more likely to quit smoking than those who did not.¹⁰² It is, however, important for health care professionals to take every opportunity available during the clinical encounter to identify smokers, document their smoking status, and offer treatment. This may include counseling and referral to more intensive support and pharmacotherapy.

Many smokers who want to try to quit unassisted should be encouraged to do so and told that support is available if necessary. Most people who have successfully stopped smoking have done so either by stopping abruptly or cutting down on their own.

More recent reports have indicated that more than 50% of all smokers making quit attempts are using some form of help, mainly medication.^{103,104} However, smokers who are more nicotine dependent are more likely to seek treatment during their quit attempts; as such, many smokers need continuous encouragement, assistance and guidance to quit successfully.¹⁰⁵

2.3.1.6.1.3 Counseling

There is clear evidence that both individual and group counselling are more effective than minimal support in increasing quit rates (RR: 1.39; 95% CI: 1.24–1.57 and RR: 1.98; 95% CI: 1.60–2.46 respectively).^{106,107} Individual counselling typically involves face-to-face meetings between a smoker and a counsellor trained in smoking cessation over a period of at least four weeks after the quit date and is normally combined with pharmacotherapy.¹⁰⁸ On the other hand, group behaviour therapy involves scheduled meetings (typically four to eight) where smokers receive information, advice and encouragement and some form of behavioural intervention.¹⁰⁸ Counselling should include practical advice consisting of problem solving, skills training, and social support as part of the treatment. Group techniques that focus on skills training and providing mutual support can be effective for those who find this method appropriate.¹⁰⁹

2.3.1.6.1.4 Hypnotherapy

This is a non-invasive method of smoking cessation therapy that aims either to weaken the urge to smoke or strengthen smokers' self-will in stopping.¹¹⁰ Despite this method being in use for some decades now, there are only a few high-quality studies to evaluate its effectiveness.^{110,111}

2.3.1.6.1.5 Acupuncture

This is an invasive procedure in which fine needles are inserted in the skin at specific points.³⁰ Acupuncture has been used during quit-attempts, especially for reducing withdrawal symptoms.¹¹² Acupressure, laser therapy and electrical stimulation are the different modalities of this therapy.¹¹² At present, there is no consistent evidence that acupuncture or any related therapy is better than doing nothing.¹¹² It has been suggested that well-designed trials of acupuncture, acupressure and laser stimulation are needed before these treatments can be recommended as effective in smoking cessation.¹¹³

2.3.1.6.2 PHARMACOLOGICAL TREATMENTS

Available reports have shown that pharmacotherapy plays an important role in smoking cessation especially in dependent smokers and as such should be made readily available for those contemplating quitting.^{114,115} It has also been shown that the best results are achieved when medication is used in combination with counselling and support, although there is some evidence that nicotine replacement therapy (NRT) can increase quit rates with or without counselling.^{90,116,117}

Pharmacological treatments such as NRT, sustained-release bupropion, and varenicline are effective in reducing the chances of relapse and relieving the unpleasant symptoms of withdrawal in smokers making a quit attempt.¹¹⁸ A study conducted in the UK on the evaluation of the National Health Service (NHS) Stop Smoking Service program showed that compared to those who used nothing, smokers who used cessation medication in addition to other forms of behavioural support programmes were four times more likely to stop smoking by the end of 52 weeks.¹¹⁹

2.3.1.6.2.1 Nicotine replacement therapy

Irrespective of the form used, combination of any two forms of NRT has been shown to be more effective than a single NRT.¹¹² For example, the nicotine patch provides a steady

background nicotine level, while the oral form gives relief for breakthrough cravings as needed. NRT use increases quit rates approximately 1.5 to 2 fold regardless of setting and its effectiveness appears largely independent of the intensity of additional support provided to the smoker.¹²⁰ The introduction of many preparations of nicotine (sublingual, lozenge, trans-dermal, nasal spray and inhaler) has increased the range of choice in how NRT is administered, but there has been no major improvement in effectiveness for smoking cessation.¹²¹ Studies that measured the effectiveness of smoking cessation methods among South Africans are almost non-existent; however, a low-cost community-based tobacco control programme designed to build cessation skills was found to reduce the smoking rate significantly.¹²¹

Health care professionals should therefore encourage willing smokers to use a combination of more than one NRT if they are unable to quit using only one NRT or when they are experiencing cravings.¹¹⁷

2.3.1.6.2.1.1 Nicotine gum

Studies on the effectiveness of nicotine gum have showed conflicting outcomes. While a review of randomized controlled trials (RCTs) of specialized cessation clinics concluded that patients using nicotine gum at six months had higher success rates than those using a placebo, another report that looked at studies of general medical practices showed that the six-month success rate of nicotine gum was no different than that of placebo.^{122,123} The report further stated that the higher cessation rates seen with nicotine gum in those specialized smoking cessation clinics may be attributed to more in-depth counseling, better adherence to treatment, trained counselors and participants who are more motivated to quit.¹²³

2.3.1.6.2.1.2 Nicotine patches

Nicotine patches have been shown to yield quit rates of 8 to 21% (versus 4 to 14% for placebo) at six months. Similarly they yielded a quit rate of 10 to 16% (versus 6 to 16% for placebo) at 12 months.¹²⁴ Nicotine patches are safe to use even among patients with coronary heart diseases, and the FDA has concluded that available studies show no evidence of any adverse effects associated with the use of nicotine patches.¹²⁵

2.3.1.6.2.1.3 Nicotine spray

A review of studies on the use of nicotine nasal spray showed a six-month success rate of 31% compared with 14% for placebo.¹²² This review recommended that patients should use one to two doses per waking hour for three to six months. Another report indicates that nicotine nasal spray seems to be the most addictive of the NRTs.¹²⁶ Physicians should consider initiating a four- to six week-tapering period if a patient presents with symptoms of withdrawal after abrupt discontinuation of treatment.¹²⁶

2.3.1.6.2.1.4 Nicotine inhaler

A recent review indicated that compared to 11% for placebo, nicotine inhaler use had a six-month success rate of 23%. However, the use of this inhaler has been associated with some adverse effects like throat irritation and cough.¹²² The recommendation from the review was therefore for the inhaler to be tapered over 6 to 12 months.¹²²

2.3.1.6.2.1.5 Nicotine lozenges

Nicotine lozenges and gum are both similar since they are administered orally; however, the lozenges deliver about 25% more nicotine than the gum.¹²⁷ Nicotine lozenges have been found to have a success rate of six weeks to six months compared to placebo.¹²⁸ This result was noticed to be similar for both the 2-mg and 4-mg doses.¹²⁹ Highly addicted individuals, especially those who smoke their first cigarette of the day within 30 minutes of awakening, are recommended to use the 4-mg dose; otherwise the 2-mg dose should be

used in general.¹²⁷ At least nine lozenges per day are recommended for the first six weeks.¹²⁷

2.3.1.6.2.2 Non-NRT medications

2.3.1.6.2.2.1 Varenicline

Varenicline is a nicotinic acetylcholine-receptor partial agonist; it was developed specifically for smoking cessation by targeting the nicotinic acetylcholine (ACh) receptor in the reward center in the brain.¹³⁰ Varenicline binds with high affinity at the $\alpha 4\beta 2$ nicotinic ACh receptor, where it acts as a partial agonist to alleviate symptoms of craving and withdrawal. At the same time, if a cigarette is smoked, the drug prevents inhaled nicotine from activating the $\alpha 4\beta 2$ receptor sufficiently to cause the pleasure and reward response. This mechanism may explain why quitting can occur later in a course of treatment with varenicline. From current available evidence, varenicline is the most effective form of single pharmacotherapy for smoking cessation, but this is based on a limited number of comparison studies.^{130,131} However, there have been concerns raised about the adverse neuropsychiatric effects and the risk of cardiovascular events associated with varenicline. A number of studies have shown that varenicline is more effective than bupropion.¹¹²

2.3.1.6.2.2.2 Bupropion

Bupropion SR is effective in both clinical practice settings and in hospital employees, with six-month success rates of 21 to 30% compared to 10 to 19% for placebo.^{132,133} Common adverse effects reported in the above reports were generally mild and consisted of insomnia and dry mouth. Less common side effects include headache, nausea, and anxiety. Bupropion is contraindicated for patients with a history of seizures, anorexia or bulimia, or head trauma, and in those who currently use bupropion or monoamine oxidase inhibitors. It should be avoided in patients with increased seizure risk (e.g. excessive use

of alcohol or sedatives, such as benzodiazepines, addiction to opiates, cocaine, or stimulants).¹³³

The effectiveness of bupropion appears to increase the effectiveness of nicotine patches, as this combination was found to be more effective than the patch alone but not significantly more effective than bupropion SR alone.^{122,134,135} A clinical trial has shown that bupropion is not as effective as varenicline. However, in cases where varenicline is not an option (such as in patient choice or as a result of side-effects), bupropion can be a substitute.¹³⁶

2.3.1.6.2.2.3 Nortriptyline

The tricyclic antidepressant nortriptyline has been shown to approximately double cessation rates compared to placebo.¹³⁷ A systematic review showed that the use of nortriptyline for smoking cessation resulted in higher prolonged abstinence rates after at least six months compared to placebo treatment.¹³⁷ The efficacy of nortriptyline does not appear to be affected by a past history of depression, but is limited in its application by its potential for side-effects which include dry mouth, constipation, nausea, sedation and headaches, and a risk of arrhythmia in patients with cardiovascular disease.¹³⁷

2.4 SUMMARY AND CONCLUSION

In conclusion, this literature review has found that cigarette smoking is a common significant health risk and that once dependent on nicotine, it is difficult for most smokers to quit, with most requiring multiple attempts to do so. To enhance the success of quit-attempts, several non-pharmacological and pharmacological interventions have been developed with varying success rates. Of these, it appears that varenicline is the most effective single treatment, but combinations of treatment interventions offer best outcomes.

This literature review has also identified factors that influence outcomes of quit attempts, albeit outside of the work place. These include smokers' demographic and physical factors, motivations and reasons for making a quit-attempt, severity of nicotine dependence, smoke-free policies /legislation, taxation and price increases, non-pharmacological and pharmacological treatments. However, literature is extremely sparse on whether these factors are also associated with increased success during quit-attempts within manual-labour-intensive industrial settings, where the physical demands of work may perpetuate smoking as a coping mechanism. The current study aims to identify the factors associated with outcomes of quit-attempts among smokers in a manual-labour-intensive workplace.

CHAPTER THREE

METHODS

3.1 Aims and Objectives

3.1.1 Aim:

To determine factors associated with outcomes of quit-attempts among smokers in the Arcelor Mittal Steel Company, located in the Vaal area of Gauteng province.

3.1.2 Objectives:

- a) To describe the demographic and smoking profiles of the study participants.
- b) To determine the proportion of ever-smokers who have ever made a quit-attempt and the outcomes of their quit-attempts (successful/ not successful).
- c) To determine what motivated these smokers to engage in a quit-attempt.
- d) To identify treatments used during the quit-attempts.
- e) To determine significant associations between participants' socio-demographic characteristics, smoking patterns, motivations to quit, treatment options used for cessation and the successful outcome of quit-attempts.

3.2 Study Design

This study was a cross-sectional study with an analytic component that compared successful and unsuccessful quitters among ever-smokers in an industrial, manual-labour intensive, steel company. This design was deemed appropriate since it is a type of observational study that

involves the analysis of data collected from a population, or a representative subset, at one specific point in time.¹³⁸

3.3 Study setting

The study was conducted in Arcelor Mittal, a big multi-national steel company in the Vaal area of Gauteng Province. This company has two sites: Vanderbijlpark, with approximately 6,500 permanent and 10,000 temporary staff, and Three Rivers (Vereeniging works), with approximately 600 permanent and 1000 temporary staff.

The Vereeniging site is South Africa's major supplier of specialty steel products, seamless tube and forged products. Its strategic priorities are focused on retaining and expanding its share of the Southern African market whilst supplying high quality, value-added steels to select international markets.¹³⁹ It supplies input material for the manufacture of safety critical components (SCC's) for the automotive industry, seamless tubes for the petrochemical, oil and gas industries and wire rods for fencing and hoisting rope used in deep-shaft mining.¹³⁹ This company generates industrial dust, exposure to which may aggravate the adverse health effects of smoking.

At Arcelor Mittal, wellness programs conducted are often not directed at smoking cessation and as such focus mainly on healthy living (diet) and obesity. However, the company recently conducted a wellness program that motivated approximately 300 employees to quit the habit of smoking.¹⁸ The program was managed in conjunction with the South African National Council on Alcoholism and Drug Dependence (SANCA) in the Vaal Triangle. Smokers were supported with group and individual sessions, medical assistance and coaching to maintain and manage good health.¹⁸

3.4 Study population

The study populations consisted of staff members of the Three Rivers site that have ever-smoked for a period of at least one year.

3.5 Sample size and sampling methods

3.5.1 Sample size

According to SADHS (2003), the proportion of ever-smokers in South Africa is about 24.6%.¹⁴⁰ Using the above data, the estimated population of ever-smokers among the 1,600 staff in the Vereeniging is estimated at about 394. Based on this target population, the sample size was calculated using the Raosoft sample calculator¹⁴¹ as 195 (assuming a 5% margin of error, 95% confidence interval and a response distribution of 50%). This was increased by 10% to cater for possible missing and incomplete data during data collection. The final sample size was therefore rounded up to 215.

3.5.2 Sampling method

Consecutive sampling was used to select consenting staff that have ever-smoked at least one cigarette per day for at least one year, using the following procedure:

A list of all employees, their section / department and contact telephone numbers was obtained from the personnel department. The participants were contacted by phone and appointments made on site at the clinic, when they came for their compulsory, periodic medical check. Participants were then informed about the proposed study using the participants' information sheet, and consent to participate in the study was obtained (see attached appendix). Employees that declined to participate in the study were left out of the study. Consecutive consenting, ever-smokers were recruited into the study until the sample size was attained.

Inclusion criteria

- Staff of Three Rivers site.
- Have ever-smoked at least one cigarette / day for as long as one year.

Exclusion criteria

- Staff of other sites other than the Three Rivers factory.
- Refusal to consent to the study.

3.5 Measuring tools and instrument

A structured closed-ended questionnaire was used. The questionnaire was written in English and developed based on the literature review, with input from a world-renowned tobacco expert (Dr Yussuf Salojee, the Director: National Action against smoking)¹⁴² based on a study on smoking at St Bartholomew's hospital, UK.

The questionnaire was divided into five sections: A, B, C, D and E.

- Section A screened for smoking and assisted in including or excluding staff from the study. Participants who had ever smoked and met the inclusion criteria completed sections B, C, D and E. Section B collected demographic information from participants.
- Section C and D collected information on participants' current smoking patterns and their efforts at quitting.
- Section E collected information from ex-smokers on their past smoking patterns, their motivation for quitting and the cessation aids used.

The questionnaire was self-administered, but the researcher gave assistance and clarity when needed.

3.6 Data collection

After obtaining consent at the time of appointment, the closed-ended questionnaire was handed out to each of the participants for completion in a quiet place within the clinic. Participants that were unable to read were assisted by the researcher. Information collected is as described in section 3.5 above. It took roughly 10-15 minutes to complete the questionnaire.

The appointment for completion of questionnaire was done every working day (during periodic medical examinations at the clinic) until the sample size was achieved over the next three weeks. All completed questionnaires were stored in a safe place (accessible only to the researcher) for data capturing and analysis.

3.7 Data analysis

Data collected on the questionnaires were entered into Epi-info software (version 3.5.3 January 2011) for analysis by the researcher with help from a bio-statistician. Descriptive statistics were done to describe participants' socio-demographic and smoking characteristics. Categorical variables such as race and types of cigarette were presented as percentages and proportions. Numerical variables such as number of cigarettes smoked per day were presented as means with their standard deviations. The proportion of participants who have ever smoked and made any quit-attempt was determined. The frequencies of motivations for making a quit attempt, the treatment aid(s) used for cessation and the outcomes of quit attempts (successful / not successful) were also determined. Participants who had successfully quit (not smoking any cigarette for the last six months or longer) were compared with those who were unsuccessful (still smoking or smoked in the last six months despite

making quit attempt(s)) with respect to selected variables such as socio-demographic factors, smoking patterns and motivations for wanting to quit using Pearson Chi square and t-tests as applicable. Logistic regression models were created to determine factors which were independently associated with outcomes of quit attempts (successful/ not successful). Statistically significant association was deemed to exist when $p < 0.05$.

3.9 Pilot study:

A pilot study was conducted at the Vanderbijlpark site to help test if the questions were well understood by the participants using 20 staff members. The result of the pilot study was not included in the current study.

3.10 Ethics

Ethics approval was obtained from the Human Research Ethics Committee (HREC) of the University of the Witwatersrand. Permission was also obtained from Arcelor Mittal Steel Company to allow the study to be conducted in its facility. Written informed consent was obtained from each participant after the nature, procedure, and potential benefits of the study were explained to them.

Participants who were current smokers were offered brief counselling and referred to the quit line for further assistance. Participants were also assured that participation in the research was voluntary and that they could withdraw at any time without prejudice. Confidentiality was ensured at all times by allowing the research team access to the interview materials only during the period of data collection; questionnaires were coded to avoid using participants' personal identifying features. The participants were interviewed in a private environment within the clinic without being seen or heard by others.

CHAPTER FOUR

RESULTS

4.1 Introduction

This chapter presents the findings of the study, starting with the participants' socio-demographic and smoking patterns. Motivation for making quit attempts and the outcomes of quit attempts are later presented. Lastly, results of comparison between successful and unsuccessful quitters and those of the logistic regression analysis are presented.

4.2 Participants

A total of 230 participants were recruited and interviewed in this study.

4.3 Socio-demographic characteristics

The demographic characteristics of the participants are shown in Table 1 and show that the majority of participants are males (82.2%, white 71.3% and permanently employed 65.2%).

Table 1: Demographic profiles of the participants

Variables	Frequency	Percentages (%)	Mean (SD)
<i>Age (years)</i>			37 years (8.4)
<i>Sex distribution</i>			
Female	41	17.8%	
Male	189	82.2%	
<i>Educational level</i>			
None	2	0.9%	
< Grade 12	41	17.8%	
Grade 12	116	50.4%	
Tertiary	71	30.9%	
<i>Marital Status</i>			
Co-habiting/Married	163	70.9%	
Divorced/Separated	23	10.0%	
Single	40	17.4%	
Widow	4	1.7%	
<i>Race</i>			
African	52	22.6%	
Colored	4	1.7%	
Indian	10	4.3%	
White	164	71.3%	
<i>Nature of appointment</i>			
Permanent	150	65.2%	
Temporary	80	34.8%	
<i>Occupation</i>			
Field based (e.g. engineers)	113	49.1%	
Unskilled artisans	57	24.8%	
Office based	60	26.1%	

4.4 Comparison of outcome groups (successful/unsuccessful), participants' age, smoking, motivation and treatment characteristics.

4.4.1: Outcomes of quit-attempts

Total participants sampled were 230, all of whom (100%) had made at least one previous quit attempt. Of these, only 52 succeeded in quitting while 178 were unsuccessful (i.e. continued to smoke in the last six months), as shown in Table 2 below.

Table 2: Showing the total participants that made quit-attempts sub-divided into two groups

Quit attempt		
Outcome of quit attempt	N	%
Successful	52	22.6
Unsuccessful	178	77.4
Total	230	100

4.4.2: Comparison of participants' age by outcomes of quit-attempts

Table 3 shows that those who were successful at making quit-attempts were significantly older than those unsuccessful as seen by the statistically significant p-value.

Table 3: Showing mean ages of the participants sub-divided into groups (* statistically significant variable).

<u>Outcomes Quit attempts</u>			
	<u>Successful (n=52)</u>	<u>Unsuccessful (n=178)</u>	<u>P value</u>
<u>Mean age (Years)</u>	<u>43.5</u>	<u>35.8</u>	<u>0.00*</u>

4.4.3: Smoking pattern and outcomes of quit-attempts

The average number of cigarettes smoked per day by the participants was 19.8 cigarettes. There was no significant difference in the number of cigarettes smoked per day between the successful and the unsuccessful groups ($p=0.83$).

4.4.3.1 Types of cigarette and outcomes of quit-attempts

Table 4 shows the cigarette types smoked by the participants. The majority of the participants smoked filter-type cigarettes.

Table 4: Showing type of cigarette smoked by the participants sub-divided into groups.

Cigarette type	Unsuccessful (178)	Successful (52)	P value
	n (%)	n (%)	
Filter	140 (78.2)	41 (78.8)	0.25
Menthol	27 (15.2)	11 (21.6)	
Non-filter	1 (0.6)	0.0 (0.0)	
Non-menthol	10 (5.6)	0.0 (0.0)	
Total	178	52	

4.4.3.2: Number of cigarettes smoked per day by outcomes of quit-attempts

Cigarettes smoked per day by the participants showed that the majority of the successful group smoked between 11 to 20 cigarettes per day while the unsuccessful group smoked between 21 to 30 cigarettes per day.

Table 5: Showing cigarettes smoked per day by the participants sub-divided into groups.

Number of cigarettes smoked per day	Successful (52) n (%)	Unsuccessful n (%)	P-value
1-10	4 (7.7)	27 (15.2)	0.83
11-20	35 (67.4)	40 (22.5)	
21-30	13 (25.0)	104 (58.4)	
31-40	0 (0.0)	7 (3.9)	
>40	0 (0.0)	0 (0.0)	
Total	52	178	

4.4.3.3: Time to first cigarette by outcomes of quit-attempts

Table 6 shows how soon the participants took their first cigarette of the day by outcomes of quit-attempts. Significantly larger proportions of unsuccessful participants took their first cigarette of the day sooner after waking up than the successful participants.

Table 6: showing time to first cigarette with quitting sub-divided into groups.

Time to first cigarette (mins)	Quit		Total	P value
	Successful n (%)	Unsuccessful n (%)		
< 10 mins	4 (9.3%)	39 (90.7%)	43	0.00*
11-30 mins	16 (18.6%)	70 (81.4%)	86	

31-60 mins	30 (35.7%)	54 (64.3%)	84	
>60 mins	1 (6.3%)	15 (93.8%)	16	
Total	52	178	230	

4.4.3.4: Motivation to quit smoking by outcomes of quit-attempts

Table 7 shows that successful participants were significantly more likely not to have been motivated by concerns for health of relatives or family members. There were no other significant differences between participants who successfully quit and those who did not in terms of motivation.

Table 7: Showing motivation to quit smoking by outcomes of quit attempts

Motivation	Successful n (52)		Unsuccessful n (165)		P value
	Yes n (%)	No n (%)	Yes n (%)	No n (%)	
Advice from HCW	43 (82.7)	9 (17.3)	88 (53.3)	77 (46.7)	0.65
Bad example for children	48 (92.3)	4 (7.7)	85 (51.5)	80 (48.5)	0.10
Concern for personal health	48 (92.3)	4 (7.7)	102 (61.8)	63 (38.2)	0.16
Concern for health of relative/ Family	3 (5.7)	49 (94.2)	35 (21.2)	130 (78.8)	0.00*
Cost or affordability	19 (36.5)	33 (63.5)	53 (32.1)	112 (67.9)	0.98
Negative Attitudes from Family/Friends	7 (13.5)	45 (86.5)	11 (6.7)	154 (93.3)	0.08
Personal Desire to Quit	50 (96.2)	2 (3.8)	114 (69.1)	51 (30.9)	0.90
Smoke Free Policies-Home	3 (5.7)	49 (94.3)	11 (6.7)	144 (93.3)	0.80
Smoke Free Policies-Work	24 (46.2)	28 (53.8)	48 (29.1)	117 (70.9)	0.16
Total	52		165		

4.5 Treatment aid(s) used by outcomes of quit-attempt.

4.5.1 Non-pharmacological treatments

Table 8: Showing non-pharmacological treatment aids used by the outcomes of quit attempt

The successful participants were significantly more likely not to have been part of a support group. In addition, they were significantly more likely to have received support from family and friends.

Non-Pharmacological treatments		Successful (n=52)	Unsuccessful (n=165)	P-value	Odds ratio (95% CI-)
Counseling (Doctors/Psychologists /Social/workers)	Individual counseling Yes n (%)	16 (30.8)	37 (30.6)	0.12	0.4 (CI: 0.1- 1.3)
	No n (%)	36 (69.2)	84 (69.4)		
Self help	Yes n (%)	46 (88.5)	111 (91.7)	0.50	0.7 (CI: 0.2- 2.0)
	No n (%)	6 (11.5)	10 (8.3)		
Support group	Yes n (%)	7 (13.5)	32 (26.4)	0.06	0.2 (CI: 0.2- 2.0)
	No n (%)	45 (86.5)	89 (73.6)		
Support from family/ friends	Yes n (%)	50 (96.2)	90 (74.4)	0.01 (Fisher Exact Test)	9.0 (CI: 2.0- 40.0)
	No n (%)	2 (3.8)	31 (25.6)		

4.5.2 Pharmacological treatments: Most of the participants reported that they have used NRTs and varenicline for their quit attempts. None of the participants reported using bupropion, clonidine, nortriptyline or acupuncture.

4.5.2.1 Nicotine Replacement Drugs:

Table 9 shows NRT use among participants by outcomes of quit attempts. Overall, use of NRT was not significantly different between those who were successful and those who were not.

Table 9: Showing the proportion of the participants that used nicotine replacement drugs.

Nicotine Replacement Drugs	Successful (52)	Unsuccessful (121)	Odds ratio (95% CI-)	P- value
Yes n (%)	32 (61.5%)	65 (53.7%)	1.4 (CI: 0.7-2.7)	0.34
No n (%)	20 (38.5%)	56 (46.3%)		

4.5.2.2: Types of nicotine replacement drugs by outcomes of quit-attempts

Table 10 shows types of nicotine replacement drugs used by participants. It shows that compared to unsuccessful participants, successful participants were significantly more likely to have used lozenges. Successful participants were, however, less likely to have used nicotine patches during their quit attempts.

Table 10: Showing the different types of nicotine replacement drugs used by the participants sub-divided into groups.

Types of nicotine replacement drugs		Successful (52)	Unsuccessful (121)	P-value	Odds ratio (95% CI-)
Gum	Yes n (%)	28 (53.8%)	55 (45.5%)	0.31	1.4 (CI: 0.7-2.7)
	No n (%)	24 (46.2%)	66 (54.5%)		
Lozenges	Yes n (%)	2 (3.8%)	0 (0.0%)	0.08 (Fisher Exact Test)	Undefined
	No n (%)	50 (96.2%)	121 (100%)		
Nasal spray	Yes n (%)	1 (1.9%)	0 (0.0%)	0.30 (Fisher Exact Test)	Undefined
	No (%)	51 (98.1%)	121 (100%)		
Patch	Yes n (%)	3 (5.8%)	27 (22.3%)	0.01 (Fisher Exact Test)	0.2 (CI: 0.1-0.7)
	No n (%)	49 (94.2%)	94 (77.7%)		

4.6 Varenicline

4.6.1: The use of varenicline by outcome of quit-attempts

Table 11 showed that those who used varenicline were significantly more likely to be successful than those who did not.

Table 11: Showing the proportion of the participants sub-divided into groups that used varenicline.

Varenicline	Successful (52) n (%)	Unsuccessful n (%)	Odds ratio (95% CI-)	P-value
Yes	24 (46.2)	26 (21.5)	3.1 (CI: 1.6-6.2)	0.00*
No	28 (53.8)	95 (78.5)		
Total	52	121		

4.7 Other results of tests of association between socio-demographic variables and outcomes of quit-attempts

This table shows that age (older age > 35 years), nature of appointment (permanently employed), marital status (married or co-habiting), and educational level (at least grade 12 educational level) were significantly associated with outcome of quit-attempts.

Table 12: Showing socio-demographic factors and outcome of quit-attempts.

Variable	p-value
Sex and outcome of quit-attempt	0.26
Age and outcome of quit-attempt	0.00*

Race and outcome of quit-attempt	0.58
Occupation and outcome of quit-attempt	0.87
Nature of appointment and outcome of quit-attempt	0.02*
Marital status and outcome of quit-attempt	0.01*
Educational level and outcome of quit-attempt	0.01*
Use of recreational drugs and outcome of quit-attempt	0.80

4.8 Results of logistic regression model

Table 13 shows the result of the logistic regression model of the relationship between smoking cessation interventions and successful quit outcomes. This model shows that participants with support from family and friends were eight times more likely to be successful than those without. Also, varenicline users were four times more likely to have a successful quit-attempt outcome. Lastly, nicotine patch use negatively predicted a successful quit-attempt.

Table 13: Final logistic regression model to determine variables which predict successful quit-attempts (*statistically significant variable).

Cessation treatment	Odds ratio (95% CI-)	p-value
Patch	0.2 (CI: 0.1-0.7)	0.01
No patch	1	
Support from family and friends	9.0 (CI: 2.0-40.0)	0.01*
No support from family and friends	1	

Varenicline	4.0 (CI: 2.0-9.0)	0.00*
No varenicline	1	

CHAPTER FIVE

DISCUSSIONS

5.0 Introduction:

This chapter discusses the findings of this study, relating them to the literature and highlighting the implications for health care, policy formation and research.

5.1 Socio-demographic characteristics

A total of 230 people participated in this study. The dominance of males in the workplace under consideration may reflect the nature of the work conducted in this industry consistent with studies conducted elsewhere in the world that show male dominance in the heavy-duty, manual-labour-intensive industries.¹⁴³

Being of older age was significantly associated with successful quit-attempts in this study. The average age of the participants who successfully quit was 44 years compared to 36 years for the unsuccessful ones. Older age has been associated with smoking cessation in South Africa,¹⁴⁴ as people of older age are more likely to appreciate the dangers associated with smoking than younger ones. This aligns with findings from similar studies conducted in Korea and South Africa, which found that those who attempted to quit were significantly more likely to be 55 years or older.^{144,145} In addition, they possibly would have made more previous quit-attempts given that they have been smoking longer, a factor that has been found to favour success in quittings.¹⁴⁶

This study showed that being permanently employed was a significant predictor of making smoking cessation attempts. This is probably because compared to temporary staff, permanent staff are more likely to enjoy better and stable benefits, including good private

medical care, and could better afford to buy smoking cessation medications such as NRTs and varenicline. This aligns with a previous study that found that smokers with low socio-economic status need more targeted efforts in order to succeed in quitting smoking compared to those in higher socio-economic strata.¹⁴⁷

Despite the manual-labour-intensive nature of the steel industry, and the fact that 49.1% of participants were field-based and 24.8% manual labourers, there was no significant difference in outcomes of quit-attempts between field-based workers, manual labourers and office-based workers. On the contrary, literature has suggested that stress perpetuates smoking and smokers do continue to smoke to relieve their stress.¹⁴⁸ Further studies are needed on workers' perceptions of stress levels, and research on coping strategies of workers in this industry is needed to shed more light into this relationship.

In this study, the existence of a smoke-free policy at work was not a significant factor for successful quit-attempts. This could be due to the fact that smoking regulations are not strictly enforced in this industry and smoking areas are also provided for smokers to make use thereof. That said, American study has found that quit-attempts are more likely among workers within a work environment hostile to smoking.^{149,150} Since workers spent considerable time at work, smoke-free policies must be enforced in order to help smokers abstain from smoking at work and also create a smoke-free environment where second- and third-hand smoking is avoided.

Being married or in a stable relationship was significantly associated with successful quit-attempts ($p=0.01$). This is consistent with the literature in that individuals in stable relationships receive support from their partners and friends when making quit-attempts, while spouses strongly influence their partners' successful quit-attempts.¹⁵¹⁻¹⁵³ In addition, smokers with greater positive partner support to quit smoking are more ready to do so, as

found in a study which examines readiness to quit smoking in rural communities.¹⁵⁴ Partners of smokers should therefore be treated as a support system during the quit-attempt process.

5.2 Smoking pattern:

This study revealed that most (78%) of participants smoked a filter type of cigarette. However, the successful group smoked on average fewer cigarettes than the unsuccessful one (11 to 20 vs 21 to 30 cigarettes per day). The unsuccessful participants may be regarded as heavy or hard-core smokers and are more nicotine dependent than those who smoke less.¹⁵⁵⁻
¹⁵⁸ Higher nicotine dependence is associated with background craving and more severe withdrawal symptoms – phenomena that explain why participants who smoke more tend to report unsuccessful quit-attempts.¹⁵⁹ Understanding the phenomenon of heavy smoking among smokers and the factors related to it is of public health importance as cigarette smokers tend to have chronic diseases earlier, more often and in larger numbers than their non-smoking peers.^{155,160}

In this study, a much greater proportion of unsuccessful smokers smoked their first cigarette sooner in the day than those who were successful in their quit-attempts (91% vs 9% and 81% vs 19%) – within 10 and 30 minutes of waking up respectively. Smoking characteristics such as levels of nicotine dependence, amount smoked daily and time to first cigarette of the day strongly correlate with the odds of smoking cessation.¹⁶¹ This finding confirms what has been established in the literature: that the sooner the time to first cigarette after waking up, the more nicotine dependent the smoker is,¹⁵⁷ and the slimmer the chances of successful quit-attempts.¹⁶¹ Smokers with high nicotine dependence will not readily engage in a quit-attempt and have difficulty quitting without the aid of medication such as varenicline.¹⁰⁶ Policies should be put in place to make such medication available at public health care facilities;

clinicians should target more dependent smokers to offer smoking cessation advice, including referral to quit lines for those willing to quit.

There was no significant association between the use of recreational drugs and quit-attempt outcomes in this study. It should, however, be noted that the context of the current study was not a recreational substance-abuse program; as such, the influence of alcohol on quit-attempts was not studied. However, a study that examined predictors of tobacco quit-attempts among recovering alcoholics found that participants with high or very high nicotine dependence scores were significantly less likely than those with moderate or low scores to attempt smoking cessation.¹⁶² Notwithstanding the finding in this study, consulting clinicians should endeavour to screen for recreational drug use and advice against it.

In the current study, most participants smoked a filter type cigarette; the quit outcomes were not significantly associated with types of cigarette smoked. Nonetheless, some studies have found the type of cigarette smoked to be determinant of quit outcomes as exemplified by a randomized controlled trial that compared smoking cessation rates among menthol and non-menthol cigarette smokers which found a lower probability of cessation among menthol cigarette smokers.¹⁶³ However, this finding is not consistent in literature, as several other studies have also found no significant differences between quit-outcomes among menthol and non-menthol cigarette smokers.¹⁶⁴

5.3 Outcomes of quit-attempts

Most smokers make multiple attempts, such that half (50%) eventually quit smoking.⁸⁷ In this study, all participants had made at least one quit-attempt in the past, confirming previous reports that the vast majority of smokers wish to quit smoking and therefore attempt to quit.¹⁹ However, this contrasts with a previous report from South Africa that indicated that only 24% of smokers make quit-attempts.⁸⁷ Although there is no clear explanation, the implementation

of smoking regulation within the company and regular workers' medical evaluation may make smokers more aware of their health status and the dangers of continuing to smoke, so motivating them to try quit. The lower success rate in the current study is explained by the fact that 22.6% is a point-in-time estimate: given more opportunities for quit-attempts in future, the lifetime success rate in this young population of smokers may also cumulatively approximate to the 50% quoted above. While 22.6% is a low success rate, evidence exists that providing treatment support to motivated quit-attempters can improve their chances of success.¹⁶⁵ Health care providers should therefore seize every contact as an opportunity for screening, motivating and providing treatment support, especially to motivated smokers who are contemplating quitting.

5.4 Motivations for making quit-attempts

This study showed that successful quit-attempters were more significantly not likely to report being motivated by "concerns for the health of relative or family". This contrasts with study findings that decreasing children's health symptoms and limiting second-hand smoke exposure were motivations for parents to attempt quitting.^{166,167} It is therefore important to educate smokers about the family health dangers of smoking in the form of second- or third-hand smoking, with a view to motivating them to engage in the process of smoking cessation.

Advice from health care providers is known to improve smoking quit rates.¹⁶⁸ However, in this study, advice from a health care worker was not significantly associated with successful quit-attempts. This could be due to the fact that health care providers in South Africa do not consistently offer cessation advice during clinical encounters.¹⁶⁹ In a previous South African study conducted in a tuberculosis clinic in Tshwane, brief motivational interviews by lay counselors approximately doubled sustained smoking abstinence for at least six months compared with brief advice alone.¹⁷⁰ This suggests that advice from health care providers

should not only provide information but also aim to motivate smokers to change their behaviour. Health care workers at all levels of care should therefore be trained to consistently offer brief motivational advice during clinical encounters and refer willing smokers to smoking quit-lines for assistance. While personal desire to quit was not significantly associated with successful quit-attempts in this study, higher baseline intention to quit and perceived self-efficacy have been found to be the main factors predicting quit-attempt success.¹⁷¹ Thus, in order to improve the chances of successful outcomes, it is not enough for smokers contemplating cessation to depend on their own self-determination: they have to be motivated for behavioural change.

In this study, personal health concerns were not significant motivation for quit-attempts. However, educating smokers irrespective of smoking level about the increased risk of developing smoking-related diseases has been shown to be a helpful strategy to reinforce the intention to quit smoking.¹⁷² Health-related cues should be used to stimulate discussion on smoking cessation during consultations with smokers, especially those willing to quit.

Setting a bad example for children and implementing smoke-free policies at home did not show any significant association with quitting smoking in this study. This is possibly because domestic smoking bans are not effective in the South African home context. Nonetheless, the presence of young children and nonsmokers has been shown to significantly predict full smoking restriction in the home.¹⁷³ In addition, parents who endorse health risk or quitting-related health benefits in their child are more likely to have high motivation to quit smoking.¹⁷⁴ Health care workers should therefore exploit the opportunity presented by the presence of family members, especially children with illness, as a trigger for initiating advice on smoking cessation.

In South Africa, increases in excise tax have caused the real price of cigarettes to rise by 115% between 1993 and 2003; aggregate cigarette consumption has decreased by about a third and per capita consumption has decreased by about 40%.¹⁷ However, cost / affordability was found not to be a significant motivation for making quit-attempts in this study, contradicting evidence that cigarette price changes do predict decreases in smokers' consumption behaviour, especially in the lower socio-economic strata.^{80,176,177} The finding in this study may possibly be due to the fact that most participants were in permanent well-paying jobs and could afford cigarettes. Notwithstanding that cost / affordability was not a significant motivation for quit-attempts in this study, policies on increasing cigarette taxes and legislations need to be intensified in order to maximize gains in decreased cigarette consumption.

5.5 Treatments used during quit-attempts

5.5.1 Non-pharmacological treatments: In this study, counseling by a healthcare worker was not significantly associated with successful quit-attempts. This could be due to health care providers not consistently offering cessation advice during consultation or the lack of effective counseling skills.^{169,178,179} One study, which assessed the extent to which smokers report on health care workers advising and assisting them with quitting based on their level of readiness for change, found that most smokers were advised to quit smoking; however, only about half of those motivated to quit were given assistance to do so.¹⁸⁰ Health care providers need to be trained on how to offer smoking cessation treatment consistently. This training should be included in the curriculum of health science schools in order to prepare health care workers to provide smoking cessation advice effectively. Post-qualification, smoking cessation treatment updates should be organized as part of continuous professional development with the view of maintaining health care providers' competence in these skill sets.

Although literature has suggested that support groups facilitate smoking cessation,^{23,181,182} it is not clear why successful participants were less likely to have reported being in a support group than those who were not successful. However, support from partners and significant others has been shown to strengthen smokers' resolve to make a quit-attempt and abstain from smoking.¹⁸³⁻¹⁸⁵ It is therefore important to recruit social support from significant others for smokers attempting to quit.

5.5.2 Drug treatment: Both groups reported using NRTs as shown in Tables 9 and 10. A review that looked at NRTs for smoking cessation concluded that all of the commercially available forms of NRT (gum, transdermal patch, nasal spray, inhaler and sublingual tablets/lozenges) can increase smokers' chances of quitting successfully by 50 to 70%, regardless of setting.¹⁸⁶ Similarly, another study, which assessed the prevalence of NRT use in a range of situations including temporary abstinence and rated helpfulness of NRT, found that nicotine patch use received higher helpfulness ratings than gum. Furthermore, NRT use in all situations was associated with increased odds of a previous attempt to quit smoking.¹⁸⁷ While all types of NRT are effective, their effectiveness is better in combination with other interventions, exemplified by the study that found nicotine patch therapy combined with cognitive-behaviour intervention to be more effective than placebo in treating tobacco dependence among adolescent smokers.¹⁸⁸

This study did not find lozenge use significant, contrary to the established opinion that nicotine lozenges represent a safe and effective new treatment for smoking cessation in low- and high-dependence smokers.¹⁸⁹⁻¹⁹¹ However, patch use was found to significantly reduce the odds of successful quit-attempts (OR=0.2; 95% CI: 0.1-0.7; p=0.01), contrary to the literature that nicotine patch use increases the chances of quitting even when used in isolation.^{186,192} Although gum, lozenges and nasal spray were reported in this study and found not to be significantly associated with successful quit-attempt outcomes, a systematic review

consisting of 150 trials and 50,000 participants found all commercially available forms of NRT (gum, transdermal patch, nasal spray, inhaler and sublingual tablets/lozenges) effective in increasing the chances of successful quit-attempts.¹⁹³ This could be due to the fact that participants' that reported using these forms of NRT were few and these NRTs are not readily available at health facilities, making it inaccessible to these smokers. On a different note, this study showed that the use of varenicline was significantly associated with successful quit-attempts (OR=4.0; 95% CI: 2.0-9.0; p=0.00), consistent with studies which have found this drug effective for smoking cessation.^{194,195} Notwithstanding that NRTs were not significantly associated with quit-attempts, the findings of these this study suggest that ensuring the availability of these cessation drugs can improve quit rates among smokers. Including NRTs and varenicline in the EDL, especially at primary care level will ensure this accessibility.

5.6 Potential biases and limitations

Although the results of this study may be generalised to the Arcelor Mittal steel company site in Three Rivers, Vereeniging, caution needs to be applied in transferring these findings to other workplaces with different factory settings because of the consecutive sampling methods. Selection bias could not be excluded as consecutive sampling is not a probability sampling method. Furthermore, this study did not calculate the number of successful and unsuccessful quitters required for comparison but assumed that the proportions of each group in the sample will approximate that in this workplace population.

Since this study was based on self-reports, the tendency for social desirability could have influenced participant responses and led to information bias. This was, however, addressed by assuring participants that they will not in any way be discriminated against nor victimised as a result of their response, as contained in the participants' information leaflet.

Recall bias may also limit the accuracy of responses as participants who stopped smoking a long time ago especially may find it difficult to remember all the details of their quit-attempts.

Since this was a cross sectional study, no causal relationship could be established between variables identified as predictors and the successful quit-attempt outcomes.

The present study did not consider the number of quit attempts made by participants before successfully quitting. The findings are therefore point- in-time estimates and not life-time or end-point estimates.

CHAPTER SIX

CONCLUSIONS AND RECOMMENDATIONS

6.1 Conclusion

This study found that smokers in this industrial workplace are making attempts to quit smoking. However, the success rates of quit-attempts in this setting is low but comparable to that obtained in the general population. In addition, the provision of social support by significant others and the use of certain types of tobacco cessation medications during quit-attempts improve the odds of success during quit attempts.

6.2 Recommendations

The findings of this study should be considered in the implementation of critical interventions to improve quit rates of smokers attempting to quit in this industrial setting, specifically that:

1. Health care providers should be trained on the factors that positively influence successful quit-attempts among smokers in the steel industry. This training should be part of a more comprehensive tobacco treatment curriculum which should transcend all health science disciplines and form part of continued professional development for healthcare providers.
2. Access to smoking cessation treatments including varenicline should be ensured at all health facilities, particularly for smokers making efforts to quit.
3. Health care providers should be made aware of the role played by supportive social networks of significant others in promoting successful quit-attempts. In this vein, such networks need to be explored where they exist and used as a strategy to improve successful outcomes among smokers thinking of trying to quit. Where these do not

exist, supportive networks such as clinic support groups for smokers willing to stop should be created and preferably integrated into existing chronic disease support groups. Alternatively, the anti-smoking agenda could be raised and acted upon within existing support group networks.

4. Although smokers in this study did not make quit-attempts motivated by advice from a health care worker, health care providers should nonetheless be trained to discuss smoking cessation with every smoker during clinical consultations, assess their readiness to quit, give advice and offer assistance with treatment.

REFERENCES:

1. World Health Organization. WHO Report on the Global Tobacco Epidemic, 2009
Geneva: World Health Organization, 2008, Geneva.
2. Sitas F, Urban M, Bradshaw D, Kielkowski D, Bah S, Peto R. Tobacco attributable deaths in South Africa. *Tob Control*. 2004; 13:396-399.
3. Ayo-Yusuf OA, Agaku IT. Intention to switch to smokeless tobacco use among South African smokers: result from the 2007 South African Social Attitude survey. *PLOS One*. 2014; (9): doi:101371/journal.pone.0095553.
4. Pam G, Theo U, Rosana N, Ria L, Corne VW, Saloojee Y et al. Estimating the burden of diseases attributable to smoking in South Africa in 2000. *SAMJ* 2007; 97 (8): 674-681.
5. Reddy P, Meyer-Weitz A, Yach D. Smoking status, knowledge of health effects and attitudes towards tobacco control in South Africa. *SAMJ* 1996; 86 (11): 1389-1393.
6. Steyn K, Bradshaw D, Norman R, Laubscher R, Saloojee Y. Tobacco use in South Africans during 1998: The first Demographic and Health Survey. *J Cardio Risk* 2002; 9: 161-170.
7. Corne VW. Recent trends in smoking prevalence in South Africa- some evidence from All Media and Products Survey (AMPS) data. *SAMJ* 2002; 92 (6):468-472.
8. Corne VW. The economics of tobacco control in South Africa. PhD Thesis, University of Cape Town, 2005.
9. Auditor-General. Report of the Auditor-General on the appropriation and miscellaneous accounts in respect of general affairs. Pretoria; Government Printer, 1992-1999.
10. Statistics South Africa. Statistical Release PO302: Mid-year Estimates 1991-1998. Pretoria; Government Printer, 1996.

11. Corne VW. Impact of the recent tobacco excise tax increases on future government revenue potential. Research release No.1. Cape Town: Applied Fiscal Research Centre, University of Cape Town, 2000.
12. Peto R. Smoking and Death: the past 40 years and the next 40. *BMJ* 1994; 309: 937-939.
13. Liu BQ, Peto R, Chen ZM. Emerging tobacco hazards in China: 1. Retrospective proportional mortality study of one million deaths. *BMJ* 1998; 317: 1411-1422.
14. Niu SR, Yang GH, Chen ZM. Emerging tobacco hazards in China: 2. Early mortality results from a prospective study. *BMJ* 1998; 317: 1423-1424.
15. Gajalakshini V, Peto R, Santhanakrishna K, Jha P. Smoking and mortality from tuberculosis and other diseases in India: retrospective study of 43000 adult male deaths and 35000 controls. *Lancet* 2003; 362: 507-515.
16. Gupta PC, Mehta HC. Cohort study of all-cause mortality among tobacco users in Mumbai, India. *Bulletin of the World Health Organization* 2000; 78 (7): 877-883.
17. Pacella-Norman R, Urban MI, Sitas F. Risk factors for oesophageal, lung, oral and laryngeal cancers in black South Africans. *Br J Cancer* 2002; 86: 1751-1756.
18. Sarie VDB. 300 smokers quit. *Vaal Weekblad*. 8 August 2012 (sourced April 20, 2014) Available from: <http://www.vaalweekblad.com/articles/articledetails.aspx?id=30643>
19. Omole OB, Ngobale KN, Ayo-Yusuf OA. Missed opportunities for tobacco use screening and brief cessation advice in South African Primary Health Care: a cross-sectional study. *BMC Fam Pract*. 2010; 11: 94. P 2-10. doi: 101186/1471-2296-11-94
20. Cheyrrp MY, Nelson G, Ross MH, Murray J. South African platinum mine employees reduce smoking in 5 years. *Tobacco Control* 2007; 16: 197-201.

21. Centre for Disease Control and Prevention (CDC) mortality and morbidity weekly reports. Quitting smoking among adults. CDC, Atlanta, USA 2011; 60 (44): 1513-1519.
22. Barnoya J, Glantz SA. The tobacco industry and second-hand smoke: lessons from Central and South America. *Ethn Dis.* 2003. Summer; 13 (2 Suppl 2):S88-90.
23. Lee CW, Kahende J. Factors associated with successful smoking cessation in the United States. *Am J Public Health* 2007; 97 (8): 1503-9.
24. Vince M. Campaign for Tobacco-free kids. June 24, 2014 (sourced 15 September 2014) Available from: <http://news.health.com/2014/06/24/cdc-readies-latest-graphic-anti-smoking-ads/>
25. Brant WR, Leslie AR, Robert CK, Bonnie MA. What motivates adolescent smokers to make a quit attempt. *Drug and Alcohol Depend.* 2002; 68 (2): 167-174.
26. Buczkowski K, Marcinowicz L, Czachowski S, Piszczek E. Motivations towards smoking cessation, reasons for relapse, and modes of quitting: results from a qualitative study among former and current smokers. *Patient Preference and Adherence.* 2014; 8: 1353-1363. Doi: 10.2147/PPA.S67767.
27. Wu L, He Y, Jiang B, Zuo F, Liu Q, Zhang L et al. Predictors for successful quitting smoking among males carried at in a smoking cessation clinic. *Zhonghua Liu Xing Bing Xue za Zhi.* 2014; 35 (7): 792-6.
28. Cahill K, Lancaster T, Green N. Stage-based interventions for smoking cessation. *Cochrane Database Syst Rev.* 2010 Jan 20; (1):CD006936. doi: 10.1002/14651858.CD006936.pub2.
29. Sheldon C, Edward L. Perceived stress, quitting smoking, and smoking relapse. *Health Psych.* 1990; 9 (4): 466-478.

30. Catherine S, Angus S. Concise Oxford English Dictionary, Oxford University Press Inc., New York 11th Edition, Revised. ISBN 978-0-19-954841-5
31. Marie NG, Michael KF, Thomas DF, Margaret R, Laura DL, Blake T et al. Smoking Prevalence and Cigarette Consumption in 187 Countries, 1980-2012. JAMA. 2014; 311(2):183-192.
32. Guindon GE, Boisclair D. Past, current and future trends in tobacco use. The International Bank for Reconstruction and Development / The World Bank, Washington DC, USA. 22 March 2009. (sourced 3 February 2014) Available from: <http://siteresources.worldbank.org/HEALTHNUTRITIONANDPOPULATION/Resources/281627-1095698140167/Guindon-PastCurrent-whole.pdf>
33. The World Health Organization, and the Institute for Global Tobacco Control, John Hopkins School of Public Health (2001). “Women and the Tobacco Epidemic: Challenges for the 21st Century”. World Health Organization. Geneva. 02 January 2009. (Sourced 3 February 2014). Available from: <http://apps.who.int/iris/handle/10665/66799>
34. Center for Disease Control and Prevention. “Surgeon General’s Report- Women and Smoking.” 2001. P 47. Atlanta. (Sourced 6 March 2014). Available from: http://www.cdc.gov/tobacco/data_statistics/sgr/2001/
35. WHO/WPRO-Smoking Statistics. World Health Organization Regional Office for the Western Pacific. 27 May 2002. (Sourced 6 March 2014). Available from: http://www.wpro.who.int/mediacentre/factsheets/fs_20020528/en/
36. Peto R, Lopez AD, Boreham J, Thun M. Mortality from Smoking in Developed Countries 1950-2000: Indirect estimates from National vital statistics. Lancet. 1992; 339(8804):1268-78.

37. Ng M, Freeman MK, Fleming TD, Robinson M, Dwyer-Lindgren L, Thomson B et al. Smoking prevalence and cigarette consumption in 187 countries, 1980-2012. JAMA 2014; 311 (2): 183-192.
38. Eriksen M. The Tobacco Atlas. Fifth Edition. American Cancer Society and World Lung Foundation, 2015.
39. Action on Smoking and Health. Tobacco and the developing World: Fact Sheet, August 2015. Accessed 2015/12/05. Available from www.ash.org.uk/files/documents/ASH_126.pdf
40. Amanda A, Lorraine G, Mimi N, Michele B. Women and tobacco: a call for including gender in tobacco control research, policy and practice. Tobacco Control 2012; 21: 134-148.
41. Toll B, Ling M. the Virginia Slims identity crisis: an inside look at the tobacco industry marketing to women. Tobacco Control 2005; 14: 236-43.
42. Women and Tobacco. World Health Organization, 1992. (Sourced 15 June 2014). Available from http://apps.who.int/iris/bitstream/10665/37510/1/9241561475_eng.pdf
43. Gender, Women and the tobacco epidemic. World health Organization, 2010. (Sourced 15 June 2014). Available from http://www.who.int/tobacco/publications/gender/women_tob_epidemic/en/
44. Borzenkowski D, Cohen J. International research of tobacco marketing among young children. Paediatrics 2013; 825-831.
45. Biswas T. Nearly a third of children want to smoke when they grow up. BMJ 2013; 347:f6149.
46. Granworth H, Stanley K, Lopez AD. Time Trends in mortality for cancer. WHO/CAN/88;5.

47. United Nations. World Population Prospects 1990. New York: United Nations, 1991: 226-231.
48. United Nations. Sex and age Distributions for Population. The 1990 Revision. New York: United Nations, 1991: 4.
49. Judith M, John C. Tobacco and the developing World. British Medical Bulletin 1996; 52 (1): 206-221.
50. Weng XZ, Hong ZG, Chen DY. Smoking prevalence in Chinese aged 15 years and above. Report of 1984 first national prevalence survey. Chin Med J (Eng) 1987; 100 (11): 886-892.
51. Center for Disease Control and Prevention (CDC). Cigarette smoking among adults and trends in smoking cessation- United States, 2008. Morbidity and mortality weekly report 58 (44): 1227-1232. Atlanta.
52. World Health Organization. Global Burden of Disease 2008. (Sourced 20 March 2014). Available from: http://www.who.int/healthinfo/global_burden_disease/gbd/en/
53. West R, Shiffman S. Fast Facts: Smoking Cessation. Health Press Ltd. ISBN 978-1-903734-98-8. P 20-26.
54. The Tobacco Atlas. Country Fact Sheet. Smoking among women, 2013. Sourced 2015/12/04. Available from www.tobaccoatlas.org/topic/smoking-among-women/
55. Reddy P, Meyer-Weitz A, Yach D. Smoking status, knowledge of health effects and attitudes towards tobacco control in South Africa. SAMJ 1996; 86: 1389-1393.
56. World health Organization. Tobacco or Health: a global status report. Geneva: WHO, 1997.
57. Patricia FC, Mary A, Alan CG, Daniel B, Donald RM, Robert AL et al. Factors associated with smoking among children and adolescent in Connecticut. Am J Prev Med 1998; 15 (1): 17-24.

58. Jarvis MJ, Wandle J. Social patterning of individual health behaviours: the case of cigarette smoking. New York: Oxford University Press; 1999. P. 240-255.
59. D. Elizabeth J, Marilyn G, Mel S. Psychosocial and spiritual factors associated with smoking and substance use during pregnancy in African Americans and white low-income women. *Jognn* 2006; 35 (1): 68-77.
60. Jing Z, Zhongmiao W. Factors associated with smoking in Asian American adults: A Systematic Review. *Nicotine Tob Res* 2008; 10 (5): 791-801.
61. Robert CK, Lisa MK. Cigarette smoking as a dietary strategy in a university population. *Int. Journal of Eating Disorders* 1998; 7 (3): 413-419.
62. Center for Disease Control and Prevention (CDC). Cigarette smoking among adults and trends in smoking cessation- United States, 2008. *Morbidity and mortality weekly report* 58 (44): 1227-1232. Atlanta.
63. World Health Organization. WHO Framework Convention on Tobacco Control (WHO FCTC); 2003, Updated reprint 2004, 2005 [On line]. Geneva. (Sourced 5 December 2014). Available from: http://www.who.int/tobacco/mpower/mpower_english.pdf
64. Van Walbeek C. The tobacco epidemic can be reversed. Tobacco control in South Africa during the 1990s. Applied Fiscal Research Centre, School of Economics, University of Cape Town, 2002
65. Van Walbeek C. Recent trends in smoking prevalence in South Africa--some evidence from AMPS data. *S Afr Med J* 2002; 92:468-472.
66. Cahill K, Moher M, Lancaster T. Workplace interventions for smoking cessation. *Cochrane Database Syst Rev*. 2008; 4:CD003440. doi:10.1002/14651858.CD003440.pub3.

67. United States Department of Health and Human Services. How tobacco smoke causes disease: The Biology and Behavioural Basis for smoking-attributable diseases: A report of the surgeon General. Atlanta: United States Department of Health and Human Services, Center for Disease Control and Prevention, National Centre for chronic disease prevention and health promotion. Office on Smoking and Health, 2010. Accessed 2015/12/05.
68. United States Department of Health and Human Services. How tobacco smoke causes disease: Reducing Tobacco use: A report of the surgeon General. Atlanta: United States Department of Health and Human Services, Center for Disease Control and Prevention, National Centre for chronic disease prevention and health promotion. Office on Smoking and Health, 2010. Accessed 2015/12/05.
69. Fiore MC, Jaen CR, Baker TB. Treating tobacco use and dependence: 2008 Update-Clinical Practice Guidelines. Rockville (MD): United States Department of Health and Human Services, Public Health Services, Agency for Healthcare Research and Quality, 2008 (Accessed 2015/12/05).
70. American Cancer Society. Guide to quitting smoking: Cancer Facts and Figures 2014. Atlanta, Ga. 2014 Access 2015/12/05. Available from www.cancer.org/acs/groups/cid/documents/webcontent/002971-pdf.pdf
71. Zwar N, Richmond R, Borland R, Peters M, Litt J, Bell J, et al. Supporting smoking cessation: a guide for health professionals. The Royal Australian College of General Practitioners; 2012. Melbourne. (Sourced 10 December 2014). Available from: http://whyquit.com/guidelines/2011_Australia_Guide.pdf
72. Wennike P, Danielsson T, Landfeldt B, Westin A, Tonnesen P. Smoking reduction promotes smoking cessation: results from a double blind, randomized, placebo

- controlled trial of nicotine gum with 2 year follow-up. *Addiction*. 2003; 98: 1395–1402.
73. Rennard SI, Glover ED, Leischow S, Daughton DM, Glover PN, Muramoto M et al. Efficacy of nicotine inhaler in smoking reduction: a double blind randomized trial. *Nicotine Tob Res*. 2006; 8 (4):555–564.
74. Medioni J, Berlin I, Mallet A. Increased risk of relapse after stopping nicotine replacement therapies: a mathematical modelling approach. *Addiction*. 2005; 100 (2):247–254.
75. Ferguson SG, Gitchell JG, Shiffman S. Continuing to wear nicotine patches after smoking lapses promotes recovery of abstinence. *Addiction*. 2012; 107 (7):1349–1353.
76. Stead LF, Perera R, Bullen C, Mant D, Hartmann-Boyce J, Cahill K. Cochrane Database Syst Rev. 2012 Nov 14;11:CD000146. doi: 10.1002/14651858.CD000146.pub4.
77. Weygandt PL, Vidal-Cardenas E, Gilman RH, Avila-Tang E, Cabrera L, Checkley W. Epidemiology of tobacco use and dependence in adults in a poor peri-urban community in Lima, Peru. *BMC Pulm Med*. 2012; 12: 9. doi: 10.1186/1471-2466-12-9.
78. Rice VH, Stead LF. Nursing interventions for smoking cessation. *Cochrane Database of Systemic Reviews* 2008, issue 1. Art. No: CD001188. DOI: 10.1002/ 14651858. CD001188.pub3.
79. Ayo-Yusuf OA. Re-emergence of traditional tobacco products usage in South Africa: an unintended consequence of existing tobacco control policy. *Afr J Drug Alcohol Stud*. 2005; 13: 32–43.

80. Van Walbeek CP. Impact of the recent tobacco excise tax increases on future government revenue potential. Cape Town: Applied Fiscal Research Centre, University of Cape Town; 2000
81. Pacella NR, Urban MI, Sitas F, Carrara H, Sur R, Hale M et al. Risk factors for oesophageal, lung, oral and laryngeal cancers in black South Africans. *Br J Cancer*. 2002; 13: 1751–1756. doi: 10.1038/sj.bjc.6600338.
82. Chaloupka FJ. Macro-Social Influences: The Effects of Prices and Tobacco Control Policies on the Demand for Tobacco Products. *Nicotine and Tobacco Research* 1 (Suppl 1):S105-9, 1999.
83. Centers for Disease Control and Prevention (CDC). Responses to Cigarette Prices by Race/Ethnicity, Income, and Age Groups –United States 1976-1993. *Morbidity and Mortality Weekly Report* 47(29):605-609.
84. Chaloupka FJ, Rosalie LP, Matthew CF, Lloyd DJ, Patrick MO. Do Higher Cigarette Prices Encourage Youth to Use Marijuana? National Bureau of Economic Research, Working Paper No. 6939, February 1999.
85. Barnoya J, Glantz SA. The tobacco industry and second-hand smoke: lessons from Central and South America. *Ethn Dis*. 2003. Summer; 13 (2 Suppl 2): S88-90.
86. Jessica LR, David H, Christian B, Geoffrey TF, Mohammad S. Socio-economic disparities in quit intentions, quit attempts, and smoking abstinence among smokers in four western countries: Findings from the international tobacco control four country survey. *Nicotine Tob Res*. 2010 Oct; 12: 20-33.
87. Yussuf S. Tobacco control in South Africa: Chronic disease of lifestyle in South Africa since 1995-2005. Chap 5, p49.
88. Lee CW, Kahende J. Factors associated with successful smoking cessation in the United States. *Am J Public Health* 2007 Aug; 97 (8): 1503-9.

89. Raw M, Anderson P, Batra A, Dubois G, Harrington P, Hirsch A et al. WHO Europe evidence based recommendations on the treatment of tobacco dependence. *Tobacco control* 2002; 11:44-6.
90. Cooper J, Borland R, Yong HH. Australian smokers increasingly use help to quit, but number of attempts remains stable: Findings from the international tobacco control study 2002-09. *Aust NZJ Public Health* 2011; 35:368-76.
91. Kanis J, Byczkowski T, Mahabee-Gitters EM. Motivation to quit smoking in parental smokers in the pediatric emergency department. *Pediatr Emerg Care*. 2014; 30 (8): 546-51.
92. Wee LH, West R, Bulgiba A, Shahab L. Predictors of 3-month abstinence in smokers attending stop-smoking clinics in Malaysia. *Nicotine Tob Res*. 2011 Feb; 13(2):151-6.
93. Karasek D, Ahern J, Galea S. Social norms, collective efficacy, and smoking cessation in urban neighborhoods. *Am J Public Health*. 2012 Feb; 102 (2):343-51.
94. Lai DT, Cahill K, Qin Y, Tang JL. Motivational interviewing for smoking cessation. *Cochrane Database Syst. Rev.* 2010; (1): CD006936.doi:10.1002/14651858.CD006936.pub2.
95. Prochaska JO, Diclemente CC. In search of how people change: applications to addictive behaviours. *Am Psychol*. 1992; 47: 1102-1114.
96. Goldberg DN, Esther MF, Mireille NM, Willem van Mechelen. Physician delivery of smoking-cessation advice based on the stages of change model. *Am J Prev Med*. 1994; 10: 267-274.
97. Prochaska JO. Working in harmony with how people quit smoking naturally. *Rhode Island Med*. 1993; 76: 493-5.

98. Lancaster T, Stead LF. Self-help interventions for smoking cessation. Cochrane Database of Systematic Reviews 2005, Issue 3. Art. No: CD001118. DOI: 10.1002/14651858. CD001118.pub2.
99. Stead LF, Bergson G, Lancaster T. Physicians advice for smoking cessation. Cochrane Database of Systematic Reviews 2008, issue 2, Art. No. CD000165. DOI: 10.1002/ 14651858. CD000165. Pub3.
100. Steyn F, Engelbrecht M, Ngweni C, Van Rensburg D. Assessing the levels of compliance of public places with current tobacco legislation. Centre for Health Systems Research and Development. University of Free State. 2 March 2005. (Sourced 5 November 2014). Available from: <http://www.mrc.ac.za/chronic/cdlchapter5.pdf>
101. Tobacco Institute of South Africa. Press release – Results of public smoking survey. 24 June 2004. (Sourced 5 November 2014). Available from: http://opensaldru.uct.ac.za/bitstream/handle/11090/694/2014_129_Saldruwp.pdf?sequence=1
102. Blecher EH. The Effect of the Tobacco Products Control Amendments of 1999 on Restaurant Revenues in South Africa: A Panel Data Approach. 2005 (personal communication).
103. Bryant J, Bonevski B, Paul C, O'Brien J, Oakes W. Developing cessation interventions for the social and community service setting: a qualitative study of barriers to quitting among disadvantaged Australian smokers. BMC Public Health. 2011 Jun 24; 11:493.
104. Kotz D1, West R. Explaining the social gradient in smoking cessation: it's not in the trying, but in the succeeding. Tob Control. 2009; 18 (1):43-6.
105. Shiffman S, Brockwell SE, Pillitteri JL, Gitchell JG. Use of smoking-cessation treatments in the United States. Am J Prev med 2008; 34: 102-111.

106. Lancaster T, Stead LF. Individual behavioural counselling for smoking cessation. Cochrane Database of Systematic Reviews 2005, Issue 2. Art. No: CD001292. DOI: 10.1002/14651858. CD001292.pub2.
107. Stead LF, Lancaster T. Group behaviour therapy programmes for smoking cessation. Cochrane Database of Systematic Reviews 2005, Issue 2. Art. No: CD001007. DOI: 10.1002/14651858. CD001007.pub2.
108. National Institute for Health and Clinical Excellence. Public health guidance 10. Smoking cessation services in primary care, pharmacies, local authorities and workplaces, particularly for manual working groups, pregnant women and hard to reach communities. 13 February 2008. (Sourced 9 June 2014). Available from: <http://www.ncsct.co.uk/usr/pub/smoking-cessation-services-in-primary-care.pdf>
109. Richmond RL, Zwar NA, Henningfield J, Seffrin J, Zatonski W. Treatment of tobacco dependence. Tobacco: science, policy and public health. 2nd edn. Oxford UK: Oxford University Press; 2010.
110. Scollo MM, Winstanley MH, editors. Tobacco in Australia: Facts and Issues. A comprehensive online resource. 3rd edn. Melbourne: Cancer Council Victoria; 2008. (Sourced 11 November 2014). Available from: <http://www.tobaccoinaustralia.org.au/downloads/chapters/Introduction.pdf>
111. Barnes J, Dong CY, McRobbie H, Walker N, Mehta M, Stead LF. Hypnotherapy for smoking cessation. Cochrane Database of Systematic Reviews 2010, Issue 10. Art. No: CD001008. DOI: 10.1002/14651858. CD001008.pub2.
112. White AR, Rampes H, Liu JP, Stead LF, Campbell J. Acupuncture and related interventions for smoking cessation. Cochrane Database of Systematic Reviews 2011, Issue 1. Art. No: CD000009. DOI: 10.1002/14651858.CD000009.pub3.

113. Zwar N, Richmond R, Borland R, Stillman S, Cunningham M, Litt J. Smoking cessation guidelines for Australian general practice: Aust Fam Physician. 2005; 34 (6): 461-6.
114. Fiore MC, Jaen CR, Baker TB, Bailey WC, Neal LB, Susan JC et al. Guideline Panel. Treating tobacco use and dependence: 2008 update. Clinical Practice Guideline. Rockville, MD: U.S. Department of Health and Human Services. Public Health Service. (Sourced 26 August 2014). Available from: http://www.ahrq.gov/professionals/clinicians-providers/guidelines-recommendations/tobacco/clinicians/update/treating_tobacco_use08.pdf
115. Stead LF, Perera R, Bullen C, Mant D, Lancaster T. Nicotine replacement therapy for smoking cessation. Cochrane Database of Systematic Reviews 2008, Issue 1. Art. No: CD000146. DOI: 10.1002/14651858. CD000146.pub3
116. Jennifer WK, Ann MM, Anna T, Kat JA. Quit attempt correlates among smokers by Race/Ethnicity. Int. J. Environ. Res. Public Health 2011, 8, 3871-3888.
117. Tonnesen P, Carrozzi L, Fagerstro KO, Gratziou C, Jimenez-Ruiz C, Nardini S et al. Smoking cessation in patients with respiratory diseases: a high priority, integral components of therapy. Eur Respir J. 2007, 29, 390-92.
118. Ferguson J, Bauld L, Chesterman J, Judge K. The English smoking treatment services: one-year outcomes. Addiction 2005; 100: 59-69.
119. Fiore MC. Treating tobacco use and dependence. Rockville, Md.: U.S. Department of Health and Human Services, Public Health Service, 2000. (Sourced 22 February 2014). Available from: <http://www.ncbi.nlm.nih.gov/books/NBK63952/>
120. Silagy C, Lancaster T, Stead L, Mant D, Fowler G. Nicotine replacement therapy for smoking cessation. Cochrane Database Syst Rev. 2002 ;(4):CD000146.

121. Steyn K, Hoffman M, Levitt NS, Lombard CJ, Fourie JM. Community-based tobacco control program: the Mamre study, a demonstration project. *Ethn Dis* 2001; 11:296-302.
122. Lam W, Sze PC, Sacks HS, Chalmers TC. Meta-analysis of randomized controlled trials of nicotine chewing-gum. *Lancet*. 1987; 2: 27–30.
123. Hughes JR, Gust SW, Keenan R, Fenwick JW, Skoog K, Higgins ST. Long-term use of nicotine vs placebo gum. *Arch Intern Med*. 1991; 151: 1993–8.
124. Joseph AM, Norman SM, Ferry LH, Prochazka AV, Westman EC, Steele BG, et al. The safety of transdermal nicotine as an aid to smoking cessation in patients with cardiac disease. *N Engl J Med*. 1996; 335: 1792–8.
125. Sutherland G, Stapleton JA, Russell MA, Jarvis MJ, Hajek P, Belcher M, et al. Randomised controlled trial of nasal nicotine spray in smoking cessation. *Lancet*. 1992; 340: 324–9.
126. Shiffman S, Dresler CM, Hajek P, Gilbert SJ, Targett DA, Strahs KR. Efficacy of a nicotine lozenge for smoking cessation. *Arch Intern Med*. 2002; 162: 1267–76.
127. Cahill K, Stead LF, Lancaster T. Nicotine receptor partial agonists for smoking cessation. *Cochrane Database of Systematic Reviews* 2011, Issue 2. Art. No: CD006103. DOI: 10.1002/14651858.CD006103.pub5.
128. Shiffman S, Dresler CM, Rohay JM. Successful treatment with a nicotine lozenge of smokers with prior failure in pharmacological therapy. *Addiction*. 2004; 99: 83–92.
129. Choi JH, Dresler CM, Norton MR, Strahs KR. Pharmacokinetics of a nicotine polacrilex lozenge. *Nicotine Tob Res*. 2003; 5:635–44.
130. Wu P, Wilson K, Dimoulas P, Mills EJ. Effectiveness of smoking cessation therapies: a systematic review and meta-analysis. *BMC Public Health* 2006; 6: 300.

131. Mills AM, Rhodes KV, Follansbee CW, Shofer FS, Prusakowski M, Bernstein SL et al. ACEP Smoking Cessation Study Group. Effect of household children on adult ED smokers' motivation to quit. *Am J Emerg Med*. 2008 Sep; 26 (7):757-62.
132. Dalsgareth OJ, Hansen NC, Soes-Petersen U, Evald T, Hoegholm A, Barber J, et al. A multi-center, randomized, double-blind, placebo-controlled, 6-month trial of bupropion hydrochloride sustained-release tablets as an aid to smoking cessation in hospital employees. *Nicotine Tob Res*. 2004; 6: 55–61.
133. Jorenby DE, Scott JL, Mitchell AN, Stephen IR, Andrew J, Hughes AR et al. A controlled trial of sustained-release bupropion, a nicotine patch, or both for smoking cessation. *N Engl J Med*. 1999; 340: 685–91.
134. Hughes JR, Stead LF, Lancaster T. Antidepressants for smoking cessation. *Cochrane Database of Systematic Reviews* 2007, Issue 1. Art. No: CD000031. DOI: 10.1002/14651858. CD000031.pub3.
135. Hughes JR1, Stead LF, Lancaster T. Antidepressants for smoking cessation. *Cochrane Database Syst Rev*. 2007; (1): CD000031.
136. Doggrell SA. Which is the best primary medication for long-term smoking cessation--nicotine replacement therapy, bupropion or varenicline? *Expert Opin Pharmacother*. 2007 Dec; 8(17):2903-15.
137. Wagena EJ, Knipschild P, Zeegers MP. Should nortriptyline be used as a first-line aid to help smokers quit? Results from a systematic review and meta-analysis. *Addiction* 2005; 100: 317-26.
138. Wikipedia. Cross-sectional Study. (Sourced January 27, 2015). Available from: http://en.wikipedia-org/wiki/cross-sectional_study.

139. Arcelor Mittal South Africa. Vereeniging Works Overview. 15 May 2012. (Sourced 7 January 2015). Available from: <http://www.arcelormittalsa.com/>.
140. South African Medical Research Council. Mrc news. Newsletter. 1 December 2008. (Sourced 7 January 2015). Available from: <http://www.mrc.ac.za/mrcnews/dec2008/jan08issue.pdf>
141. Raosoft. Sample Size Calculator. (Sourced May 15, 2012). Available from: <http://www.raosoft.com/samplesize.html>
142. Saloojee Y. Smoking study at St Bartholomew's hospital, West Smithsfield, London. (Personal communication).
143. Knowledge Center. Women in male-dominated industry and occupations in the US and Canada; Catalyst March 13, 2013.
144. Ayo-Yusuf OA, Szymanski B. Factors associated with smoking cessation in South Africa. *S Afr Med J*. 2010; 100 (3): 175-9.
145. Young-Ju Kim. Predictors for successful smoking cessation in Korean adults. *Asian Nursing Research* 2014; 8 (1), p1-7.
146. Aubin HJ, Bobak A, Britton JR, Oncken C, Billing CB, Jr, Gong J et al. Varenicline versus transdermal nicotine patch for smoking cessation results from a randomised open-label trial. *Thorax* 2008; 63:717–24.
147. Marjaana P, Ulla B, Tellervo K, Ari H, Timo P, Annamari T, et al. Smoking, Nicotine dependence and nicotine intake by socio-economic status. *Addict Behav*. 2014; 30 (7): 1145-51.
148. Sheldon C, Edward L. Perceived stress, quitting smoking and smoking relapse. *Health Psychology* 1990; 9 (4): 466-478.
149. Lee CW, Kahende J. Factors associated with successful smoking cessation in the United States. *Am J Public Health* 2007; 97 (8): 1503-9.

150. Franklin T, Wang Z, Suh JJ, Hazan R, Cruz J, Li Y et al. Effects of varenicline on smoking cue-triggered neural and craving responses. *Arch Gen Psychiatry* 2011; 68 (5):516-26.
151. Takagi D, Kondo N, Takada M, Hashimoh N. Differences in spousal influence on smoking cessation by gender and education among Japanese couples. *BMC Public health*. 2014; 14: 1184.
152. Cobb LK, McAdams-DeMarco MA, Huxley RR, Woodward M, Koton S, Coresh J et al. The association of spousal smoking status with the ability to quit smoking: the atherosclerosis risk in communities studies. *Am J Epidemiol*. 2014; 179 (10): 1182-7.
153. Manchon WP, Carrillo P, Flores G, Masuet C, Morchon S, Ramon JM. Effects of partner smoking status and gender on long term abstinence rates of patients receiving smoking cessation treatment. *Addict Behav*. 2007; 32 (1): 128-36.
154. Rayens MK, Hahn EJ, Hedgecock S. Readiness to quit smoking in rural communities. *Issue Ment Health Nurs*. 2008; 29 (10): 1115-33.
155. Sorensen G, Goldberg R, Ockene J, Klar J, Tannenbaum T, Lemeshow S. Heavy smoking among a sample of employed women. *Am J Prev Med*. 1992; 8 (4): 207-14.
156. Darville A, Hahn EJ. Hardcore smokers: What do we know? *Addict Behav* 2014; 39 (12): 1706-12.
157. Fagerstrom Test for Nicotine Dependence. 25 November 2014. (Sourced 5 January 2015). Available from: http://ndri.curtin.edu.au/btftp/documents/Fagerstrom_test.pdf
158. Stevens SS, Michael CF, Timothy BB. Smoking cessation in smokers who smoke menthol and non-menthol cigarettes. *Addiction*. 2014; 109 (12): 2107-17.
159. Dunbar MC, Shiffman S, Kirchner TR, Tindle HA, Scholl SM. Nicotine dependence, “background” and cue-induced craving and smoking in the laboratory. *Drug Alcohol Depend* 2014; 14 (142): 197-203.

160. Kalucka S. Social aspects of tobacco addiction and the quality of life people smoking and non-smoking tobacco. *Przegl lek.* 2012; 69 (10): 908-13.
161. Mercincavage M, Branstetter SA, Muscat JE, Horn KA. Time to First Cigarette predicts cessation outcomes in adolescent smokers. *Nicotine Tob Res.* 2013; 15 (12): 1996-2004.
162. Bobo JK, Lando HA, Walker RD, McIlvain HE. Predictors of tobacco quit attempts among recovering alcoholics. *J Subst. Abuse.* 1996; 8 (4): 431-43.
163. Smith SS, Fiore MC, Baker TB. Smoking cessation in smokers who smoke menthol and non-menthol cigarettes. *Addiction.* 2014; 109 (12):2107-17.
164. Kasza KA, Hyland AJ, Bansal-Travers M, Vogl LM, Chen J, Evans SE et al. Switching between menthol and non-menthol cigarettes: Findings from the US cohort of the International tobacco control four country survey. *Nicotine Tob Res.* 2014; 16 (9): 1255-65.
165. Ann W St Claire, Raymond GB, Barbara AS, Peter R, Kristie AT. Smoke-free Home Rules Adoption by Smokers and Non-smokers Minnesota, 1999 –2010. *Am J Prev Med* 2012, 43 (5S3): S197-204.
166. Halterman JS, Borrelli B, Conn KM, Tremblay P, Blaakman S. Motivation to Quit Smoking among Parents of Urban Children with Asthma. *Patient Educ Couns.* 2010; 79 (2): 152–155.
167. Mills AM, Rhodes KV, Follansbee CW, Shofer FS, Prusakowski M, Bernstein SL et al. ACEP Smoking Cessation Study Group. Effect of household children on adult ED smokers' motivation to quit. *Am J Emerg Med.* 2008; 26 (7):757-62.
168. Stead LF, Bergson G, Lancaster T. Physician advice for smoking cessation. *Cochrane Database of Systematic Reviews* 2008, Issue 2. Art. No.: CD00016 10.1002/14651858.CD000165.pub3.

169. Omole OB, Ayo-Yusuf OA, Ngobale KN. Implementing tobacco dependence treatment during clinical consultations: a qualitative study of clinicians' experiences, perceptions and behaviours in a South African Primary Health care setting. *BMC Fam Pract* 2014; 6 (15): 85. P 1-10 doi. 10.1186/1471-2296-15-85.
170. Louwagle GM, Okuyemi KS, Ayo-Yusuf OA. Efficacy of brief motivational interviewing on smoking cessation at a tuberculosis clinic in Tshwane, South Africa: a randomized controlled trial. *Addiction* 2014; 109 (11): 1942-52.
171. Smit ES, Hoving C, Schelleman-Offermans K, West R, De vries H. Predictors of successful and unsuccessful quit attempts among smokers motivated to quit. *Addict Behav.* 2014; 39 (9): 1318-24.
172. Savoy E, Reitzel LR, Scheuermann TS, Agarwal M, Mathur C, Choi WS, et al. Risk perception and intention to quit among a tri-ethnic sample of non-daily, light-daily, and moderate/ heavy daily smokers. *Addict Behav.* 2014; 39 (10): 1398-400.
173. Kanis J, Byczkowski T, Mahabee-Gitters EM. Motivation to quit smoking in parental smokers in the pediatric emergency department. *Pediatr Emerg Care.* 2014; 30 (8): 546-51.
174. Kalrouz S, Lasnier B, Mihaylova T, Cohen JE. Smoking Restriction in homes after implementation of a smoking ban in public places. *Nicotine Tob Res.* 2015; 17 (1): 41-7.
175. Van Walbeek C. Tobacco Control in South Africa. *Promot Educ.* 2005; (4): 25-8, 57.
176. Grace RC, Kivell BM, Laugesen M. Predicting decreases in smoking with a cigarette purchase task: evidence from an excise tax rise in New Zealand. *Tob Control* 2014. pii: tobaccocontrol.2014-051594.doi10.1136/tobaccocontrol.2014-051594. (Sourced 8 August 2014). Available from: <http://www.ncbi.nlm.nih.gov/pubmed/25052862>

177. Nikaj S, Chalaupkak FJ. The effect of prices on cigarette use among youths in the global youth tobacco survey. *Nicotine Tob Res.* 2014; 16 (1): S16-23.
178. Vilaradaga R, Heffner JL, Mercer LD, Bricker JB. Do counsellor technique predict quitting during smoking cessation treatment? A component analysis of telephone-delivered acceptance and commitment therapy. *Behav Res Ther.* 2014; 61: 89-95.
179. Ridner SL, Ostapchuk M, Cloud RN, Myers J, Jorayeva A, Ling J. Using motivational interviewing for smoking cessation in primary care. *SAMJ* 2014; 107 (5): 314-9.
180. Williams RJ, Nigg CR. Assessing the extent to which healthcare workers advised and assisted smokers to quit based on patient motivation levels. *J Addict Nurs.* 2014; 25 (2): 81-6.
181. Heather LC, Rajani SS, Jessica HW, Julie EV, Yu-Mei S, Connie K. Crowdsourced peer-versus Expert-written smoking-cessation messages. *Am J Prev Med.* 2013 Nov; 45 (5): 10.1016/j.amepre.2013.07.004
182. Haug S, Schaub MP, Venzin V, Meyer C, John U. Efficacy of a text message-based smoking cessation intervention for young people: a cluster randomized control trial. *J Med Internet Res.* 2013; 15 (8): e171.
183. Homish GG, Leonand KE. Spousal influence on smoking behaviours in a US community sample of newly married couples. *Soc Sci Med.* 2005; 61 (12): 2557-67.
184. Key JD, Marsh LD, Carter CL, Malcolm RJ, Sinha D. Family-focused smoking cessation: enhanced efficacy by the addition of partner support and group therapy. *Subst Abus.* 2004; 25 (1): 37-41.
185. Okechukwu CA, Nguyen K, Hickman NJ. Partner smoking characteristics: Association with smoking and quitting among blue-collar apprentices. *Am J Ind Med.* 2010; 53 (11): 1102-8.

186. Moolchan ET, Robinson ML, Ernst M, Cadet JL, Pickworth WB, Heishman SJ et al. Safety and efficacy of the nicotine patch and gum for the treatment of adolescent tobacco addiction. *Paediatrics* 2005; 115 (4): 407-14.
187. Beard E, Michie S, Fidler J, West R. Use of nicotine replacement therapy in situations involving temporary abstinence from smoking: a national survey of English smokers. *Addict Behav.* 2013; 38 (3): 1876-9.
188. Stead LF, Perera R, Bullen C, Mant D, Hartmann-Boyce J, Cahill K et al. Nicotine replacement therapy for smoking cessation. *Cochrane Database Syst. Rev.* 2012 Nov 14; 11: CD000146. doi: 10.1002/14651858.CD000146.pub4.
189. Saul S, Carolyn MD, Peter H, Simon JAG, Darren AT, Kenneth RS. Efficacy of a nicotine lozenges for smoking cessation. *Arch Intern Med.* 2002; 162 (11): 1267-1276.
190. Saul S. Nicotine lozenges efficacy in light smokers. *Drug and Alcohol Depend.* 2005; 77 (3): 311-314.
191. Saul S. Use of more nicotine lozenges leads to better success in quitting smoking. *Addict.* 2007; 102 (5): 809-814.
192. Michael CF Stevens SS, Douglas EJ, Timothy BB. The effectiveness of the nicotine patch for smoking cessation: a meta-analysis. *JAMA* 1994; 271 (24): 1940-1947.
193. Richard DH, Lowell CD, Paul A F, Casey CC, Gary AL, Kenneth PO et al. Nicotine patch therapy for smoking cessation combined with physician advice and nurse follow-up: one-year outcome and percentage of nicotine replacement. *JAMA* 1994; 271 (8): 595-600.
194. Chengappa KN, Perkins KA, Brar JS, Schlicht PJ, Turkin SR, Hetrick ML et al. Varenicline for smoking cessation in bipolar disorder: a randomized, double-blind, placebo-controlled study. *J Clin Psychiatry.* 2014; 75 (7): 765-72.

195. Gonzales D, Hajek P, Pliamm L, Nackaerts K, Tseng LJ, McRae TD et al. Retreatment with Varenicline for smoking cessation in smokers who have previously taken varenicline: a randomized, placebo-control trial. Clin. Pharmacol Ther. 2014; 96 (3): 390-6.

APPENDIX 1: Questionnaire

QUESTIONNAIRE

TITLE: Factors associated with outcomes of quit attempts among smokers in an industrial workplace in the Vaal area of Gauteng Province.

A. Screening (Done over the phone)

1. Have you ever smoked at least one cigarette/day in your life time?

Yes []

No []

If No, thank you for your time.

If yes, to be included in study and book for an appointment with participant at his/her convenient time.

PLEASE ANSWER ALL THE QUESTIONS BELOW

B. Demographics

1. Age.....

2. Sex M [] F []

3. Race African [] White [] Indian [] Colored []

Others [], specify.....

4. Occupation.....

Please select- Field based [] Manual laborer [] Office based []

5. Nature of appointment

Temporary []

Permanent []

6. Marital status Married [] Divorced [] Single []

Co-habiting [] Widowed [] Separated []

7. Educational level None [] <Grade 12 [] Completed grade 12 []

Tertiary []

INSTRUCTIONS FOR SECTIONS C, D & E

If you are currently smoking, answer section C and D.

If you are not currently smoking, answer section E

C. Smoking pattern (only those currently smoking should answer this section)

1. How many cigarettes do you smoke per day.....

2. How soon after waking up from sleep do you take your first cigarette?

< 10 min [] 11-30 min [] 31-60 min [] > 60 min []

3. What brand do you smoke?

Please specify.....

4. Cigarette type Menthol [] Non-menthol [] Hand rolled []

Filter [] Non filter [] Marijuana []

Other [], specify.....

5. Do you use any recreational drug including alcohol? Yes [] No []

If yes, please specify.....

D. Efforts to stop smoking

1. Have you ever tried to stop smoking? Yes [] No []

2. How many times have you seriously tried to stop smoking in the past?

Once [] Twice [] Thrice [] Four and more []

4. When was your last attempt at stopping smoking?.....

5. What was the longest period of time you have stayed without smoking?

.....years

.....months

.....weeks

.....days

6. Why do you feel you did not stop for longer? (**You can choose more than one option**)

- a. Felt awful []
- b. Pressure at work []
- c. Pressure at home []
- d. Lack of will power []
- e. Addiction []
- f. Not convinced I should give up []
- g. Enjoyed it too much []
- h. It helps my confidence []
- i. It relieves tension []
- j. Could not stand the craving []
- k. Other smokers in family []
- l. Other smokers at work []
- m. Other smokers among friends []
- n. Put on weight []
- o. Others

Specify.....

7. What motivated you to try stopping smoking during any attempt?

a. Advice from a health care worker Yes [] No []

If yes, specify the category of health care worker

.....

b. Smoke free policies at home? Yes [] No []

c. Smoke free policies at work? Yes [] No []

d. Personal desire to quit Yes [] No []

e. Negative attitudes from family/friends Yes [] No []

f. Concerns for personal health Yes [] No []

g. Bad example for children Yes [] No []

h. Concerns for health of relatives/family Yes [] No []

i. Cost / affordability Yes [] No []

j. Others

Specify.....

E. If you have stopped smoking:

1. How many cigarettes did you smoke per day.....

2. How soon after waking up from sleep did you take your first cigarette?

< 10 min [] 11-30 min [] 31-60 min [] > 60 min []

3. What brand did you smoke?

Please specify.....

4. Cigarette type Menthol [] Non-menthol [] Hand rolled []

Filter [] Non filter [] Marijuana []

Other [], specify.....

5. While you were smoking, did you use any recreational drug including alcohol?

Yes [] No []

If yes, please specify.....

6. How long have you stopped smoking?

a. 1 month []

b. 1-6 months []

c. 6-12 months []

d. 1-2 years []

e. >2 years []

7. What motivated you to stop smoking?

a. Advice from a health care worker Yes [] No []

If yes, specify category of health care worker

.....

b. Smoke free policies at home? Yes [] No []

c. Smoke free policies at work? Yes [] No []

d. Personal desire to quit Yes [] No []

e. Negative attitudes from family/friends Yes [] No []

- f. Concerns for personal health Yes [] No []
- g. Bad example for children Yes [] No []
- h. Concerns for health of relatives/family Yes [] No []
- i. Cost / affordability Yes [] No []
- j. Others

Specify.....

8. What treatment aid(s) assisted you in quitting?

- a. Counseling (by professional groups such as Doctors, psychologists and social workers) Yes [] No []
 - Individual counseling Yes [] No []
 - Group counseling Yes [] No []
- b. Nicotine replacement drugs Yes [] No []

If yes,

- Patch Yes [] No []
- Gum Yes [] No []
- Lozenges Yes [] No []
- Nasal spray Yes [] No []
- c. Other medications Yes [] No []

If yes:

- Bupropion []
- Varenicline []
- Nortriptyline []
- Clonidine []

- d. Self-help Yes [] No []
- e. Acupuncture Yes [] No []
- f. Support group Yes [] No []
- g. Support from family/friends Yes [] No []
- h. Others

Specify.....

Thank you,

Andezai JA

APPENDIX 2: Invitation and Information sheet for prospective participants.

09th November 2012

Invitation and Information sheet for prospective participants.

Good Day,

I Dr Andezai JA, a Registrar from the Department of Family Medicine at the University of the Witwatersrand Medical School located at the Sedibeng District Health Services; I am conducting a research on Factors associated with outcomes of quit attempts among smokers in workplace. This study is aimed at finding out how we can assist smokers who want to quit smoking and finding it difficult to quit.

I am inviting you to consider participating in this study. Assurance is given that your participation in the research is voluntary and you may withdraw at any time without any negative effect. Your response will be treated in confidence and will not be linked to your personal details. The findings of this study will be used mainly as part of fulfilling the requirements for my degree (MMED) at the University of the Witwatersrand. The findings may also be disseminated at conferences or peer reviewed academic journals. In all instances, the findings will not be linked to your personal details.

Thank you.

DR ANDEZAI JA

APPENDIX 3: Consent form

Consent form

I, the undersigned agree to participate in the study-‘Factors associated with outcomes of quit attempts among smokers in an industrial workplace in the Vaal area of Gauteng Province’, outlined in the invitation and information sheet for prospective participants.

Participants name.....

Signature.....

Date.....

Witness:

Signature

Date

1.....

2.....

APPENDIX 4: Permission to conduct study letter at Arcelor Mittal Steel Company

09th November 2012

Chief Personnel Officer

Arcelor Mittal Company

Three Rivers.

Good Day Sir/Ma,

Permission to conduct a study in your facility

I Dr Andezai JA, a Registrar from the Department of Family Medicine at the University of the Witwatersrand Medical School located at the Sedibeng District Health Services wish to conduct a study in your facility on Quit attempts and factors associated with outcomes of quit attempts among smokers in an industrial workplace.

In order to improve the lives of our people and quality of life complete cessation of tobacco smoking needs to be encouraged.

This research is aim at identifying the factors which are associated with successful quit attempts among smokers in the work place.

My team and I intend doing the study with the following objectives:

- To describe the demographic and smoking profiles of the study participants.
- To determine the proportion of ever smokers who have ever made a quit attempt and the outcome of the quit attempt (successful/ not successful).
- To determine what motivated these smokers to engage in a quit attempt.
- To determine what cessation treatment methods were used during the quit attempts.
- To explore the relationship between factors such as socio-demographics, smoking Patterns, motivations to quit and outcome of the quit attempts.

Assurance will be given that participation in the research is voluntary and the participants may withdraw any time they want to without any negative effect. Confidentiality will be

ensured at all times by limiting access to the interview materials to co-researchers assisting with data collection.

Thank you.

DR ANDEZAI JA

APPENDIX 5: HREC approval certificate


R14/49 Dr Andezai J Andembutop
HUMAN RESEARCH ETHICS COMMITTEE (MEDICAL)
CLEARANCE CERTIFICATE NO. M130267

NAME:
(Principal Investigator) Dr Andezai J Andembutop

DEPARTMENT: Department of Family Medicine
Medical School

PROJECT TITLE: Factors Associated with Outcomes of Quit
Attempt among Smokers in an Industrial Work-
place in the Vaal Area of Gauteng

DATE CONSIDERED: 22/02/2013

DECISION: Approved unconditionally

CONDITIONS:

SUPERVISOR: Dr OB Omole

APPROVED BY: 
Professor PE Cleaton-Jones, Chairperson, HREC (Medical)

DATE OF APPROVAL: 22/02/2013

This clearance certificate is valid for 5 years from date of approval. Extension may be applied for.

DECLARATION OF INVESTIGATORS

To be completed in duplicate and **ONE COPY** returned to the Secretary in Room 10004, 10th floor, Senate House, University.

I/we fully understand the conditions under which I am/we are authorized to carry out the above-mentioned research and I/we undertake to ensure compliance with these conditions. Should any departure be contemplated, from the research protocol as approved, I/we undertake to resubmit the application to the Committee. I agree to submit a yearly progress report.

 Principal Investigator Signature

Date 3/03/2013

PLEASE QUOTE THE PROTOCOL NUMBER IN ALL ENQUIRIES

PLEASE QUOTE THE PROTOCOL NUMBER IN ALL ENQUIRIES