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This Issue in the Journal

Original articles

Young people, money, and access to tobacco

Grace Wong, Marewa Glover, Vili Nosa, Becky Freeman, Janine Paynter, Robert Scragg

Studies have shown that children who get more pocket money are more likely to smoke. We used focus group interviews with Māori, Pacific Island, European, and Asian 11 to 15 year olds to find out more about access to, and payment for, cigarettes. They told us that they could get cigarettes free from family, friends, and adults in the street. They could also buy cigarettes from retailers, and from social suppliers for as little as 50 cents each even though this is illegal. Youth used pocket, lunch, earned, 'scabbed', and borrowed money to buy cigarettes. Adults and family members must be discouraged from giving children cigarettes, and parents advised to communicate openly with children about spending, in order to discourage cigarette purchase.

Parental and adolescent smoking: does the association vary with gender and ethnicity?

Robert Scragg, Marewa Glover

This paper reports results from the largest survey to-date of the influence of parental smoking on adolescent smoking (sample size of more than 90,000 Year 10 [4th form] students surveyed in 2002–2004). Parental smoking is a consistent risk factor for adolescent smoking in a multi ethnic sample. Maternal smoking has a stronger effect on youth smoking than paternal smoking. The effects of maternal and paternal smoking were additive in youth of all ethnic groups except for Asian, where they had a synergistic effect (i.e. more than the sum of their net effects). The effect of maternal smoking was strongest in the youth of Asian families, where maternal smoking is less common than in other ethnicities.

Is Salamol less effective than Ventolin? A randomised, blinded, crossover study in New Zealand

Catherina L Chang, Manisha Cooray, Graham Mills, Robert J Hancox

Salbutamol is the most commonly used asthma reliever inhaler in New Zealand with over ½ million prescriptions per year. Salbutamol as Ventolin® is now no longer fully funded by PHARMAC and plans have been made to gradually replace it with a fully-funded generic alternative—Salamol®. Concerns regarding the effectiveness of Salamol (compared to Ventolin) have been raised by patients as well as some doctors. In our study, the effects of Ventolin, Salamol (new), and Salamol (used) inhalers were assessed by breathing tests in 12 volunteers with artificially induced asthma attacks. The volunteers did not know what inhalers they were receiving. We found no difference in the responses to Ventolin or Salamol inhalers (both inhalers were

equally effective). Our study is the first to objectively assess the airway dilation affects of Ventolin and Salamol inhalers in the setting of an asthma attack.

Smacking—are we being too heavy-handed? Findings from the Pacific Islands Families Study

Philip J Schluter, Gerhard Sundborn, Max Abbott, Janis Paterson

Smacking is a widespread form of discipline administered to Pacific children and hitting with objects is common. If the use of objects constitutes a consequential assault in the newly ratified Crimes (Substituted Section 59) Amendment Act 2007 then many parents within this cohort are in breach of this law. We believe that legally-acceptable guidelines for corporal punishment need to be made clear to all, and widespread culturally-sensitive efforts to teach parents positive parent management strategies are urgently required.

Punitive parenting practices of contemporary young parents

Lianne J Woodward, David M Fergusson, Anna Chesney, L John Horwood

In this study we describe the punitive parenting practices of a group of young (<25 years) New Zealand (NZ) parents to identify risk factors that placed these vulnerable young parents at increased risk of child physical punishment/abuse. At age 25, all respondents who had become a parent were interviewed about their parenting practices and family circumstances, including an assessment of the use of child physical punishment/abuse. Punitive parenting behaviours questioned about included smacked on bottom with bare hand; hit on bottom with belt, hairbrush, stick, or other hard object through to very severe forms of physical assault/abuse (i.e., hit child over and over as hard as could, choked, burned, or scalded on purpose). We identified poorer and larger families, and parents who experienced the same behaviours in their own childhoods, as being particularly at risk of displaying punitive parenting behaviours. Findings support the recent introduction of the anti-smacking law in NZ.

Neonatal intensive care utilisation by infants born to mothers older than 40 years of age: a 10-year review

Malcolm Battin, Coila Bevan, David Knight

The age at which women in New Zealand give birth to their children is increasing. We have studied 10 years of data on admissions for neonatal care at National Women's to evaluate important trends including resource utilization by infants born to women over the age of 40 years. For the study period, 203 infants were admitted with admissions increasing to a peak in 2001-2002. Changes in referral practice from 2004 may have affected the infant numbers thereafter. Thus, infants born to mothers over the age of 40 currently represent about 3% of total births but 5% of the infants requiring neonatal intensive care.

Non-fatal work-related motor vehicle traffic crash injuries in New Zealand: analysis of a national claims database

Shaheen Sultana, Gillian Robb, Shanthi Ameratunga, Rod T Jackson

This study describes event rates and associated costs from non-fatal work-related motor vehicle traffic crash injuries on public roads in New Zealand based on an analysis of the Accident Compensation Corporation (ACC) claims database. Transport workers were the most common occupational category among this particular category of injury claimants. Relatively high rates of work-related motor vehicle traffic crash injuries were also observed among workers in communication (postal, courier, and telecommunication services); mining; and electricity, gas, and water supply industries.

Viewpoint article

The new International Health Regulations: a revolutionary change in global health security

Michael G Baker, Andrew M Forsyth

The new International Health Regulations (2005) came into force in June 2007 in 193 countries including New Zealand. This is the most comprehensive global agreement ever developed for managing emerging human health hazards such as SARS and pandemic influenza. The IHR 2005 expands the range of events which must be notified by introducing a new legal concept, the Public Health Emergency of International Concern. It also allows the World Health Organization to use all sources of information for identifying emerging hazards, including news reports and the Internet. With collective national and international effort, this agreement will support greater global health security for all.



Punishment of children in relation to the new anti-smacking law in New Zealand

Ian Hassall

The report from the Pacific Islands Families (PIF) Study in this issue of the *Journal* by Schluter et al (<http://www.nzma.org.nz/journal/120-1267/2860>) is another reminder of New Zealanders' habits in relation to punishing children. Interestingly, the distribution of frequency of mothers striking their 4-year-olds in this cohort differs little from that found by the Ritchies in their mixed New Zealand European (Pākehā)/Māori population sample of mothers of 4-year-olds 40 years ago.¹

While the data is useful, the paper's main argument and conclusion, in relation to accommodating physical punishment, rests on an apparently careless reading of the *Crimes (Substituted Section 59) Amendment Act 2007*.

The Act explicitly prohibits at s.5(2) the use of force for the purpose of correction and yet the authors conclude, "*We believe that guidelines for corporal punishment which is legally acceptable needs to be made explicit to all...*"

No corporal punishment is legally acceptable under the new law. The further conclusion that, "...widespread culturally sensitive efforts to teach parents positive parent management strategies is urgently required." is, of course, well drawn.

In 2 years of Select Committee hearings and public and parliamentary debate the punishment issue was examined exhaustively and in May 2007 an overwhelming parliamentary majority passed a modified version of the original Bill introduced in June 2005.

Parliament opted for outright prohibition of corporal punishment. However, the authors of this paper say the new law "*removed parents' or caregivers' statutory defence to use reasonable force for the purpose of correction except in circumstances to prevent or minimise harm to the child or another person.*" This is simply not true.

The provision for the use of reasonable force in these circumstances is not an exception to the prohibition of force for correction. It covers the circumstance of restraining a child which, although it is technically an assault in law, is clearly a desirable part of child-rearing practice.

On the separate issue of police discretion, there is another error. It is said "*a late amendment within the Act gave police the discretion not to prosecute complaints.*" The discretion was not 'given' under the Act but 'affirmed', the word used at s.5(4). The difference is that the Act did not create police discretion and therefore there was no aim by the lawmakers to specifically modify or minimise the effect of the Act.

The provision affirms long-standing police discretion in determining whether an alleged assault on an adult or child should be prosecuted. The clause was inserted to allay fears of wholesale prosecution that had been evoked by opponents of the Bill.

These are not trivial issues. The purpose of the new Act is, as stated at s.4, “..to make better provision for children to live in a safe and secure environment free from violence by abolishing the use of parental force for the purpose of correction.”

This aim will not be achieved by interpretations that return the law to setting a standard of parental conduct toward children that includes striking them at will.

The two South Island longitudinal studies provide evidence for New Zealanders' habits in relation to severity of punishment of their children.^{2,3} Six percent of the Dunedin cohort and 3.9% of the Christchurch cohort suffered harsh or severe punishment; 35% percent of the Dunedin cohort reported that the usual punishment during their primary school years when their parents were mad at them was hitting them with an object.

Telephone surveys of adult New Zealanders that have framed their question in terms of adult authority vs child misbehaviour have consistently found around 80% of respondents in favour of striking children in certain circumstances.⁴⁻⁶ In other surveys of adults with questions framed more neutrally or from a child's perspective, different results have been obtained, with a slender majority favouring sparing the child.^{7,8}

The provisions of the old s.59 of the Crimes Act 1961 supported the custom of hitting children and was inherited from British law and ultimately Roman law. Similar provisions have until recently been widely in force around the World.

The main arguments of the supporters of repeal were that the existence of s59 was:

- An infringement of the child's right to physical integrity and a life free of the threat of pain, humiliation, and injury.
- A denial of equal protection as a citizen before the law.
- An expression of a culture of violence.
- A danger to the child through removing a barrier to escalation to greater violence.

The efficacy or not of physical punishment was never an important part of the argument. Physical punishment of wives, apprentices, and others that was once permitted would still, after all, be condemned even if it could be shown that it improved their behaviour. Furthermore, there is no evidence that the 20% or so of children brought up without physical punishment are less disciplined or worse behaved than their punished peers. On the contrary, there is evidence that physical punishment is a health risk to children.⁹

These arguments won the day. New Zealand law does not now permit the use of force for the purpose of correction of a child. It is the first law of this kind among the English-speaking nations although it is only 18th among the nations of the World (Nordic nations were the first to make this law change: Sweden in 1979, Finland in 1983, and Norway in 1987. In 2007, four countries have made the change: The Netherlands, New Zealand, Portugal, and Uruguay.)

The law spells out the circumstances, such as prevention of harm to the child, in which restraint can be used (Box 1). For example, parents and carers can stop a toddler from running onto the road or from touching a heater. And they can restrain a child from damaging property, hitting another child or an adult, or hurting an

animal.¹⁰ Those who cannot envisage a parent-child relationship in which smacking does not feature may interpret this as permission to smack but it is clear that this is not the intention of the law.

The new Act also reiterates the established provision in law for the exercise of police discretion in deciding whether or not to prosecute. There has been an argument put forward that a persistent majority in favour of striking children means that the law is invalid and some provision must be made for accommodating people who wish to go on striking their children. This is hardly in the tradition of our democracy or any other but more in the nature of an appeal to mob rule. This point has been well made in a recent New Zealand Herald editorial.¹¹

Box 1. Excerpt from the Crimes (Substituted Section 59) Amendment Act 2007

“59 Parental control

“(1) Every parent of a child and every person in the place of a parent of the child is justified in using force if the force used is reasonable in the circumstances and is for the purpose of—

“(a) preventing or minimising harm to the child or another person; or

“(b) preventing the child from engaging or continuing to engage in conduct that amounts to a criminal offence; or

“(c) preventing the child from engaging or continuing to engage in offensive or disruptive behaviour; or

“(d) performing the normal daily tasks that are incidental to good care and parenting.

“(2) Nothing in subsection (1) or in any rule of common law justifies the use of force for the purpose of correction.

“(3) Subsection (2) prevails over subsection (1).

“(4) To avoid doubt, it is affirmed that the Police have the discretion not to prosecute complaints against a parent of a child or person in the place of a parent of a child in relation to an offence involving the use of force against a child, where the offence is considered to be so inconsequential that there is no public interest in proceeding with a prosecution.”

Source: Public Access to Legislation Project. Parliamentary Counsel Office in association with Thomson Brookers: <http://www.legislation.govt.nz/>

Progress in human rights from abolition of slavery onward has been dependent more on principled leadership than on popular demand. It would be a retrograde step to revisit definition of where and how hard and at what age children should be hit. It is a notion bordering on the macabre, reminiscent of the ‘rule of thumb’ under which husbands were once permitted to chastise their wives, and was quite properly resoundingly defeated by our parliamentary representatives in May.

Competing interests: I was New Zealand's first Commissioner for Children from 1989 to 1994; a post which is currently held by Cindy Kiro.

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Salamol—was it worth it?

Lutz Beckert, Adrienne Edwards

Background—Asthma management guidelines advise regular reviews to allow for best possible asthma treatment. However the most vulnerable patients cannot afford regular reviews let alone the medication prescribed. If they do attend the clinic, our practice is hampered by limited access to combination products, inhaler regimens that require expert manual dexterity, breath holding, the cleanliness gene, and a suitcase to hold all the kit. So why are we focussing so much attention on an inhaler that is easily blocked, hard to engage, and foul tasting?

The economic cost of asthma in New Zealand was estimated to be around NZ\$825 million per year during the late 1990s—comprising about NZ\$125 million in direct medical costs and about NZ\$700 million in indirect non-medical costs, including days off work.¹

The PHARMAC decision—In 2005 New Zealand's medication funding authority (PHARMAC) introduced a cheaper salbutamol inhaler, Salamol®, to replace Ventolin® and estimated it would save the country NZ\$2 million over 16 months.¹⁵

PHARMAC announced this cost-saving exercise and informed the public that it would subsidise one metered-dose inhaler, Salamol—which forced more than 500,000 patients to switch from their 'trusty puffer' (Ventolin) to Salamol or pay the full price. (Salamol was gradually introduced in other countries whereas in New Zealand there was hardly any warning, and the only public discussions involved cost savings.)

This decision fuelled public debate and scepticism in those affected by the changes. This was compounded by negative reporting in the media with a case report of Salamol resulting in a failed alcohol breathe test.^{2,3} Unsurprisingly, Medsafe received over 700 complaints about this cheaper asthma drug. Biased or not, it felt different, tasted different, and made patients feel worse.

The Reti study—Dr Shane Reti became an advocate for these voices when he published an article in the *NZMJ* emphasising these points.⁴ Although the study was widely felt to be unscientific (poorly designed, prone to bias, small numbers, no blinding, no crossover, and short duration), it highlighted the experiences of patients when advised they could no longer use (or had to pay the full price for) their Ventolin inhaler.

PHARMAC reviewed its policy and continued the Ventolin subsidy for 2 years whilst the complaints were investigated further.

Medsafe investigation—New Zealand Medicines and Medical Devices Safety Authority (Medsafe) investigated the faulty devices from complainants and found that Salamol inhalers did indeed 'block' when uncleaned but functioned appropriately following a good clean (as per manufacturer guidelines).⁵ Despite learning points from marketing experience elsewhere, Medsafe felt that patients and health

professionals were ill-informed and unprepared regarding Salamol and its cleaning requirements.

Waikato study comparing Salamol to Ventolin—Medsafe's finding together with Reti's article facilitated the Waikato investigation in this issue of the *NZMJ* which aims to establish whether Salamol is as efficacious as Ventolin.⁶

The Waikato study is not a perfect trial but addresses most of the concerns raised about Salamol. It demonstrates that Salamol is as good as Ventolin at reversing methacholine-induced bronchospasm in a single-blinded fashion. Although it does not remove all concern about Salamol, it has taken the complaints seriously, given some answers, and should help restore trust in the new Salamol preparation.

Shortcomings of that study include:

- The use of spacers, which fails to address the argument that Salamol is harder to activate than Ventolin.
- Children were not included.
- The 'laboratory-used' Salamol inhalers, probably do not mimic Salamol inhalers that have spent quality time in sports bags, pockets, bathrooms.

These limitations may be explained by the lack of funding for the study. To avoid conflict of interest, no pharmaceutical funding was accepted by the authors. The suspicion persists that without proper cleaning the Salamol inhaler may not perform as well as the Ventolin version.

Should the article by Reti have been published in the first place?—The accompanying editorial, letters following publication of the article, and even the author himself alluded to its unscientific design. The following original articles highlight previous clinical observations that have forwarded clinical thinking.

- John Homans highlighted the development of deep vein thrombosis (DVT) in one patient following airline travel, and in two others following prolonged automobile travel. Now part of a recognised, though minor, risk factor for venous thromboembolic disease.⁷
- In 1963 two pathologists published their observations; 21 children with fatty degeneration of viscera were observed. A clinical description (which became known as Reyes syndrome) in children with viral infection treated with aspirin followed.⁸
- Meningococcal meningitis cases noticed amongst the epidemic of encephalitis lethargica during the influenza epidemic.⁹

It seems paradoxical that the call for more evidence is actually stopping clinical-based research and forcing researchers to collaborate with industry to obtain necessary funding. The outcome of these industry-sponsored trials are often 'scientifically correct' but become clinically meaningless by focussing on drug prescription alone.

Where are we at with our asthma care?—New Zealand has one of the highest prevalence rates of asthma in the World, with asthma occurring in about 15–20% of children and adults and affecting at least 600,000 people. Asthma tends to be more common in Māori and Pacific Islanders than in non-Polynesian (predominantly

European) New Zealanders and has been attributed to the inequality of health associated with being in a low socioeconomic group.¹⁰ In the Melbourne Asthma Study, 89 patients under the age of 45 died over a period of 2 years. Smoking, alcohol, and family problems were more common in these patients than in the control living asthmatics. Written action plans were associated with a 70% reduction in the risk of death.¹¹ It suggests much work is still to be done and these problems of daily care probably won't be addressed through sponsored trials.

It is refreshing to read the new American Asthma guidelines, which embraces the theme of partnership in asthma management. They structure the asthma care in the following four steps:¹²

- Measures of *assessment and monitoring*, obtained by objective tests, physical examination, patient history and patient report, to diagnose and assess the characteristics and severity of asthma and to monitor whether asthma control is achieved and maintained.
- *Education for a partnership* in asthma care.
- Control of *environmental* factors and comorbid conditions that affect asthma.
- *Pharmacologic therapy*

A holistic patient approach is required if we are ever going to negate mortality due to asthma, regardless of what guideline we follow. Great work has already been completed in New South Wales using a peer led programme for asthma education in adolescents.¹³ This has not been widely adopted but might be an additional way of improving control in those unlikely to attend the clinic.

New Zealand researchers have published on the impact of insulating housing on respiratory symptoms. Insulation resulted in improved self related health, self reported wheezing, less days off school and work, and fewer GP and hospital visits.¹⁴ Such interventions will not only improve community spirit, but have potential to reduce health inequalities. We need to work within our communities both locally and nationally to ensure all asthmatic patients receive the correct long-term partnership plan.

So has the Salamol debate been of value to the New Zealand asthmatic population?—If money saved from prescribing cheaper (probably efficacious) medication is used to improve inequalities in housing and health, then we would likely embrace this partnership with Salamol. Even if it involved a little extra cleaning.

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Raising non-smokers

Jennie Connor, Rob McGee

The primary prevention of smoking and its consequent harms means stopping uptake, primarily among adolescents. For adolescents, smoking features as an assertion of maturity, but once established becomes hard to shake. As in the case of hazardous use of alcohol by young people, there are many demonstrable influences on uptake but they are essentially the determinants of demand (or desirability), and supply (or access). All of the factors that influence how desirable smoking is to adolescents, and that control their access to tobacco must be considered as opportunities for action to reduce harm.

The prevalence of smoking among New Zealand Year 10 students has been monitored yearly since 1999, and daily smoking has declined each year. In 2006, the prevalence for girls (10.1%) continued to be higher than for boys (6.2%), and large ethnic differences persisted, with the highest prevalence in Māori girls (25.2%) and the lowest in Asian girls (2.0%).¹ Overall, the decline should be seen as encouraging as it is occurring in both boys and girls and in all ethnic groups.

In this issue of the *Journal*, two papers deal with smoking in adolescents; one exploring demand (Scragg and Glover) and one supply (Wong et al). Both papers increase our understanding in important areas, and both need to be translated into ideas for effective action.

The article by Scragg and Glover² examines the recognised relationship between parental smoking and the uptake of smoking by adolescents. By combining 5 years of Year 10 smoking surveys they have been able to quantify the influence of mothers' smoking and fathers' smoking, as well as how these influences vary among ethnic groups.

Parental smoking, and by mothers in particular, is shown once more to be a major contributor to youth smoking. Nevertheless, parental influences on smoking remain subject to broader social and cultural influences. This is reflected in strong associations of youth smoking with lower socioeconomic status^{3,4} and ethnicity¹ in New Zealand.

It might be argued that the most pervasive influences on adolescent smoking are the tobacco industry, and in turn the retail industry. By and large, young people smoke because people market and sell cigarettes to them. While the direct advertising of cigarettes has been reduced by legislation, adolescents are still subject to ideas and images propagated by popular culture. This has been exploited in the past by tobacco companies' use of "product placement" in films to expose adolescents to an artificially high prevalence of smoking, and to reinforce the association of smoking with success and glamour. Increasing evidence of the effects of this strategy on smoking behaviour of young people is emerging.⁵

One response might be to re-classify films on the basis of smoking content, but this remains controversial as it may simply increase the perception of smoking as a sign of

maturity, or as “forbidden fruit”. Public health workers may do better to work with script writers and directors of movies and television programmes directly, to reduce the reliance on depicting smoking as part of a storyline. Earlier this year, Disney Studios announced that they will “discourage the depiction of cigarette smoking in Disney, Touchstone, and Miramax films” and that “in particular, we expect that depictions of cigarette smoking in future Disney-branded films will be non-existent.”⁶ This move followed a challenge to the film industry from US congressman Edward Markey, chairman of the US House of Representatives subcommittee on telecommunications.

While progress in the film industry is encouraging, web-based media such as YouTube, Facebook, and MySpace provide unregulated access for adolescents to pro-tobacco material. “Stealth marketing” using these media as well as the implications for tobacco control are now being investigated.⁷

Parents exert influence over the uptake of smoking in ways other than their own smoking behaviour. Parental disapproval of smoking has been associated with reduced youth smoking,⁸ while inconsistent advice about smoking in childhood has been associated with higher levels of smoking in young adults.⁹ Exposure to parents’ quitting behaviour in adolescence also seems to reduce uptake,⁹ and in the annual Year 10 surveys, there was a greater reduction in smoking among students from smokefree homes than homes where smoking is permitted.¹ Parents also have the opportunity to influence the supply side of adolescents’ smoking by not supplying cigarettes (directly or by having them available to take) and by decreasing pocket money or monitoring its use.¹⁰

Also in this issue of the *Journal*, Wong et al¹¹ report on a qualitative study of young people, money, and access to tobacco. Focus groups of 11–15 year olds reveal how children access tobacco with only small and variable amounts of money. Given the population-based strategies that have been implemented to control access to tobacco by young people it is disappointing to see how easy it remains.

Parallels with underage supply of alcohol are clear here. Plenty of rules exist but they are paralysed by lack of enforcement. Young people consistently report that a lot of tobacco is sold directly to the under-age smokers by retailers.¹² Added to this fact, the well-supplied informal market breaks down the barrier of a child having to be able to buy a whole packet of 20 cigarettes.

Smoking in young people is inextricably linked with smoking in adults, particularly parents, and continued efforts to get adults to quit should benefit young people. One of the most effective strategies for this—increasing taxes on tobacco—will immediately make tobacco less accessible to school children. Even though cigarettes will still be bought informally in small numbers, increasing the price will decrease the supply. They will become too expensive for many children to buy, and too expensive for adults or friends to give away or be careless with.

In this new study about access to cigarettes by young people, as with those that have preceded it (e.g.^{12,13}), tobacco retailers’ poor compliance with the law stands out as a major barrier to reducing youth smoking.

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Young people, money, and access to tobacco

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Abstract

Introduction The social and family processes involved in children's sources and use of money in relation to buying cigarettes are not well understood. Hence this study investigated how Māori, Pacific Island, European, and Asian school students access cigarettes, with a special focus on their disposable income.

Method Students aged 11–15 years, recruited through schools, participated in 12 focus groups run by ethnically matched senior student facilitators and researchers. Topics discussed included sources of student money, parental monitoring of the use of money and student access to cigarettes.

Results Students reported that young people can easily buy cigarettes from tobacco retailers. They could also be bought cheaply (50 cents for a roll-your-own) and/or on an "I owe you" basis from friends and social suppliers. Students used money from family, and money that was earned, "scabbed", and borrowed from friends. Cigarettes were also obtained freely from family members or from adults on the street. Whilst parents monitored students' use of large amounts of money, participants experienced relative freedom to spend small amounts which they saved out of money provided by parents for lunches and other purposes. Students were open to parental advice on how to use money but felt they should have the final say.

Conclusion Cigarettes continue to be accessible to children free or at affordable prices. Adults and family members must be discouraged from supplying cigarettes to children. Parents should be made aware of the way children use small amounts of money and advised to monitor, educate, and guide them to discourage cigarette purchase.

Children in communities with strict tobacco sales laws and strong disincentives to buy cigarettes continue to buy cigarettes from both commercial and social sources.^{1,2}

New Zealand has implemented a comprehensive range of strategies with the aim of reducing youth access to tobacco products. They include smokefree legislation to:

- Raise the legal age for purchase of tobacco from 16 to 18 years;
- Raise the tax on tobacco to reduce its affordability;
- Disallow the sale of packs of 10 cigarettes or single cigarettes;
- Restrict the display of tobacco products;
- Restrict the use of tobacco-product vending machines; and to
- Ban tobacco advertising, promotion, and sponsorship.^{3–5}

Despite these provisions, Darling et al (2005) found that New Zealanders aged 15–16 years obtained most of their tobacco from commercial sources.¹ They estimated that tobacco sales to under-18 year olds exceed \$35 million per year. Children aged 15–16 reported buying cigarettes themselves (44.3%) or having them bought by someone else (10.4%). They also reported buying cigarettes from other students (2.4%). Other sources of cigarettes were friends, family, or by stealing them.^{1,6}

Several studies have associated cigarette purchase by young people with disposable income. For youth aged 13–19, participation in employment has been associated with increased smoking and spending on cigarettes.^{7,8} The amount of pocket money received by school children (12–19 years) has been positively associated with smoking.^{6,9–11} In New Zealand, the adjusted relative risk of self-purchasing cigarettes was 74% higher for Year 10 students receiving more than \$50.00 per week compared with students receiving \$10.00 weekly or less.⁶

Parents are the most important source of disposable income for their children and they influence the way their children save and spend their money.^{7,12} In a recent qualitative study, Māori, Pacific Island, European, and Asian parents of children aged 8 to 15 were confident their children did not use pocket money to buy cigarettes.¹³ However, young people self-report buying cigarettes.^{1,6,14,15}

Croghan et al found that youth (13–15 years) were most likely to use their pocket money to buy cigarettes.¹⁵ The social and family processes involved in New Zealand children's sources and use of money in relation to buying cigarettes are not well understood. This limits the scope of potentially effective action aimed at reducing youth access to tobacco products.

This study was designed to inform a multi-faceted family, school, and community-based intervention aimed at reducing smoking initiation among Year 7 and Year 8 children, aged 11–13 years. The study used a qualitative design to investigate how students access cigarettes with a special focus on their disposable income.

Methods

Participants—Māori, Pacific Island, New Zealand Europeans, and Asian students were recruited from a co-educational Intermediate school (Year 7 and 8 students), and two single-sex Colleges (Year 10 boys and girls). The schools selected reflected the ethnic diversity of the smoking population in New Zealand, and had middle to low decile levels. The school decile is a measure of socioeconomic status, with decile 1 schools having the highest level of disadvantage and 10 the lowest level.¹⁶ Youth aged 11–15 were selected since qualitative and cross-sectional studies suggest that smoking initiation for many Māori begins at 10; 29% of Year 8 students reported smoking in the past, and more than a third of students (males 36.2% and females 36.5%) have reported smoking a cigarette at the age of 13 or younger.^{17–20} Staff at the three schools identified up to 20 students (smoking and non-smoking) from each ethnic group, excluding those who did not speak English. Students were informed of the nature and purpose of the study, and provided with an information sheet and letter inviting them to participate. If they wished to participate they were given a letter and information sheet for their parents along with a consent form for their parent to sign.

Procedures—Twelve focus groups were conducted in 2006. A parallel culturally appropriate youth-focused design was used. Separate focus groups and interviews were run for Māori, Pacific Islanders, New Zealand Europeans (Pakeha/Europeans), and Asian/other students by trained ethnically matched student facilitators and researchers.

Māori, Pacific Island, European and Asian senior students (16 years and over) were identified as potential focus group facilitators by school staff at the single-sex schools on the basis of their leadership and communication skills, and availability. Four female and four male students participated in a 4-hour workshop on facilitating a focus group.

The male student facilitators ran the focus groups with researcher support at their own school. The female student facilitators ran the focus groups with researchers at their school, and at the Intermediate school. At each school, the focus groups for the different ethnic groups were run simultaneously in classrooms or quiet areas such as the library. Refreshments were provided for participants. They also received either a \$NZ15.00 school tuck (food retail) shop or bookstore voucher.

The school tuck shop vouchers were given on the advice of the student facilitators from one school with a National Heart Foundation-endorsed healthy food outlet. Schools received a koha (gift) of \$NZ250.00 to acknowledge their help.

Only students with signed consent from a parent were able to participate in the focus groups. Students were further informed about the study and their personal right to withdraw at the beginning of the focus groups. They then signed their own consent forms. The student facilitators signed confidentiality forms and were reimbursed for their time. The study was approved by the University of Auckland Human Participants Ethics Committee.

The research team developed a semi-structured interview schedule to investigate findings that related disposable income to student smoking from the annual New Zealand-wide ASH Year 10 surveys, as well findings about parental beliefs about their children's use of their disposable income and purchasing of cigarettes from a previous study.^{11,13}

The interview schedule was piloted with the student facilitators. Despite reassurances about confidentiality, student facilitators were initially reluctant to talk about personal income. Consequently the interview schedule was modified so that focus group participants were asked about their understanding of the "pocket money" and "earned money" items in the national Year 10 survey first. This was followed by questions about the sources of money for youth, spending, parental input into managing money, and youth purchase of cigarettes.

The researchers and student facilitators discussed the focus groups after the first two rounds, and the question schedules were not altered again. Demographic data—including age, sex, whether born in New Zealand or not, self-identified ethnicity, smoking status, sources of cigarettes, parental smoking status, and the amount of money students received weekly—was collected on a self-complete questionnaire. The student facilitators were debriefed immediately after the focus groups finished.

The interviews were taped and the researchers assisting the student facilitators took notes. The tapes were transcribed. Researchers reviewed their transcripts for accuracy and added material from their notes as necessary. The transcripts were combined into one document under subject areas.

Initially, the subject areas followed the topics in the semi-structured interview schedule. An inductive content analysis process was used to identify new subject areas.²¹ The results from each ethnic group and each school remained clearly identifiable. Multiple readings of the combined document were used to identify similarities and differences across the different age groups and ethnic groups as well as across the male and female Year 10 focus groups. The research team discussed their individual results and the overall results together, identifying similarities and highlighting and interpreting ethnic variations.

All but two of the focus groups ran as planned. In one group, the researcher ethnically matched to the group was unwell, but a suitable replacement was found. In another, the student facilitator was unwell and the adult researcher ran the group alone. Feedback from the facilitators and researchers revealed that the focus group participants found the student facilitators approachable. They talked freely among people from their own cultures observing tacit and explicit cultural nuances naturally. For instance, one Māori group elected to begin with karakia (prayer), to set the scene for that group in that school.

The adult researchers made sure comments were followed up, and everyone had a chance to speak. This was a particular issue in one instance where the student facilitator reacted to prior experiences of a student from the same school by not noticing that student's contribution. The student facilitator had already told the researcher about these experiences, thus alerting the researcher to a need for support which was well accepted. The student facilitators were positive about their experiences in their debriefing sessions.

Results

A total of 81 students participated in 12 focus groups ranging in size from 2 to 10 participants. Focus groups with Year 10 students were gender-specific. Focus groups with Year 7 and 8 students were mixed (10 males and 19 females). The participants

were aged 11–15 years. Eighteen of the 81 students described themselves as having two or more ethnicities. Overall, 20 students were not born in New Zealand.

Table 1. Characteristics of participants

Variables	College Girls	College Boys	Intermediate	Total
Māori	7	7	4	18
Pacific Island*	7	10	9	26
Asian	5	2	10	17
European/Pakeha	6	8	6	20
Total	25	27	29	81
Smoked ever	12	14	3	29
Smoke now	5	8	2	15
Both parents smoke	4	7	6	17
Mother only smokes	4	4	4	12
Father only smokes	3	5	4	12
Have friends who smoke	5	10	4	19
Buy cigarettes	2	1	0	3
Get cigarettes from family	6	3	2	11
Get cigarettes from friends/other	11	14	2	27

*Mostly of Samoan, Tongan, Niuean, or Cook Islands origin.

Twenty-nine students reported smoking ever (including just a few puffs), and 15 smoked currently. Five smoked at least once a day. Seventeen students reported that both their parents smoked. In addition, 12 said their mothers only smoked, and 12 that their fathers only smoked. Nineteen had friends who smoked. Three students reported they bought cigarettes themselves, 11 got cigarettes from family members, and 27 from friends or someone else (multiple responses possible). See Table 1.

There were few differences in the focus group results across the four ethnic groups, the two different age groups, and the male and female Year 10 student focus groups. Because of this, the results were integrated with differences between the ethnic, age, and gender groups highlighted as they occurred.

Sources of money for children—Participants in all the focus groups said they received money from their parents and other family members (older siblings, grandparents, uncles, aunts, cousins, and relations from overseas). Some students reported earning from employment outside the home. Māori, Pacific Island, and European students particularly described sharing, borrowing and repaying money between friends. A few students described “scabbing” (scrounging or asking), bullying (boys only), or stealing money (“when you’re desperate”).

Money supply was intermittent and variable for most students. Many described “just asking” for money when it was needed for specific purposes such as school trips and stationery. Students were also given pocket money regularly or irregularly, and as a gift.

All the Asian groups, and some students in the other groups, said they received money for doing well at school. Students also said they got money for achieving in sports events (Māori) or as “bribes”. One student said parents gave money to children so that they would “keep out of their faces” (stay out of the way). Others received money when they did jobs at home.

The amount of money participants received varied across all ethnic groups. Some students reported getting no money ever, others said they were given up to \$70.00 weekly or on occasion \$500.00 (such as for their birthday). Receiving \$5.00 for lunch was common.

Participants said that students (not necessarily themselves) used the money from family (pocket money, money from home, lunch money) to buy cigarettes. Students also reported using earned money, scabbed money, and money from friends to buy cigarettes.

What children did with their money—Students commonly reported that they “save some, spend some” although some participants said they spend all the money they get. Most said they saved or would save some of the money they received. Some students gave all the money they received to their parents to save for them. Students described saving small amounts until they had enough to buy something that they wanted.

Male and female students of all ethnicities and ages mainly spent their money on food. Mostly female students, and particularly Asian and European girls, said they used their money for clothes, shoes, DVDs, and mobile phone ‘top-ups’. Both male and female participants reported using money for presents, outings (e.g. movies), and sharing with friends (especially Māori and Pacific Island students). Buying drinks (male participants) and “smokes” (male and female) were also reported in three focus groups with Year 10 students.

What parents want children to do with their money—All groups reported that parents advised participants to spend their money “wisely” and to save money. Students said parents gave them money for specific purposes e.g. lunch, stationery, school trips, to shop for the family. Some students received pocket money which was their own to spend as they pleased. Some said they were expected to use their own money to buy things over and above what their parents considered their responsibility to provide.

What children expect to be able to do with their money—Students thought that parents should help by advising them about getting value for money, but they all felt they should be able to control their own money themselves—parents could help them decide how to spend their money but ultimately the students wanted to “have the last say”:

In some ways she [mother] has her opinion, but in other ways she doesn't have the right because it's not her money.

Students were positive about having money at their disposal. They said it made them feel “rich”, “free” (“buy what you want”), and “safe”—although it could also make you feel sad because it would run out, might be stolen, or you could be forced to “hand it over”.

Some participants did not always tell their parents when they had money. This was because they could be instructed to hand it over for safekeeping and it could be spent and not returned to them. Māori and Pacific Island students said money was good for “sharing with friends”.

Long-term savings were for the “future”, university, or a car. More short-term savings were “until I see something good” or for things that cost more than a small amount e.g. \$5.00.

Parental monitoring—Participants reported that parents both liked to know what their children did with their money, especially large amounts, and actually knew about this. Participants described showing their parents purchases, and parents checking receipts, “Eftpos”, and bank statements. They said their parents got angry when money was spent on things they did not approve of—for instance, at the \$2.00 Shop, spending all their money in one day, or on “smokes”.

Some students said they told their parents about what they had bought on a “need to know” basis especially when they had bought items that they did not think parents would approve of—e.g. “junk”, “a pretty pen”, tattoos, getting hair dyed.

They did not tell parents about their purchase of cigarettes and alcohol. Students in some focus groups discussed telling parents purchases had cost less than they had or spending some of the money designated for a specific purpose as expected but doing “what I want” with the remainder.

Many were certain that their parents did not and/or could not know how they spend small amounts of money. Some described not telling them about money in their possession, in case their parents said they would look after it for them, and didn’t give it back.

Accessing cigarettes—In relation to accessing cigarettes, students who smoked described their own experiences related to accessing cigarettes, while others (especially younger non-smokers) talked about what they had observed or what they had heard about.

Participants said that young people either got cigarettes free or bought tailor-made cigarettes (“tammies”) and roll-your-owns (“rollies”). Free cigarettes were given to them by family members or stolen from family; for instance, taking a box when parents were at work. One student received cigarettes for doing jobs at home. One girl bought cigarettes for her mother, and received cigarettes for doing this.

Free cigarettes were also shared among friends, found (for example in ashtrays or on the ground), and scabbed (by scrounging or asking people for a cigarette). Year 10 girls, in particular, found men very willing to give them cigarettes. Sharing cigarettes and money for cigarettes with friends involved paying them back later: “So if you give me a dollar, I’ll buy some tomorrow”.

Year 10 students reported buying cigarettes from retailers (especially dairies/convenience stores) personally or they asked older people to buy cigarettes for them. They believed that younger shop workers were more likely to sell youth cigarettes.

Girl participants said some male retailers were particularly willing to sell cigarettes to girls and would give them other items for free:

Yeah because there’s this one guy in this dairy, he’s kind of a rapist but he’s young. And he sells smokes to me. But then when I come in and his dad’s in there he doesn’t [sell to me]...

There’s a dairy like that that I go to. And there’s this old man and he always give me free pies.

Intermediate-aged students from the Pacific Islands said that children their age (11 and 12 years) could buy cigarettes in the Islands. They said it was “hard” when students couldn’t buy cigarettes in New Zealand. Students also reported buying cigarettes from other people such as older students who bought or stole cigarettes “to make more money out of it”.

Cost of cigarettes—Students of all ages were aware of the retail price of cigarettes—they reported that “tammies” (20 pack minimum size) cost at least \$9.50 and loose tobacco about \$22.00 (since papers and filters are also required). Tammies bought from other young people cost \$1.00 to \$2.00 each; rollies 50 cents. Some people sold “combos” e.g. three cigarettes for \$2.00 or three cigarettes and matches for \$5.00. One focus group said that “IOUs” were acceptable.

Discussion

Participants were relatively free to spend small amounts of money, which they saved out of money provided by parents for lunches and other purposes. They could use these small amounts of money to buy tobacco since other young people sold cigarettes from as little as 50 cents each. Neither cost nor the erratic supply of money described by participants were barriers to accessing cigarettes, since they could get them free or on an “IOU” basis. The Framework for Reducing Smoking Initiation in Aotearoa-New Zealand recommends that parents be advised of a positive association between pocket money and smoking, and provided with information about providing pocket money “... at a level and in a way that does not encourage smoking initiation”.²²

Other studies suggest either restricting pocket money or targeting quit-smoking initiatives at those who receive pocket money.^{8,9} However, advice to parents to restrict their children’s disposable income may not be the most practical way to address the association between youth disposable income and smoking rates. Instead, parents could be encouraged to monitor and advise children about using small amounts of money in the same way that they guide their children with managing large amounts of money.

Parents and family influence children’s spending and saving. The participants in this study did not object to parental guidance with managing money, although they felt that ultimately they should have the final say about its use. They said their parents monitored the use and management of large amounts of money closely and counselled them to use money wisely, but almost all were certain their parents did not know how they spent smaller amounts of money.

Furnham has described various ways used by parents to educate their children about money, including providing weekly pocket money, encouraging saving, permitting/encouraging children to earn money away from home, and negotiating roles and responsibilities around the use of pocket money.²³

Parents could be encouraged to talk to their children about the responsible use of small amounts of money. Parents may be advised to:

- Put conditions on the use of the money they provide so that buying cigarettes is clearly not permissible;
- Create and reinforce consequences to buying cigarettes; and
- Advise youth against buying cigarettes with self-earned money.

This may be especially the case for parents who smoke, since they are more likely to give more pocket money.⁶

Having money to buy cigarettes is an important factor for both social and commercial sources. The continuing sale of cigarettes to minors via licensed tobacco retailers,

despite controls, has been reported.^{1,14,24} Although few students in this study reported buying cigarettes in their self-completed questionnaires, it is not clear if they were referring only to buying from commercial outlets, since they went on to describe cigarette sales by young people in their communities.

Strengthening enforcement of bans on sales to minors is important and may go some way towards decreasing access to cigarettes, but social supply remains problematic. It has been suggested that the social supply of free and cheap cigarettes could be reduced by increasing the price of cigarettes via taxation, thus making fewer cigarettes available because of a prohibitive initial cost.²⁵ Adults who buy tobacco products on behalf of children must be made aware that this is illegal and the law needs to be enforced.

While it has been reported that occasional smokers, and up to one-quarter of regular smokers aged 13-15 years, obtain their cigarettes free, we found (in common with other studies) that reciprocation or payment of some kind was expected.^{15,25,26} Sexual overtones associated with free supply and sales by men to girls were perceived as threatening and are of concern.

Because we paid careful attention to cultural differences by running ethnic-specific groups and ensuring that analysis was similarly sensitive, we are confident that the commonalities we found reflect the experiences and attitudes of our diverse range of participants, rather than those of a dominant group. The groups shared many factors in terms of their sources of money and parents' concern for their children. Differences between the groups, such as the experiences of Pacific Island children in the Islands, do not affect recommendations for parents.

Suggestions related to disposable income must be supplemented with interventions with family and parents, addressing other known risk and protective factors. These include discouraging family members from supplying cigarettes to youth, quitting programmes for family and parents so they role model quitting and smokefree lifestyles, and promoting clear expression of disapproval of and advice not to smoke (especially when parents themselves smoke).^{5,27-29}

In addition, the social supply of free and cheap cigarettes could be reduced by:

- Increasing the price of cigarettes via taxation;
- Strengthening enforcement and sanctions against sales to minors;
- Discouraging adults other than family from supplying young people;
- Increasing parents' awareness of how children use small amounts of money; and
- Encouraging them to talk to their children about smoking and money.

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Parental and adolescent smoking: does the association vary with gender and ethnicity?

Robert Scragg, Marewa Glover

Abstract

Aim Determine whether parental smoking is a consistent risk factor for adolescent smoking in a multi-ethnic sample, and whether maternal and paternal effects combine additively or multiplicatively.

Methods Annual national cross-sectional surveys (2002–2004 combined) with multi-ethnic sample of 91,219 Year 10 students from New Zealand who answered a questionnaire on personal and parental smoking.

Results Maternal smoking and paternal smoking were associated separately with increased risk of daily adolescent smoking in all ethnic groups except paternal smoking in Asian youth. The relative risk of adolescent daily smoking (adjusted for age and sex) was significantly higher for maternal only smoking compared with paternal only smoking in each ethnic group: Asians 5.50 (95% CI: 3.55–8.52), Europeans 1.38 (1.26–1.52), Pacific Islanders 1.38 (1.10–1.73), and Māori 1.10 (1.00–1.21). The excess maternal effect varied inversely with smoking prevalence. The net effects of maternal and parental smoking are additive among European, Māori, and Pacific Island students, but multiplicative in Asian. Overall, about 40% of adolescent daily smokers could be attributed to parental smoking.

Conclusions These results show that parental smoking is a consistent risk factor for adolescent smoking in all ethnic groups. Prevention strategies targeted at parents may help limit the uptake of smoking by adolescents.

Parental smoking was identified as a risk factor for adolescent smoking in the 1950s.^{1–3} Since then, numerous studies of the association between parental and adolescent smoking have been carried out, with inconsistent findings;⁴ and major questions remain unanswered.

For example, a number of studies have shown that the parental influence is stronger in families where both parents smoke rather than one.^{2–3,5–12} However, it is unclear whether maternal and paternal effects are additive or whether they interact to increase the risk of adolescent smoking more than the sum of their net effects. Three previous studies have reported additive effects,^{8,10,13} but this finding is not consistent.¹⁴

On balance, maternal smoking has been found to have a stronger effect than paternal smoking,^{14–17} but it is unclear whether the maternal effect is equal in boys and girls,¹⁰ or stronger in girls^{16–18} such that same-sex parental effects predominate.^{19–21}

Most studies have been of single ethnic groups, and it is unclear whether parental effects are consistent across ethnicities. In the US, adult smoking has been associated with adolescent smoking in whites and Asians but not in blacks and Hispanics;²² while paternal smoking was associated with smoking by white and Latino adolescents, maternal smoking with Asian adolescent smoking, but no association was

observed in blacks.²³ We have previously shown that parental smoking is a risk factor in all main ethnicities in a 2001 national survey of New Zealand children.²⁴

We have examined the above questions by combining data from the 2002–2004 New Zealand national surveys to provide a large multi-ethnic sample of over 90,000 adolescents. This sample, more than five times larger than any previous study of parental and adolescent smoking,^{4,25} provided an opportunity to investigate gender-specific smoking effects within each of four main ethnicities (European, Māori, Pacific Islander [mostly of Samoan, Tongan, Niuean, or Cook Islands origin], and Asian [mostly of Chinese, Indian subcontinent, or Korean origin]), to see if parental effects were similar or varied across ethnic groups which have a 10-fold variation in adolescent smoking prevalence, and to assess whether maternal and paternal effects combined in an additive or interactive manner.

Methods

National surveys of tobacco smoking by Year 10 (4th form) students have been carried out yearly since 1999.²⁶ The current paper reports data from the 2002–2004 surveys. In each year, all New Zealand schools with Year 10 students were invited to participate in the survey by administering a short questionnaire to their Year 10 students in November. The annual school response rate was 67.3% in 2002 (n = 309), 66.1% in 2003 (n = 312), and 64.7% in 2004 (n = 319).

The Ethics Committee of the Ministry of Health in Auckland granted a waiver of the formal review and consenting processes. School principals gave permission for teachers to supervise students who completed the anonymous questionnaire in class. To maintain confidentiality, teachers did not examine questionnaires for completeness.

Students answered a two-page questionnaire, which included questions on age, sex, and ethnicity (self-assigned). The questionnaire asked whether the student had ever smoked a cigarette (even just a few puffs). Those who answered “no” were classified as never smokers. Those who answered “yes” were queried about the frequency of their current smoking (at least once a day, at least once a week, at least once a month, less often, never).

Students were asked whether their mother and/or father were current smokers, with the question “Which of these people smoke?” (with instructions to tick any of the following responses that apply: mother, father, older brother or sister, best friend, none of these). For ethnic-specific analyses, because students could choose more than one ethnic group, a priority system was used to classify any student choosing Māori, then any Pacific student, followed by any Asian student, followed by European.

The total number of completed questionnaires returned by schools during the 3-year period was 99,063 (30,972 in 2002, 34,812 in 2003, 33,279 in 2004), out of 140,721 on school rolls (70.4% student response).

Statistical analyses were restricted to 91,219 students who were 14 and 15 years old, with known sex, ethnicity (European, Māori, Pacific, and Asian), student smoking status and parental smoking status; after excluding: 2907 with age 13 years, 16 years or missing; 268 with missing sex; 971 with missing ethnicity; 784 with missing student smoking status; 1386 with missing parent smoking status; and 1528 of “Other” ethnicity.

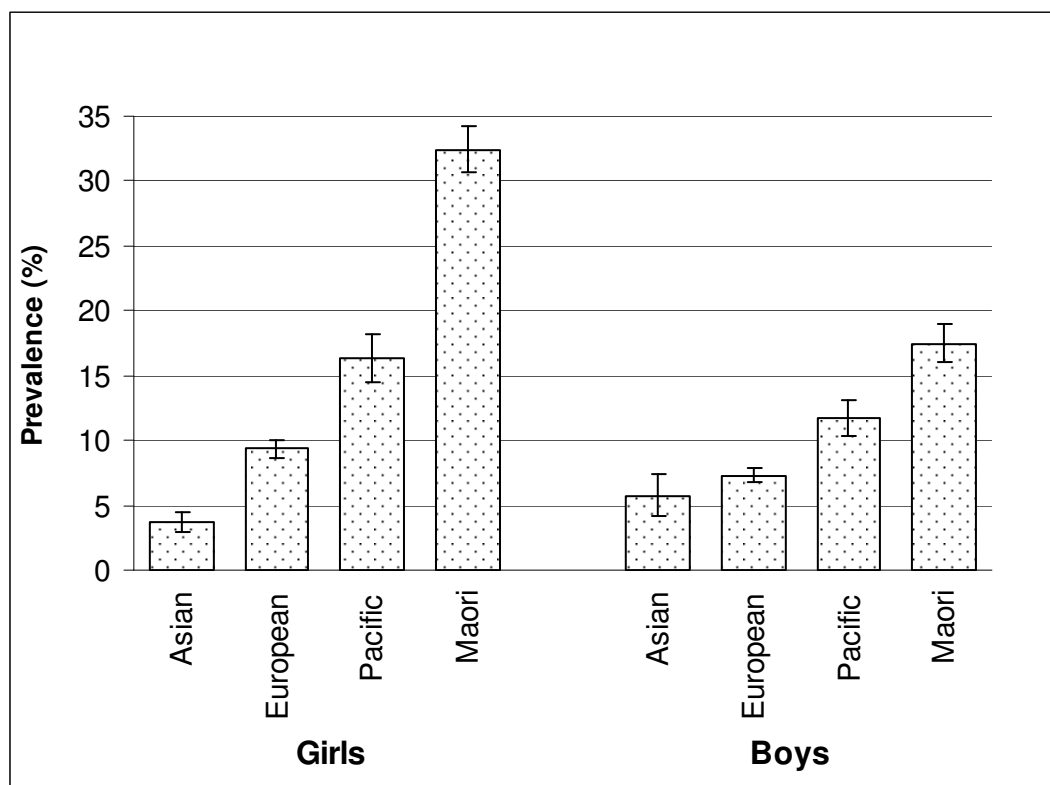
Statistical analyses were made using SUDAAN (Release 9.0.1, 2005) which corrects standard errors and confidence intervals for any design effect from clustering of students by school. The CROSSTAB procedure was used to calculate prevalences and Mantel-Haenszel adjusted relative risks. Confidence intervals for excess prevalences were calculated from the pooled variance.²⁷ The population attributable risk was calculated by estimating the attributable proportion for the exposed cases within each exposure category.^{28,29}

Results

Prevalence of adolescent and parental smoking—The sample analysed comprised 46,400 girls (30,569 Europeans, 8632 Māori, 3103 Pacific Islanders, 4096 Asians) and 44,819 boys (29,414 Europeans, 7839 Māori, 3262 Pacific Islanders, 4304

Asians). The prevalence of daily smoking was higher in girls (13.6%; 95% confidence interval [CI] 12.5%–14.7%) compared to boys (9.3%; 95% CI 8.5%–10.0%). There was a more than 8-fold variation in daily smoking prevalence among girls, from Māori 32.4%, Pacific 16.3%, European 9.4%, to Asian 3.7%; and 3-fold variation among boys from Māori 17.5%, Pacific 11.8%, European 7.3%, to Asian 5.7% (Figure 1).

Figure 1. Prevalence (95% CI) of daily smoking by gender and ethnicity



The prevalence of parental smoking varied with student ethnicity and sex of the parent (Table 1). Parents of Māori students were most likely to smoke (64.4%), followed by Pacific Island (47.5%), and European (34.6%) parents, with Asian parents least likely to smoke (30.6%). There was a 6-fold variation in the sex-ratio of smoking parents between ethnic groups, with the ratio of maternal-to-paternal smokers ranging from a high of 1.48 for Māori, down to 0.97 for European, and 0.95 for Pacific, and right down to 0.24 for Asian parents.

Table 1. Distribution of parental smoking status among male and female students, by ethnicity

Parental smoking	European	Māori	Pacific*	Asian†	Total
Both smoke	11.4%	30.2%	16.8%	4.5%	14.5%
Mother only	11.1%	20.6%	12.5%	1.9%	12.0%
Father only	12.2%	13.6%	18.2%	24.2%	14.0%
Neither	65.4%	35.6%	52.5%	69.4%	59.5%
(n)	(59,983)	(16,471)	(6365)	(8400)	(91,219)

*Mostly of Samoan, Tongan, Niuean, or Cook Island origin; †Mostly of Chinese, Indian subcontinent, or Korean origin.

Risk of adolescent smoking associated with parental smoking—The prevalence of daily youth smoking, along with the excess daily smoking prevalence (compared with students of non-smoking parents), by parental smoking status, is shown in Table 2, by sex and ethnicity. Maternal smoking and paternal smoking, alone, were each associated with a significant ($p < 0.05$) excess smoking prevalence in all student sex-ethnic groups aside from paternal smoking among Pacific and Asian students of either sex.

Relative risks of student daily smoking associated with parental smoking, by sex and ethnicity of students, adjusted for age, are shown in Table 3. As reported in Table 2, maternal only and paternal only smoking were each associated with a significantly increased relative risk in all student subgroups except for paternal only smoking in Pacific and Asian students of either sex.

When male and female students in the latter two ethnic groups were combined, the relative risk associated with paternal only smoking (adjusted for age and sex) was significantly increased compared with neither parent smoking among Pacific students (1.29; 95% CI: 1.05–1.58) but not in Asian students (1.22; 95% CI: 0.91–1.64). Thus, paternal only smoking was associated with significantly increased risk of daily student smoking in all ethnic groups except Asian.

Risk of adolescent smoking by parent gender—Maternal-only smoking had a stronger effect than paternal-only smoking. When students in these two parental smoking groups were compared, the relative risk of student daily smoking (adjusted for age and sex) was significantly higher for maternal only smoking compared with that for paternal only smoking in each ethnic group: Asians 5.50 (95% CI: 3.55–8.52), Europeans 1.38 (95% CI: 1.26–1.52), Pacific Islanders 1.38 (95% CI: 1.10–1.73), and Māori 1.10 (95% CI: 1.00, 1.21; $p = 0.050$).

Figure 2 shows that the increased effect from maternal smoking (compared with paternal smoking) varied inversely with the ratio of maternal to paternal smokers in each ethnic group, so that the increased maternal effect is strongest in Asian students where maternal smoking is rare and weakest in Māori students where maternal smoking is most common.

The data in Tables 2 and 3 provide limited support for gender-specific effects on students associated with maternal smoking. The absolute effect of mother only smoking was larger in girls than boys among European (11.8% vs 7.6%) and Māori (15.9% vs 8.0%) students, with confidence intervals of comparison groups not overlapping, but not different between female and male Pacific (10% vs 5.4%) and

Asian (16.4% vs 15.9%) students; while, the absolute effect of father only smoking was the same for girls and boys in each ethnic group (Table 2).

The same pattern is seen in Table 3, where relative risks of student daily smoking associated with father only smoking are very similar for girls and boys within each ethnic group; while only among European students was the relative risk associated with mother only smoking higher for girls compared to boys (Breslow-Day test for homogeneity, p-value <0.05).

Table 2. Daily smoking prevalence, and excess daily smoking prevalence—by sex, ethnicity, and parental smoking status

Ethnicity	Parental smoking	Girls			Boys		
		N	Daily smoking prevalence % (95% CI)	Excess prevalence %	N	Daily smoking prevalence % (95% CI)	Excess prevalence %
European	Both smoke	3536	25.6 (23.8–27.4)	20.8 (19.0–22.7)	3297	19.8 (18.3–21.2)	15.6 (14.1–17.1)
	Mother only	3376	16.6 (15.2–18.1)	11.8 (10.3–13.4)	3257	11.8 (10.5–13.2)	7.6 (6.3–9.0)
	Father only	3819	11.7 (10.4–12.9)	6.9 (5.5–8.2)	3472	8.9 (7.8–10.1)	4.7 (3.6–6.0)
	Neither	19,838	4.8 (4.3–5.3)	0	19,388	4.2 (3.8–4.6)	0
Māori	Both smoke	2699	44.7 (42.3–47.0)	25.0 (21.9–27.9)	2270	26.0 (23.5–28.5)	15.6 (12.8–18.4)
	Mother only	1802	35.6 (33.1–38.0)	15.9 (12.8–18.9)	1587	18.4 (16.2–20.7)	8.0 (5.4–10.6)
	Father only	1176	31.5 (28.3–34.7)	11.8 (8.0–15.4)	1067	17.5 (15.0–20.0)	7.1 (4.3–10.0)
	Neither	2955	19.7 (17.9–21.6)	0	2915	10.4 (9.0–11.8)	0
Pacific*	Both smoke	508	27.8 (23.9–31.6)	15.9 (11.5–20.2)	562	24.4 (20.6–28.1)	16.6 (12.5–20.7)
	Mother only	383	21.9 (17.4–26.5)	10.0 (5.1–15.0)	410	13.2 (9.9–16.4)	5.4 (1.7–9.1)
	Father only	599	15.0 (11.3–18.8)	3.1 (-1.1–7.4)	559	10.4 (8.0–12.8)	2.6 (-0.4–5.6)
	Neither	1613	11.9 (10.0–13.8)	0	1731	7.8 (6.1–9.5)	0
Asian†	Both smoke	157	35.7 (27.8–43.6)	33.5 (25.6–41.5)	219	41.1 (33.0–49.2)	37.9 (29.8–46.1)
	Mother only	70	18.6 (10.2–27.0)	16.4 (8.0–24.8)	89	19.1 (9.3–28.9)	15.9 (6.1–25.8)
	Father only	1039	2.1 (1.2–3.0)	-0.1 (-1.2–1.1)	993	4.5 (2.9–6.2)	1.3 (-0.6–3.4)
	Neither	2830	2.2 (1.5–2.8)	0	3003	3.2 (2.1–4.3)	0

*Mostly of Samoan, Tongan, Niuean, or Cook Islands origin; †Mostly of Chinese, Indian subcontinent, or Korean origin.

Table 3. Relative risk of daily smoking associated with parental smoking status, by sex and ethnicity

Ethnicity	Parental smoking	Girls	Boys
		Relative Risk (95% CI)*	Relative Risk (95% CI)*
European	Both smoke	5.35 (4.83–5.91)	4.70 (4.22–5.24)
	Mother only	3.46 (3.08–3.87)	2.83 (2.49–3.21)
	Father only	2.44 (2.17–2.74)	2.14 (1.89–2.42)
	Neither	1.00	1.00
Māori	Both smoke	2.26 (2.07–2.45)	2.50 (2.20–2.85)
	Mother only	1.80 (1.63–1.99)	1.77 (1.51–2.08)
	Father only	1.60 (1.43–1.80)	1.69 (1.42–2.01)
	Neither	1.00	1.00
Pacific**	Both smoke	2.33 (1.95–2.77)	3.13 (2.41–4.07)
	Mother only	1.84 (1.41–2.41)	1.68 (1.19–2.36)
	Father only	1.26 (0.97–1.63)	1.33 (0.97–1.81)
	Neither	1.00	1.00
Asian†	Both smoke	16.60 (11.52–23.92)	12.61 (9.00–17.66)
	Mother only	8.62 (4.96–14.97)	5.90 (3.30–10.56)
	Father only	0.99 (0.61–1.59)	1.38 (0.95–2.01)
	Neither	1.00	1.00

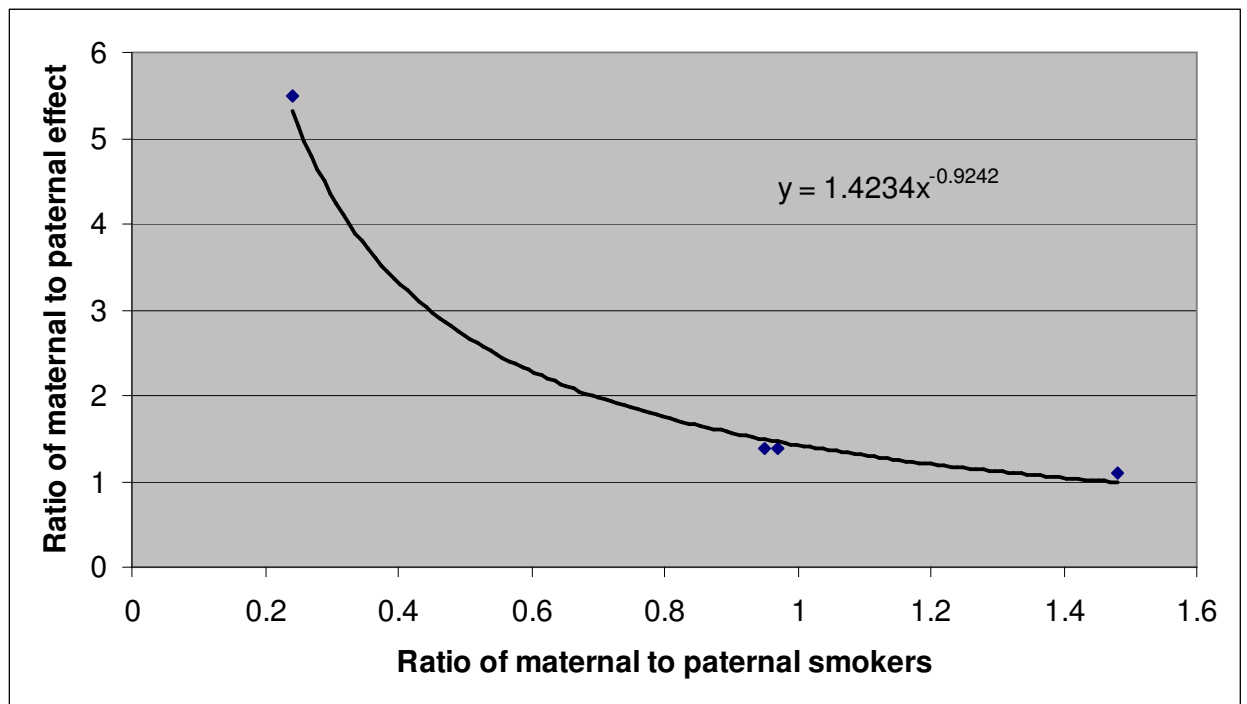
*Adjusted for age; **Mostly of Samoan, Tongan, Niuean, or Cook Islands origin; †Mostly of Chinese, Indian subcontinent, or Korean origin.

Are parental effects additive or multiplicative?—For students with both parents smoking, the excess prevalence was similar to the sum of the individual excess

prevalence for maternal only smoking and paternal only smoking among European and Māori students of both sexes and Pacific Island girls, but larger among male and female Asian students and male Pacific Island students (Table 2).

This pattern is repeated with the relative risks in Table 3, where the increase in the relative risk for students exposed to both parents is more than the sum of the increases for mother only smoking and father only smoking for Asian students and male Pacific Island students. However, in logistic regression models which contained maternal smoking, paternal smoking and their interaction term, the beta-coefficients for the interaction term were only positive and significant in Asian female and male students ($p=0.0063$). These results indicate that the effects of maternal and parental smoking are additive among European, Māori, and Pacific Island students, but multiplicative in Asian.

Figure 2. Relation between ratio of maternal to paternal smokers (x) and ratio of effect from maternal and paternal smoking (y)



The proportions of student daily smokers attributable to parental smoking are shown in Table 4. Overall, 43% of female student daily smokers, and 41% of male, could be attributed to parental smoking. The proportion attributable to maternal smoking is higher than for paternal smoking.

For girls, 26% of daily smokers are attributable to maternal smoking compared to 15% for paternal smoking; and among boys the respective proportions are 22% and 15%. This pattern is consistent within each sex-ethnic subgroup, and is primarily due to the greater effect of maternal smoking, than paternal smoking, in increasing student smoking as described above.

Table 4. Percent (number) of daily smokers attributable to parental smoking, by sex and ethnicity

Parental smoking	Girls				Boys			
	Percent* (n) attributable to:				Percent* (n) attributable to:			
	Mother smoking	Father smoking	Interaction	Total	Mother smoking	Father smoking	Interaction	Total
<i>European</i>								
Both smoke	15% (419)	8% (243)	3% (74)	26% (736)	12% (252)	7% (157)	5% (104)	24% (513)
Mother only	14% (400)	–	–	14% (400)	12% (249)	–	–	12% (249)
Father only	–	9% (263)	–	9% (263)	–	8% (165)	–	8% (165)
Total	29% (819)	18% (506)	3% (74)	49% (1399)	23% (501)	15% (322)	5% (104)	43% (927)
<i>Māori</i>								
Both smoke	14% (386)	10% (286)	0%	24% (672)	13% (182)	12% (162)	1% (10)	26% (354)
Mother only	10% (285)	–	–	10% (285)	9% (127)	–	–	9% (127)
Father only	–	5% (138)	–	5% (138)	–	6% (76)	–	6% (76)
Total	24% (671)	15% (424)	0%	39% (1095)	23% (309)	17% (238)	1% (10)	41% (557)
<i>Pacific Island</i>								
Both smoke	10% (51)	3% (16)	3% (14)	16% (81)	8% (30)	4% (14)	13% (48)	24% (92)
Mother only	7% (38)	–	–	7% (38)	6% (22)	–	–	6% (22)
Father only	–	4% (19)	–	4% (19)	–	4% (14)	–	4% (14)
Total	18% (89)	7% (35)	3% (14)	27% (138)	14% (52)	8% (28)	13% (48)	33% (128)
<i>Asian</i>								
Both smoke	17% (26)	0%	18% (27)	35% (53)	14% (35)	1% (3)	18% (45)	34% (83)
Mother only	7% (11)	–	–	7% (11)	6% (14)	–	–	6% (14)
Father only	–	0%	–	0%	–	6% (14)	–	6% (14)
Total	14% (37)	0%	18% (27)	42% (64)	20% (49)	7% (17)	18% (45)	45% (111)
Total for sex	26% (1616)	15% (965)	2% (115)	43% (2696)	22% (911)	15% (605)	5% (207)	41% (1723)

*Percent of daily smokers in each sex-ethnic subgroup.

Discussion

We have found in a large multi-ethnic cross-sectional sample of more than 90,000 adolescents that parental smoking is a risk factor for adolescents of all ethnic groups; and that maternal smoking has a greater effect than paternal smoking on the risk of adolescent smoking.

A major strength of our analysis is the large sample size, more than 5 times larger than any previous study, which has ensured sufficient statistical power to detect parental smoking effects in all ethnic subgroups. Previous studies which have examined the effect of parental smoking across ethnicities have had small sample sizes. For example, small sample size is a likely explanation for the lack of a consistent parental smoking effect in 211 Hispanic and 80 African-American students studied by Sussman and colleagues;²² while Landrine and colleagues did not observe a parental smoking effect in a sample of only 514 African-Americans.²³

Both maternal smoking and paternal smoking were associated separately with increased risk of adolescent smoking in all ethnic groups except for paternal smoking among Asian students (Tables 2 and 3).

Our finding of a stronger maternal smoking effect, than paternal, on the risk of adolescent smoking is consistent with most previous studies¹⁴⁻¹⁷ but not all.¹⁰ It is possible that previous studies have not detected a weaker paternal effect because of their smaller sample sizes.¹⁵ A new finding from our data is that the excess maternal smoking effect is inversely associated with the ratio of maternal to paternal smokers (Figure 2).

In populations where maternal smoking is uncommon (e.g. Asians), those mothers who smoke appear to have a much greater effect on the risk of their children smoking than in populations where maternal smoking is common (e.g. Māori). So great is the maternal smoking effect among Asian adolescents, that there was a multiplicative interaction between maternal and paternal smoking effects. However, among all other ethnic groups (European, Māori, Pacific Islander), maternal and paternal smoking effects were additive, consistent with previous reports.^{8,10,13}

We found only limited support for gender-specific effects (Table 2). Maternal smoking had a stronger effect in girls than boys among European and Māori students, but did not differ between girls and boys among Pacific and Asian students; while the absolute effect of paternal smoking was the same for girls and boys in all ethnic groups. Our findings contrast with earlier studies carried out in the 1960s to 1980s which reported gender-specific effects.¹⁹⁻²¹ The reasons for this are unclear, but changing parental role models with increased sharing of household duties by both parents is a possible explanation.

Further, our study highlights the importance of reporting both absolute and relative effects. The excess (or absolute) effect of parental smoking on adolescent smoking was similar for European, Māori, and Pacific students (Table 2). In contrast, the relative effect from parental smoking varied between these three ethnic groups, being highest in European students and lowest in Māori students (Table 3), because of varying adolescent smoking prevalences among the reference group (students with neither parent smoking), which were low in European and highest in Māori (Table 2).

Our study has strengths and weaknesses. Its major strengths are the very large sample size, thus ensuring the study has high statistical power, and varied ethnic composition. However, the cross-sectional study design does limit the inferences that can be drawn around the causal sequence, although it is reasonable to assume that parental smoking precedes student smoking in all or most instances.

The overall response rate is only moderate, after allowing for school and student non-response, and hence the results cannot be extrapolated with certainty to all Year 10 students in New Zealand. However, the 70% student response rate suggests that the results are likely to be representative of participating schools.

The collection of parental smoking data from students may have resulted in errors in measuring parental smoking status, but if this was non-differential, it is likely to have attenuated the effect of parental smoking. In particular, some parents who were classified as non-smokers are likely to have been ex-smokers, and their presence in the non-smoking parental group will have biased effect estimates towards the null. Many comparisons are in this analysis, and it is possible that some significant results occurred by chance, although we consider this is unlikely because of the large sample sizes in this study.

Our attributable risk percentages for parental smoking (43% in girls and 41% in boys, Table 4) indicate that parental smoking is a major cause of adolescent smoking, which, in combination with other factors under parental control (e.g. allowing smoking in the home), explains a similar proportion of adolescent daily smoking as does peer smoking.³⁰

Our results are similar to those reported by Kandel and Wu who found that maternal smoking explained 60% of smoking by girls and 30% by boys.¹⁴ These findings suggest that prevention strategies targeted at parents may help limit the uptake of smoking by adolescents.

Competing interests: None.

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Is Salamol less effective than Ventolin? A randomised, blinded, crossover study in New Zealand

Catherina L Chang, Manisha Cooray, Graham Mills, Robert J Hancox

Abstract

Aim The effectiveness of the fully subsidised bronchodilator in New Zealand, Salamol®, has recently been questioned. We compared the efficacy of Salamol® and Ventolin® inhalers in relieving acute bronchospasm. We also tested the efficacy of partially used Salamol inhalers because of concerns that the device may become blocked during use.

Methods 12 asthmatic subjects were enrolled in this randomised, single-blind, 3-way crossover study. Subjects inhaled methacholine to produce a 20% fall in forced expiratory volume at 1 second (FEV₁) on 3 different days. Salbutamol was given post-bronchoconstriction as Ventolin, Salamol (new), or Salamol (used) in random order. Inhalations of 100, 100, and 200 mcg salbutamol were delivered at 5 minute intervals via spacer and FEV₁ was measured 5 minutes after each dose. The main outcome variable was the area under the salbutamol dose response curve.

Results There was no significant difference in the bronchodilator response to salbutamol whether delivered as Ventolin or Salamol (p=0.63). Furthermore, there was no difference in bronchodilator response between used Salamol inhalers and new Salamol inhalers (p=0.60) or between used Salamol inhalers and Ventolin (p=0.08). The final FEV₁s at 15 minutes (after a total of 400mcg salbutamol) were also similar for the different inhalers.

Conclusions We found no evidence that either new or partially used Salamol inhalers are less effective at relieving acute bronchoconstriction than Ventolin.

Beta-agonists are the most effective bronchodilators for symptom relief in asthma.¹ Ventolin® inhalers which contain salbutamol have been widely used for many years in New Zealand. However there are now a range of generic salbutamol inhalers available and Ventolin is no longer fully-funded by PHARMAC (New Zealand's medication funding authority). Plans have been made to gradually replace it with a cheaper generic alternative, Salamol®.²

Studies have demonstrated equivalent bioavailability (in terms of post-dose plasma and urine concentration³) and bronchodilation (in terms of post dose lung volumes⁴) between Ventolin and Salamol in stable patients. However, since its introduction to New Zealand, anecdotal reports have centred on negative aspects of Salamol. Complaints include decreased therapeutic effect, inhaler blockage, and unpleasant taste.

Reti recently reported the experiences of 36 adults being switched from Ventolin to Salamol in general practice. Most of these were either unable to tolerate the new inhaler or experienced worse asthma control.⁵ Unfortunately, no objective measures

of lung function or bronchodilator response were obtained and the findings depended largely on patient perceptions.

The interpretation of these data was controversial.⁶ Nevertheless the pharmacological efficacy of Salamol has been called into question. In an environment of overwhelmingly negative media publicity about Salamol, the study by *Reti* leaves the question of Salamol's clinical effectiveness unanswered.

To shed more light on this issue, we compared the effectiveness of Salamol and Ventolin in relieving acute bronchoconstriction. Because there has been some concern that Salamol inhalers may become blocked during use, we further compared the effectiveness of new and partially used Salamol inhalers.

Methods

Subjects—Volunteers aged 21–64 years with mild to moderate asthma were recruited. All had bronchial hyper-responsiveness to methacholine (provocative dose causing a 20% fall in forced expiratory volume in one second (FEV₁) (PD₂₀) of less than 8 µmol.⁷

Subjects who had used oral corticosteroids in the previous 3 months were excluded, as were those using long acting beta-agonist inhalers and current or previous heavy cigarette smokers (> 5 pack years). All subjects provided written informed consent. Ethics approval for the study was granted by the Northern Y Regional Ethics Committee.

Study design—After abstaining from bronchodilators for at least 6 hours, the subjects inhaled methacholine to produce a 20% fall in FEV₁ on 3 different days. Salbutamol was then administered as Ventolin, Salamol (new), or Salamol (used) pressurised metered dose inhalers (MDI) via spacer (100 µg per actuation).

The subjects received a different inhaler on each of the 3 days and the order in which they received the inhalers was randomised by computer. The inhalers were concealed in a sock to maintain blinding of the subjects to which inhalers they were receiving.

Methacholine challenge was performed using a modified Yan technique.^{7,8} Baseline FEV₁ was the highest of 3 consistent measurements. Subjects then inhaled doubling doses of nebulised methacholine from 0.0073mg to 3.728mg from a dosimeter. FEV₁ was measured 1 minute after each dose. Once the FEV₁ had fallen by ≥ 20% from baseline, methacholine challenge was stopped. The PD₂₀ (cumulative dose) was calculated by linear interpolation.

Salbutamol (Ventolin® marketed by GlaxoSmithKline, Auckland, New Zealand; and Salamol® marketed by Airflow, Wellington, New Zealand) 100µg, 100µg, and 200µg via metered dose inhaler and volumatic spacer were given at 0, 5, and 10 minutes after methacholine challenge respectively. The FEV₁ was measured 5 minutes after each dose of salbutamol, giving a total response time of 15 minutes.

Two different Salamol MDIs were used by each subject—one new (i.e. clean and unblocked) and one used (i.e. after 100 actuations in increments of 10, at least one week previously and not washed).

Measurements—The main outcome measurement was the area under the salbutamol response curve (AUC), expressed as FEV₁ gained in litres after methacholine induced fall. The final FEV₁s after 15 minutes (cumulative dose 400µg salbutamol) were also compared.

Statistics—The AUCs for each treatment were analysed by ANOVA. Specific comparisons between treatment arms [e.g. Ventolin and Salamol (new)] were made using paired t-tests. The sample size was calculated from previous investigations⁹ to provide 90% power to detect a 30% difference in AUC with a significance of 0.05.

Results

Thirteen subjects were recruited. One subject (participant 3) withdrew after the first study day due to personal reasons. Twelve subjects (3 males) completed the study protocol. Baseline data on the subjects are presented in Table 1.

Table 1. Baseline data on subjects

Subject	Age (years)	Sex	Dose of inhaled Steroids (mcg)*	Baseline FEV ₁ (L)	FEV ₁ (% Predicted)
1	21	female	0	2.48	89%
2	28	female	0	3.06	95%
4	28	female	1000	2.85	90%
5	24	female	0	3.37	104%
6	61	female	400	2.08	94%
7	29	female	400	2.87	95%
8	51	female	800	1.77	55%
9	59	male	500	1.38	40%
10	44	female	800	1.85	77%
11	48	male	0	6.21	113%
12	49	female	0	2.50	96%
13	58	male	800	1.80	58%

*budesonide equivalent (beclomethasone = budesonide = 2 x fluticasone)

Table 2. Lung function pre/post methacholine challenge

Treatment Arm	Ventolin	Salamol(New)	Salamol(Used)	P
Mean Baseline FEV ₁ (L) (95%CI) L	2.50 (1.9-3.1)	2.48 (1.9-3.0)	2.47 (1.9-3.0)	0.79
Mean Post-MC* FEV ₁ (L) (95% CI)	1.94 (1.5-2.4)	1.88 (1.4-2.3)	1.89 (1.4-2.4)	0.39
GeoMean PD ₂₀ (mg)	0.14	0.14	0.18	0.60
Mean FEV1 post Salbutamol (cumulative)				
100µg (L)	2.24	2.22	2.17	0.51
200µg (L)	2.37	2.38	2.35	0.86
400µg (L)	2.50	2.50	2.45	0.57
Mean AUC** (L/min) (95% CI)	6.8 (5.4-8.2)	6.8 (5.4-8.2)	6.7 (5.3-8.1)	0.63***

*MC = Methacholine Challenge; **AUC = Area under the salbutamol response curve

*** Paired t-tests: p= 0.60 (Ventolin vs Salamol New), p= 0.08 (Ventolin vs Salamol Used)

Figure 1. Mean FEV₁ response curve. Data are expressed as a percentage of the baseline (pre-methacholine) FEV₁

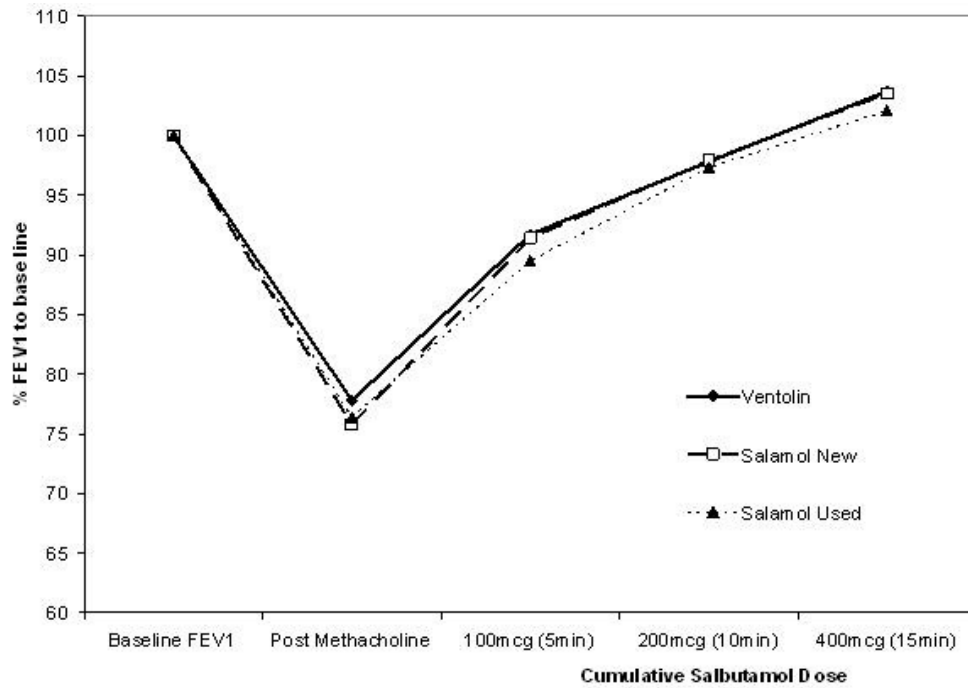
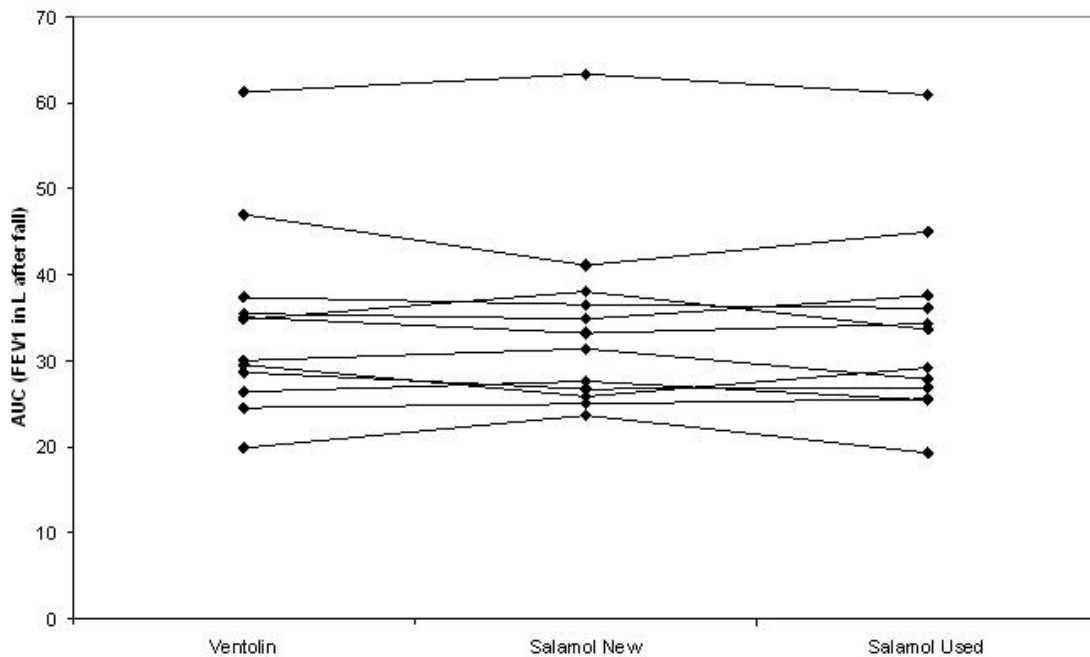


Figure 2. Areas under the salbutamol dose response curves for each individual



There were no significant differences in mean baseline FEV₁ ($p=0.71$) geometric mean PD₂₀ ($p=0.60$) or in the percentage fall in FEV₁ induced by methacholine ($p=0.33$) between the treatment arms.

Mean FEV₁ response curves for each treatment are shown in Figure 1. There was no significant difference in the AUC between the three treatment arms (ANOVA,

p=0.63). There was also no difference in the mean AUC comparing Ventolin and Salamol (p=0.79) nor between Salamol (new) and Salamol (used) inhalers (p=0.60). A small trend favouring the Ventolin treatment group was observed when compared with Salamol (used) inhalers but this was not statistically significant (p=0.084).

The final FEV₁s after 15 minutes (i.e. after a cumulative dose of salbutamol 400 µg) were also not different between treatments (Table 2).

Discussion

We found no difference in the efficacy of either new or partially used Salamol inhalers in relieving bronchoconstriction compared to Ventolin. These findings suggest that reports of deterioration in asthma stability on switching to Salamol and ineffectiveness of Salamol inhalers are unlikely to be due to a lack of bronchodilator efficacy.

Our findings are consistent with previous studies of the bioavailability of salbutamol from Salamol inhalers.³ They are also compatible with previous reports of the equivalence of Salamol in stable asthma.⁴ However, studies in stable asthma can be misleading since full bronchodilation can be achieved with small doses of β-agonists. In practice, β-agonists are used to relieve acute bronchoconstriction. Previous studies indicate that the “challenge-rescue” model that we have used is far better at identifying differences in bronchodilator efficacy than bronchodilator response tests in stable asthma and has been used in several studies to assess tolerance to long and short acting β-agonist inhalers.⁸⁻¹² The fact that we found virtually identical responses to Salamol and Ventolin using this technique suggests that it is unlikely that clinically meaningful differences between the effectiveness of these inhalers exist.

There may be other reasons why patients might prefer Ventolin to Salamol. These include familiarity with the inhaler and the taste of the aerosol. In our study, several patients commented on the unpleasant taste of the Salamol, even though this had been given via spacer from a blinded inhaler. It is also possible that the other components of the aerosol have an adverse effect on asthma control over a longer term. We have no data on this and, although it seems unlikely, this possibility cannot be excluded.

There has also been widespread concern that the Salamol MDI is more prone to blockage than the Ventolin MDI (due to the smaller dispensing port of Salamol MDI).^{13,14} New Zealand Medicines and Medical Devices Safety Authority (Medsafe) has therefore recommended that Salamol inhalers are cleaned regularly.¹⁴ However, many patients will forget to do this and may be unable to do this during an acute exacerbation. We therefore tested partially used (more than 100 actuations) Salamol inhalers which had not been cleaned. There was no evidence that any of these inhalers were less effective (Figure 2). Hence, inhaler blockage did not appear to be a problem in any of the 12 used Salamol inhalers used in this study. Although we cannot exclude the possibility that occasional inhalers block, this seems very unlikely to explain the widespread dissatisfaction with Salamol inhalers in the study by Reti.

Based on previous studies, this study was powered to detect a 30% difference in the area under the bronchodilator response curve.⁹⁻¹² The actual differences in AUC that we detected were 0.6% lower with new Salamol inhalers and 2% lower with used Salamol inhalers. Neither of these differences was statistically significant. We cannot exclude the possibility that there is a small difference between Salamol and Ventolin

inhalers; however our findings indicate that any such difference is unlikely to be clinically relevant.

There are a number of limitations to this study. The study was single (rather than double) blind, and even though the inhalers were concealed from the subjects, some could taste a difference and may have guessed which inhaler was being used. Using an objective outcome measure (FEV₁) will have minimised any bias due to this possible loss of blinding. We also limited the dose-response time to 15 minutes because previous studies indicate that the spontaneous recovery from methacholine challenge is minimal within this time.⁹ It is unlikely that a longer period of observation would have revealed differences between the inhalers because salbutamol is a fast-acting bronchodilator and most subjects fully recovered within the observation period (Figure 1). Perhaps the most important limitation is that Ventolin and Salamol were administered via a spacer. Although this is the recommended method for relieving acute bronchospasm,¹ in practice many patients use their inhalers without a spacer. It is possible that there are greater differences in the delivery of salbutamol to the airways and therefore in the effectiveness of Salamol and Ventolin when a spacer is not used. To investigate this would require a further study.

In summary, we have found no difference in the ability of Salamol and Ventolin to relieve acute bronchoconstriction. We also found no evidence of inhaler blockage reducing the effectiveness of Salamol. It is unlikely that the reported patient preference for Ventolin over Salamol are due to Salamol being a less effective bronchodilator. There are many reasons why patients may prefer to continue with their usual inhaler. However, patients can be reassured that the fully funded generic alternative is an equally effective bronchodilator.

Competing interests: None

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Smacking—are we being too heavy-handed? Findings from the Pacific Islands Families Study

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Abstract

Aims To report the types, frequency, and concordance of physical punishments employed by parents on their Pacific children at ages 1, 2, and 4 years.

Methods A cohort of Pacific infants born during 2000 in South Auckland, New Zealand, was followed. Separate home interviews that included questions about child discipline were undertaken at 1-year, 2-years, and 4-years postpartum for mothers, and 1-year and 2-years postpartum for fathers.

Results Maternal interviews were completed from 1224, 1144, and 1048 mothers and 825 and 757 fathers respectively. Over these measurement waves, the prevalence of smacking was 21.5%, 52.0%, and 77.1% for mothers and 24.4% and 78.4% for fathers, while the prevalence of hitting with an object (such as a spoon or belt) was 0.2%, 6.6%, and 24.3% for mothers and 1.3% and 13.2% for fathers. There was poor statistical agreement in physical punishment administered between mothers and fathers, and significant asymmetry with fathers more likely to employ harsher punishment than mothers.

Conclusions Smacking is a widespread form of discipline administered to Pacific children, and hitting with objects is common. If the use of objects constitutes a consequential assault in the newly ratified *Crimes (Substituted Section 59) Amendment Act 2007* then many parents within this cohort are in breach of this law. We believe that guidelines for corporal punishment which is legally acceptable needs to be made explicit to all, and widespread culturally sensitive efforts to teach parents positive parent management strategies is urgently required.

Abusive physical punishment of children by their parents or caregivers is widely regarded as being unacceptable and illegal in most societies.¹ Such abuse can lead to juvenile offending, substance abuse, mental health problems, injuries,² and even death.³ Less clear is whether any physical punishment of children (such as smacking) is acceptable, has adverse health or other consequences, and should be legally permissible.

Smacking has become a topical issue in New Zealand and is polarising individuals within families, workplaces, communities, and the nation. Arguments about the effects of smacking are equivocal,^{4,5} with two comprehensive reviews of corporal punishment reaching different conclusions; one finding it primarily beneficial⁶ and one primarily detrimental.⁷

The *Crimes (Substituted Section 59) Amendment Act 2007*, which came into force on 22 June 2007, removed parents or caregivers statutory defence to use reasonable force for the purpose of correction except in circumstances to prevent or minimise harm to the child or another person. The purpose of this amended Act is to stop force and

associated violence being inflicted on children in the context of correction or discipline, but many antagonists argue that the new law could make parents liable to criminal charges each time they smack their children.

Conversely, proponents of the amended Act argue that “mild assaults (so-called little smacks) will not result in complaints to the police or prosecutions. However serious assaults (such as beatings with implements and objects causing injuries) would no longer be excused as discipline.”⁸

A late amendment within the Act gave police the discretion not to prosecute complaints against parents where the offence was considered to be inconsequential.⁹ However, it is unclear what defines inconsequential offending and where on the assault-continuum that police complaints and prosecutions will begin. Many, including Pacific Island parents,¹⁰ lawyers,¹¹ and the police themselves,⁹ have expressed concerns if it is left to police to exercise discretion when deciding who to prosecute in these matters.

In New Zealand population-based surveys, 80%¹² and 87%¹³ of respondents agreed that parents should be able to smack a child with an open hand, consistent with prevalence figures from the USA and elsewhere.⁵ Indeed, research has demonstrated that most New Zealand parents have smacked or physically punished their children at one time or other¹⁴ and approximately half smack their children at least once a week.¹⁵

There is a view that physical punishment (often to extreme levels) is the norm for Pacific peoples; a view shared by non-Pacific and Pacific people alike.^{15,16} It has been argued that the literal interpretation and acceptance of Christianity and the Bible since the arrival of missionaries in the late 18th Century and early 19th Century was instrumental in creating this child discipline culture.¹⁷ However, others challenge this perception,¹⁷ and there is no empirical evidence that supports the view that Pacific people resident in New Zealand are more accepting of physical punishment.^{12,13}

Indeed, in one of New Zealand’s most recent surveys of punishment, it was reported that Māori and Pacific people were significantly less likely than NZ European/Other respondents to think that it was acceptable to physically discipline children age 0–10 years old.¹² Despite this, Pacific (27%) people were significantly more likely to think that disciplining with a wooden spoon or belt should be legally allowable than Māori (10%) or NZ European/Other respondents (15%).¹² However, weaknesses in that study’s results were the relatively small number of Pacific participants (n=94), the telephone sampling technique, and the fact that questions focused on attitudes rather than use of physical punishment in a population (rather than parent) survey.

While attitudes towards smacking is widely supported by the New Zealand public, the hitting of children in anger with objects, or around the head, is not. In a targeted sample of 445 adults, when asked “Could there be times when it is OK to hit a child in anger with (i) an object or (ii) around the head?” 88% responded “Definitely no” to the use of an object and 93% responded similarly to hitting around the head.¹⁸

These New Zealand views are shared by the Canadian Supreme Court judiciary. In January 2004, the Supreme Court of Canada refused to repeal Section 43 of their Criminal Code that allows parents and school teachers to physically discipline children in their care by using “reasonable” force.¹⁹ However, the Supreme court ruled that for corporal punishment to be legally acceptable, it must: (i) involve only

minor corrective force of a transitory and trifling nature; (ii) can only be used against children aged 2-12 years; (iii) and it was unacceptable to hit a child with an object (like a belt or paddle); and, (iv) that blows or slaps to the child's head was unacceptable.¹⁹

The challenge in New Zealand is to define where on the assault-continuum police complaints and prosecutions should begin. It has been suggested that this task should encapsulate public opinion with moral and legislative imperatives.¹⁸ Or, as more directly and pragmatically expressed by the Minister of Justice Phil Geoff, to “eliminate child abuse and violence against children but working within the consensus of New Zealand public opinion”.²⁰

To help inform this debate, this paper aims to report the types, frequency, and concordance of punishments employed by parents at various ages for a large cohort of Pacific children resident in New Zealand. This information will provide robust benchmark estimates of disciplinary practices, and allow changes in these practices to be tracked over time following the introduction of the *Crimes (Substituted Section 59) Amendment Act 2007*.

Methods

Background and design—The Pacific Islands Families (PIF) study follows a cohort of Pacific infants born at Middlemore Hospital, South Auckland, between 15 March and 17 December 2000. (Pacific refers to people of South Pacific Islands origin—mostly from Samoa, Tonga, or Cook Islands.) Detailed information about the cohort, and its recruitment and retention procedures, is described elsewhere.²¹ In brief, all potential participants were selected from births where at least one parent was identified as being of Pacific Islands ethnicity and a New Zealand permanent resident. Information about the study was provided to all potential participants and consent was sought to make a home visit. Approximately 6 weeks after infants' births, female interviewers of Pacific Islands ethnicity who were fluent in English and a Pacific Islands language visited mothers in their homes. Once eligibility was confirmed and informed consent obtained, mothers participated in 1-hour interviews concerning family functioning and the health and development of the child. This interview was conducted in the preferred language of the mother.

When the children reached their first, second, and fourth birthdays, all maternal participants were re-contacted and revisited by a female Pacific interviewer. Again, consent was obtained before the interview was conducted in the mother's preferred language.

At the time of the 1-year and 2-year interviews, mothers were asked to give permission for a male Pacific interviewer to contact and interview the father of the child. If permission and paternal contact details were obtained, then a male Pacific interviewer contacted the father to discuss participation in the study.

Once informed consent was obtained from the father, the interview was carried out in the father's preferred language. Compared with data available from Statistics New Zealand's 1996 and 2001 Censuses,²² the inception cohort was broadly representative of the Pacific census figures.²¹

Measures of child discipline—For all participant and measurement waves, except the 6-week maternal interviews, a modified version of the Parent Behavior Checklist (PBC)²³ was used. Fifteen statements were read aloud and participants are asked to complete the sentence with responses: daily/almost daily, weekly, fortnightly, monthly, never/almost never. Two statements were relevant to this paper and included: “*I smack my child...*”; and “*I hit my child with an object (such as a spoon or belt)...*”.

Statistical analysis—Descriptive statistics were used to report type and frequency of child punishment used by parents. Concordance between maternal and paternal responses was measured using the Kappa (κ) statistic. Using Landis and Koch's characterisation,²⁴ $\kappa > 0.75$ was taken to represent strong agreement, $\kappa < 0.40$ was taken to represent poor agreement, while $0.40 \leq \kappa \leq 0.75$ was taken to represent moderate agreement beyond chance. Symmetry of the discordant observations was compared using McNemar's test.

All statistical comparisons were undertaken with a Stata version 8.0 (Stata Corporation, College Station, Texas, USA) software program, and $\alpha=0.05$ was used to define significance.

Ethics—Ethical approval was obtained from the Auckland Branch of the National Ethics Committee, the Royal New Zealand Plunket Society, and the South Auckland Health Clinical Board.

Results

In total, 1708 mothers were identified, 1657 were invited to participate, 1590 (96%) consented to a home visit, and of these, 1477 (93%) were eligible for the PIF Study. Of those eligible, 1376 (93%) mothers giving birth to 1398 infants (of which 680 (49%) were female) participated at the 6-weeks interview.

Mothers' mean age was 27.9 years (standard deviation 6.2 years) and selected characteristics appear in Table 1. Of the 1376 mothers who participated at the 6-weeks postpartum interview, 1224 (89%) were re-interviewed at 12 months, 1144 (83%) at 2 years, and 1048 (76%) were re-interviewed at 4 years.

Table 1. Characteristics of mothers at the 6-week interview and fathers at the 1-year interview from the Pacific Islands Families (PIF) Birth Cohort Study

Variables	Mother		Father	
	n	(%)	n	(%)
Age (years)				
<25	465	(34)	105	(13)
25–30	366	(27)	216	(26)
30–34	324	(24)	238	(29)
≥35	220	(16)	264	(32)
Ethnicity				
Samoan	650	(47)	440	(53)
Tongan	289	(21)	199	(24)
Cook Island Māori	232	(17)	73	(9)
Other Pacific	106	(8)	54	(7)
Non-Pacific*	99	(7)	59	(7)
Highest educational qualification				
Post-secondary (e.g. degree, diploma)	377	(27)	122	(15)
Secondary (high school)	464	(34)	220	(27)
No formal qualification	535	(39)	481	(58)
Years lived in New Zealand				
≥10	996	(73)	543	(66)
5–9	162	(12)	177	(22)
0–4	215	(16)	102	(12)

*Eligible through the Pacific Islands ethnicity of their partner.

Altogether, 999 of the mothers interviewed at 12 months had partners who met eligibility criteria to act as collateral respondents, of whom 825 (83%) were interviewed. Father's mean age was 32.1 years (SD 7.3 years) and selected characteristics also appear in Table 1. At the 2-year interview, 938 mothers had eligible partners of whom 757 (81%) consented and completed the interview.

The type and frequency of maternal and paternal physical punishment of children within the cohort at ages 1-year, 2-year, and 4-year postpartum is presented in Table 2. Apparent from Table 2 is the high prevalence and age dependency of physical

punishment. Overall, 21.5%, 52.0%, and 77.1% of mothers reported smacking at least monthly their child aged 1-year, 2-years, and 4-years respectively, while 24.4% and 78.4% of fathers smacked at least monthly their child aged 1-year and 2-years.

Many parents also used an object (such as a spoon or belt) to hit their child. Overall, 0.2%, 6.6%, and 24.3% of mothers reported hitting their child with an object at least monthly aged 1-year, 2-years, and 4-years, respectively, while 1.3% and 13.2% of fathers hit their child with an object at least monthly aged 1-year and 2-years.

At age 1 year, smacking and hitting prevalences were comparable between mothers and fathers. However, by 2 years of age, fathers were approximately 1.5 times more likely to smack and 2 times more likely to hit their child with an object at least monthly than mothers.

Table 2. The type and frequency of mothers and fathers physical punishment of children within the cohort at ages 1-year, 2-year, and 4-year postpartum

	1-year				2-years				4-years	
	Mother		Father		Mother		Father		Mother	
	n	(%)	n	(%)	n	(%)	n	(%)	n	(%)
<i>I smack my child</i>										
Daily/almost daily	30	(2.5)	18	(2.2)	83	(7.3)	52	(6.8)	181	(17.3)
Weekly	67	(5.5)	61	(7.4)	183	(16.0)	252	(32.9)	281	(26.9)
Fortnightly	44	(3.6)	62	(7.5)	128	(11.2)	176	(23.0)	167	(16.0)
Monthly	110	(9.0)	60	(7.3)	200	(17.5)	120	(15.7)	177	(16.9)
Never/almost never	971	(79.5)	622	(75.6)	549	(48.0)	165	(21.6)	239	(22.9)
<i>I hit my child with an object</i>										
Daily/almost daily	0	(0)	1	(0.1)	3	(0.3)	0	(0)	25	(2.4)
Weekly	2	(0.2)	1	(0.1)	14	(1.2)	17	(2.2)	87	(8.3)
Fortnightly	0	(0)	2	(0.2)	19	(1.7)	24	(3.2)	55	(5.3)
Monthly	1	(0.1)	7	(0.9)	39	(3.4)	60	(7.9)	87	(8.3)
Never/almost never	1220	(99.8)	812	(98.7)	1067	(93.4)	662	(86.8)	791	(75.7)

The concordance in the physical punishment measures used at least monthly between parents is presented in Table 3. There was poor agreement in adopted punishment measured used between parents on children aged 1 year and 2 years. However, there was significant asymmetry, with fathers more likely to employ harsher physical punishment than mothers at both 1 year and 2 years of age.

Table 3. Concordance in the physical punishment measures used at least monthly between parents for children aged 1 years and 2 years

	Never/almost never smack n (%)	Smack n (%)	Hit with object n (%)	κ (95% CI)	McNemar's P-value
<i>Father 1-year</i>		<i>Mother 1-year</i>		-0.02 (-0.09, 0.04)	0.01
Never/almost never smack	484 (59.1)	127 (15.5)	2 (0.2)		
Smack	160 (19.5)	35 (4.3)	0 (0)		
Hit with object	6 (0.7)	5 (0.6)	0 (0)		
<i>Father 2-years</i>		<i>Mother 2-years</i>		-0.03 (-0.08, 0.02)	<0.001
Never/almost never smack	77 (10.2)	70 (9.3)	11 (1.5)		
Smack	253 (33.5)	213 (28.2)	31 (4.1)		
Hit with object	43 (5.7)	55 (7.3)	3 (0.4)		

Discussion

While difficult to directly compare, due to the age-dependant nature of smacking, the prevalence of smacking found in this study was broadly similar to the 80% receiving physical punishment during childhood reported from the predominantly European/Pākehā Dunedin Multidisciplinary Health and Development Study,¹⁴ and the attitudes of 80%¹² and 87%¹³ respondents from New Zealand population surveys reported earlier. However, these results do not support the previously noted findings that Pacific people were significantly less likely than NZ European/Other respondents to think that it was acceptable to physically discipline children,¹² nor does it support the commonly accepted view that physical punishment (often to extreme levels) is a 'norm' for Pacific people.^{15,16}

In this cohort, 20.5% of mothers and 24.4% of fathers were smacking their Pacific children at 1 year of age compared to NZ European/Other (25%) and Pacific (13%) respondents who found it acceptable to physically discipline children under 2 years. Furthermore, we found 77.1% of mothers of 4-year-old children and 78.4% of fathers of 2-year old children disciplined these children by smacking, considerably higher than the NZ European/Other (66%) and Pacific (31%) respondents who found it acceptable to physically discipline children 2–5 years of age.

The difference between the prevalence estimates found here and those previously reported may reflect the potentially large differences between population attitudes and parental behaviours, and the broad age range used in the survey as opposed to the actual age of discipline used in this study.

Despite the majority public view against the use of an object to hit a child,¹⁸ 13.2% of 2 year olds in this cohort had already been hit by their father and 24.3% of 4 year olds hit by their mother—a figure not far short of the 27% of Pacific people who think that disciplining with a wooden spoon or belt should be legally allowable reported earlier.¹² Perhaps more perplexing is that some children were being physically punished by mothers and fathers with an object as early as 1 year of age—a finding unlikely to be limited to Pacific children.

As physical punishment is age-dependent, it is likely that more children within this cohort will be subject to this form of punishment in the future and, if left unchecked, perhaps approach the 45% experiencing hitting and 6% reporting extreme physical punishment as the most severe form of childhood discipline reported by adult participants from the Dunedin Multidisciplinary Health and Development Study.¹⁴

A significant finding in this study was the poor agreement between parents in punishment administered to children aged 1 year and 2 years within families. We could find no other studies directly investigating the concordance between mothers and fathers in disciplining their child. Furthermore, we demonstrated that (at both 1 year and 2 years of age) significantly more fathers administered harsher physical punishment compared to mothers.

While intuitively plausible, our reported behaviour findings appear contrary to the cross-sectional attitudinal results reported elsewhere (where women found it more acceptable than men to physically punish children less than two years, yet men were more accepting than women to physically punish children 6–10 and 11–14 years).¹²

The lack of agreement in reported behaviour between parents might imply that parents' punishment choice is frequently based on each individual's discretion, rather than on a uniform consensus strategy arranged between both parents. Alternatively, one parent may take a more physical stance to punishment while the other uses non-physical or different approaches—a balance perhaps explicitly negotiated or implicitly assumed within the parents' relationship.

While the Pacific Islands Families Study has many strengths (including being a large representative cohort with a relatively small and non-differential attrition rate to date,²¹ and using reliable standardised scales for punishment²³), it also has weaknesses.

Arguably, the most important limitation is reliance on self-reports of discipline behaviors which may be subject to recall and social desirability biases. That is, respondents may forget or report behaviours in a way they believe to be socially acceptable or appropriate rather than accurate. However, we believe the repeated face-to-face home interviews undertaken by Pacific gender-matched interviewers should minimise these biases, compared to those recognised using other sampling techniques.¹²

Another important limitation is that smacking is not defined within the Parent Behavior Checklist (PBC) and may be inconsistently interpreted between parents. For instance, some parents may not consider a single light open-handed blow to the back of a child's hand as smacking whereas others may; some parents may regard close-fisted hitting or punching as smacking whereas others may not. Thus, without a clearly articulated definition, systematic biases may be inherent within our reported estimates of smacking that limits their utility.

Lastly, due to acculturation and assimilation of immigrant Pacific people within New Zealand, it is unlikely that the study results are generalisable to Pacific people resident elsewhere.

Most parents here and elsewhere reported having been smacked and using smacking for child discipline. The majority of the public are accepting of this form of discipline. Based on USA data, it has been argued that a normal range of "spanking" frequencies by non-abusive parents is between 0 to 5.73 times/day, with mean 2.5 times/day.²⁵ Are we conflating smacking with physical violence, injury or abuse or are they separate phenomena?⁴

If we want to use the current consensus of the New Zealand public to establish boundaries on the assault-continuum,²⁰ then it would seem they are separate and that

smacking is acceptable. If this so, then we believe that guidelines for legally acceptable corporal punishment, similar to those issued by the Canadian Supreme Court,¹⁹ are necessary in establishing where police complaints and prosecutions should begin. Although we acknowledge that the establishment of guidelines can, in itself, be problematic,¹⁸ and that some see describing how to hit a child safely as being absurd²⁶ and sending out the wrong public message.⁸

Perhaps no form of physical punishment should be tolerated within our society? Certainly, such a move would be politically unpopular and public views would require changing. Introduction of new legislation is, by itself, unlikely to affect such a change. Although commonly cited, the 1979 legal reform in Sweden which banned physical punishment did not affect public attitudes.²⁷

Despite the lack of consistent, strong, compelling evidence for the harmful consequences of smacking, we believe that the administration of this disciplinary measure should be minimised and used sparingly (if at all). However, in our opinion, more widespread efforts to teach parents positive parent management strategies will go considerably farther in promoting optimal child development and health than exhorting parents to stop smacking.

Competing interests: None.

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Punitive parenting practices of contemporary young parents

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Abstract

Aims To describe the punitive parenting practices of a cohort of young (<25 years) New Zealand parents and to examine the life course risk factors that placed these parents at increased risk of severe child physical punishment/abuse.

Methods The data were gathered as part of the Christchurch Health and Development Study. At age 25, all respondents who had become a parent were interviewed about their parenting practices and family circumstances, including an assessment of child physical punishment/abuse using the Parent-Child Conflict Tactics Scale. The present analysis was confined to those young parents (n=155) who were living full-time with their children at the time of assessment.

Results Amongst this high-risk group of young parents, 77% reported having physically punished a child and almost 12% reported having severely physically assaulted a child in the past year. Although higher rates of child physical punishment were reported for parents of older children, a substantial proportion of parents reported having physically disciplined an infant (37%) or preschooler (84%) in their care. Risks of severe physical punishment/abuse were greatest amongst those young parents from lower socioeconomic status family backgrounds whose own parents were controlling, restrictive, and over-protective, and who (as young adult parents) were responsible for the care of larger numbers of children under conditions of socioeconomic and family functioning stress.

Conclusions The use of physical punishment and more severe forms of physical assault/abuse are relatively common amongst contemporary young parents. Implications of study findings for social policy aimed at reducing levels of family violence in New Zealand are considered.

Family violence (particularly violent behaviour towards children) is a major public health issue in New Zealand. Compared to other developed nations, New Zealand has the third highest rate of child deaths due to maltreatment, with an average of 1.2 children per 100,000 dying at the hands of an adult each year.^{1,2}

In addition, large numbers of children are hospitalised and/or referred to child protection services annually as a consequence of actual or suspected physical abuse. For example, during 2003, 116 children were hospitalised, and a further 33,000 (or 4% of all children in New Zealand) were referred to Child Youth and Family services.³

In the past year, concerns about these high rates of child physical abuse have resulted in protracted debates about the rights of all parents to physically punish their children. This debate has centred on the rights of parents to use physical punishment versus the rights of children not to experience such treatment.

In contrast, comparatively little attention has been given to the extent to which New Zealand children are exposed to physical punishment and/or abuse. For this paper, child physical punishment is defined as the use of physical force by a parent to cause pain but not injury for the purpose of correction or control such as smacking on the hand or bottom.⁴ Further along the continuum, physical abuse involves parental actions that are likely to cause injury to a child irrespective of actual intent, for example actions resulting in minor bruises, severe fractures, or death.⁵

Existing evidence suggests that physical punishment is widely endorsed and used by New Zealand parents to discipline their children, with various studies indicating that around 70% of children are exposed to physical punishment and 6% to severe violence including uncontrolled hitting, punching and choking that resulted in injury and/or lasting bruises.⁶⁻¹⁰

Although this research has helpfully highlighted the widespread use of physical punishment, it has primarily described New Zealand parenting practices between 1960 and 1990. Also most of these studies were heavily reliant on the use of retrospective measures of childhood physical punishment/abuse which are prone to unreliability due to memory difficulties and recall bias.

Such measures also provide limited information about the exposure of very young children to physical punishment which is unfortunate given the over-representation of infants and toddlers in national child injury and abuse statistics.¹

Finally, existing studies have focused primarily on general population samples as opposed to high risk samples where child physical punishment/abuse is more common.^{11,12} Developing a better understanding of the rates of physical punishment and abuse amongst high risk parent groups is important to help inform current public health policy, as well as to assist the development of more effective intervention strategies for reducing rates of family violence particularly amongst those at greatest risk.

This study describes the punitive parenting practices of a cohort of 25-year-old parents with children aged 0 to 15 years. Given that younger parents are at increased risk of physically punishing or abusing a child,¹³ parent, child, and family factors associated with the use of harsh and severe physical punishment in this high-risk sample were also examined.

Methods

Sample—Data were collected as part of the 25-year follow-up assessment of the Christchurch Health and Development Study (CHDS). The CHDS is a longitudinal study of a birth cohort of young people born in the Christchurch urban region during mid-1977 and then studied at regular intervals to age 25.¹⁴ At age 25, all cohort members who had become biological parents or who were parenting a non-biological child as a step or foster parent were asked to participate in a separate parenting and family life interview. Both resident and non-resident parents were included. A total of 174 parents participated in this interview (75% of those eligible).

The present analysis is based on the sub-sample of 155 parents (110 women, 45 men) who were living full-time (resident) with at least one dependent child. These parents were caring for an average of 1.8 children (range: 1 to 6). One in 7 (14%) of these parents was parenting a non-biological step or foster child. Less than a quarter were married (22%), half (50%) were living with a partner, and 28% were sole parents (all female). The median net (after tax) total household income for these young parents was \$585/week (range: \$250–\$2,450) and rates of welfare assistance were high (46%).

Measures—The parenting interview examined a range of issues relating to parenting practices and family circumstances. As part of this interview, parents completed for each child in their care, the physical assault subscale of the *Parent-Child Conflict Tactics Scale (CTS-PC)*.¹⁵ This subscale consisted of 12 items assessing the extent to which parents had behaved in a physically punitive way towards each of their children in the last 12 months.

Items spanned corporal punishment (i.e. smacked on bottom with bare hand; hit on bottom with belt, hairbrush, stick, or other hard object) through to very severe forms of physical assault/abuse (i.e. hit child over and over as hard as could; choked, burned, or scalded on purpose). One item from the original CTS-PC was excluded because of the young age of most children: “threatened with a knife or gun.” All items were rated on a 7-point scale ranging from never (0) to more than 20 times (6). A parent was classified as having used a particular form of physical punishment if they reported having used it with any of their children. The CTS-PC represents one of the most widely used measures of parent-child aggression and has been shown to be reliable and valid.^{15,16}

To examine the factors that placed parents at increased risk of child physical punishment/abuse, a wide range of antecedent and concurrent measures were identified from the study database. These included measures of:

- *Childhood family circumstances*—e.g. family socioeconomic background, family stability, childhood physical abuse, inter-parental conflict and violence, parental mental health, parenting style;
- *Childhood and adolescent characteristics and behaviour*—e.g. gender, antisocial behaviour, mental health, cognitive ability, educational achievement; and
- *Concurrent parenting and family circumstances*, e.g. age of first parenthood, partnership status, number of children, employment, family income, welfare assistance, degree of family functioning, and socioeconomic stress.

Detailed analyses revealed that only four of the many factors considered made significant net contributions to the prediction of parental physical punishment/abuse. These factors are described below.

- *Family socioeconomic status (birth)*: This was assessed on the basis of paternal occupation at the time of the respondent’s birth using the Elley and Irving (1976) scale of socioeconomic status.¹⁷ This six-point scale was collapsed into three levels: 1 = Levels 1, 2 (professional, managerial); 2 = Levels 3, 4 (clerical, technical, skilled); and 3 = Levels 5, 6 (semi-skilled, unskilled, unemployed).
- *Parental overprotection (0–16 years)*: At age 16, this was assessed using the over-protection subscale of the Parental Bonding Instrument (PBI)¹⁸ which measures the extent to which parents are perceived as controlling, over-protective, and intrusive by their children. Maternal and paternal scores were averaged to create a composite parental overprotection score.
- *Number of resident children (25 years)*.
- *Family stress*: This was measured using a 14-item scale assessing the extent to which young parents reported experiencing a range of family stressors including not having enough time to yourself, no one to call on for help, lack of sleep, family relationship conflicts, insufficient financial resources, and housing problems (coefficient alpha = 0.74).

Results

Characteristics of younger parents—Compared to their non-parenting same-age peers, early parenting cohort members were significantly more likely to have been raised in families characterised by higher levels of socioeconomic disadvantage (41% vs 25%), teenage motherhood (48% vs 22%), maternal educational underachievement (70% vs 48%), and family instability (mean number of parental changes: 2.3±3.4 vs 0.9±2.0).

Young parents were also more likely to have left school without qualifications, to have adolescent externalising (26% vs 12%) and internalising difficulties (49% vs

32%), and as young adults, to identify themselves as Māori (22% vs 11%), have lower personal/family incomes, and higher levels of welfare dependence (46% vs 15%).

These findings illustrate the highly selective processes associated with early parenthood as well as the challenging circumstances in which many young parents are raising their children, further raising concerns about their vulnerability to parenting difficulties, including child physical punishment/abuse.

Punitive parenting practices of younger parents—Table 1 shows the proportion of parents who reported using a range of punitive parenting behaviours when disciplining their children during the past 12 months, including minor physical assault/punishment as well as severe and very severe physical assault/abuse.

The use of physical punishment was high, with over three-quarters having physically punished a child in the last year by smacking, slapping, shaking, or hitting them on the bottom with an object. Severe forms of physical violence were less common, with one in nine parents (11.6%) reporting an act of severe physical punishment/assault (i.e. face slapping, hitting with fist or object on body other than bottom, kicking, throwing) and just under 3% reporting an act of extreme abuse (i.e. beating up, choking, burning).

Further examination of gender differences in the use of physical punishment/abuse revealed that mothers and fathers were highly similar in their levels of child physical punishment/abuse, with the exception of a small tendency for slightly more mothers to report using physical punishment than fathers during the last year (78% vs 62%, $p=0.04$).

Table 1. Parents' reported use of different methods of child physical punishment in the last 12 months

Measure	N (total sample=155)	%
Minor assault or physical punishment	120	77.4
Smacked child on bottom with bare hand	97	62.6
Hit child on bottom with belt, hairbrush, stick, or other HO	16	10.3
Slapped child on hand, arm or leg	102	65.8
Shook child	9	5.8
Severe assault or physical abuse	18	11.6
Slapped child on face, head or ears	16	10.3
Hit child on part of body besides the bottom with belt, hairbrush, stick, or other HO	5	3.2
Threw or knocked child down	2	1.3
Hit child with a fist or kicked them	1	0.7
Very severe assault or physical abuse	4	2.6
Hit child over and over as hard as could	3	1.9
Choked or grabbed child around the neck	1	0.7
Burned or scalded child on purpose	0	0.0
Punched child	2	1.3
Any physical punishment	120	77.4

HO=Hard object.

Physical punishment by child age—Table 2 examines the extent to which the severity of parental physical punishment/abuse varied depending on the ages of children being parented. Results show that the use of physical punishment by parents

was more common with children aged 2 years and over than with children aged under 2 years ($p < 0.0001$). Nevertheless, even amongst parents with dependent children under 2, over a third (36.7%) reported an act of minor assault/physical punishment towards their child and 3.3% reported a severe assault (though none reported a very severe assault on a child under 2).

Table 2. Parents' reported use of physical punishment by child age

Measure	Under 2 years of age (N=60)	Preschool (2–4 years) (N=90)	School age (≥ 5 years) (N=72)
% Minor assault or physical punishment	36.7	84.4	77.8
% Severe assault or physical abuse	3.3	11.2	15.3
% Very severe assault or physical abuse	0.0	2.2	5.6
% Any physical punishment	36.7	84.4	77.8

Predictors of child physical punishment—To examine the parent, child, and family factors associated with the extent of parents' use of physical punishment, a composite measure of physical punishment/abuse was created by first recoding the physical punishment items from the CTS-PC as absent/present and then summing them to form an overall scale score. This produced a score which ranged from 0 for parents who reported never using physical punishment to a maximum of 9 for one parent who reported using 9 of the 12 forms of physical punishment listed in Table 1 in the previous 12 months. This score was then related to a wide range of prospectively and concurrently assessed predictors (see Methods).

Multiple regression analysis identified four variables as making significant net contributions to the extent of parents' use of physical punishment/abuse. These variables were: the *socioeconomic status* of their family of origin ($\beta = 0.17$; $p = 0.02$); *parental overprotection in their own childhood* ($\beta = .19$; $p = 0.01$); the *degree of concurrently reported socioeconomic and family functioning stress* ($\beta = 0.19$; $p = 0.01$); and the *total number of children in the family* ($\beta = 0.27$; $p < 0.0001$).

Greater use of physical punishment/abuse was associated with having more children in the family, greater perceived family stresses and functioning difficulties, and having been raised in families characterised by lower socioeconomic status and overly restrictive and controlling parenting practices.

Conversely, those reporting the lowest rates of physical punishment/abuse were more likely to have only one child in the family, to report lower levels of stress and difficulty in family functioning, and to have been raised in higher socioeconomic status families characterised by less restrictive and less protective parenting practices.

Jointly, these four factors explained only 21% of the variance in physical punishment/abuse, suggesting a moderate level of prediction of the rate of physical abuse in this sample.

Discussion

The right of New Zealand parents to smack and physically punish their children has recently attracted considerable public health and media attention. This study aimed to describe the prevalence of child physical punishment/abuse amongst a high risk group

of young parents and to identify factors associated with an increased risk of severe child physical punishment/abuse. Study findings and their implications are discussed below.

There was clear evidence to support the high risk status of younger parents in terms of their preparedness for parenting. Compared to study members who had yet to become parents, those becoming parents by age 25 tended to have grown up in family circumstances characterised by socioeconomic disadvantage and parental instability, were less academically able, had gained fewer educational qualifications, and had higher rates of adolescent mental health problems.

As young adults, they were earning less and had higher levels of welfare assistance, depression, and anxiety disorders. These findings are consistent with previous studies describing the adverse psychosocial backgrounds and parenting circumstances of teenage and younger parents.¹⁹⁻²¹ They also highlight the vulnerability of younger parents to parenting difficulties.¹³

Examination of the reported punitive parenting practices of these young parents further confirmed these concerns. Physical punishment was common with over three-quarters of parents reporting the use of this method of discipline.

Of even greater concern were the high rates of severe (11.6%) and very severe physical assault (2.6%). These rates are higher than those based on earlier retrospective general population studies showing that the rate of severe assault was around 6%.^{9,10} However, they are highly consistent with rates of severe physical assault (11.7%) reported by high-risk parents not receiving early intervention support.²²

Although risks of minor through to very severe child physical assault tended to increase with increasing age of the child, results showed that a substantial proportion of younger parents were physically punishing and severely assaulting infants and preschoolers. This is consistent with international studies showing that smacking is very common amongst parents of preschool children.²³ Such findings warrant considerable concern given the over-representation of very young children in national child abuse statistics.

Finally, with the exception of a tendency for mothers to more frequently report the use of minor assault/physical punishment (likely due to differences in child care responsibilities), no gender differences were found in risks of severe or very severe physical punishment/abuse.

With respect to the antecedent and concurrent life course factors that placed younger parents at elevated risk of severe child physical punishment/abuse, surprisingly few strong predictors were identified. This may reflect the relatively homogenous nature of the study sample in terms of their social background, personal characteristics, and current life circumstances. This sample selection bias may also have reduced heterogeneity in parenting outcome.

Nonetheless, analyses did show that those parents most likely to use more severe forms of physical punishment were more likely to have come from lower socioeconomic status family backgrounds; to have been raised in families characterised by controlling, restrictive, and over protective childrearing methods; and who as young parents experienced higher levels of stress in relation to family

functioning and socioeconomic circumstances. In addition, the use of physical punishment/abuse increased with the number of children being cared for within the family.

These findings suggest that an individual's social background, childhood parenting experiences, as well as current levels of family stress and difficulty contribute to later effective parenting, particularly the use or avoidance of child physical punishment.

Of particular interest was the finding that having been raised in a family environment characterised by restrictive and controlling parenting appeared to be more predictive of later punitive parenting than an individual's own history of physical punishment as a child. This suggests that the overall style of parenting to which a young person is exposed may be more important than specific parenting behaviours in predicting their later risks of child physical punishment/abuse. However, since other studies have demonstrated strong linkages between childhood exposure to physical punishment/abuse and later approval of physical punishment²⁴ as well as risks of harsh parenting,^{12,25,26} further follow-up of this cohort at older ages with a larger and more representative sample will be important to clarify this issue.

The present study has a number of limitations. Firstly, the sample is a selected sample of young parents from relatively homogenous and disadvantaged backgrounds. This may have limited our ability to identify risk factors differentiating between parents at risk of more punitive parenting behaviour from those who were not.

Secondly, the sample was living predominantly (75%) in Christchurch. Thus, the extent to which these findings apply to other New Zealand samples and centres remains uncertain.

Finally, although the CTS-PC has a number of advantages including the use of specific behavioural criteria and the ability to assess infrequent and difficult to observe behaviour (e.g. kicking, choking), social desirability or the tendency for parents to minimise negative behaviours is a problem,²⁷ as it is with virtually all self report measures of parenting. Thus, it is possible that the use of the CTS-PC may have resulted in an under-estimation of the extent of physical punishment and child abuse.

Nonetheless, within these limitations, study findings do suggest that the use of child physical punishment is likely to be common amongst young parents and that up to 12% of these parents may engage in harsh or abusive treatment of their children.

These findings have a number of important implications for current policy debates aimed at reducing levels of family violence in New Zealand. Firstly, it is clear that smacking is widely employed by younger parents to discipline their children, and that rates of severe assault are highly consistent with those reported amongst other high risk groups such as parents meeting psychosocial criteria for early intervention services. These findings lend support to recent policy initiatives to legislate against the use of physical punishment by parents. Whilst it is appreciated that not all parents who physically punish their children are at risk of child abuse, some compromise on the part of the many may be necessary to reduce risks for more vulnerable families.

Secondly, given the high prevalence of physical punishment and severe physical assault in this high risk sample, it is evident that efforts to regulate physical punishment and its associated risks will need to extend beyond legislation alone to an

increased investment in parenting programmes aimed at reducing the fraction of children exposed to harsh or abusive treatment.

Mounting evidence exists to suggest that such programmes can be effective^{22,28–30} For example, recent findings from a randomised controlled trial of the Early Start Program showed that (by 36 months) families who received early intervention support had significantly lower rates of severe child physical assault (4.4% vs 11.7%); and higher mean levels of positive, non-punitive parenting; than untreated control families.²²

Whilst legislating against the use of physical punishment may represent an important first step in the prevention of family violence, further research to evaluate existing and emerging parenting intervention strategies (to determine what works best and for whom) will be essential to fully address the problem of family violence in New Zealand.

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Neonatal intensive care utilisation by infants born to mothers older than 40 years of age: a 10-year review

Malcolm Battin, Coila Bevan, David Knight

Abstract

Background Increased maternal age is associated with increased rates of maternal hypertension, diabetes, growth restriction, and Caesarean section in pregnancy. However, there are few data on outcome and utilisation of neonatal resources by this group of infants.

Aim The primary aim was to determine how many infants born to women 40 years old or over were admitted for neonatal care at National Women's Hospital in Auckland, New Zealand during the period 1995–2004 inclusive. Secondary aims were to evaluate trends in admission, neonatal mortality, morbidity, and service utilisation.

Method Infants admitted for neonatal care and eligible for registration with the Australian New Zealand Neonatal Network were identified from the National Women's Neonatal Intensive Care Unit (NICU) database, trends were evaluated and resource utilisation estimated.

Results For the study period, 203 infants were admitted following birth to women over 40 years. The median gestation was 33 weeks. Admissions increased to a peak in 2001–2002. A similar increase was seen in the total days in NICU and the percentage of total respiratory support used. Changes in referral practice from 2004 may have affected the infant numbers thereafter.

Conclusion Infants born to mothers over the age of 40 currently represent about 3% of total births but 5% of the infants requiring neonatal intensive care.

Over the last 25 years a combination of social and demographic factors have resulted in a notable drift upwards in the age at which women in developed countries give birth to their children. In New Zealand, for the first quarter of 2006, the median maternal age at birth was 30.4 years compared with 28.7 years in 1996 and 25.1 years in 1975.¹ Consequently, a large number of women are having first babies in their mid-30s and a significant number are having their first babies at age 40 or older. Indeed, at National Women's Hospital (Auckland, New Zealand) approximately 3% of deliveries are to women over 40 years old.² Although most women over the age of 35 or even over 40 have healthy pregnancies and healthy babies, there are potential problems associated with pregnancy at an increased maternal age. These include declining fertility, and an increased rate of multiple pregnancies; spontaneous pregnancy loss; medical complications of pregnancy; intrauterine growth restriction; and prematurity and congenital anomalies, including chromosomal abnormality.

Moreover, at the time of the labour and delivery, increased maternal age is associated with higher risk of fetal distress, prolonged second stage of labour, and increased rates of Caesarean section.^{3–5} These factors (either alone or in combination) may result in both short- and long-term neonatal morbidity.

While there is a reasonable body of literature regarding the effect of advanced maternal age on obstetric outcome (including perinatal mortality), there is a relative paucity of data on neonatal outcome, which is often restricted to neonatal admission rate.⁵⁻⁷ In one large study of births in California in the early 1990s an increase in the proportion of infants coded as having *any birth asphyxia* was reported following birth to nulliparous women over 40 years but a lower rate of birth trauma was also reported perhaps due to increased delivery by caesarean section.⁸ Moreover, there are few published series of temporal trends in utilisation of neonatal resources by infants born to women of very advanced maternal age.

Therefore the aims of this study were two-fold. Firstly, to quantify the requirement for neonatal intensive care in infants born to women aged 40 years old or over during the period 1995–2004 inclusive. Secondly, to evaluate trends in: demographic characteristics; neonatal mortality; neonatal morbidity; and service utilisation, measured by duration of respiratory support and stay on the neonatal unit.

Methods

Data were reviewed for the 10-year period January 1995 to December 2004. All infants admitted to National Women's Hospital Neonatal Intensive Care Unit (NICU) and eligible for registration with the Australian New Zealand Neonatal Network (ANZNN) were identified from the National Women's NICU database. The ANZNN registration criteria included live born infants transferred from labour ward or admitted to the participating hospital at less than 28 days of age with any of the following: birth at less than 32 weeks gestation; birth weight less than 1500 grams; more than 4 consecutive hours of respiratory support, or major neonatal surgery.

Ethical approval has previously been obtained for the submission of de-identified data to the ANZNN from our hospital. For the time period reviewed, National Women's Hospital (NWH) provided all neonatal intensive care to the central and Northern Auckland region which included approximately 12,000 births annually.

The number of infants born to mothers in the age group of interest was determined then appropriate clinical and demographic data were reviewed. The dataset included a de-identified record of maternal age; ethnicity, and past pregnancy history (including previous premature births), previous perinatal death, and assisted conception.

Pregnancy data included plurality, presenting antenatal problem, prolonged rupture of membranes, preterm labour, intrauterine growth restriction (suspected antenatal), antenatal diagnosis of fetal malformation, hypertension in pregnancy, antepartum haemorrhage, antenatal corticosteroids, and (for multiples) birth order.

Delivery data comprised of presentation and mode of delivery. Neonatal data—comprising gestational age, birth weight, Apgar scores, resuscitation details, and respiratory diagnosis—measures morbidity including highest lowest fractional inspired oxygen (FiO₂) in the first 12 hours, exogenous surfactant use, air leak, days on positive pressure ventilation, days on continuous positive airways pressure (CPAP), proven or suspected necrotising enterocolitis (NEC), number of proven infections, intraventricular haemorrhage (IVH), or other cranial ultrasound abnormality and retinopathy of prematurity (ROP).

Important trends in both overall numbers of infants and individual morbidities were examined. Data are presented as mean and standard deviation if normally distributed, or as median and range if not normally distributed. The data are presented by year or if more appropriate by 2- or 5-year epoch.

To demonstrate trends in graphs or tables (for total number of infants, percentage of admissions, number of twins, deaths, days of NICU care, and percentage of respiratory support) the epochs are 2-year blocks. The two items of data that were used to indicate utilisation of neonatal resources were total days hospital care prior to discharge and total days on respiratory support during neonatal stay.

To explore differences in demographic and presenting obstetric clinical data, the infants were divided into two time periods (1995–1999 and 2000–2004) and the data compared. Incidences were compared by Chi-squared and continuous data by Mann Whitney U test or Student's *t*-test as appropriate. Statistics were calculated using Statview (Cary, NC USA) software.

Results

For the study period, 203 babies (who fulfilled ANZNN registration criteria following birth to women older than 40 years) were admitted to NICU at National Women's Hospital. The presenting obstetric clinical data and delivery mode are summarised Table 1.

Table 1. Antenatal complications and mode of delivery for mothers aged 40 years and over (registered with Australian New Zealand Neonatal Network) delivering babies in 1995–2004

Clinical details	Number of women
Antenatal complication	
Premature rupture of membranes	39 (19%)
Spontaneous preterm labour	63 (31%)
Maternal hypertension in pregnancy	56 (28%)
Antenatal haemorrhage	37 (18%)
Intrauterine growth restriction (IUGR)	24 (12%)
Fetal distress	59 (29%)
Delivery mode	
Spontaneous vaginal	54 (27%)
Elective Caesarean section	110(54%)
Emergency Caesarean section	31 (15%)
Forceps or ventouse	8 (4%)

On examining the data for trends in antenatal complications there was an increase in the proportion of pregnancies coded as complicated by suspected intrauterine growth restriction for 1995–1999 versus 2000–2004 (8% versus 14%, $p=0.02$) and in the proportion reported to have spontaneous preterm labour (16% versus 39%, $p=0.03$) but no other significant differences or trends in antenatal characteristics were detected.

There was no statistically significant difference in mode of delivery between the two time periods 1995–1999 and 2000–2004. Overall, there was a high rate of antenatal steroid use in pregnancies that delivered prior to 34 completed weeks of gestation, with 100 of the 116 (62%) receiving a full course and 72 of 116 (86%) receiving some steroid prior to birth.

The median (range) gestational age and birth weight for the infants were 33 (24–42) weeks and 2092 (570–5320) grams respectively. Although there was wide variation in the range of values for the individual years there was no clear trend by individual year or 5-year block in either gestational age or birth weight. Overall, the majority of infants were born in satisfactory condition with a median (range) Apgar score of 7 (1–9) at 1 minute and 9 (1–10) at 5 minutes respectively.

Indeed, only 80 infants (39%) and 24 infants (12%) had an Apgar score below 7 at 1 and 5 minutes respectively. Resuscitation at birth included intubation in 15.3% of infants. After admission to the neonatal unit, 33/203 (16%) received surfactant for respiratory distress syndrome.

In addition, one infant with meconium aspiration syndrome received high frequency oscillation ventilation, five infants with pulmonary hypertension received nitric oxide, and one infant with cardiac malformation underwent extracorporeal membrane oxygenation (ECMO). There were no significant trends in the proportion of infants requiring these interventions over time.

Mortality and acquired morbidities with long-term serious consequences were uncommon. Eleven of the 203 (5.4%) infants died. There was no overall trend in death when examined by individual year and no significant difference in rate between the first and second time periods.

Neonatal morbidity included four infants with air leak requiring drainage and eight infants diagnosed as having chronic lung disease (five of these were discharged home receiving supplemental oxygen). Also four infants had acquired neurological conditions that adversely affected outcome. Specifically, there were two term infants with severe neonatal encephalopathy that died and two preterm infants (25 and 28 weeks gestation) with major (i.e. grade III/IV) intraventricular haemorrhage (IVH).

The infant with grade IV IVH died and the other who had grade III survived. Other serious neonatal morbidity were uncommon; the median number of proven infections was 0 (range 0–2), there was only one proven and one suspected case of necrotising enterocolitis, and no cases of retinopathy of prematurity (ROP) requiring treatment. Given the rarity of these morbidities, trends were not assessed.

In addition to the acquired morbidity, several infants had chromosomal abnormality, dysmorphic syndromes, or congenital anomalies that would potentially affect outcome. Seven infants had major chromosomal abnormality, this included Trisomy 21 in six infants and Trisomy 18 in one infant. Three infants were diagnosed with an abnormal syndrome in the neonatal period; one each of Prader Willi syndrome, Noonan syndrome, and Klinefelter syndrome. In addition, nine infants had major congenital anomalies including five with cardiac lesions and two each with skeletal or central nervous system anomalies.

The five cardiac malformations included transposition of the great arteries (TGA) in three cases, hypoplastic right heart ventricle in one, and ventriculo-septal defect (VSD) in one. The two skeletal malformations were missing digits from the hand in one case and syndactyly in the other. The two malformations of the central nervous system were idiopathic microcephaly and an occipital encephalocele.

Important trends—including: total number of infants, percentage of admissions, number of twins, deaths, days of NICU care, and percentage of respiratory support—are summarised in Table 2.

The overall mean duration of neonatal admission was 32 days. An increase was observed in the number of admissions, total days NICU care, and percentage of total respiratory support from 1995–6 to a peak in 2001–2. Thereafter there was a small decrease in numbers but there were changes in referral practice at that time, with the opening of other level two neonatal units in the city.

Assisted conception, as recorded in the database (i.e. reported by the women or lead maternity caregiver), was significantly more common in the mothers over 40 years compared with those below 40 years of age (15% versus 6.7%, $p < 0.001$). Moreover, for infants born to mothers over 40 and admitted to NICU, there was an increase in

the proportion reported to be conceived following assisted conception from approximately 9% and 13% for the two time periods 1995–1999 and 2000–2004.

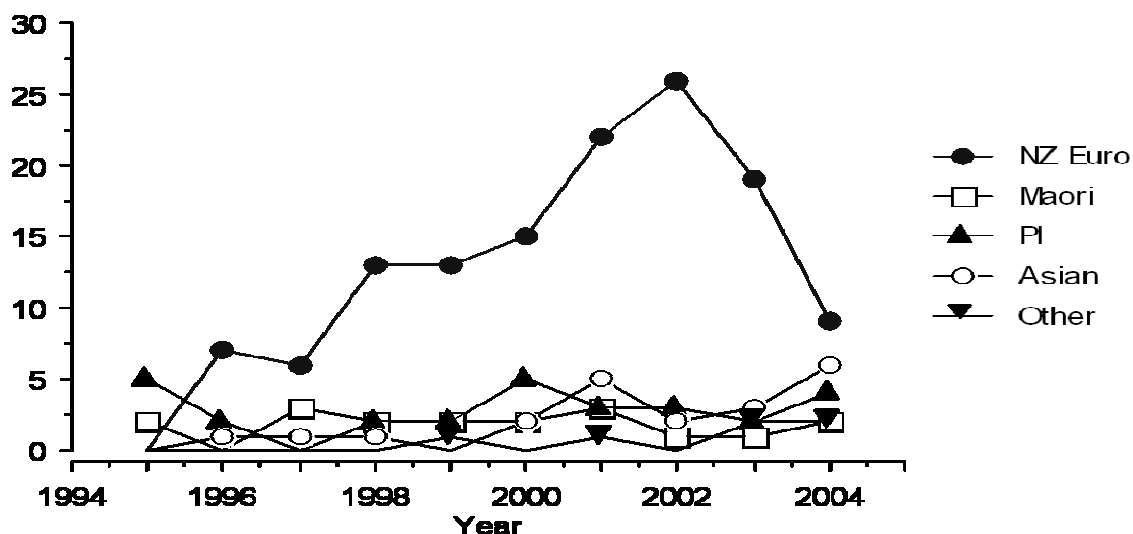
Changes in the contribution from the major ethnic groups over time are presented in Figure 1. A rise was seen in number of New Zealand European infants compared to stable numbers in the other ethnic groups.

Table 2. Summary of neonatal admissions and care in infants born to women over 40 years old for the 10-year period 1995–2004

Period	Number (No.) of infants	Percentage of total admissions (ANZNN-eligible)	No. of twin infants	No. of infants who died	Total days in NICU	Percentage of total days respiratory support provided in NICU
1995–6	20	2.6	4	2	759	1.3
1997–8	25	3.8	6	1	658	1.8
1999–2000	42	3.8	6	2	1123	2.7
2001–2	66	6.5	21	3	2358	5.6
*2003–4	50	4.9	15	1	1650	4.2

BW=birth weight; GA=gestational age; *2004 had referral process changes with opening of other level 2 neonatal units.

Figure 1. Trends in the number of infants born to mothers over 40 years of age, by ethnic group



NZ Euro=New Zealand European; PI=Pacific Islander (e.g. Samoan, Tongan, Niuean, Cook Islander).

Discussion

New Zealand, like many other developed countries, has experienced a substantial increase in births to women over the age of 40 years. For instance, over the last 10 years, National Women's Hospital has experienced an increase in deliveries to women in this age group from 1.5% to approximately 3% of total deliveries.²

It is well recognised that with increasing maternal age several factors (including increased rates of multiple births, medical complications of pregnancy, and perinatal complications) result in more infants with neonatal problems. This study examined trends over a 10-year period in a single centre and demonstrated an increase in both the absolute number of admissions and proportion of total admissions born to women aged over 40 years.

Although there have been concomitant changes in the rates of delivery to older women and some changes the total number of admissions for neonatal intensive care, it is notable that infants born to women over the age of 40 account for 3% of deliveries but 5% of neonatal admissions. Further, these demographic changes are associated with a significant increase in the workload measured by total days neonatal care and total time on respiratory support for this group of infants.

Despite the increase in birth numbers to women in the over-40s age group, the presenting obstetric factors and infant characteristics were fairly consistent. Specifically, the rates of prolonged rupture of membranes, antepartum haemorrhage, hypertension in pregnancy, or fetal distress were unchanged but there was a significant increase in multiple pregnancy, spontaneous preterm labour, and suspected intrauterine growth restriction (IUGR)—although the majority of the infants were neither extremely low gestational age nor extremely low birth weight, with a median gestational age and birth weight of 33 weeks and 2092 grams respectively.

The significant increase in multiple pregnancy may contribute to the increase in premature birth. Also the increased IUGR rate may be explained by better ultrasound detection and the use of individualized growth charts.^{9,10}

Even though the neonatal mortality and rate of serious neonatal morbidities were both low, the admission for neonatal care is not without consequence. Certainly the infants did receive a substantial amount of respiratory support and the mean duration of neonatal admission was 32 days. Interestingly, overall 16% got surfactant (to aid lung function) with no significant change in rates between two time periods. Finally with respect to the individual infant there is recent evidence that even if only moderately premature there can be significant short term morbidity¹¹ and in the longer term this may be associated with some cognitive impairment compared with matched controls.¹²

The increase in numbers of infants receiving neonatal intensive care following birth to women above the age of 40 years occurs predominately in NZ Europeans. Full discussion of the complex social factors responsible for the increasing maternal age is beyond the scope of this paper. However, it is noted that Māori mothers tend to be younger with a median age at birth of 26.0 years compared with 30.4 years in the overall population 2006.¹ It is also clear that increased maternal age is associated with difficulty conceiving and increased rates of assisted conception.

Overall, 15% of the infants born to the older mothers were reported to be the product of assisted conception. Furthermore, it is possible that this was an underestimate of fertility treatment data as information may not be forthcoming or not recorded at the time of pregnancy booking. However, a steady increase in numbers was observed through the 10-year period. Twin births following fertility treatment are at an increased risk of preterm birth, but are mostly mildly preterm.¹³

In the study group, an increase in twins as both absolute numbers and proportion of total admissions was seen with a peak in 2002. The pattern for the reported use of fertility treatment and the rate of twin birth were similar with an initial increase then, after 2002, a decline in rate seen for both.

Although spontaneous twins are more common with advanced maternal age, the recent decline in the twin rate almost certainly reflects changes in fertility practice. Since 2004, or perhaps slightly earlier, there has been a push for single embryo transfer.¹⁴

A potential limitation of the study is that it is from a single centre. Certainly the apparent decrease in overall numbers after 2003 may be a consequence of changes in neonatal admissions, as two other level two neonatal units opened in the city.

Our hospital also possibly selects a greater proportion of older women and the increased neonatal admission rate may not reflect the general experience in New Zealand. However, this is unlikely that our unit is the only one affected by these demographic changes given the national population data illustrating an increase in the number of women who are now giving birth to children after the age of 40. Nevertheless, further work is planned using ANZNN data on all New Zealand admissions which will allow the study of trends for the whole country rather than a single centre.

A second potential limitation of the study is that there have been significant changes in neonatal respiratory care during the 10-year period 1995–2004. Firstly, the increasing availability and use of surfactant from the mid 1990s then increased CPAP use and a decline in both ventilation and surfactant use in the late 1990s. In order to account for these changes, the data on trends in respiratory support (Table 2) are calculated from total time on respiratory support, i.e. calculated from combined ventilation and CPAP duration.

In conclusion, infants born to mothers over the age of 40 years currently represent about 5% of admissions to the service fulfilling ANZNN criteria. Their mortality and morbidity is fairly low, but admission numbers and service utilisation (measured by total days care and respiratory support) has markedly increased compared to 1995. Although the number of infants remains quite low this increase in neonatal workload and change in maternal demographics needs to be recognised and may have implications for service planning.

Competing interests: None.

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Non-fatal work-related motor vehicle traffic crash injuries in New Zealand: analysis of a national claims database

Shaheen Sultana, Gillian Robb, Shanthi Ameratunga, Rod T Jackson

Abstract

Objectives This study describes event rates and associated costs from non-fatal work-related motor vehicle traffic crash (WR MVTC) injuries on public roads in New Zealand based on an analysis of the Accident Compensation Corporation (ACC) entitlement claims database.

Methods WR MVTC injury claims between July 2004 and June 2006 were identified from the ACC Motor Vehicle Account. Cross-sectional analyses were performed to describe the characteristics of the claims. Injury rates were estimated where appropriate.

Results The overall age-standardised rate of non-fatal WR MVTC injury claims during the study period was 109 per 100,000 workers per year. The majority of claimants were male (75%) and New Zealand (NZ) European (67%), and one in three of these injuries occurred among plant and machine operators and assemblers. In contrast to rates of road traffic injury resulting in deaths and hospital admissions in NZ, younger and older workers had similar proportionate representation in the claims data. The total cost associated with the 1968 claims made during the 12 months from July 2004 to June 2005 was approximately NZ\$6 million, with an average cost per claim of NZ\$2884.

Conclusions To our knowledge this is the first published analysis of non-fatal WR MVTC injury claims in New Zealand. These analyses identify industry and demographic groups that appear to be at increased risk of WR MVTC injuries that could be targeted for preventive interventions. However, a number of limitations in the database, including uncertainties regarding the definition and coding of crashes deemed as “work-related”, under-reporting of claims, and lack of a reliable indicator of injury severity significantly compromised our ability to interpret the results. Considerable improvement in the quality and reporting of claims data is required to facilitate the utility of this information to inform injury prevention strategies.

International studies indicate that motor vehicle traffic crash (MVTC) injuries are one of the leading causes of work-related fatalities.¹⁻⁴ MVTC injuries whilst at work are considered to be the single largest cause of occupational fatality in United Kingdom.⁵ In the USA, they represent from 20 to 25% of work-related fatalities; 25% in Denmark, Finland and Sweden; 30% in Canada; 49% in Australia; and 60% in France.^{6,7}

Death due to MVTCs also comprises the single largest category of work-related deaths in New Zealand. McNoe et al⁸ in their recent report on work-related traffic fatalities in New Zealand reported that there are on average 31 such deaths annually, occurring at a rate of 2 per 100,000 workers per year.

Data on fatal injuries are easier to ascertain and analyse, but deaths are a small fraction of the overall burden of injury, i.e. the tip of the injury pyramid. In New Zealand, approximately 230,000 compensated work-related injuries were reported in the financial year commencing 1 July 2001.⁹ Despite considerable human and economic consequences, non-fatal work-related (WR) MVTC injuries in New Zealand have received scant attention.

Research in this field is challenged—at least in part—by varying levels of attention to the coding of the ‘place of injury’ category in hospital discharge data and the lack of a single agency that has the responsibility of collecting information on all WR MVTCs resulting in injuries.¹⁰ However, the New Zealand Injury Prevention Strategy (NZIPS) has identified road traffic and workplace injuries among its six priority areas,¹¹ the implementation of which requires better information on non-fatal injuries to inform preventive strategies.¹²

The present study aims to contribute to the current gap in knowledge by providing a profile of non-fatal WR MVTC on public roads in New Zealand between 2004 and 2006—as identified through the ACC claimants’ database. The ACC claimant database is theoretically the most complete national register of WR MVTC injuries that require medical care and/or earnings-related compensation, including non-hospitalised injuries.

Methods

Case selection

The Accident Compensation Corporation (ACC) administers New Zealand’s Accident Compensation Scheme, which provides personal injury cover for all New Zealand citizens, residents, and temporary visitors to New Zealand no matter who is at fault. ACC operates under the *Injury Prevention, Rehabilitation and Compensation (IPR&C) Act 2001* that came into force on 1 April 2002. A claimant in ACC is thus defined as a person who has cover for a personal injury under the IPR&C Act 2001.¹³

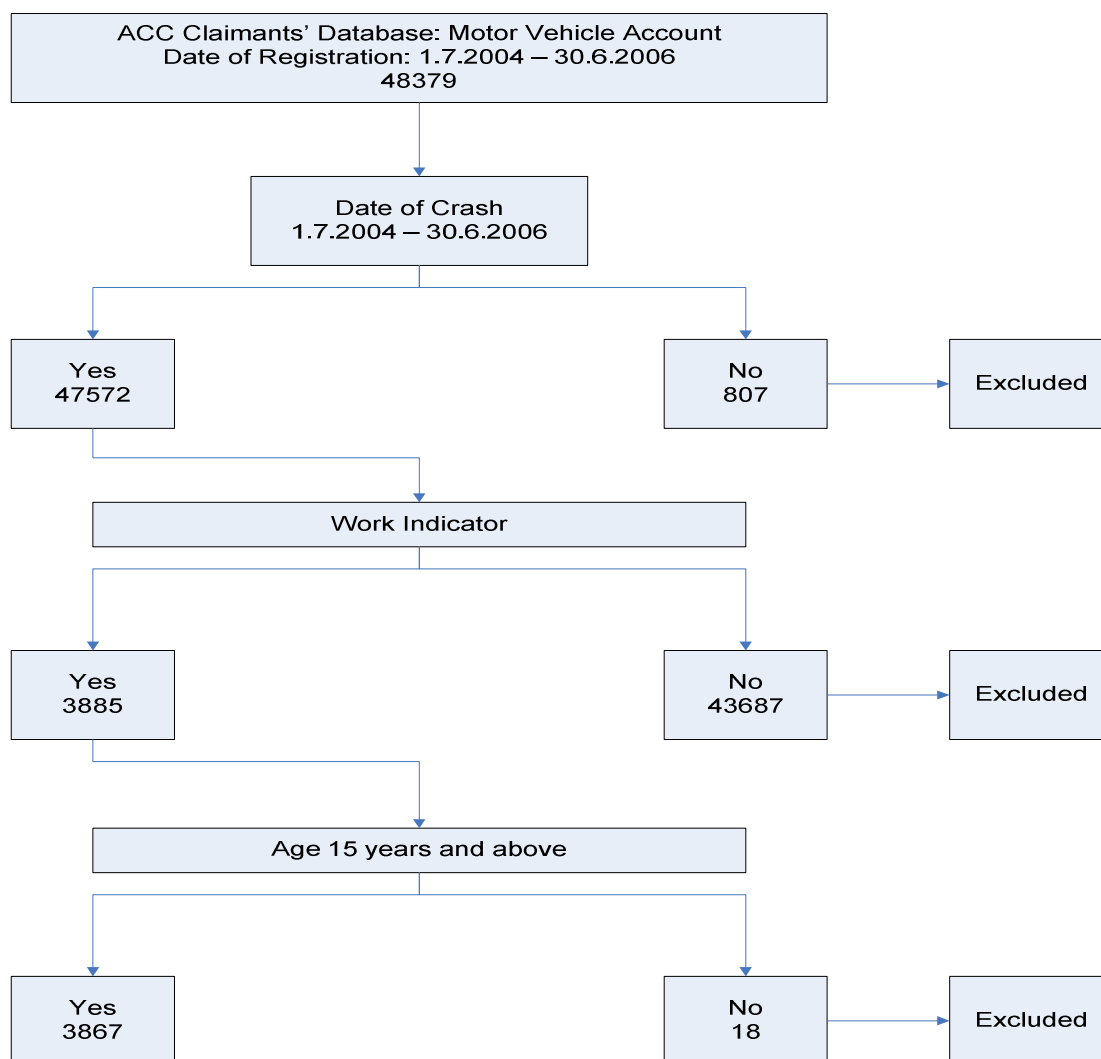
Work-related non-fatal MVTC injuries resulting in ACC claims between July 2004 and June 2006 were identified from the ACC Motor Vehicle Account. The initial dataset of approximately 50,000 cases was contained in a single Microsoft Excel data file. In addition to a narrative description of the crash, the dataset contains information regarding the crash date, claim registration date, whether the injury was work-related, occupational and industry class, injury diagnostic codes, and sociodemographic characteristics of the claimant—specifically age, sex, and ethnicity.

The study sample was defined using the following eligibility criteria:

- Registered claim in the ACC Motor Vehicle Account
- Injury occurred between 1 July 2004 and 30 June 2006
- Claimants aged 15 years and above
- Currently in paid employment
- Injury happened within New Zealand on a public road
- Injury coded in the database as “work-related”

The latter code is initially determined from the response on the ACC45 claim form “did the accident occur at work” and subsequently confirmed by ACC staff to be an injury defined as work-related by the IPR&C Act 2001. The selection procedures for all cases for WR MVTC injury from the initial dataset are shown in Figure 1.

Figure 1. Process of case selection from the ACC claimants' database



Definitions of variables

Demographic details (age, gender, and ethnicity); injury details (prior activity, injury diagnoses, and body part injured), work details (employment status, work type, industry, and occupation); and cost of claims were measured. The definitions and limits noted below are based on operational definitions provided by ACC.

Age—Age in years is at the date of injury. Age was categorised as 15–24 years, 25–34 years, 35–44 years, 45–54 years, 55–64 years, and 65 years or above.

Ethnicity—The information for this variable is based on the claimants' response to the question, “what is your ethnic background” on the ACC45 claim form. Ethnicity was then grouped into European (European not further specified, NZ European/Pakeha, Other European), Maori, Pacific (Pacific Islander not further defined, Samoan, Cook Island Maori, Tongan, Niuean, Tokelauan, Fijian, Other Pacific Islander), Asian (Asian not further defined, Southeast Asian, Chinese, Indian, Other Asian), and others (Middle Eastern, Latin American/Hispanic, African, Other).

Injury diagnosis—The ACC diagnosis maps the type of work-related injury from either “Read”¹⁴ or “ICD” codes, supplied by the treatment provider (Usually, ICD from hospitals and Read from general practitioners). This in-house diagnostic variable applied by ACC was used in these analyses.

There were 12 different diagnostic groups in the dataset which were re-grouped into 5 categories.

Employment status—Self-employed, or working for another person or entity, i.e. an employee.

Types of work—Based on the claimants' response to the question. "What type of work do you do?" from the ACC 45 claim form. The self-identified categories listed in the form include: sedentary (brief standing and walking), light (mainly standing and walking), medium (often lift 5 kg plus), heavy (often lift 9 kg plus), and very heavy (often lift 22kg plus).

Cost of claims—The payments made by the ACC to the injured worker, or next of kin, or the cost to the ACC of the treatment or service provided. The costs shown here are exclusive of New Zealand's Goods and Services Tax (GST). There are three modes of payments. "Entitlement claims" involve entitlement payments (e.g. weekly compensation for lost remuneration at work, rehabilitation payment) to the injured person. "Medical fee only claims" refer to payments to recognised treatment providers, such as, doctors, physiotherapists, or pharmacists.

Costs of treatment provided at hospitals (e.g. Accident and Emergency departments or in-patient services) are covered through bulk-funding agreements with the District Health Boards and recorded in the "other payments" category.

Industry—Coded according to the Australian and New Zealand Standard Industrial Classification, ANZSIC 1996¹⁵.

Occupation—Coded according to the New Zealand Standard Classification of Occupations, NZSCO 1999.¹⁶

Statistical analysis

Descriptive analyses were undertaken for each variable. Where appropriate, 95% confidence intervals (CIs) were computed for comparing proportions. Claim incidence rates per 100,000 person years and 95% CI were calculated where suitable denominator data were available. Population rates were calculated using the Census-2001 data as the denominator. Denominators were the number of persons of working age employed in the labour force, specified by age, gender, occupation, and industry.

Age-standardisation was undertaken by the direct method, using the Segi population. All values expressed as integers are rounded to the nearest whole number unless otherwise specified. Data were analysed using STATA statistical software (version 8.2).¹⁷

Ethical approval

The study was approved by the Multi-region Ethics Committee, Wellington.

Results

A total of 3867 claims representing 3749 individuals associated with WR MVTC injuries were identified from the ACC Motor Vehicle Account over the 2-year period 2004–2006 (Figure 1). Of these individuals, 102 claimants submitted 2 claims and 8 claimants submitted 3 claims. While some of these could be a new claim for a new incident, it was not possible to distinguish between a new claim and a repeated claim from the dataset provided. However, given the small number of these claims, all claims were assumed as independent claims.

The estimated overall age-standardised rate of WR MVTC injuries on a public road, between 2004 and 2006, was 109 per 100,000 workers per year.

Demographic characteristics

WR MVTC injuries occurred mostly in males (75%) and in New Zealand Europeans who comprised 67% of total injuries in the claims database. In the 10-year age bands from 15 years and older, the greatest number of worker injuries occurred in the 35–44 age group (28%) with an overall mean age of 39 years. The distribution by recorded age, gender, and ethnicity of the claimants including age-standardised rate is presented in Table 1.

Table 1. Work-related motor vehicle traffic crash injury (July 2004–June 2006): demographic characteristics of the claimants

	Number (N=3867)	Percent (%)	Crude rate* per 100,000 per year	Age-standardised rate* per 100,000 per year (95% CI)
Age				
- 15-24 years	599	15	111	
- 25-34	817	21	109	
- 35-44	1088	28	122	109 (103–114)
- 45-54	791	20	103	
- 55-64	500	13	124	
- ≥65	72	2	80	
Gender				
- Male	2899	75	157	152 (144–161)
- Female	968	25	60	57 (51–63)
Ethnicity†				
- European	2586	67		
- Maori	569	15		
- Pacific	145	4	–	–
- Asian	134	3		
- Other	433	11		

* Denominator: The usual resident working population based on 2001 Census □

† Unable to calculate age-standardised rates as age-specific census data for ethnicity grouping for the people who are in labour force was not available.

Age-specific census data was not readily available for ethnicity grouping for people in the labour force; therefore age-standardised rates by ethnicity were not calculated. There was no clear pattern observed in age-specific rates except for a sharp decline in the ≥65 year age group (Figure 2).

Injury details: injury diagnosis and body part injured

The majority of the claimants were diagnosed as having soft tissue injuries (sprains and strains), accounting for 69% of WR MVTC injuries, with a further 12% being lacerations (Figure 3). In terms of body part injured, more injuries affected the neck (27%) than any other bodily location, followed by head and face including ear and eye, shoulder including clavicle (19%); and back/ spine (12%).

Figure 2. Work-related motor vehicle traffic crash injury: age-specific rates (95% CI)

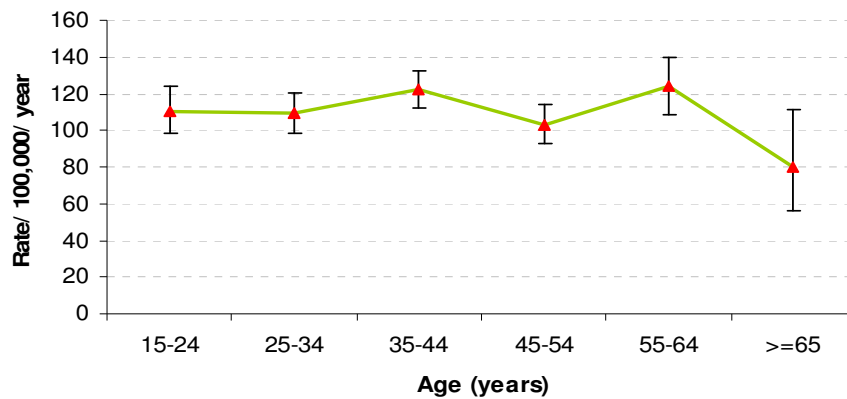
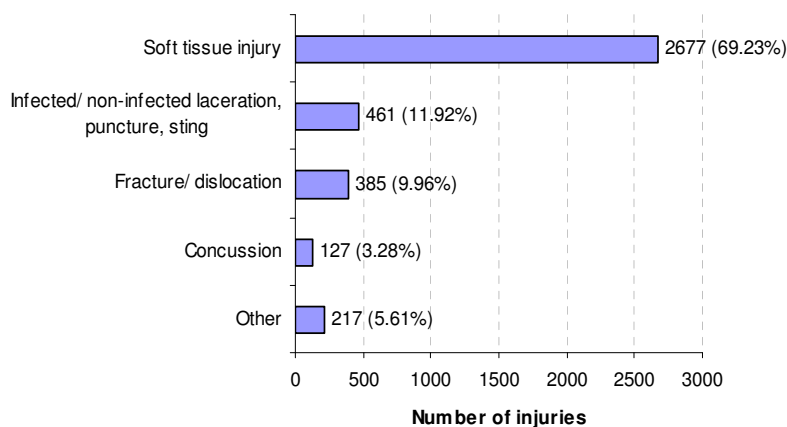


Figure 3. Work-related motor vehicle traffic crash injury: injury diagnosis



Work details

The majority of injuries identified from this database occurred among paid employees (86%) and to those who were engaged in medium (34%) and heavy (29%) activity work (Table 2).

Transport workers were the most frequent victims of work-related injuries (an age-standardised rate of 390 per 100,000 per year) and accounted for about 14% of the total injuries (Table 3). ‘Road freight transportation’—sub-grouping of ‘Transport and Storage Industry’, had a particularly high number of workers injured (n=311) followed by ‘road passenger transportation’ (n=149) over the 2-year period.

Relatively high rates were also observed among workers in mining; communication; and electricity, gas, and water supply industries.

Table 2. Work-related motor vehicle traffic crash injury: employment status

Variables	Frequency (n=3867)	Percent (95% CI)
Employment		
- Employee	3333	86 (85–87)
- Self-employed	534	14 (13–15)
Type of Work		
- Sedentary	342	9 (8–10)
- Light	568	15 (13–16)
- Medium	1313	34 (32–35)
- Heavy	1116	29 (27–30)
- Very heavy	478	12 (11–13)
- Undefined	50	1 (1–2)

Table 3. Work-related motor vehicle traffic crash injury: major industry (ANZSIC 1996) classification

Major Industry	Frequency (n=3867)	Percent (%)	Crude rate* per 100,000 per year	Age-standardised rate* per 100,000 per year (95% CI)
1. Agriculture, forestry, fishing	214	5	74	79 (63–95)
2. Mining	26	0.7	388	450 (99–802)
3. Manufacturing	242	6	54	55 (42–68)
4. Electricity, gas, and water supply	36	1	301	340 (56–623)
5. Construction	338	9	163	171 (139–203)
6. Wholesale trade	164	4	82	80 (59–102)
7. Retail trade	205	5	49	49 (38–60)
8. Accommodation, cafes, and restaurants	22	0.6	14	20 (3–38)
9. Transport and storage	542	14	407	390 (332–447)
10. Communication services	197	5	425	407 (308–505)
11. Finance and insurance	30	0.8	29	31 (7–56)
12. Property and business services	321	8	83	85 (70–101)
13. Govt admin and defence	110	3	92	88 (61–114)
14. Education	53	1	21	22 (10–33)
15. Health and community services	187	5	67	63 (46–80)
16. Cultural and recreational services	26	0.7	31	27 (12–42)
17. Personal and other services	215	5	168	162 (127–196)
18. Undefined	939	24	517	525 (476–574)

* Denominator: The usual resident working population based on 2001 Census

Among the major occupational classes, approximately one in three WR MVTC injuries occurred in ‘plant and machine operators and assemblers’ with a corresponding high rate of WR MVTC injuries (an age-standardised rate of 422 per 100,000 per year) (Table 4). This group includes industrial plant operators, stationary machine operators and assemblers, drivers, and mobile machinery operators, and building and related workers. Among them, ‘drivers and mobile machinery operators’ (not surprisingly) had the highest number of injuries (n=1126).

Table 4. Work-related motor vehicle traffic crash injury: major occupation (ANZSCO 1999) classification

Occupation	Frequency (n=3867)	Percent (%)	Crude rate* per 100,000 per year	Age-standardised rate* per 100,000 per year (95% CI)
1. Legislators, administrators, managers	269	7	62	57 (43–71)
2. Professionals	310	8	65	72 (57–87)
3. Technicians and associate professionals	313	8	82	78 (63–93)
4. Clerks	257	7	60	56 (45–66)
5. Service and sales workers	422	11	87	85 (72–97)
6. Agriculture and fishery workers	254	6	92	98 (80–117)
7. Trades workers	216	6	74	74 (58–89)
8. Plant and machine operators and assemblers	1247	32	433	422 (381–463)
9. Elementary (i.e. others) occupations	579	15	288	287 (252–323)

* Denominator: The usual resident working population based on 2001 Census

Cost of claims by age and gender

The total cost associated with the 1968 claims made for the 1-year period from 1 July 2004 to 30 June 2005 was approximately NZ\$6 million, with an average total cost per claim of NZ\$2884. Of the total cost, 360 entitlement claims (average of NZ\$14,808 per claim) accounted for the majority of payments. The remainder included an average of NZ\$237 for medical fee only payments, and NZ\$65 for other payments.

The cost of claims for males (n=1457) was greater than for those by females (n=511), with males averaging NZ\$3520 per claim and females averaging NZ\$1071 (Table 5).

Table 5. Work-related motor vehicle traffic crash injury: cost of claims by age and gender

	Number (%) (n=1968)	Average cost (NZ\$)	95% CI (NZ\$)
Gender			
- Male	1457 (74)	3520	2657–4383
- Female	511 (26)	1071	542–1601
Age			
- 15-24 years	293 (15)	992	221–1763
- 25-34	421 (21)	1340	805–1876
- 35-44	566 (29)	4321	2447–6196
- 45-54	397 (20)	2475	1541–3409
- 55-64	253 (13)	5254	3141–7366
- ≥65	38 (2)	1686	182–3190

Workers aged 35–44 years incurred the largest proportion of claims (approximately 30%) (Table 5); however, claims were most expensive in the 55–64 year age group with an average cost per claim being NZ\$5254.

Discussion

During the 2-year period commencing 1 July 2004 an average of 1934 claims annually were lodged with ACC for WR MVTC injuries, thus representing an age-standardised rate of 109 claims per 100,000 workers per year. Claimants were predominantly male (75%), NZ European (67%), and 35–44 years old (28%).

Surprisingly, younger workers were not at increased risk compared with older workers given the importance of younger age as a major risk factor for motor vehicle injury in general. Soft tissue injuries (sprains and strains) and injuries affecting the neck were particularly common. Transport workers (14%) and the ‘plant and machine operators and assemblers’ (32%) had the highest number of injuries. The total cost associated with the 1968 claims made for the 1-year period (July 2004–June 2005) was NZ\$6 million, with an average total cost per claim of NZ\$2884. To our knowledge, this is the first published analysis quantifying the burden of WR MVTC injuries in New Zealand.

There are important limitations to this study that could significantly compromise the validity of the results. Since data were obtained from an administrative database for managing claims, there was minimal data on other factors that could have helped elucidate causes of injuries. The number of ACC claims is also likely to be an underestimate of the total number of injuries experienced by the New Zealand population for several reasons.

The ACC captures information only on medically attended injuries and work-related injuries treated in the Accident and Emergency department are not included in the database.¹⁸ Furthermore, previous publications have referred to major concerns regarding the reliability and coding of the work-related indicator.^{19,20} Information regarding the reasons for the trip during which the crash occurred is often incompletely recorded in this database which primarily exists for administrative purposes.²¹ In previous research using the same database, Driscoll et al⁹ reported that only 5–10% of all claims for motor vehicle injuries were work-related.

Commuter and bystander injuries, the events most likely to have been underestimated, are not defined as WR MVTC injuries according to the current legislation (the IPR&C Act 2001). McNoe et al⁸ have reported that commuting fatalities comprised a significant proportion (44%) of all work-related road traffic deaths.

The Auckland Car Crash Injury Study²² reported that 15% of all drivers in serious crashes in 1998–9 in the Auckland region were commuting and another 5% were working at the time.²¹ In addition, Langley et al,²³ in their more recent report, identified work-related bystander deaths as a significant hidden problem in New Zealand and reported that they represent approximately 52% of the total work-related fatalities.

The issues noted above highlight the major difficulties posed by varying definitions of WR MVTC injuries. For example, in some European countries, commuters are included within this definition while in the United States, Canada, the United

Kingdom, the Netherlands, Denmark, and Norway commuting injuries are excluded from many operational definitions of work-related injuries.⁶

In New Zealand, a previous study⁸ investigating work-related fatal traffic injuries included injuries sustained during commuting to and from work, as well as an “activity during a recess period (e.g. at lunch time), at an employer’s sponsored social function and during training or a non-work period if the incident arose because of work.”

A further limitation of these analyses relates to the ethnicity coding. While an injured worker can list more than one ethnic group in an ACC claim form, in contrast to the Census, the ACC allows only one ethnic group to be coded.²⁴ To avoid the resulting biases, a standardised approach to ethnicity coding should be implemented that is consistent with the Census and recommended by the Ministry of Health.²⁵

The majority of the injuries in this analysis could be considered as “minor” with respect to the threat to life and the average cost of claims. However, some of these injuries can pose a significant threat to disability, contribute substantially to the overall injury burden,^{26–28} and be responsible for a high societal cost.²⁹

Whiplash type neck injury caused by MVTCs, were common in this analysis (27%), and can have long-term disabling effects including adverse psychologic and social consequences.³⁰

Despite the limitations, the findings of our report are consistent with previous studies. In a study of work-related fatal traffic injuries in New Zealand by McNoe et al⁸ males had more fatalities and with a peak frequency of occurrence in the 35–44 year age-group as in our study.

In several studies^{6–8} the industry with most fatal work-related injuries was transport. In the McNoe study,⁸ 40% of the fatalities occurred in the ‘transport and storage industry’. However, the heterogeneity in national data collection procedures including issues related to case definitions and differences in the medico-legal contexts makes any between country comparisons of questionable validity.

Based on Statistics NZ data compiled from Traffic Crash Reports, drivers in the 15 to 19 year age group are 7 times more likely to crash (per 100 million kilometres driven) than drivers in the 45 to 49-year old age group.³¹ Our analyses showed no age-effect on WR MVTC injuries which may indicate that the major causes of WR MVTC injuries differ from non-WR MVTC injuries. While an alternative explanation is that more of the work related driving is done by workers in older age-groups, it seems unlikely that this would be sufficient to account for the ‘disappearance’ of the expected substantial age effect.

We have recently completed a systematic review³² that also suggests a different pattern of risk factors between work and non-WR MVTC injuries. For example, alcohol—an established risk factor for driving in general—may not be as important a factor in the context of work-related driving, potentially due to codes of practice and policies at workplaces. In contrast, distraction may be more important for work-related driving where people spend more time in their vehicle and are likely to be operating under time pressure to meet deadlines for appointments or delivery of goods.

In conclusion, the relatively high incidence of WR MVTC injury claims identified in some industries and some demographic groups highlights the importance of WR MVTC injuries within the overall burden of work-related injury in New Zealand. The contribution of minor injuries to the overall injury burden should be taken into consideration while identifying targets for prevention. These findings also suggest there may be potential to target prevention interventions through both road safety and occupational health and safety procedures.

Given the shortcomings and inconsistencies identified, it is recommended that the process, content, and coding of data collection be reviewed. If substantial improvements can be made both completeness and quality can be achieved, these data collections could provide valuable information to plan and evaluate prevention strategies.

Competing interests: None

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Ten citation classics from the New Zealand Medical Journal

Derek R Smith

Abstract

Although their contribution may go unrecognised at the time, if journal citations are indeed the “currency” of science, then *citation classics* could justifiably be regarded as the “gold bullion”. This article examines the 10 most highly-cited articles published by the *New Zealand Medical Journal (NZMJ)*, as of August 2007. By topic, the top cited article described a study of risk factors for sudden infant death syndrome among New Zealand infants, while 3 of the remaining 9 articles focused on asthma. Most citation classics from the *NZMJ* were comparatively recent, with the top cited article being published in 1991, 7 having been published in the 1980s, and 2 in the 1970s. Overall, this study clearly demonstrates the international relevance of New Zealand medical researchers, and the significant global impact of their findings for human health.

If citations are, as some commentators have stated, the “currency” of science,¹ then *citation classics* could justifiably be regarded as the “gold bullion”.

The term “citation classics” was first described in 1977, to denote highly cited scientific articles identified by the Science Citation Index[®], the Social Sciences Citation Index[®], or the Arts and Humanities Citation Index.^{®2} By 1984, over 1800 authors had written invited commentaries on their highly cited papers for the journal *Current Contents*, although many more “classic” articles than this had actually been identified.³

In recent years, the citation classics of various clinical fields have been published, including those from anesthesia,⁴ critical care,⁵ dermatology,⁶ occupational medicine,⁷ otorhinolaryngology,⁸ periodontology,⁹ and many others. Citation classics from specific journals themselves have also been described, including manuscripts from some of the larger^{10–13} and smaller^{14,15} periodicals.

The exact definition of a citation classic remains somewhat fluid however, as citation rates differ widely between the disciplines,¹⁶ and the size of a research field generally limits the number of super-cited papers it will ever contain.¹⁷

Laboratory science and methodological articles have historically performed well, with Oliver Lowry’s 1951 paper on the Folin phenol reagent,¹⁸ for example, remaining the most popular scientific work of all time, having received almost 300,000 citations by 2005.¹⁹

On the other hand, a recent investigation of classic articles in occupational medicine⁷ only located 85 articles that had received over 100 citations, with most having been cited between 100 and 150 times. A similar study from the Medical Journal of Australia (*MJA*) reported that their most highly cited paper had only received 888 citations by 2004.¹⁵

The threshold at which a classic article is decided also appears to increase over time, with Garfield¹⁷ suggesting that a 1955 paper with 250 citations could be deemed a “classic”, whereas the threshold might have risen to 400 by 1975, and to 1000 by 1995. As such, it is difficult to establish at what point a super-cited paper might begin to be counted, although when analysing the publications of a single journal, one can simply rank all articles by total citation counts.^{10,15}

Methods

The *New Zealand Medical Journal* (*NZMJ*) was founded in 1887,²⁰ with articles on the National Library of Medicine’s *PubMed* database, now dating back to Volume 48, in 1949.

By 2007, at least 14,000 *NZMJ* articles (including 290 reviews) had been listed on *PubMed*.²¹ For the current study, citation counts were obtained for the 10 most highly cited *NZMJ* articles listed on the *Web of Science*® Database, as of August 2007. Articles were then ranked by individual citation counts, similar to the methodology used in other papers on this topic.^{7,14,15}

Results

As shown in Table 1, and similar to Gregory’s observation of citation classics in the *MJA*,¹⁵ it appears that although all highly cited *NZMJ* articles had a common grounding in local data, their findings were clearly relevant to both the local and international scientific community.

Table 1. Ten Citation Classics from the New Zealand Medical Journal

Rank	Article	Citations*
1	Mitchell EA, Scragg R, Stewart AW, et al. Results from the first year of the New Zealand cot death study. <i>N Z Med J.</i> 1991;104:71–6.	269
2	Sears MR, Rea HH, Beaglehole R, et al. Asthma mortality in New Zealand: a two year national study. <i>N Z Med J.</i> 1985;98:271–5.	198
3	Lewis GR, Morley KD, Lewis BM, Bones PJ. The treatment of hypertension with verapamil. <i>N Z Med J.</i> 1978;87:351–4.	154
4	Morris A, Nicholson G, Lloyd G, et al. Seroepidemiology of <i>Campylobacter pyloridis</i> . <i>N Z Med J.</i> 1986;99:657–9.	140
5	Morton P, Thomson AN. Oral acyclovir in the treatment of herpes zoster in general practice. <i>N Z Med J.</i> 1989;102:93–5.	130
6	Mitchell EA. Increasing prevalence of asthma in children. <i>N Z Med J.</i> 1983;96:463–4.	117
7	Holst K, Wilson PD. The prevalence of female urinary incontinence and reasons for not seeking treatment. <i>N Z Med J.</i> 1988;101:756–8.	112
8	Nicholls MG, Espiner EA. A sensitive, rapid radioimmunoassay for angiotensin II. <i>N Z Med J.</i> 1976;83:399–403.	104
9	Rea HH, Sears MR, Beaglehole R, et al. Lessons from the national asthma mortality study: circumstances surrounding death. <i>N Z Med J.</i> 1987;100:10–13.	95
10	Reddy J, Bailey RR. Vitamin K deficiency developing in patients with renal failure treated with cephalosporin antibiotics. <i>N Z Med J.</i> 1980;92:378–9.	80

(*Total number of citations received as of August 2007)

The most highly cited paper ever published in the *NZMJ* was a study of sudden infant death syndrome (SIDS) by Professor Ed Mitchell and colleagues from the University of Auckland in 1991.²² The main findings of their landmark study are displayed in Figure 1.

Figure 1. The most highly cited paper ever published in the *NZMJ**

Title	Results from the first year of the New Zealand cot death study
Authors	Mitchell EA, Scragg R, Stewart AW, Becroft DM, Taylor BJ, Ford RP, Hassall IB, Barry DM, Allen EM, Roberts AP
Published	27 February 1991, Volume: 104, Number: 906, Pages: 71–76 ²²
Methods	<ul style="list-style-type: none">• 162 infants who had died from SIDS were compared with 589 controls• Obstetric records were examined and parental interviews were conducted
Main findings	<ul style="list-style-type: none">• Many risk factors were confirmed, including: low socioeconomic status, being an unmarried mother, being a young mother, younger school leaving age of the mother, younger age of mother at first pregnancy, late attendance at antenatal clinic, nonattendance at antenatal classes, being Māori, having a greater number of previous pregnancies, lower birth weight, shorter gestation, being a male infant, and admission to neonatal intensive care unit• After controlling for all the above variables, the relative risks associated with prone sleeping position, not breast feeding, and maternal smoking remained statistically significant
Conclusions	If all parents stopped putting their infants down to sleep in the prone position, breast fed, and did not smoke, the SIDS mortality rate may decline from 4.0 / 1000 live births to less than 1 / 1000

(*As of August 2007)

Discussion

Aside from groundbreaking research in the field of cot death, it is interesting to note that 3 of the 10 NZMJ citation classics focused on asthma. The general age of articles which became citations classics were also relatively recent, somewhat contrary to expectations. In this regard, the most highest cited article was from 1991, 70% had been published in the 1980s, and only 20% in the 1970s.

Generally speaking, it takes time for an article to become a citation classic, with Lundberg,²³ for example, suggesting that the historical impact of any work is difficult to assess when it is less than 15 years old. Other international research has also supported such a hypothesis.

In Garfield's 1987 study of citation classics from the *Journal of the American Medical Association (JAMA)*,¹⁰ for example, the top cited paper was 22 years old, while in the specialty field of occupational medicine, the top cited paper located by Gehanno and colleagues⁷ was 47 years old.

Smaller, local journals have also demonstrated similar patterns. A study of citation classics in the *MJA* by Gregory,¹⁵ for example, revealed that their most cited article was from 1949, whereas in Japanese occupational medicine journals, it was from 1970.¹⁴

In a retrospective analysis of seven major medical journals, Chew and colleagues²⁴ found that the total number of citations received each year appears to be increasing,

thus suggesting that the actual number of citations recorded by classic articles may also increase in future.

While the investigation and ranking of landmark articles in medical journals certainly provides interesting information on publishing trends, it is important not to dismiss less highly cited work, as most authors can probably never expect to publish a “citation classic”.

Of the 38 million citable items published in scientific journals between 1900 and 2005, for example, less than 1% were cited more than 200 times and half were not cited at all.²⁵ Similarly, the absolute humanitarian benefit of classic articles is also uncertain, as many important publications never attain a classic status.

Albert Sabin’s landmark article describing a live polio vaccine,²⁶ for example, had received fewer than 100 citations by the late 1980s.¹⁰ Even Eugene Garfield’s 1955 article proposing the concept of a journal impact factor²⁷ did not become his most highly cited work²⁸. As such, it is difficult to predict not only which articles will eventually become citation classics, but also which will not, regardless of their contribution to science or humankind.

Conclusion

Overall, as this article has demonstrated, the identification of citation classics within a particular journal has many benefits.

Firstly, super-cited papers highlight the power of clinical research to further the understanding of diseases and treatment methods.¹⁵

Secondly, such articles help identify which authors have published significant findings on which research topics, and what was the short- or long-term impact of their work from a literary perspective.

Thirdly, as Gehanno et al⁷ and Gregory¹⁵ have pointed out, super-cited papers in medical journals also serve an important role to educate and inspire the next generation of doctors, scientists, and medical researchers.

Perhaps most importantly of all, an examination of NZMJ citation classics clearly demonstrates the international relevance of New Zealand medical researchers, and the significant global impact of their findings for human health.

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Two cases of parotid tuberculosis

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Mycobacterium tuberculosis (TB) infection of the salivary glands is rare, even in countries with a high prevalence of TB. There are two distinct forms—a localised form (resulting from infection of periglandular nodes), and a diffuse form involving the entire gland due to direct spread from adjacent nodes or primary parenchymal involvement.

Overall, extrapulmonary TB accounts for approximately 20% of active TB.¹ Primary parotid tuberculosis may present as a slowly growing mass in the region of the parotid gland, resembling a parotid neoplasm. Clinically, tuberculous salivary gland disease and a neoplasm cannot be distinguished.

It is important to differentiate the two forms, as salivary gland TB can be treated medically, thus avoiding potential surgical complications.

Case reports

A 45-year-old Filipino woman, who had immigrated to New Zealand 17 years previously, presented with a left parotid swelling of 1 year's duration. She had recently visited her brother in the Phillipines, who was subsequently diagnosed with TB. She underwent left superficial parotidectomy, after 5 unsuccessful attempts to obtain cytology via fine needle aspiration (FNAC). Postoperative histology confirmed granulomatous parotid disease.

A 42-year-old Filipino man, who had been living in New Zealand for 1 year, presented with a 1-month history of painless right pre-auricular swelling. CT showed a homogenously enhancing parotid lesion and apical pulmonary fibrosis bilaterally. His immigration chest film 1 year before was normal, and Mantoux tests were repeatedly negative. FNAC suggested a granulomatous lesion, confirmed by positive culture of *Mycobacterium tuberculosis*. Polymerase chain reaction (PCR) was negative.

Both patients were diagnosed with non-resistant TB, and were treated with the 2RHZ/4RH regimen (as per the New Zealand Ministry of Health guidelines).² R, H and Z signify rifampicin, isoniazid, and pyrazinamide respectively—the treatment course involves 4 months of all three drugs, followed by a further 2 months of rifampicin and isoniazid.

Neither patient encountered any serious adverse reactions while on treatment and both are now cured.

Discussion

TB parotitis usually has an insidious clinical course, and may exist for up to 15 years without causing a systemic inflammatory response in a host. However, when host immunity is attenuated, the affected site will rapidly enlarge. TB parotitis occurs

equally among men and women, and typically affects patients between 30 and 50 years of age.

There are no statistics available in New Zealand reporting the prevalence of parotid tuberculosis, but 'other' tuberculous disease (including salivary gland involvement) makes up 17% of extrapulmonary disease with 147 cases reported in New Zealand between 1995 and 2001.²

Tuberculosis cases in foreign-born individuals may be the result of reactivation, reinfection, or undiagnosed TB during immigration.³ A normal chest radiograph and negative Mantoux test (the standard screening methods for immigrants to New Zealand) do not exclude TB, particularly extrapulmonary cases.

TB parotitis can have a variety of appearances on computed tomography (CT) scanning, and may mimic inflammatory and neoplastic conditions.

Traditionally, tuberculous salivary gland disease has been diagnosed with a combination of acid-fast bacilli (AFB) staining, culture, and FNAC, and histology in some cases. AFB staining requires the presence of many bacteria to be detected histopathologically, and culture can take up to 6 weeks to return a result.

Cytology may require multiple samples. PCR is a more recent diagnostic technique; it is very helpful in rapid detection of drug-resistant mutations. However, sensitivity is limited in extrapulmonary TB due to low bacterial numbers.⁴

There may also be a role in future for interferon- γ T-cell assays, especially in low-incidence settings like New Zealand.⁴ The test uses an enzyme-linked assay to detect T-cells specific for the *M. tuberculosis* proteins ESAT-6 and CFP-10, which are absent in the Bacillus Calmette-Guerin (BCG) vaccine and in most environmental mycobacteria. The test is not confounded by BCG immunisation and has better correlation with TB exposure than Mantoux testing, suggesting a role in settings where the bacterial burden is low.⁵

In light of the drawbacks of each method, they are usually used in combination for preoperative diagnosis. This enables the condition to be treated with anti-tuberculous chemotherapy, avoiding surgical resection and associated morbidity.

In summary, we emphasise the importance of early diagnosis of tuberculous salivary gland disease, to avoid surgery and commence effective anti-TB chemotherapy.

Though rare, TB should be considered in the differential diagnosis of a diffuse swelling of the parotid, particularly in immigrant populations.

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Multiple lipomatosis—a rare cause for small bowel intussusception

Marianne Lill, Barrie Berkeley, Gary Cooper

We report a case of multiple lipomatosis of the jejunum with suspected intermittent intussusception and spontaneous reduction over several months.

Case report

A 39-year-old male social worker with no past medical history presented with severe upper abdominal pain. He had been experiencing intermittent episodes of pain for 3 months, without bowel symptoms. An ultrasound scan showed dilated loops of bowel.

A computed tomography (CT) abdominal scan showed a “bulls eye” lesion suggestive of intussusception (Figure 1). A focal mass of fat density was seen at the lead point.

Figure 1. CT scan showing “bulls eye” lesion (arrowed) suggestive of intussusception



An urgent laparotomy was performed. At operation the intussusception had spontaneously reduced. Two focal lesions were palpable within the small bowel, approx 20 cm apart. Proximally the bowel was erythematous and mildly dilated. Distally it was collapsed, consistent with resolved obstruction. The adjacent area of

small bowel mesentery was thickened and leathery suggesting the possibility of chronic recurrent intussusceptions with mesenteric ischaemia and fibrosis (Figure 2).

Figure 2. Area adjacent to small bowel mesentery



Figure 3. Multiple submucosal polyps



A 40 cm segment of small bowel was resected and the bowel anastomosed. The patient made a good recovery. Following discharge, a small bowel follow through CT scan was performed, which showed no further lesions.

The specimen contained two discrete areas of multiple submucosal polyps. These appeared macroscopically like clusters of grapes, ranging in size from 5 mm to 30 mm (Figure 3). Histological examination confirmed these were benign lipomata.

Discussion

Intussusception due to lipoma of the small bowel is a rare cause of SBO. A 58 case series of adult intussusceptions accumulated over 30 years reported only 3 cases due to solitary lipoma out of the 44 small bowel intussusceptions in the series (7%).¹ The current case had multiple lipomata present in the segment of small bowel resected. This is very rare, with 20 cases reported to 1989² and approximately 1 case per year reported since. There are no previous reports of this in Australasia.

Multiple lipomatosis is reported more commonly in males, between the fourth and sixth decade of life. Most occur in the ileum and ileo-caecal region, with a small number in the jejunum. The most common mode of presentation is intussusception with SBO. The majority of polyps are submucosal, although they can also be subserosal or intramuscular.³ Multiple lipomatosis has been reported to occur in association with diverticulosis and volvulus.⁴

Surgery was undertaken in most reported cases, with resection of the affected segment. Surgery is usually curative, and most patients make a good recovery.³

Further imaging, such as CT with small bowel follow through may help confirm that all lesions have been removed.

SBO was documented on CT, but at operation this had resolved. The thickening of the mesentery is consistent with recurrent intussusception and spontaneous reduction resulting in mesenteric fibrosis. This has been previously reported to occur with a solitary lipoma.⁵

This case demonstrates that this condition can present with an acute-on-chronic history, probably due to intermittent recurrence and reduction of the intussusception. Appropriate and timely imaging can help clarify the diagnosis prior to surgery.

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The new International Health Regulations: a revolutionary change in global health security

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Abstract

The International Health Regulations 2005 (IHR 2005) came into force in June 2007. These revised Regulations contain many important changes compared with the previous agreement that they replaced (IHR 1969). This revision was driven by concerns about increasing global health threats and the need to respond with more effective surveillance and control practices.

The IHR 2005 agreement: greatly expands the range of events which states must notify to the World Health Organization (WHO) and to which the Regulations apply; introduces a new class of event, the Public Health Emergency of International Concern (PHEIC) which is defined based on modern risk assessment principles; recognises a wide range of surveillance sources that WHO may use; requires states to establish National IHR Focal Points which are responsible for communication with WHO and for the collation and dissemination of information within each state; introduces processes for WHO to investigate, assess, and declare PHEIC; introduces mechanisms for WHO to formally recommend health measures; requires WHO to seek external advice regarding operation of the IHR; obliges states to develop core capacities for surveillance, response, and points of entry; applies human rights principles; updates provisions for borders, travellers, and conveyances; and specifies situations where international collaboration should occur.

With collective national and international effort to implement these new Regulations, the IHR 2005 will support greater global health security for all.

On 15 June 2007 the most comprehensive global agreement ever developed for the management of emerging human health hazards came into force in 193 countries, including New Zealand. This agreement, the International Health Regulations 2005 (IHR 2005) had been adopted by the World Health Assembly on 23 May 2005.¹ A full copy of the Regulations is available on the World Health Organization (WHO) website (<http://www.who.int/csr/ihr/en/>).

This paper briefly describes the reasons for revision of the IHR, summarises the main changes, and describes what they mean for New Zealand.

The IHR 2005 became binding international law for all member states of the WHO 2 years after the formal notification of their adoption, unless a state advised that they rejected them or made a reservation. New Zealand was among the overwhelming majority of WHO member states that did not lodge such an objection.

Only three countries tendered qualifications to the IHR 2005, and only in the case of the United States were these reservations potentially important (the US reserved against the IHR 2005 to the extent that it will give effect to the core capacities in

accordance with its constitutional arrangements for the demarcation of responsibilities between federal and state governments).

The IHR 2005 is a vastly different agreement to the previous version (IHR 1969) that it replaced.² It represents an historic development for international law on public health.³ WHO began revising the IHR in 1995⁴ and this work accelerated following severe acute respiratory syndrome (SARS) in 2003. New Zealand participated actively in the review process, including the formal inter-governmental negotiating sessions in Geneva in 2004 and 2005.

The negotiation process saw some changes, notably: the removal of explicit references to intentional releases of biological, chemical, and radiological agents (though such events are still covered by wording in Article 7); a reluctance from some quarters to rely solely on a risk assessment process for identifying which events to notify to WHO; and concerns about the costs of implementing the new regime. However, the core direction of the revisions was accepted by all member states.

Reasons for changes

Updating the IHR has been driven by concerns about increasing global health threats and the need to incorporate more effective surveillance and control practices to combat these threats. Originally adopted in 1951,⁵ and last substantially changed in 1969,⁶ the previous IHR (IHR1969) was recognised as inadequate by the mid-1990s, if not earlier.⁷

Like the new IHR, the IHR 1969 included articles on notification of specified diseases, control measures, and provisions for travellers, points of entry, and conveyances (aircraft, ships, trains, road vehicles). However, the scope of the IHR 1969 was severely constrained as its provisions applied to just three named diseases (cholera, plague, yellow fever) and it had little flexibility for responding to other current and emerging health threats such as pandemic influenza.

The experience with SARS in 2003 demonstrated the inter-dependence of countries in the detection, assessment and management of public health threats.⁸ There is considerable evidence that the global spread of epidemics can only be inhibited by a rapid and focused response.⁹ Although the response to SARS has been hailed as a success for international collaboration in infectious disease control, there were features of this disease that made it relatively containable.^{10,11}

Other transmissible diseases such as pandemic influenza will be much harder to manage. Even for that disease, modelling work has shown that it may be possible to contain an outbreak with geographically targeted prophylaxis and social distancing. However, the effectiveness of these containment measures still depends critically on rapid identification and response.^{12,13}

Global environmental and social changes may also be creating conditions where new emerging diseases threats are more likely.^{14,15} The high speed and steadily growing volume of international traffic makes the threat of disease spread a potentially greater risk than during the era of mass migration by sea when previous forms of the IHR were first developed. One of the predicted consequences of global climate change is an increase in the burden of emerging infectious diseases.¹⁵

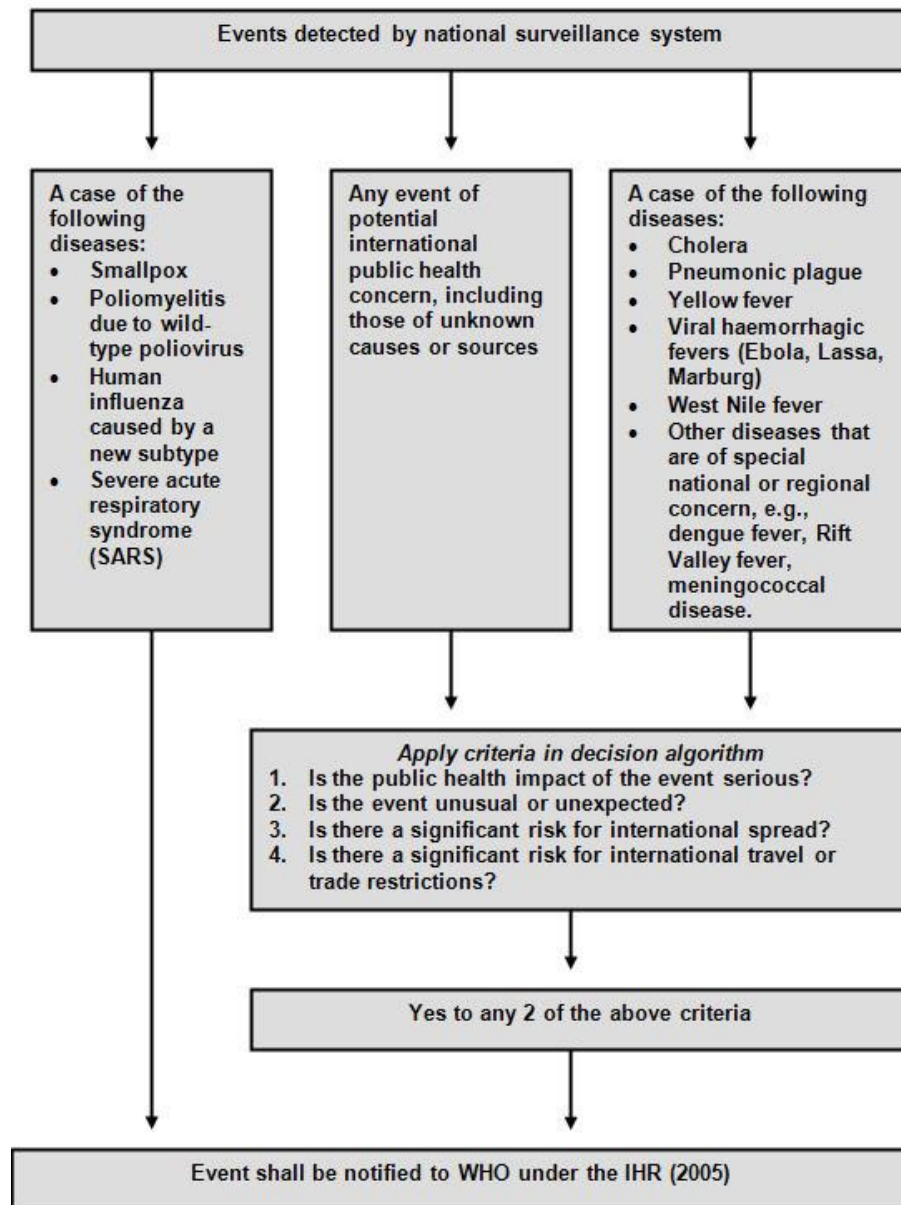
Globalisation more generally has created an environment where international law and global governance approaches are being increasingly considered.¹⁶

Table 1. Important features of the International Health Regulations 2005

Feature	Relevant Articles & Annexes
1. Expands the range of events which must be notified to WHO and for which response measures can be taken (based on risk assessment criteria; including biological, chemical and radiological sources; including naturally occurring, accidental and intentional events; and including responses to PHEIC)	Concept of a public health emergency of international concern (PHEIC), Article 1 Broad definition of disease includes both communicable and non-communicable, Article 1 Broad definition of public health risk, Article 1 Notification and information sharing regarding PHEIC, Articles 6 & 7 Consultation about potential PHEIC, Article 8 Risk assessment approach for identifying PHEIC, Annex 2
2. Expands the range of surveillance sources that WHO can use, including informal non-governmental sources	WHO surveillance activities, Article 5 WHO use of other reports, Article 9
3. Obliges States Parties to establish National IHR Focal Points (responsible for communication and information collation & dissemination roles in each state and notifying potential PHEIC to WHO)	National IHR Focal Point, Article 4 WHO IHR Contact Point, Article 4
4. Gives WHO the power to declare PHEIC and introduces processes for investigation and assessment of PHEIC	Verification (including on-site assessments), Article 10 Provision of information by WHO, Article 11 Determination of PHEIC, Article 12 Assessing severity of risk and adequacy of control measures, Article 13
5. Gives WHO the power to recommend health measures for management of PHEIC and routine public health risks, specifies criteria for these processes, and limits health measures that States Parties can apply	Definition of health measures, Article 1 Process for making recommendations, Articles 15-17 Range of measures for persons, baggage, cargo, containers, conveyances, goods and parcels, Article 18 Additional health measures, Article 43
6. Requires WHO to seek external advice regarding operation of the IHR, including declaration of PHEIC and recommended health measures	IHR Roster of experts, Article 47 Emergency Committee, Articles 48 & 49 Review Committee, Articles 50-53
7. Obliges States Parties to develop core capacities for surveillance, response, and points of entry (international airports, ports and ground crossings) and harmonise domestic legislation with IHR 2005	Surveillance, Article 5 & Annex 1 Response, Article 13 & Annex 1 At points of entry, Articles 19, 20 & Annex 1 Domestic legislation, Article 59 National public health emergency response plans, Annex 1
8. Applies human rights principles in the implementation of the IHR 2005	Respect for dignity, human rights, freedoms, Article 3 Informed consent and safety, Article 23 Limits on health measures applied to travellers, Article 31 Treating travellers with respect, Article 32 Health measures to be prompt, transparent and non-discriminatory, Article 42 Limits on additional health measures, Article 43 Information confidentiality and disclosure, Article 45
9. Updates provisions for borders, travellers, and conveyances (aircraft, ships, trains, motor vehicles)	Points of entry, including airports, ports, ground crossings, Articles 19-22 Travellers, Articles 23, 30-32 Conveyances and conveyance operators – including ships, aircraft, lorries, trains, coaches, Articles 24-29, Annexes 4 & 5 Goods, containers, loading areas, Articles 33 & 34 Health documents, Articles 35-39, Annexes 3, 6, 7, 8, 9 Charges, Articles 40 & 41
10. Specifies international collaboration and support in surveillance and response to PHEIC and capacity building	WHO assistance with capacity building, Article 5 Assistance with response to public health risks and PHEIC, Article 13 Collaboration and assistance with capacity building and response, Article 44

	Support with assessing, planning, and implementing capacity building, Annex 1
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Figure 1. Decision instrument from the International Health Regulations 2005 (simplified from Annex 2). Reproduced from reference.¹⁷



Main changes in the IHR 2005

The stated purpose of the Regulations ...*are to prevent, protect against, control and provide a public health response to the international spread of disease in ways that are commensurate with and restricted to public health risk, and which avoid unnecessary interference with international traffic and trade* (Article 2). The IHR 2005 agreement contains a wide range of new measures to support this goal (summarised in Table 1).

The most dramatic of these changes is the new surveillance system this agreement establishes, which goes far beyond what the IHR 1969 contained.¹⁷ Where the previous IHR applied to just three named diseases, the new IHR agreement is concerned with any public health risk that may adversely affect the health of human populations.

To encapsulate this concept it defines a new legal event, the *Public Health Emergency of International Concern (PHEIC)* which ...*means an extraordinary event which is determined... (i) to constitute a public health risk to other States through the international spread of disease and (ii) to potentially require a coordinated international response* (Article 1). Under the IHR 2005, states are required to notify all events that may constitute a PHEIC.

The IHR 2005 agreement (Annex 2) includes a risk-based decision instrument that states are required to use in assessing events that may represent a PHEIC (Figure 1). Under this framework, even a single case of smallpox, polio, SARS, or human influenza caused by a new subtype would be notifiable. Other diseases would be assessed according to four decision criteria and would be notifiable if they met any two of these (Figure 1).

Where the previous IHR agreement focused exclusively on formal notifications from WHO member states, the new Regulations specify that WHO may use surveillance data from any available source, including media reports. This important change is consistent with a more globalised world where information of all kinds is often communicated fastest through unofficial channels.^{18,19}

As well as specifying responsibilities for surveillance, response, and points of entry, the IHR 2005 also specify the capacities that countries must develop to carry out these activities. The provisions for regulating points of entry, conveyances, and travellers represent an important updating of requirements, but are more evolutionary than revolutionary. The IHR 2005 agreement retains some of the 'tried and true' provisions from the IHR 1969, such as vector control and *pratique* (permission for an arriving craft to unload cargo or disembark travellers).

What the new IHR agreement means for New Zealand

Like most international agreements, the IHR 2005 offers important benefits for participating states, but inevitably there are obligations and associated costs, including some loss of national sovereignty.³

Probably the most important benefit from the new Regulations is the greater level of global health security that will come from having a coordinated global surveillance and response system for emerging health threats. Because of the heightened risk of an influenza pandemic, the World Health Assembly in May 2006 called upon member

states to immediately comply with relevant provisions of the IHR 2005 in relation to influenza.²⁰ There are also the benefits to trade and commerce from having well standardised processes for managing borders, conveyances, and travellers.²¹

The obligations of the IHR 2005 agreement include complying with its processes and developing and maintaining specified capacities. These capacities largely relate to surveillance, response, and points of entry. Building these domestic public health capacities is likely to assist countries to better manage routine and endemic health risks on an ongoing basis, as well as helping them to identify and report potential PHEIC.

The IHR focal point for New Zealand is the Ministry of Health where this function is performed primarily by the Office of the Director of Public Health, including application of the Decision Instrument when required. Few events in New Zealand are likely to meet the threshold for assessment as a potential PHEIC. Far more common will be events that represent evidence of a public health risk outside the territory of the reporting country that may cause international disease spread. Such events include imported human cases, vectors, and contaminated goods (Article 9). The IHR 2005 require New Zealand to report such events to the WHO within 24 hours of receipt of such evidence.

The new Regulations specify that states assess the ability of existing national structures and resources to meet the minimum requirements described in the IHR 2005 (Annex 1). This assessment may identify functional areas where enhancements to existing public health capacities are warranted. Where capacities require development, states are required to have a national implementation plan to fully implement these capacities throughout their territories, with a deadline of June 2012. The New Zealand Ministry of Health plans to carry out this assessment prior to the June 2009 deadline specified in the IHR 2005.

Under Article 59, states were also expected, by June 2007, to have adjusted domestic legislation and administrative arrangements to make them compatible with the IHR 2005. Many of the key elements of the Regulations are already incorporated into New Zealand legislation, in particular the quarantine provisions of the Health Act 1956. Some aspects of the new IHR regime are implemented by administrative and other means. The primary vehicle for full legislative compliance will be through the proposed Public Health Act, which will replace the Health Act 1956.

The IHR 2005 agreement includes specific obligations for states to collaborate with each other to improve the detection, assessment, and response to PHEIC, and in building the capacities to achieve this goal (Article 44). There is an expectation that developed countries such as New Zealand will support developing countries in these areas. Arguments have also been made for supporting health service development more generally, rather than a specific focus on sophisticated surveillance systems.²²

Clinicians in New Zealand will notice few immediate effects of the IHR 2005. One visible change is that the “international certificate of vaccination or revaccination against yellow fever” has been replaced by the “international certificate of vaccination or prophylaxis”. In keeping with the greater flexibility of the IHR 2005, clinicians filling in this form will now need to specify, in the space provided, when the disease for which the certificate applies is “yellow fever”.²³

The surveillance requirements of the IHR 2005 emphasise the importance of swift recognition and reporting of public health risks at the local level. Alert clinicians and laboratory scientists remain the cornerstone of timely and sensitive surveillance of both familiar and unfamiliar diseases of public health importance.^{24,25} It is important that all health workers observing an unexpected or unusual health event, particularly one which may spread or may present serious and direct danger, report this immediately to their local medical officer of health.

Conclusion

The IHR 2005 is an important international agreement for public health, scientific, and symbolic reasons. From a public health perspective, it specifies and mandates processes and capacities to enable public health surveillance and control measures to work. From a scientific perspective, it embodies modern risk assessment and surveillance methodologies. From a symbolic perspective, it articulates the view that the world is inter-dependent when confronting global health threats.

The IHR 2005 agreement is not a panacea for global health threats.³ It will not, for example, require states to address the many underlying factors that give rise to emerging health threats, such as global climate change. Its focus on new risks means that it provides limited direct support for efforts to reduce established threats such as HIV/AIDS, tuberculosis, and malaria. Nor does it address the growing global burden of non-communicable diseases.²⁶

There are important technical, resource, governance, legal, and political obstacles to be overcome in implementing the IHR 2005.¹⁷ But there are also effective responses to these barriers.¹⁷ With collective national and international effort to implement these new Regulations, the IHR 2005 will support greater global health security for all.

Competing interests: Both of the authors have carried out short-term consultancies for the World Health Organization, including work on the IHR 2005.

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Texting tenosynovitis

Emma F Storr, Fleur O de Vere Beavis, Mark D Stringer

During a 3-month period, a right-handed 20-year-old dental student experienced increasing pain and tenderness over the radial side of her right wrist and proximal thumb.

She had recently been using her mobile phone to send 2500 texts per month, each consisting of around 150 characters. Text messages consisting of traditional and predictive text were generated at a speed of about four characters per second using her right thumb. Clinical examination revealed tenderness over the tendons of extensor pollicis brevis and abductor pollicis longus at the wrist and distally (Figure 1), consistent with de Quervain's tenosynovitis.

After learning to text with her left thumb instead, the patient's original symptoms resolved but she has since developed similar mild symptoms in her left hand.

Figure 1. Site of tenderness represented by the shaded area



Since the first generation of mobile phones were launched in the early 1980s, ownership has mushroomed. The total number of mobile phone users worldwide is currently around 2.3 billion and Nokia predicts that this figure will exceed 3 billion by 2009. In New Zealand alone, there were more than 3.5 million mobile phones in 2005.¹

There are only two previous reports of texting tenosynovitis. Yoong (2005) observed this condition in school children in Singapore who were sending more than 100 text messages per day.² One of these cases was treated with corticosteroid injections. Menz (2005) reported a 13-year-old girl with tenosynovitis induced by text messaging; her symptoms resolved after rest, topical naproxen, and the use of both thumbs to operate her phone.

Text messaging has become increasingly popular in the last 5 years, particularly among young people. Texting tenosynovitis may be more common than we think.

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Adenosine challenge in the diagnosis of inapparent accessory pathways

Jaspal S Taggar, Peter A Carey

A 31-year-old man presented with a history of sudden onset palpitation. There were no other symptoms. Physical examination revealed a pulse of 170 beats per minute without cardiovascular compromise. The remainder of the examination was normal. Initial 12-lead ECG (Figure 1) confirmed an irregular broad complex tachycardia with left axis deviation and concordance of QRS complexes in the chest leads.

A diagnosis of pre-excited atrial fibrillation was made and restoration of sinus rhythm was achieved with intravenous amiodarone; a further 12-lead ECG was normal without evidence of ventricular pre-excitation (Figure 2).

He went on to have an adenosine challenge; by inducing complete atrioventricular dissociation, depolarisation along an inapparent accessory pathway was demonstrated (Figure 3).

He was referred for electrophysiological study and had successful radiofrequency ablation to a left posterolateral accessory pathway. Adenosine challenge remains a useful, simple, and effective non-invasive investigation in the identification of inapparent accessory pathways in daily clinical practice.

Figure 1. Pre-excited atrial fibrillation



Figure 2. Post cardioversion—normal sinus rhythm

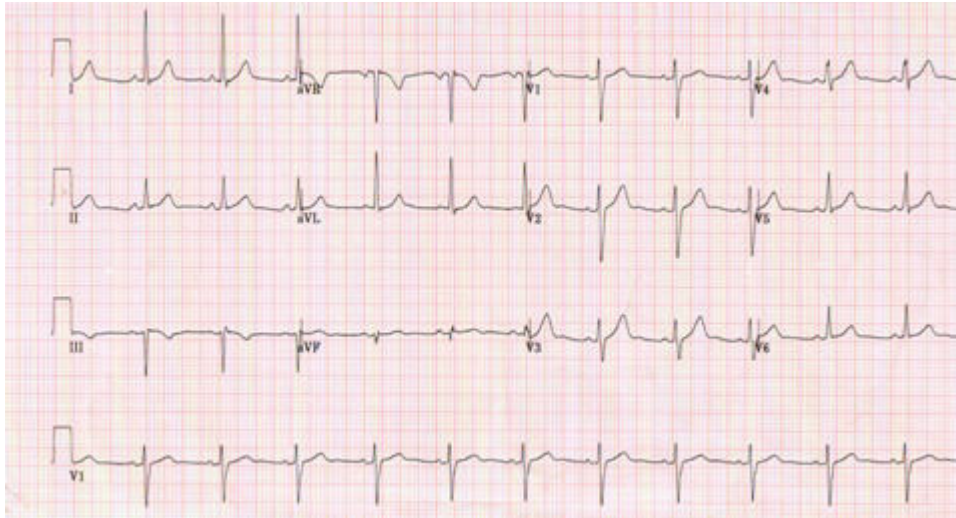
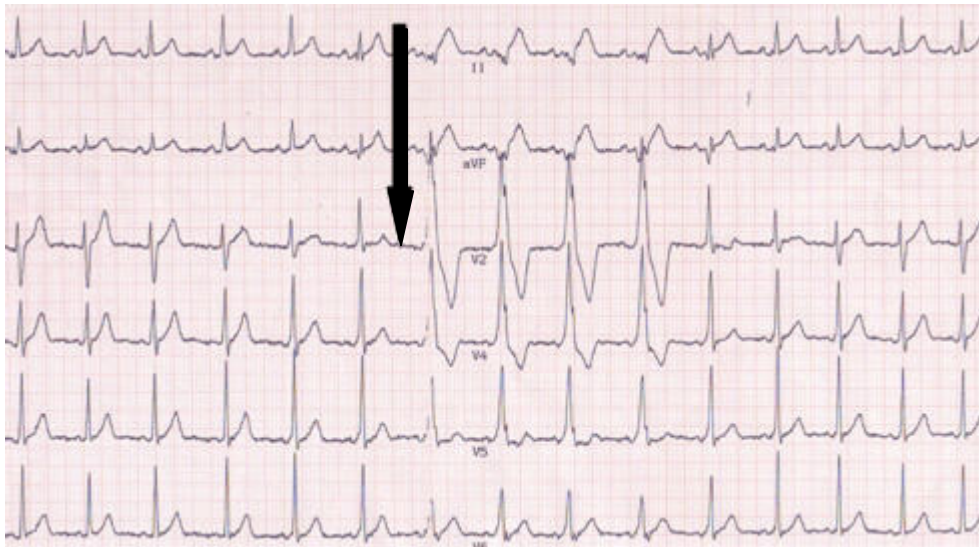


Figure 3. Inapparent accessory pathway is demonstrated by the development of pre-excitation: shortened PR interval, delta wave, and change in QRS morphology (arrow indicates the point of complete atrioventricular dissociation and the onset of conduction along the accessory pathway)



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The establishment of a State Medical Service

Based on a *Wanganui Chronicle* article and published in *N Z Med J* 1908;6(25):29–

It has been aptly said that the man who is his own lawyer has a fool for his client. That which applies in the domain of law is equally applicable in the sphere of medicine.

“Every man his own doctor” may be a pretty phrase, but it is certainly as foolish as it is pretty, for the reason that the average layman is no more competent to cope with the ills to which his flesh is heir than he is to grapple successfully with the intricacies of a legal problem. Yet while it is impossible for every man to be his own doctor, just as it is impracticable for every man to be his own letter carrier or policeman, there appears to be nothing illogical or irrational in the suggestion—made to us by a duly qualified medical practitioner—that every man should have a doctor at his immediate service.

This implies, of course, the establishment of a Government Medical Service, on the lines indicated in an article on the same subject which we published a few weeks ago. As we pointed out on that occasion, the idea, though it has much to commend it to popular favour, is at present encompassed with difficulties and objections of a more or less serious nature.

It will be remembered, however, that the most important of these difficulties and objections were anticipated and combated by the medical gentleman who formulated the scheme which we outlined in our previous article. As we said at the time, we are inclined to think the worthy doctor has somewhat under-estimated the force of the more serious objections. Nevertheless, we consider the proposal to be worthy of serious consideration, and we should welcome a discussion of the subject by both lay and professional writers.

We believe it to be a sore point with every conscientious doctor that he is forced to ask for payment from people to whom an illness is a dire financial calamity. Doctors, like other people, must live, and to that end they must be paid for their services. A poor man has no more right to expect that his doctor will attend him for nothing than he has to expect that his tailor will provide him with clothes without payment. The fact that almost every man who follows the profession of healing is called upon to do a great deal of gratuitous work does not justify the assumption that a doctor ought to do as a matter of course what a man in another profession or trade would never be asked to do.

The philanthropy of medical men is wholly commendable, and their generosity ought not to be abused. It may be said that the majority of doctors are not so charitable as is commonly supposed, and that they make the well-to-do pay for the indigent.

The answer to this is that both systems are unfair—it is unfair to ask a doctor to work for nothing and it is unfair to make one man pay for services rendered to another. It may be that the solution will ultimately be fourfold in the establishment of a State Medical Service, controlled by the Department of Health, and the consequent throwing of the burden of sickness and ill-health on the whole community through the

medium of a medical tax, exactly as all are now taxed for education and police protection. There are, as we have remarked, considerable difficulties in the way, but it does not follow that those difficulties are insuperable.

Apart from the practical benefits which such a service as that proposed might confer upon medical men and the public, there is something attractive in the prospect of New Zealand being the first country to recognise that sickness is a burden that must be shared by all.



Cardiac stab injury

Li Hsee, Ian Civil, Nicholas Kang

A 51-year-old man with previous psychiatric history and suicidal attempts stabbed himself in the left lower chest with a long steak knife. He was brought by paramedics into the resuscitation room at Auckland City Hospital alive and with the knife *in situ*.

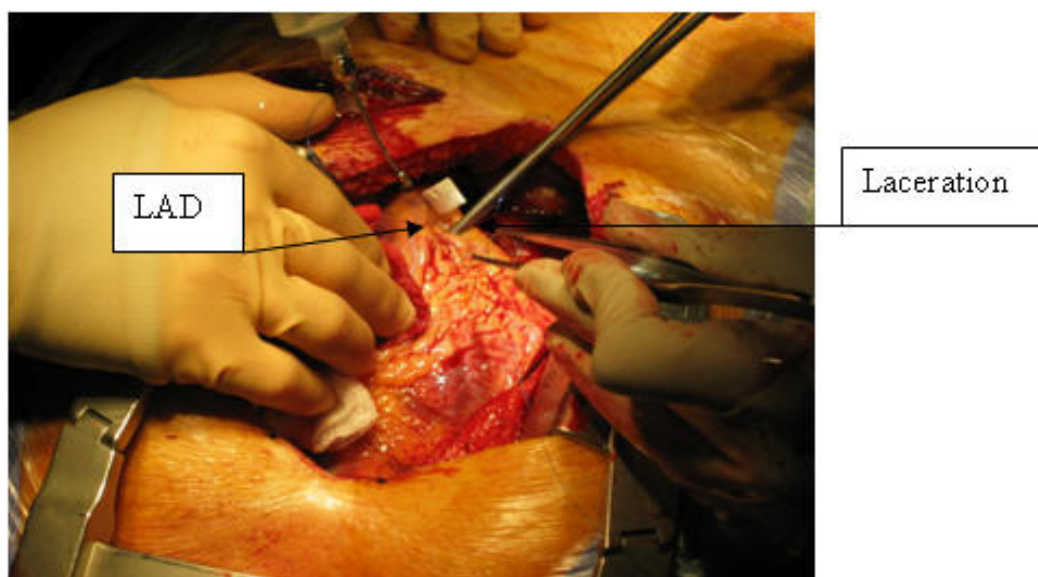
In the emergency department, he was alert and surprisingly cooperative (with a Glasgow Coma Scale 15); his vital signs revealed heart rate 56 beats per minute, systolic blood pressure 140 mmHg, and respiratory rate 10 breaths per minute. Initial chest auscultation demonstrated good air entry to the lung fields bilaterally. His heart sounds were clear and jugular venous pressure was not elevated. Chest X-ray did not show any evidence of haemothorax or pneumothorax. Focussed assessment by sonography for trauma (FAST) scan was not available at the time.

He was taken urgently to the operating theatre where the knife was removed and the laceration of the right ventricle sutured.

Figure 1: Knife *in situ* of chest cavity



Figure 2. Suturing of right ventricular laceration with pledgets (note the close proximity of the left anterior descending [LAD] coronary artery)



Discussion

Penetrating injury to the heart is uncommon in New Zealand. It is often fatal in the community.¹ We reviewed all trauma admissions to Auckland City Hospital over the last 10 years (1997–2006) using the Auckland City Hospital Trauma Registry.²

There were total of 13,070 trauma patients admitted over the 10-year period. Of these, 1171 (9%) patients suffered penetrating injuries. Only 12 (0.1%) patients had penetrating injury to the heart; 6 out of the 12 patients had self-inflicted injuries, 5 were inflicted by others, and 1 case was accidental. All patients arrived in hospital alive but 2 died in the resuscitation room.

Typically with penetrating injuries to the heart, patients present in shock due to either haemorrhage or cardiac tamponade.³ Large retrospective studies suggest that other factors associated with poor outcome for penetrating cardiac trauma include gunshot wounds (versus stab wounds), pre-hospital cardiac arrest, and multiple chamber injuries, whereas isolated right ventricular injury and presence of cardiac tamponade are associated with improved survival.^{4,5}

In conclusion, penetrating cardiac injury is rare in New Zealand. However, if a patient presents to hospital alive, rapid assessment and transfer to the operating room are vital for survival.

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An unusual manifestation of Henoch-Schönlein purpura: haemorrhagic bullous lesions

Secil Aydinoz, Ferhan Karademir, Selami Suleymanoglu, Halit Ozkaya, Atilla Ersen, Ismail Gocmen

A 4-year-old girl admitted to our hospital with a 1-day history of a purpuric rash on lower extremities, arthralgia, and oedema on the right knee joint. During the physical examination she appeared well, and her vital signs (including body temperature, blood pressure, respiration rate, and heart rate) were normal. Palpable purpuric lesions with haemorrhagic bullous lesions presented on lower extremities (Figure 1).

Figure 1. Palpable purpuric lesions with haemorrhagic bullous lesions



Complement, antinuclear antibody and antineutrophil cytoplasmic antibodies were negative, making the diagnosis of vasculitic diseases unlikely. The clinical features were compatible with Henoch-Schönlein purpura (HSP).

After 5 days the patient was discharged home without any treatment and presented with no problems during the subsequent follow-up at 3 months. Our patient recovered quickly without treatment thus demonstrating the characteristic pattern of this benign self-limited disorder.

Discussion

HSP is an acute leukocytoclastic vasculitis due to IgA deposition in vessel walls. It has been defined as a purpuric rash in association with arthritis or gastrointestinal symptoms (or both) and occurs predominantly in children.¹

HSP was first described by Johann Schönlein in 1837 and Eduard Henoch in 1874.² HSP is usually seen in 5–10 year old children (affecting 10–20 out of 100,000) and the most consistent clinical feature is the purpuric rash.³

Bullous HSP is an unusual manifestation of HSP and has been seen in up to 60% of adult patients but only in 2% of children. There have been only 11 reported cases to date and the commonest sites were feet, ankles, legs, and buttocks, thus suggesting that pressure is the most likely factor in its pathogenesis.⁴

This unusual cutaneous manifestation of HSP may be a source of diagnostic confusion and clinician must keep in mind this atypical cutaneous presentation of HSP.

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What's in a name?

The Australian Rheumatology Association wrote to the *MJA* recently, advocating that the eponym “Reiter’s syndrome” be expunged from the medical literature. They argued that the distinction of having one’s name immortalised in an eponym should never be accorded to doctors involved in crimes against humanity. They considered that honouring the Nazi physician Reiter with his own eponym was a travesty.

So writes the editor of the *MJA*. He then discusses the merits of eponym cleansing. Perhaps a good idea but the circle of Willis, the Krebs cycle, the Henderson-Hasselbalch equation in biochemistry, Addisons disease, etc, etc are going to be very difficult to eradicate.

Perhaps we should settle for not creating any new eponyms?

MJA (Med J Aust) 2007;187:321

Strong words from a famous surgeon

“In many hospitals there are too many consultants for the facilities available and this is extremely wasteful. The other obvious gross excess is the vast number of managerial posts and a system which enables managers to promote each other and proliferate in an almost malignant manner, adding another financial burden to the hospital and also causing ridiculous bureaucratic duplication and unnecessary minor regulations not related to patient care.”

Who said that? It was Sir Roy Calne (Emeritus Professor of Surgery, Cambridge University). Obviously commentating on his view of things in the United Kingdom, however one has heard similar observations closer to home.

British Journal of Hospital Medicine 2007;68:460–1

More about drug-eluting stents in the management of coronary artery disease

The debate continues—are bare metal stents better or worse than drug-eluting stents in terms of mortality and/or stent thrombosis?

Two drug-eluting stents have been approved by the US Food and Drug Administration—a sirolimus-eluting stent and a paclitaxel-eluting stent.

Are these better than bare metal, bearing in mind that they are much more expensive?

And which of these is the best? A paper and editorial comment on this topic concludes that the mortality was similar with both bare-metal and drug-eluting stents. However, sirolimus-eluting stents were associated with the lowest risk of myocardial infarction.

Lancet 2007;1914–5 & 937–48

Incidental findings on brain MRI

As the technology of sophisticated diagnostic tests improve, we can expect an increase in incidentalomas. And this is happening with brain MRI. To what extent is measured in this study from the Netherlands—2000 subjects from the general population (mean age 63.3 years) had a high resolution, structural brain MRI. 456 (22.8%) of the subjects had an abnormality detected.

Asymptomatic brain infarcts were present in 145 persons (7.2%). Among findings other than infarcts, cerebral aneurysms (1.8%) and benign primary tumours (1.6%) mainly meningiomas, were the most frequent.

In only 2 of the 2000 subjects was intervention necessary—one with a subdural haematoma and the other had an aneurysm treated. Who would like a free brain MRI for Christmas?

N Engl J Med 2007;357:1821–8

Advocacy for persons with rare diseases

The authors of the paper point out that a rare disease is defined as one that affects 200,000 people or fewer. On the other hand there are approximately 7000 such disorders. Furthermore, in the US, patients with rare diseases number ~25 million people—almost 12% of the population.

So, collectively, they are not so rare. The problems arising from their rarity include poor coverage in medical schools, physician's inexperience with the diseases, and neglect by the pharmaceutical industry because of small market potential.

They suggest that the individual advocacy groups for the rare diseases should be more united and hence become more powerful advocates of their causes.

Nature Clinical Practice Rheumatology 2007;3:421



Complaint against Medsafe on the matter of antidepressants for adolescents

For over a year, local child psychiatrists have become increasingly concerned about the Medsafe's position on the use of SSRI antidepressants in adolescents and its failure to correct its position when informed of accumulating contrary evidence.

Because of this, on September 18, 2007 I filed a complaint on behalf of local psychiatrists with the Minister of Health as set out below. I received an immediate acknowledgment from the Minister saying that I would receive a reply as soon as possible.

On November 2 I reminded the Minister that I had not yet had this reply and again received an acknowledgment dated November 7 that I would receive a reply as soon as possible. To date nothing further has been received.

One can be forgiven for believing that Medsafe is unwilling to front up in the hope that our complaint will disappear without trace into the Wellington morass. I consider that this behaviour is both unethical and contrary to the public weal.

However, I leave readers to judge.

18/09/2007

Rt Hon Pete Hodgson
Minister of Health

cc Dr Jackie Blue MP
Editor NZMJ
RNZ National

We wish to make a formal complaint against the Ministry of Health's Medsafe with respect to its recent public utterances on the use of Selective Serotonin Reuptake Inhibitor (SSRI) antidepressants in adolescents. While initially, Medsafe grudgingly admitted that one SSRI antidepressant (fluoxetine) might be useful, though only when other treatments had failed, in the last year or so it has at least twice publically made comments to the effect that the risk of using SSRIs in adolescents outweighs the benefits. We have contested these utterances in a number of ways on the grounds that this position does not reflect the medical research facts. We have had no response and so we are appealing to you to get Medsafe to modify its statements to reflect the medical facts.

We ask this not just because Medsafe's position is scientifically untenable, but because it is deterring doctors in NZ from prescribing antidepressants, causing unnecessary anxiety in patients and families, limiting patient choice, and (arguably) increasing the risk of youth suicide.

As noted Medsafe initially agreed that fluoxetine might be used in some cases but only as a second-line treatment. This ordering is inconsistent with the facts which show that fluoxetine is superior to other treatments (March et al 2004). It is an unacceptable paradox that as the evidence for the value of fluoxetine has grown stronger, Medsafe has in fact extended its proscription!

Scientific evidence supports our view that SSRI antidepressants (notably fluoxetine) can be both safe and effective in the treatment of certain psychiatric conditions of adolescence as follows:

- Depression—unipolar and bipolar types with or without psychosis.
- Obsessive compulsive disorder (one SSRI is approved by the US FDA for this use and in children as well as adolescents).
- Some Anxiety/Phobic disorders especially in autism (this is tentative only).

However, we shall confine our comments to adolescent depression as that is by far the commonest use of these medications in adolescents.

We contend that Medsafe's draconian position is depriving patients of choice and is, in some cases, statistically the best treatment.

- Fluoxetine (Fluox), an SSRI antidepressant, has been shown to be an effective (if not the most effective) treatment for adolescent depression (Hettrick et al 2007).
- It is true that there are other treatments for adolescent depression most notably cognitive behaviour therapy (CBT). While CBT seems to be favoured by Medsafe, there is an inconvenient truth about this treatment. The best study (March et al 2004) so far of over 400 adolescents with depression, showed that the SSRI antidepressant fluoxetine response (60.6%) was significantly superior to that of CBT (43.2%). There are other issues too—not all patients will respond to CBT (especially those with the severe forms of depression), and some may do better with a combination of CBT and medication (March et al 2004), though this has not been found by others (Goodyer 2007), and some prefer medication or will not engage in CBT.

Medsafe continues to emphasize the risks rather than the benefits, but we contend that the risks are significantly less than the benefits (60.6%).

The scientific evidence around risk shows as follows:

- The reputed increase in suicidal thinking and acts is by no means clear and disputed by two good studies (see March et al 2005; Goodyer 2007). What this means is that if this effect is real, it is small and difficult to detect and overshadowed by a large beneficial effect.
- There is no evidence to support the view that SSRIs have caused any increase in actual youth suicide - anywhere. In fact, as the number of prescriptions in NZ of SSRI antidepressants has risen dramatically in adolescents over the past five years or so, the youth suicide rate has declined significantly. While we do not wish to claim that these events are causally related, it is not unreasonable to so conjecture.
- A recent study in one of the top psychiatric journals shows that as the prescribing of SSRIs has fallen due to official warnings (in the US and the Netherlands), there has been a rise in youth suicide rates (American Journal of Psychiatry 2007).

- In the March et al (2007) study, while the rate of attempted suicide was higher in the fluoxetine group, it also occurred in the CBT group. It is by no means certain that the process of CBT may not in itself stress patients and cause an elevation in suicidal thinking. There is, in fact, an old unproven adage in psychiatry that the most dangerous time for suicide is in the recovery phase of depression. There is no a priori reason that this should not affect CBT too.
- Depression has been shown to be a risk factor for youth suicide. While this is not the only risk factor is it one of the most treatable. Anything which detracts from an evidence based treatment for depression (fluoxetine) would be predicted to increase the risk of youth suicide.

Finally, the history of psychopharmacology shows that generally drugs within the same class (e.g. SSRI antidepressants, antipsychotics) nearly always turn out to be much the same differing only in side effects and kinetics. Only fluoxetine has been robustly trialled so far and it is likely that at least some of the other SSRI antidepressants will eventually be shown to have a place in the treatment of adolescent depression. While we do not at this stage wish to argue for any other SSRI antidepressants, when and if evidence of their value comes forward, we do not wish to have to have to fight the same battle over again.

We consider that Medsafe's position of actively discouraging the use of SSRI antidepressants like fluoxetine in youth is not only inconsistent with the scientific knowledge but it constitutes a potential health threat to the youth of this country and deprives them of the right of informed choice of treatment.

We ask that Medsafe issue a statement as follows admitting that:

- It has misinformed the public about the use of SSRIs ,notably fluoxetine, in adolescent depression, by overstating the risks and minimising the value.
- Its opinion was formulated knowingly over the objections of the child and adolescent psychiatrists of NZ.
- In the treatment of adolescent depression an SSRI antidepressant, fluoxetine, has been shown to be effective with a clinically significant effect size (Hettrick et al 2007).
- CBT and fluoxetine are of probably comparable efficacy, though at the moment the evidence favours the superiority of fluoxetine. Thus both treatments, either separately or in combination, should be considered as the **primary** treatments of adolescent depression (Hettrick et al 2007).
- Some patients will prefer, be suited and have access to CBT but others will need medication as **treatment of first choice** because they prefer it, are unable to cooperate with CBT, have no access to CBT or have depression of such severity that CBT is vitiated.

John S Werry
Child & Adolescent Psychiatrist
(j.werry@auckland.ac.nz)

For the NZ Branch of the Faculty of Child Psychiatry of the RANZCP

References:

1. American Journal of Psychiatry 2007;164:1356–63.
2. Goodyer I et al: BMJ. June 11 2007.
3. Hettrick S et al: Cochrane Library 2007 No 3.
4. March J et al: Journal of the American Medical Assn 2004: 292:807–20.



Mind games

Some years ago, when my late-life career as a GP locum was sputtering to its close, I had to deal with a patient with a minor psychiatric disturbance. As is often the case when working as a locum, I knew nothing about the patient, and there were no notes.

I knew (or thought I knew) where to find a psychiatrist in private practice, and the patient had the money to pay a private fee. The psychiatrist, when briefed, didn't want to see the patient, told me this over the phone, and suggested referral to a team that worked out of the public hospital. Of this team I knew nothing, although I had heard other GPs complain about it.

My only other contact with psychiatry was at about the same time when a trainee psychiatrist told me how much it was costing her to sit the prescribed examinations and become a member of the Royal Australian and New Zealand College of Psychiatrists. She didn't think a lot of it, adding, "They always fail you the first time."

The College has its own website. It is clogged with vast amounts of rubbish, but the other day I decided to see if it would help an enquirer find a psychiatrist in their hour of need. After all, in Australasia there are 2500 "Fellows" of the College, and 800 doctors in training.

Go to "About psychiatry." There are eight headings. Click on "How to contact a psychiatrist." You will get this; "For referral to a psychiatrist or to discuss your treatment options please see your general practitioner (GP). Please note the Royal Australian and New Zealand College of Psychiatrists cannot provide patients with referrals to psychiatrists." Nor does it, I might add, bother to list their names or tell you where they are.

A search of the list of Registered Medical Practitioners and Medical Clinics in the latest Wellington telephone directory shows that there are for the entire region four psychiatrists in private practice, fewer than there were forty years ago.

Contrast this with a report in *The Dominion Post* on 6 December 2007 saying that there are 65 to 70 doctors working for the Capital and Coast DHB in the field of mental health.

A young colleague gave me a tip. "Just give the patient a letter, and tell them to take it to the hospital."

I completed my exit from the tatters of general practice and its busted private referrals before I had any need to resort to these defeatist tactics. Old doctors like me don't move with the times. You have to be young—and believe in a full-time hospital-based salaried service.

Roger M Ridley-Smith
Retired GP
Wellington

Response from Roger Mulder (Professor of Psychological Medicine and a NZMJ Subeditor)

Dr Ridley-Smith is correct. Private practice psychiatry is so unrewarding that few psychiatrists bother with it. Those that do often confine themselves to performing assessments for those that are able to pay, such as ACC and insurance companies.

The situation is likely to continue unless health insurance companies compensate psychiatric assessment and treatment more realistically. As things stand, the split between procedural and non-procedural medical specialties will continue to widen with the former becoming more popular and available in private while the latter become less and less accessible.

Roger Mulder
Professor
Department of Psychological Medicine
University of Otago, Christchurch



Peter Geoffrey Kennedy

1919 — 16 September 2007

Peter Geoffrey Kennedy died peacefully in Albarosa Rest Home in Christchurch after a long illness.

Peter's roots were planted deeply in Irish soil. His father was a Canon in the Church of Ireland parish of Castlelyons. He was brought up in the country around Fermoy near Cork in the southwest of Ireland. He enjoyed an outdoor childhood of shooting pheasants, fishing, and playing golf.

He studied medicine at Trinity College, Dublin, and held residences at Bolton Hospital and Hull Royal Infirmary. In 1950 he became orthopaedic registrar at Warwick Hospital. Here he met up with three other Cork men, and together they enjoyed exploring the Warwickshire pubs and the theatre at Stratford. Here he also met and married his wife Meeta.

Peter entered General Practice in Rugby where he practiced from 1953 to 1966. He became increasingly disillusioned with the NHS free on-demand health system so, to preserve his peace of mind, he and Meeta emigrated to New Zealand with their three children.

Their next-door neighbour in Rugby was Nigel Creese who left for New Zealand in 1963 to become headmaster of Christ's College. This connection drew them to Christchurch. They arrived in September 1966 with no position to go to, but within a week Peter had taken over the practice of Dr John Burn, in Papanui, who had just taken ill. He shared rooms with Dr Neil Whetter, and within a year they shifted down the road to found the Papanui Medical Centre at its present site. Among his patients at this time were the staff of the Firestone Tyre and Rubber Co where he visited weekly.

Peter remained at the Papanui Medical Centre until his retirement in 1988. He was a very good doctor and pleasant and supportive partner. His wry sense of humour and Irish wit were much appreciated by all the staff. His many patients were loyal and appreciative of his care. He could have very firm views. He was initially firmly opposed to having women as practice partners, "they were unreliable, tended to get pregnant, and would never be able to contribute adequately to the finances of the centre". But he coped with the change and came to highly value their contribution to the practice. He even came to accept babies as being part of the staff set-up!

Peter loved a flutter on the horses or the dogs. He had a number of health scares during his life, including gas gangrene of his left lower leg following a soccer injury. This left him wearing a calliper on this leg for the rest of his life. He also had a scary experience in when in practice in Rugby, when on a night call he was received at the door of the house by a deranged man armed with a shotgun aimed at his head. These and other experiences meant he would have taken long odds against living to a good age.

The years after retirement were occupied with golf, gardening and reading and occasional trips with Meeta back to the UK. He loved spending time with his

extended family, taking a great interest in the progress of four grandchildren. In September 2000 both he and Meeta contracted pneumonia and were in hospital together. It was there that he suffered a heart attack followed by a stroke, which sadly took away his quality of life.

Peter and Meeta were a great team and gracious hosts; a visit to their home was always a pleasure.

Peter was a valued partner who made a foundational contribution to the success of the Papanui Medical Centre.

Peter is survived by sons Ian and David and daughter Kate, and four grandchildren. Dr George S Chisholm (Christchurch), a former colleague of Peter, wrote this obituary.



Griffith Jones

20 December 1920 – 14 October 2007

Dr Griff Jones was born in Auckland and attended Auckland Grammar School, where in 1938 he was a prefect, a member of the Cricket First XI, and captain of the Hockey First XI.



At Auckland University College he graduated BSc, majoring in physics, in which subject he won a Senior Scholarship. During his final year (1941) he also did a radio training course. He then joined the RNZAF, and was posted to the Radar Installation Facility in Wellington. The war over, he decided to do medicine and graduated from the Otago Medical School in 1951.

Dr Jones worked as an RMO in Auckland and Cornwall Hospitals, spent a year in Te Kuiti in a rural practice, and a further year in Thames Hospital. He returned to Auckland to take over the Herne Bay practice of Dr Ussher, who had been killed in a boating accident.

In January 1955 I did a locum for Griff, and I was impressed by his high clinical and ethical standards, and by the esteem in which his patients held him. His quiet and unassuming manner won him many friends and admirers.

Griff married Barbara Gould in 1958, and they bought a property in Epsom which was to be their home for a good many years.

It was perhaps natural that Griff would want to combine his flair for medicine and for physics in the specialty of radiology. In 1961 he returned to Auckland Hospital for 2 years as Radiology Registrar, then proceeded to London for further studies. Back in Auckland Hospital in 1965 as a consultant he had acquired the DMRD and the Australasian Fellowship. He worked in private practice as well as the hospital, and also became involved with the Cancer Society reporting mammograms.

In addition to all this, when there was a period when there was no full-time radiologist in the North, Northland Hospital would send down their films by courier for Griff to report on from his home.

Griff's interests outside medicine were many and varied. He continued playing hockey after he left school and was in the University team at senior level both in Auckland and Dunedin. He was a member of the Auckland Racing Club, and raced two of his own horses in 1957. Later on, he was not only a frequent spectator at Eden Park, but also an honorary physician to the Rugby Union.

Fishing was another of his pursuits, and his family recall nostalgically holidays spent in a remote spot on the Coromandel, “roughing it” without electricity or running water and with plenty of time to relax.

Griff retired in 1990, and he and Barbara made the decision to move to Queensland’s Gold Coast. They liked the climate, the opportunities for golf and fishing, and the chances to travel into the Australian Outback as well as overseas.

A year or so ago Griff developed pulmonary fibrosis, and he died while on holiday in Brisbane.

He is survived by his wife Barbara, his daughter Elizabeth in Auckland, his son Michael in Hong Kong, and two grandchildren.

Dr Bill Brabazon (Auckland) wrote this obituary using information supplied by Griff’s family.



GRAHAM AITKEN NUFFIELD TRUST

GRAHAM AITKEN NUFFIELD MEDICAL POSTGRADUATE TRAVELLING SCHOLARSHIP

Applications are invited from well qualified New Zealand medical graduates in the 25–35 age group for the above Scholarship.

The purpose of the Scholarship is to provide travel funds to enable New Zealand graduates to further their clinical medical training and research interests in the United Kingdom.

The Scholarship will provide up to three return airfares to the U.K., together with allowances amounting to \$3000.

Candidates for the Scholarship must submit a training or research programme for approval together with the name of a person in the U.K. who will provide salary and facilities.

For further information please consult the Deans of the Schools of Medicine or write to Professor A.D.Campbell, Honorary Secretary, Managing Trustees, Graham Aitken Nuffield Trust, C/- Department of Chemistry, University of Otago, P.O. Box 56, Dunedin.

Applications must be submitted to Professor Campbell by 31 March 2008

THE NEW ZEALAND MEDICAL JOURNAL

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National Heart Foundation: 2008 Grant Applications

View this notice by clicking [here](#).

((Libraries, print the PDF and replace this page))

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Medical Benevolent Fund

NZMA Members, and families of deceased Members, may apply for aid when in situations of financial hardship or distress.

Applications should be directed through the NZMA:

Central Office
P O Box 156
Wellington
Tel: 0800 656161



Calling obituary writers

Obituaries do not write themselves, oddly enough. They require organisation, time, and respect for our departed colleagues.

Many decades ago, our medical practitioners were Otago graduates with a sprinkling of Brits. Things have changed. With the Auckland Medical School and our overseas-trained colleagues coming from a wide variety of medical schools, it is no longer a tight little club where everyone knows everyone else.

Thus we need a network to tell us who has died and who amongst family and colleagues can best give the rest of us some overview of the life, both professional and social, of our dead colleague.

For several years I have tried to rejuvenate this part of the *Journal*. I have been greatly helped in this task by colleagues in Auckland, Wellington, and Dunedin who scan the local newspapers. Anyone whose death notice does not appear in one of the four main dailies is liable to miss out.

Who is to write the obituary? Someone who cares. It need not be a literary masterpiece but should give something of the texture of the person's life. Most funerals have a eulogy and the eulogist is often in the best position to help with an obituary.

About 400 words is usual but, with the electronic journal, space is no longer the problem it was in the days of hard copy.

The next time a colleague dies, ask yourself: "Who is going to do the obituary?" It could be you or someone whose arm may need only a gentle twist.

Most of the *Journal* belongs to the younger and brighter of us but the obituaries belong to us all. Even the old and cranky.

Roy Holmes
Coordinator of Obituaries
NZMJ

Note: See <http://www.nzma.org.nz/journal/obituaries.html> for further details and instructions.

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A reminder to book review writers

Book publishers in New Zealand and overseas regularly post us new publications in medicine and related fields. These books range from pocket-sized paperbacks to weighty tomes containing almost a thousand pages and retailing for several hundreds of dollars. Increasingly, some of these larger textbooks have electronic media attached (CDs).

Although we occasionally review books ourselves, the editor usually instructs my assistant and I to send such books to suitable reviewers throughout New Zealand, especially to our regular and reliable manuscript reviewers as a token of our appreciation (the reviewer can keep the book afterwards).

With medical professionals being very busy people and book reviews not being our core business, we have followed a hands-off approach of not setting deadlines nor reminding reviewers (unlike manuscript reviews). A sizeable percentage of book reviews never get written, however, despite the best of intentions.

Therefore, if you received a book several months (or even 1–3 years) ago but don't have the time to write the review, then please pass the book to a suitable colleague willing and able to undertake this task. Alternatively please return the book to this office so we can send it to someone else.

The reviewer need not read every page of the book nor does the review have to be long or eloquent (many book reviews contain less than one full page of text). A concise, clearly written summary of the book and your overall impression is all that is required. To assist you, see the [journal archives](#) for examples of published book reviews.

Brennan Edwardes

Production Editor, NZMJ

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Conn's Current Therapy 2007: Text with Online Reference

Rakel and Bope. Published by [Saunders Elsevier](#), 2006. ISBN 9781416032816.
Contains 1568 pages. Price AU\$108.00 (online price)

This well-known textbook has the aim of providing concise and up-to-date information for conditions most commonly encountered in practice. To test this, I dipped into it whenever I had a question from my day-to-day practice as a geriatrician—clearly I skipped some of the paediatric chapters in which I have no expertise. I found each chapter useful, succinct, and with clear treatment options.

There is a pragmatic emphasis on diagnosis and treatment options, with less on the pathophysiological basis of the disease in question. I liked this approach. It fits with the way I use a text such as this—dip into it briefly at the end of the day to check I am on giving the correct treatment, or to refresh my memory for condition that I have not seen for a year or two. One or two chapters stood out as they made complex topics quite readable, without being too simplistic—these included one on peripheral neuropathies and haemolytic anaemia.

Once or twice, I was frustrated when a particular chapter did not have sufficient detail to help me, but there are specialist texts to go to at those times. This will always be the case for a book that is overtly aimed at the generalist.

Who should use this book? I suspect it is aimed at the US market with their general physicians and family physicians. However NZ generalists such as general physicians, geriatricians, and possibly GPs will find the breadth of coverage helpful.

Will I continue to dip into it? Yes, together with other sources of information.

Carl Hanger
Geriatrician, Older Persons Health
The Princess Margaret Hospital
Christchurch



Dendrites (2nd edition)

Greg Stuart, Nelson Spruston, Michael Häusser (eds). Published by [Oxford University Press](#), 2007. ISBN 9780198566564. Contains 550 pages. Price £42.95 (hardback)

This is an attractively produced small textbook devoted entirely to the dendrite and dendrite research. It is not a book for clinicians, but for students, researchers, and teachers of neuroscience. The book is both comprehensive and well organised.

Chapter 1, which describes dendritic structure, begins with a succinct definition of the dendrite: “Dendrites are extensions of the cell body of the neuron specialised for receiving and processing synaptic inputs.” Following chapters cover all imaginable topics related to dendrite biology and research including comparative biology and evolution, embryologic dendrite development, molecular aspects of dendritic organisation, ion-channel distribution and physiology, biochemical compartmentalisation, calcium signalling, dendritic integration, functional plasticity at dendritic synapses, dendrites in disease, and several chapters devoted to aspects of computational modelling of dendritic function.

The book ends with a final chapter entitled “The Future of Dendrite Research”. This short chapter does well by highlighting the limitations in current knowledge and identifying priorities for future research in the field. Although I am certainly no expert in this field, the contributors appear authoritative and each chapter is well-organised with subheadings that enhance readability and are extensively referenced.

The book is full of full-colour diagrams, drawings and micrographs which are of very high quality. The printing, binding, and paper quality are of the highest quality as well.

This book would be a deserved purchase by any department or library of an institution where dendritic research is being practiced or contemplated, or by a student approaching a PhD on the topic.

John Fink

Consultant Neurologist and Senior Lecturer in Medicine
Department of Medicine, University of Otago, Christchurch



Safety and Ethics in Healthcare: A Guide to Getting in Right

Bill Runciman, Alan Merry, Merrilyn Walton. Published by [Ashgate Publishing Ltd](#) (Hampshire, UK), 2007. ISBN 0754644375. Contains 360 pages. Price £30.00

When two copies of this book were sent to me by different groups I knew that someone thought I needed some help. When I looked at the book chapters such as “Naming, blaming and shaming” also “Knowing what to do when things go wrong” and “Looking after the people involved” I thought I just had to read it. The only concern I had was what could two professors of anaesthesia and an associate professor of medicine tell me about these problems. Anaesthetists and physicians are amongst the least complained about specialties to the Health and Disability Commissioner (HDC), however having heard Runciman and Merry speak previously I thought that I would at least enjoy reading what they had to say.

The book is well set out, has boxes of key information, and uses cases to demonstrate situations. It is hard-covered, with good-quality paper and reasonable type face. Interestingly there is an erratum pasted inside the front cover which ironically appears appropriate for this book.

I found many chapters lived up to my expectations, others did not. Overall the book did live up to my expectations and I would suggest that most doctors would find parts of the book that could aid their clinical practice, especially those of us who work in areas where a significant number of complaints are generated.

Frank A Frizelle
Professor, Colorectal Unit
Department of Surgery, Christchurch Hospital