Cannabis Use and Dependence

*Public Health and Public Policy*

The use of cannabis in the late twentieth and this century is an area of medical and moral controversy. Despite its illegality, cannabis is the most widely used drug after alcohol and tobacco among young adults in Australia, the USA and Europe. This book explores the relationship between health policy, public health and the law regarding cannabis use. It assesses the impact of illegality in drug use and relates this to contemporary policy analysis in Australia, the UK, the US and other developed societies. It evaluates current debates about 'safe use' and 'harm minimisation' approaches, as well as examining the experiences of different prevention, treatment and education policies. Written by two leading drug advisers *Cannabis Use and Dependence* makes a valuable addition to this important field of research.

Wayne Hall is Director of the Office of Public Policy and Ethics at the Institute for Molecular Bioscience, University of Queensland, Australia. He has been an adviser to the World Health Organisation and is a current member of their Expert Advisory Panel on Drug Dependence and Alcohol Problems.

Rosalie Liccardo Pacula is an Economist with the RAND Corporation and a Research Fellow with the United States National Bureau of Economic Research. She has published extensively on drug consumption and policy and is a leading adviser in her field.
Cannabis Use and Dependence

Public Health and Public Policy

Wayne Hall
University of Queensland

Rosalie Liccardo Pacula
RAND Corporation, California
To our families:

Pat, Tess and David Hall
and
Joe, Gabriella and Brian Pacula
Contents

List of figures and tables ix
Foreword by Peter Reuter x
Acknowledgements xii

1 Introduction 1

Section 1 Cannabis the drug and how it is used 11

2 Cannabis the drug 13
3 Patterns of use 18

Section 2 The health effects of cannabis 31

4 The acute effects of cannabis 38
5 The cellular, immunological and reproductive effects of chronic cannabis use 46
6 The cardiovascular, respiratory and gastrointestinal effects of chronic cannabis use 60

Section 3 The psychological effects of chronic cannabis use 67

7 Cannabis dependence 70
8 The effects of cannabis use on cognitive functioning 79
9 Cannabis use and psychotic disorders 87
## Contents

### Section 4  Effects on adolescent development  101

10  Is cannabis a gateway drug?  104
11  Adolescent psychosocial outcomes  115

### Section 5  Harms and benefits of cannabis use  127

12  Comparing the health effects of cannabis with alcohol and tobacco  130
13  The benefits of cannabis use  142

### Section 6  The effectiveness and costs of cannabis prohibition  155

14  The impact of prohibition on cannabis use  159
15  The monetary cost of enforcing prohibition  165
16  Other costs of cannabis prohibition  176

### Section 7  Policy alternatives  183

17  Variations on prohibition  187
18  Cannabis as a legal substance  195
19  Summing up  213

Appendix 1  227
Appendix 2  236
References  240
Index  289
List of figures

3.1 Cannabis use in the USA in 2001 by age ........................................... 19
3.2 Trends in monthly cannabis use among 18–25-year-olds in the USA .... 20
3.3 Cannabis use in high school students in the USA in 2001 ................. 20
3.4 Trends in cannabis use in US grade 12 students 1975–2000 .............. 21
3.5 Current monthly use of cannabis, alcohol, cigarettes, other illicit drugs and prescribed psychoactive drugs by age ................................................. 22
3.6 Lifetime and past-year use of cannabis in Australia 2001 ................. 24
3.7 Trends in lifetime cannabis use among 20–29-year-olds in Australia .... 24
3.8 Global cannabis use in the late 1990s .............................................. 27
3.9 Percentage of global cannabis use in the late 1990s by region ............. 27
15.1 Per capita cannabis possession arrests ......................................... 167

List of tables

3.1 Prevalence of cannabis use surveys in European countries 1998–2000 .... 28
Foreword

Cannabis is the cutting-edge drug for those interested in drug policy reform, the only drug in the Western world for which legal change is a serious possibility. Indeed, changes are already occurring. The German High Court in 1992 declared that a state which allowed alcohol could hardly criminalise the possession of cannabis; the German states have enacted various forms of decriminalisation. Belgium, hardly known as a bastion of drug reform, expanded the frontier of choices by legalising the use of the drug in private in March 2003. The Swiss government is in the midst of a long process that may result in full legalisation. The medical marijuana movement in the various American states represents, in part at least, a reaction against the harshness of policy toward recreational use of the drug.

The basis for assessing the desirability of these policy and legal changes is weak. The research base on the health and behavioural effects, let alone the consequences of prohibition is slight. For example, there are no studies of the long-term health effects of cannabis use in the general population, itself a remarkable fact, given the number of health studies that have examined far rarer behaviours. Nor can one more than very roughly assess how much marijuana affects automobile accidents and fatalities.

The stepping stone hypothesis, the belief that marijuana use increases the likelihood that a young person will go on to use of more dangerous drugs, is central to the policy debate. Given the simple facts, that those who use marijuana regularly are much more likely to subsequently use cocaine and heroin, the hawks emphasise this with sincerity and passion. Reformers rest their case on methodologically subtle attacks on the interpretation of these facts and produce models which show that the same patterns of use could be accounted for by factors other than the drug itself. Neither side can be said to have made its case strongly. That does not prevent advocates from expressing great certainty. The reformers’ claim that there are no harms is simply wrong. Similarly, the drug warriors’ claims as to the severity and breadth of its harms are hugely exaggerated. Indeed, the official US government trumpeting of
every finding of adverse effects, often from small-scale and weak studies with conflicting outcomes, would verge on scandal if we were not induced to it.

Wayne Hall and Rosalie Pacula have written the first honest book on cannabis addressing the whole range of issues that need to be considered for a sensible policy discussion. Honesty seems like a modest plaudit for scholars but it is surprisingly rare in the area of drug policy generally. Moreover they bring to the topic established records of research on marijuana policy-related issues. Hall is a psychologist and Pacula an economist, a good combination for this task since it involves both behavioural and policy issues.

Of particular interest is their discussion of the effect of the removal of criminal penalties for possession, the middle ground for which most reform politicians reach. I, like most other scholars, have accepted at face value the research findings of a generation ago that depenalisation of marijuana in twelve American states had no effect on the prevalence of youthful marijuana use. Hall and Pacula report recent analyses that suggest there is less to this finding than meets the eye. States that depenalised did not necessarily create penalty regimes that were in fact much less punitive than those in some of the other states. For example, New York State, which removed criminal penalties for possession, retained them for actual use. Large numbers of New Yorkers pass through the criminal justice system, at least briefly, for use; to the young, depenalisation may seem like a fine point. Laws may simply not be very relevant when arrest is so rare and punishment so slight. The fact that the highest cannabis use rates in Europe are not in the Netherlands, where the drug has been de facto legalised, but in fully criminalised Britain adds to the unease that these kinds of changes are principal drivers.

Hall and Pacula’s analysis is, so to speak, sobering. Cannabis is a source of pleasure to many persons but it poses a variety of risks to users and to society. Policy debates give little weight to the pleasures, reflecting the heavy use by the young and consequently concerns about long-term developmental effects. In that sense the discussion is similar to that about the legal drinking age, in which youthful pleasures from drink are also firmly disregarded. The policy argument is centred on whether marijuana prohibition, with its attendant costs and inevitable inequities, produces enough reductions in youthful cannabis use and related harms. There is no alternative to sorting through the mass of evidence. Hall and Pacula have done that and policy-makers and the public will have to decide how to deal honestly with the uncertainties that they produce.

Peter Reuter
School of Public Affairs and Department of Criminology
University of Maryland
Acknowledgements

Wayne Hall

This book has had a ten-year gestation. It began life as a review of the health and psychological effects of cannabis use that I was commissioned to write in May 1992 by the Australian National Task Force on Cannabis (Hall, Solowij and Lemon, 1994). Parts of this review were updated for a 1997 report on the health implications of cannabis by the World Health Organisation and for a series of papers on specific aspects of the health effects of cannabis.

My work on this topic has been funded by the Commonwealth Department of Health and Ageing as part of the core funding of the National Drug and Alcohol Research Centre (between 1992 and 2001), specific grants from the Commonwealth Department of Health (1993 and 2001), and by funding for the Office of Public Policy and Ethics, Institute for Molecular Bioscience, University of Queensland (2002–2003).

Peter Reuter is owed special thanks for encouraging me to write a book that addressed both the health effects of cannabis and the effects of cannabis control policies. He also suggested the collaboration with Rosalie Pacula when my enthusiasm for finishing the book was at its lowest point after taking up my current new appointment at the University of Queensland in September 2001.

I would like to thank the following colleagues at the National Drug and Alcohol Research Centre (NDARC) who contributed to my work on cannabis that is summarised in this book:

Dr Louisa Degenhardt whose doctoral work better informed me about the relationship between mental health and cannabis use, and who provided invaluable assistance by undertaking many research and editorial tasks in preparing this book;

Dr Nadia Solowij who collaborated on the 1994 review of the health effects of cannabis and has kept me up to date with her research on the cognitive effects of chronic cannabis use;
xiii  Acknowledgements

Dr Greg Chesher who provided helpful advice on the scientific literature on cannabis over many years;

Neil Donnelly who collaborated in research on the effects of the South Australian Cannabis Expiation Notice System on rates of cannabis use;

Dr Michael Lynskey who improved my understanding of longitudinal research on adolescent health and the effects of adolescent cannabis use;

Dr Wendy Swift’s whose doctoral research improved my knowledge of cannabis dependence;

Dr Alex Wodak who will not agree with everything in this book but who made it a better book by challenging my arguments.

Special thanks are due to Sarah Yeates and Kate Morley from the Office of Public Policy and Ethics for their invaluable help in preparing the manuscript for publication. Without their efforts, under tight deadlines and competing demands, the book would not have been completed.

Finally I would like to thank my wife Pat and children Tess and David for their support throughout the work reported in this book and for allowing me to break a long standing family rule by working on Saturday afternoons in the last two months of work on the book.

Earlier versions of the many chapters have been previously published. Chapter 1 includes material originally prepared for the WHO on assessing the health and psychological effects of cannabis. Chapters 2–12 are extensively updated and revised versions of chapters in Hall, Solowij and Lemon (1994) and Hall, Degenhardt and Lynskey (2001). Chapter 7 on cannabis dependence benefited from the doctoral work of Wendy Swift. Chapter 8 on the cognitive effects of chronic cannabis use is indebted to Nadia Solowij’s doctoral work which was published as Solowij (1998). Chapter 11 has been based on work done in collaboration with Michael Lynskey on the educational consequences of adolescent cannabis use. Chapter 13 is based in part upon literature reviewed by Louisa Degenhardt for her doctoral thesis. Chapter 19 develops arguments first expressed in the 1999 Okey Lecture (Hall, 2001).

Rosalie Liccardo Pacula would also like to gratefully acknowledge the contributions of several of her colleagues. In particular, she would like to thank Beau Kilmer, MS, for his excellent research assistance and significant contributions to the sections on marijuana use and crime included in Chapters 14 and 16. The literature review included in these two chapters, in addition to that reflected in Chapter 15, was partially supported by a grant from the National Institute on Drug Abuse to Dr Pacula at RAND.

Chapters 17 and 18, which focus on the legal aspects of prohibited and regulated markets, benefited significantly from discussions and comments with numerous
Acknowledgements

colleagues, including Peter Reuter, Rob MacCoun, Jonathan Caulkins, Jamie Chriqui and Mark Kleiman. The legal framework employed in these two chapters was developed in conjunction with work being conducted by Drs Pacula, Chriqui, MacCoun and Reuter on alternative cannabis depenalisation regimes with funding from the Robert Wood Johnston Foundation.

Finally, Dr Pacula would like to acknowledge the contribution made by her immediate family, particularly her husband Joe, her children Gabriella and Brian, and her sister Kathleen Liccardo, without whose personal sacrifice this project would not have been completed.