Christchurch School of Medicine

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# Annotated Bibliography of Publications from The Christchurch Child Development Study 1977 to 1989

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# INTRODUCTION

The Christchurch Child Development Study is a longitudinal study of a birth cohort of 1265 children born in the Christchurch urban region during mid 1977. These children have now been studied at birth, four months, and at annual intervals until the age of twelve years. The aims of the study are threefold:

1. Epidemiological research: to document the prevalence of illness within the cohort in order to examine the various social, environmental and associated risk factors which are related to various aspects of child morbidity and health.

2. Health and Education Services Research: to document rates of utilisation of New Zealand health and education services and to examine the social and familial factors which are related to variations in rates of service utilisation.

3. Social and Familial Disadvantage Research: to take a broader perspective and examine the social, familial, economic, and other factors which may be associated with disadvantage in children and their families.

From these three main aims it can be seen that the Christchurch Child Development Study aims to describe the health, education, and social welfare of a sample of New Zealand children studied over a protracted period of time.

In order to fulfil these aims the study has gathered information from a number of sources. These sources include: parental interview; health diary information; hospital notes and general practitioner records; teacher questionnaires; and psychometric assessment (publication no. 33 gives a more detailed account of these sources).

After twelve years of research a large number of papers have been published from the study and it has gained international recognition. The scope of research topics has been large and it is hoped that this bibliography will be useful in providing both, an indication of the varied research topics, and a brief summary of each paper.

## OUTLINE OF THE BIBLIOGRAPHY

The bibliography contains annotations of all published material from the Christchurch Child Development Study for the period since its beginning until December 1989. The annotations take the form of an abstract of the main points presented in each paper. Papers in press and awaiting publication are also included in the bibliography. Papers submitted, but awaiting publication decisions, are not included in the main body of the bibliography but are listed in the Appendices along with unpublished theses from the study.

The bibliography is divided into five main sections which reflect the major areas of concern that have been investigated. These five main sections are as follows:

1. Illness and health in the child population - focus is on the medical aspects of child development and the aetiology of illness and disease.

2. Mental health and cognitive development - focus is on psychological issues regarding children and their families.

3. Community health services and their utilisation.

4. Family, social environment, and education - focus is on social, economic, and other factors which influence social, physical, and educational development.

5. Methodology and measurement - primary focus is on the methods of research or in formulating models to guide empirical research.

In many cases publications touch on issues relevant to several topics, in which case assignment to a main section is based on the primary focus of the paper. Within each main section when there are two or more papers on the same topic a sub-heading is utilised which groups publications according to specific topics of investigation. Within the sub-headings publications are listed by year of publication. Also, each publication is numbered and where other papers in different main sections are directly relevant this has been indicated. The overall organisation of the bibliography is as follows:

Reprints of all publications are available and requests for reprints should be sent to the address listed on the title page.

## ACKNOWLEDGMENTS

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# Annotated Bibliography of Publications from the

# Christchurch Child Development Study, 1977 - 1989

## A. ILLNESS AND HEALTH

### A.1 Accidents

1. Beautrais, A.L., Fergusson, D.M., Shannon, F.T. Accidental poisoning in the first three years of life. **Australian Paediatric Journal**, 1981; 17: 104 - 109.

   Accidental poisoning was found to occur with a relatively high frequency (19%) amongst preschool children, but in the vast majority of cases did not require intensive medical treatment. The most frequent sources of poisoning were medicines, household cleansers and petrochemicals. A number of risk factors were found to be associated with accidental poisoning but overall prediction was not strong. The strongest predictors of poisoning were the mother's reports of problems with her child and the mother's use of tranquillisers and/or anti-depressant medication.

2. Fergusson, D.M., Horwood, L.J., Beautrais, A.L., Shannon, F.T. A controlled field trial of a poisoning prevention method. **Pediatrics**, 1982; 69: 515-520.

   Comparison of poisoning rates and levels of household hazard in a group of 583 families supplied with Mr Yuk labels and a control group of 543 families not given Mr Yuk labels failed to reveal any significant differences. Examination of the reasons for the failure of the Mr Yuk poisoning prevention method suggested that three factors were involved: parents failed to provide an adequate coverage of all poisons in the home; a significant number of poisonings occurred with substances that could not be labelled with Mr Yuk; and, in a minority of cases, clear failures of the method were observed. The results suggest that simply supplying Mr Yuk stickers to families with young children is not an effective poisoning prevention method. However, the method may be effective with older children or as an adjunct to an integrated poisoning prevention method.

3. Beautrais, A.L., Fergusson, D.M., Shannon, F.T. Childhood accidents in a New Zealand birth cohort. **Australian Paediatric Journal**, 1982; 18: 238-242.

   Childhood accidents (non-poisoning) during the age period from one to four years were common with 49.5% of the cohort making one medical attendance for accidents and 19% making two or more attendances. While the majority (66%) of accidents were minor lacerations, abrasions and contusions, 9% of all accidents resulted in hospital admission. Risk factors associated with accidents included: the family experiencing a large number of significant life events; low maternal education level; and the child being male. The nature of these risk factors suggests that the scope for reducing childhood accidents by modifying

these risk factors is very limited: a more fruitful approach to childhood accident prevention may be through the creation of a home environment which minimises the impact of variations in parental care and child activity levels on the risk of childhood accidents.

4. Horwood, L.J., Fergusson, D.M., Shannon, F.T. The safety standards of domestic swimming pools. **New Zealand Medical Journal**, 1981; 94: 417-419.

Results showed that at three years of age 31% of children in the cohort either had access to a family pool or lived immediately adjacent to a property containing a pool. Examination of four safety features for swimming pools suggested that there was considerable room for improvement in the safety standards of the pools surveyed: over half did not have a surrounding fence or wall at least a metre high; less than one in five had a surrounding fence with self closing gate or padlocked gate; just under half had sides more than a metre above ground level; and one pool in five had none of the four safety measures. It is concluded that serious consideration should be given to the establishment and enforcement of a recognised set of safety standards for domestic swimming pools.

5. Fergusson, D.M., Horwood, L.J., Shannon, F.T. The safety standards of domestic swimming pools 1980-1982. **New Zealand Medical Journal**, 1983; 96: 93-95.

Compares 1982 data on domestic swimming pools with data collected in 1980 (see 4). The comparison indicated two major trends: there was an increase in the number of children in the cohort who had a swimming pool on their property or on a neighbouring property; and there was a marked decline in pool safety standards. In addition, mothers were questioned about their attitudes to fencing legislation or by-laws requiring adequate pool fencing and gates. Results showed that a large majority (86%) of mothers were in favour of such regulations.

6. Fergusson, D.M., Horwood, L.J., Shannon, F.T. Domestic swimming pool accidents to preschool children. **New Zealand Medical Journal**, 1983; 96: 725-727.

Reports on the frequency of accidents in domestic swimming pools during the period from birth to five years. A total of 94 such accidents were reported and while most were not serious - requiring only rapid adult intervention - six children faced a clear drowning situation. Analysis of risk factors associated with swimming pool accidents showed that children with pools on their own or neighbouring properties were two and a half times more likely to be involved in swimming pool accidents. It is concluded that the results reiterate the need for the introduction of a uniform and well enforced set of domestic swimming pool safety regulations.

7. Fergusson, D.M., Horwood, L.J. Risks of drowning in fenced and unfenced domestic swimming pools. **New Zealand Medical Journal**, 1984; 97: 777-779.

Utilising data from the cohort on the fencing of domestic swimming pools a method for estimating the risks of drowning in fenced and unfenced domestic swimming pools is presented. Application of this method suggests that the probability of drowning occurring in an unfenced pool is between two to five times higher than that of a fenced pool. It is also estimated that the introduction of pool fencing would reduce the number of drownings in domestic swimming pools by 40% to 70%.

## A.2 Asthma/Eczema

8. Fergusson, D.M., Horwood, L.J., Beautrais, A.L., Shannon, F.T., Taylor, B. Eczema and infant diet. **Clinical Allergy**, 1981; 11(4): 325-331.

The relationship between parental atopy (asthma or eczema), breast-feeding, early solid food diet and the rate of eczema was examined for the period from birth to two years. Breastfeeding had no significant effect on rates of eczema, but the results suggested that both parental atopy and diversity in early diet are factors which contribute towards rates of childhood eczema.

9. Fergusson, D.M., Horwood, L.J., Shannon, F.T. Risk factors in childhood eczema. **Journal of Epidemiology and Community Health**, 1982; 36: 118-122.

Extends a previous analysis of eczema and infant diet at two years (see 8) to examine risk factors in childhood eczema for the first three years. The findings replicate those of the previous study. In addition, analysis suggested that the apparent association between exclusive breastfeeding and reduced rates of eczema, reported in previous studies, may be because exclusively breastfed infants were not exposed to early solid feeding, rather than to any beneficial effect of breast milk itself.

10. Fergusson, D.M., Horwood, L.J., Shannon, F.T. Asthma and infant diet. **Archives of Disease in Childhood**, 1983; 58(1): 48-51.

Examines the relationship of milk diet and solid feeding practices to rates of asthma during the first 4 months of life. The results showed no significant association between rates of asthma and breastfeeding or solid feeding practices - this was true for children both of asthmatic and non-asthmatic parentage. Discusses previous research reporting an association between breastfeeding and a reduction of atopic disease, but concludes that there is no evidence to indicate that early breastfeeding had any detectable effect on the risk of subsequent asthma for this birth cohort. However, it is concluded that this does not negate

the possibility that breastfeeding may have a prophylactic effect for children from highly atopic families.

11. Fergusson, D.M., Horwood, L.J., Shannon, F.T. Parental asthma, parental eczema and asthma and eczema in early childhood. **Journal of Chronic Diseases**, 1983; 36(7): 517-524.

Reveals the presence of a complicated system of relationships between asthma and eczema in parents and the occurrence of these conditions in children during early childhood. The analysis suggested the presence of a specific component of inheritance in childhood asthma and eczema: asthma in parents was associated with asthma but not eczema in boys; eczema in parents was associated with eczema but not asthma in both sexes; and there was an additional generalised tendency for asthma and eczema in children to occur together. Concludes with a discussion of the implications of the findings.

12. Horwood, L.J., Fergusson, D.M., Shannon, F.T. Social and familial factors in the development of early childhood asthma. **Pediatrics**, 1985; 75(5): 859-868.

Examines the role of social and familial factors in the development of childhood asthma by the age of six years. The results indicate that early childhood asthma appears to be inherited to some extent, its age of expression is related to the child's sex, and it has a complex interaction with other forms of allergic disease. There was no evidence to suggest that the structures, practices, or dynamics of the child's family played a significant role in the development of asthma for children in this birth cohort.

13. Fergusson, D.M., Horwood, L.J., Shannon, F.T. Early solid feeding and recurrent childhood eczema: A ten year longitudinal study. **Pediatrics**, 1990; 10: 541-546.

Extends a previous study of the relationship between eczema and infant diet (see 8) by extending the analysis to ten years, and distinguishing between mild eczema and chronic or recurrent eczema. By the age of ten years 7.5% of the children had developed recurrent eczema. Utilising a proportional hazards model which controlled for confounding factors - parental atopy; atopy in siblings; the child's early milk diet; and family social background - the analysis showed clear and consistent associations between the diversity of the child's diet during the first four months and risks of eczema. Children exposed to four or more different types of solid food before four months had risks of recurrent eczema which were 2.9 times those of children who were not exposed to early solid feeding. It is concluded that early exposure to a diet diverse in potential food antigens may act to predispose susceptible children to recurrent childhood eczema.

## A.3 Breastfeeding

Also see: 9, 10, 40.

14. Fergusson, D.M., Horwood, L.J., Shannon, F.T., Taylor, B. Infant health and breastfeeding during the first 16 weeks of life. **Australian Pediatric Journal**, 1978; 14: 254-258.

    Examines the relationship between the method of infant feeding and health during the first 16 weeks of life. Results showed that there was no detectable relationship between the risk of mortality and method of infant feeding. Examination of overall morbidity revealed significant differences between bottlefed and breastfed infants: totally bottlefed infants had four times the risk of consulting a medical practitioner for gastro-intestinal disturbances when compared with totally breastfed infants. However, the results for respiratory infection showed that, when social background was taken into account, there was no association between the risk of medical consultation for these infections and method of infant feeding. It is concluded that although breastfeeding remains the optimal form of infant nutrition, the benefits are marginal in a developed community in terms of illness in early infancy.

15. Starling, J., Fergusson, D.M., Horwood, L.J., Taylor, B. Breastfeeding success and failure. **Australian Paediatric Journal**, 1979; 15: 271-274.

    The factors influencing the success or failure of breastfeeding were assessed in mothers who had remained with their children throughout the first year of life (a sample of 1121). Of the 81% of mothers who intended to breastfeed, 52% failed to achieve their desired duration. Over three quarters of the failures occurred in the first three months of life, and the major explanation given for failure was inadequate lactation. Among the factors associated with failure to achieve breastfeeding intentions were complementary feeding in the maternity hospital and limited mother/child contact in the first few days after birth. Better educated mothers, those in two parent families and older mothers were more likely to succeed, as were those who received encouragement from family, professional, and lay support groups.

16. Fergusson, D.M., Horwood, L.J., Shannon, F.T., Taylor, B. Breastfeeding, gastro-intestinal and lower respiratory illness in the first two years. **Australian Paediatric Journal**, 1981; 17: 191-195.

    Extends a previous analysis of infant health and breastfeeding during the first 16 weeks (see 14) to examine the association in the first two years. Although during the first four months, there were significant tendencies for rates of gastro-intestinal illness to decrease with increasing duration of breastfeeding, there were no significant associations beyond four months. Prolonged breastfeeding was associated with significantly lower rates of respiratory illness during both the first and second years. However, when the effects of social and

familial factors were taken into account, the apparent associations between duration of breastfeeding and rates of lower respiratory illness became non-significant.

## A.4 Circumcision

17. Shannon, F.T., Horwood, L.J., Fergusson, D.M. Infant circumcision. **New Zealand Medical Journal**, 1979; 90: 283-284.

    Results showed that by the age of one year 25% of the male infants in the study had been circumcised. As 62% of the fathers of the children were circumcised, the findings suggest that there has been a dramatic reduction in the prevalence of the operation. The major reason given for infant circumcision was hygienic benefit and very few parents elected to have their child circumcised on the basis of medical or sexual benefits. It is concluded that parents request infant circumcision on the basis of family tradition rather than medical advice.

18. Fergusson, D.M., Lawton, J.M., Shannon, F.T. Neonatal circumcision and penile problems: An 8 year longitudinal study. **Pediatrics**, 1988; 81(4): 537-541.

    Comparison of circumcised and uncircumcised boys showed that by eight years circumcised boys had a rate of 11.1 penile problems per 100, and uncircumcised boys had a rate of 18.8 per 100. However, the relationship between risks of penile problems and circumcision status varied with age. During infancy, circumcised children had a significantly higher risk of penile problems than uncircumcised children, but after infancy the rate of penile problems was significantly higher among the uncircumcised. It is concluded that while recent evidence does suggest that the medical histories of circumcised and uncircumcised males differ systematically, opinions will remain divided as to whether neonatal circumcision is a justifiable procedure.

## A.5 Enuresis/Bladder Control

19. Fergusson, D.M., Horwood, L.J., Shannon, F.T. Factors related to the age of attainment of nocturnal bladder control: An 8 year longitudinal study. **Pediatrics**, 1986; 78(5): 884-890.

    Results showed that by eight years of age, all but 3.3% of children had attained nocturnal bladder control, but because some children had relapsed subsequent to the attainment of control, 7.4% of children had nocturnal enuresis. Factors predictive of the age of attainment of nocturnal bladder control were: a family history of enuresis; the child's developmental level at one and three years of age; and the child's early sleeping patterns. The age of attainment of bladder control was unrelated to a broad range of psycho-social factors including family social and economic background, family life event measures, changes in parents in the family, and residential changes. It is concluded that the etiology of

primary enuresis is mainly biologic and that psycho-social factors play little role in this aspect of bed-wetting.

20. Fergusson, D.M., Horwood, L.J., Shannon, F.T. Secondary enuresis in a birth cohort. **Paediatric and Perinatal Epidemiology**, 1990; 4: 53-63.

Results showed that by the age of ten years 7.9% of children in the study had developed secondary enuresis. Analysis suggested that two risk factors were involved in secondary enuresis: children who were late to attain nocturnal bladder control had significantly higher risks of secondary enuresis than children who attained early nocturnal bladder control; and the child's level of exposure to adverse life events was associated with the onset of secondary enuresis. The results suggest that the rate at which the child acquires primary bladder control acts as a vulnerability factor which determines the child's susceptibility to developing secondary enuresis when exposed to stress.

## A.6 Fluoridation and Dental Health

21. Fergusson, D.M., Horwood, L.J. Relationships between exposure to additional fluoride, social background and dental health in 7-year-old children. **Community Dentistry and Oral Epidemiology**, 1986; 14: 48-52.

Exposure to additional fluoride was found to be a result of at least three factors: the use of fluoride toothpaste; the child's length of residence in a fluoridated area; and the length of time for which the child had been provided fluoride tablets. The results confirm previous findings which have concluded that additional fluoride does reduce dental disease in children. In addition, the results suggested an inverse relationship between social background and dental health: increasing social disadvantage was associated with decreasing dental health. However, this association was not particularly strong and social background had differing effects on exposure to fluoride depending on the source of additional fluoride.

22. Shannon, F.T., Fergusson, D.M., Horwood, L.J. Exposure to fluoridated public water supplies and child health and behaviour. **New Zealand Medical Journal**, 1986; 99: 416-418.

Examines the relationship between duration of exposure to fluoridated public water supplies and measures of child health and behaviour taken during the period from birth to seven years. The analysis showed no association between exposure to fluoridated water and a large range of measures of child health and behaviour, even when the possible effects of family social background were taken into account.

## A.7 Parental Smoking

23. Fergusson, D.M., Horwood, L.J., Shannon, F.T. Smoking during pregnancy. **New Zealand Medical Journal**, 1979; 89: 41-43.

Reports on maternal smoking habits during pregnancy. The findings show that about 26% of women smoked throughout pregnancy and a further 8% smoked at some time during pregnancy. Women who smoked during pregnancy tended to be younger, to have lower educational qualifications, were more often non-European, were more often mothers of ex-nuptial infants, and came from families of low socio-economic background. Smoking during pregnancy was associated with a decrease in infant birthweight, a greater risk of low birthweight, and a greater risk of spontaneous abortion. It is concluded that, in terms of obstetric practice, it is important that steps are taken to provide the smoking mother with greater encouragement and support to stop smoking during pregnancy.

24. Fergusson, D.M., Horwood, L.J., Shannon, F.T. Parental smoking and respiratory illness in infancy. **Archives of Disease in Childhood**, 1980; 55(5): 358-361.

The analysis indicates a complicated relationship between parental smoking and all respiratory illness in infants. Firstly, maternal smoking was associated with an increased incidence of lower respiratory illness, but there was no statistically significant association between paternal smoking and lower respiratory illness. Secondly, children of mothers who smoke do not have a greater risk of overall respiratory illness, but they do have a greater risk of suffering respiratory illness affecting the lower respiratory tract. It is concluded that prolonged exposure to cigarette smoke may predispose infants to develop lower respiratory symptoms when they contract a respiratory infection.

25. Fergusson, D.M., Horwood, L.J., Shannon, F.T., Taylor, B. Parental smoking and lower respiratory illness in the first three years of life. **Journal of Epidemiology and Community Health**, 1981; 35(3): 180-184.

Extends a previous analysis of parental smoking and respiratory illness at one year (see 24) to examine the association for the first three years of life. The findings showed that at one year, clear differences between the offspring of smokers and non-smokers were evident; at two years the evidence was equivocal; and by three years an association between maternal smoking and infant lower respiratory illness was clearly absent.

26. Fergusson, D.M., Horwood, L.J. Parental smoking and respiratory illness during early childhood: A six-year longitudinal study. **Pediatric Pulmonology**, 1985; 1: 99-106.

Extends two previous studies of parental smoking and respiratory illness (see 24, 25) to examine the association up to the age of six years. After two years there was no detectable association between parental smoking habits and lower respiratory infection. There was also no evidence to suggest that children whose parents smoked had increased risks of asthma, or increased rates of asthmatic attacks, during early childhood. Results are discussed in the context of previous research findings.

## A.8 General Aspects of Illness and Health

27. Fergusson, D.M., Horwood, L.J., Shannon, F.T. Length and weight gain in the first three months of life. **Human Biology**, 1980; 52(2): 169-180.

The analysis showed that there was a complicated relationship between birth size and length and weight gains. The findings suggest that growth in the immediate postnatal period operates in a redistributive fashion which tends to stabilise the relationship between the child's weight and length. The analysis underlines the dangers of treating inter-related measures such as weight and length in isolation and emphasises that growth is a process which involves a system of inter-related and inter-dependent parameters.

28. Fergusson, D.M., Horwood, L.J., Shannon, F.T. Birth placement and child health. **New Zealand Medical Journal**, 1981; 93: 37-41.

Examines the association between birth placement and standards of health and health care during the period from birth to three years. Results show a systematic tendency for levels of health care and morbidity to vary with the child's birth placement: in general adopted children had the best standard of health care and lowest rates of morbidity; children who entered single parent families at birth had the poorest standards of health care and the highest rates of morbidity. These results remained statistically significant when a range of confounding factors were controlled. Concludes with a discussion of possible explanations of the variations in health care and morbidity associated with birth placement.

29. Fergusson, D.M., Beautrais, A.L., Horwood, L.J., Shannon, F.T. The prevalence of illness in a birth cohort. **New Zealand Medical Journal**, 1982; 95: 6-10.

Examines the prevalence of illness in the study children up to the age of three years. Frequency of contact with medical practitioners was high: on average, children had made 16 visits to general practitioners; 29% had been admitted to hospital; and 47% had made hospital outpatient attendances. Medical

consultations were dominated by a relatively small number of common conditions. The results are discussed in terms of implications for health planning and medical education.

30. Abbot, G.D., Fergusson, D.M., Horwood, L.J. General practitioner prescribing practices for childhood respiratory infection. **New Zealand Medical Journal**, 1982; 95: 185-188.

Examines the prescribing practices for respiratory infection during the period from birth to three years. Details the type of medication prescribed and the frequency of return consultations due to the effects of initial treatment. Discusses the implications of the high rate of anti-microbial prescribing present for this sample.

31. Beautrais, A.L., Fergusson, D.M., Shannon, F.T. Life events and childhood morbidity: A prospective study. **Pediatrics**, 1982; 70(6): 935-940.

Examines the relationship between family life events and rates of childhood morbidity during the period from one to four years of age. Family life events were associated with increased risks of medical consultation and hospital attendance for illness of the lower respiratory tract, gastro-enteritis, accidents, burns, scalds, and accidental poisoning. In addition, children from families experiencing large numbers of life events had an increased risk of hospital admission for suspect or inadequate care. The correlation between life events and rates of child morbidity persisted when a range of measures of family social and economic background was taken into account statistically. Discusses possible explanations of the role of family life events in the development of childhood morbidity.

32. Fergusson, D.M., Dimond, M.E., Shannon, F.T. Morbidity during the preschool years. **Australian Paediatric Journal**, 1985; 21: 139-145.

Extends a previous analysis of the prevalence of illness in the cohort for the period from birth to three years (see 29) and examines morbidity for the period from birth to five years. By five years children had made an average of 18.0 family doctor consultations for morbidity and a further 4.7 for preventive health care procedures; 38% had been admitted to hospital and 62% had made one or more attendances at a hospital outpatient department.

33. Fergusson, D.M., Horwood, L.J., Shannon, F.T., Lawton, J.M. The Christchurch Child Development Study: A review of epidemiological findings. **Paediatric and Perinatal Epidemiology**, 1989; 3: 278-301.

Provides a review of the major lines of epidemiological research examined in the Study over an eleven year period. These include: breastfeeding and child

health; parental smoking and child health; the effects of low level lead exposure; childhood asthma; nocturnal bladder control; the effects of early hospital admission; the distribution of child health services; and the consequences of private medical insurance. In addition, a number of general topics - study design, sample attrition, measurement error, individual differences, and causal inference - relating to longitudinal designs are briefly discussed.

34. Fergusson, D.M., Horwood, L.J., Shannon, F.T. Morbidity from five to ten years. **Australian Paediatric Journal**, 1989; 25(2): 72-79.

Extends previous analyses of the prevalence of illness in the cohort for the period from birth to five years (see 29, 32) and examines morbidity from five to ten years. During this period children had an average of 12 consultations with family doctors; 26% were admitted to hospital and 53% made one or more attendances at hospital outpatient departments. Medical consultations were dominated by a relatively small number of common conditions. Trends in rates of medical consultation for accidents and respiratory illnesses during the period from birth to ten years are described and the implications of the findings are discussed.

## B. MENTAL HEALTH AND COGNITIVE DEVELOPMENT

### B.1 Behaviour and Behavioural Problems

35. Fergusson, D.M., Dimond, M.E., Horwood, L.J. Childhood family placement history and behaviour problems in 6-year-old children. **Journal of Child Psychology and Psychiatry**, 1986; 27(2): 213-226.

Examines the relationship between childhood family placement history and maternal and teacher reports of child behaviour at six years of age. Children who had experienced a marital breakdown showed a tendency to increased aggressive/anti-social behaviour. Within the group of children experiencing a family breakdown, behavioural outcomes varied with the child's subsequent family history: children whose parents reconciled or whose mother remarried appeared to suffer more behaviour difficulties than children who remained in a single parent family. Multivariate analyses suggested that these differences arose from social and contextual factors associated with differing family situations.

36. Shannon, F.T., Fergusson, D.M., Dimond, M.E. Early hospital admissions and subsequent behaviour problems in 6-year-olds. **Archives of Disease in Childhood**, 1984; 59(9): 815-819.

Results for teacher and maternal ratings of child behaviour problems at age six, showed a slight but consistent trend for reported behaviour problems to increase

with increasing length of hospital stay. However, when the effects of family social background and life events were controlled for, there was no significant association between duration of hospital stay and reports of child behaviour problems. It is concluded that there is little evidence to suggest that in a modern paediatric setting, admission to hospital has any significant effect on the child's subsequent behavioural pattern. Also see 69.

37. Fergusson, D.M., Horwood, L.J. The trait and method components of ratings of conduct disorder - Part I. Maternal and teacher evaluations of conduct disorder in young children. **Journal of Child Psychology and Psychiatry**, 1987; 28(2): 249-260.

Presents a theoretical model designed to estimate the trait and method specific components of maternal and teacher ratings of childhood conduct disorder. Application of the model to data at six and seven years produced evidence which indicated that maternal and teacher ratings of childhood behaviour were contaminated by method variance. Estimates showed that one third of the variance in these scores reflected variance attributable to child behaviour traits. When the data were adjusted for the effects of method specific factors, the model suggested that conduct disorder measures were highly stable over time.

38. Fergusson, D.M., Horwood, L.J. The trait and method components of ratings of conduct disorder - Part II. Factors related to the trait component of conduct disorder scores. **Journal of Child Psychology and Psychiatry**, 1987; 28(2): 261-272.

Using the statistical model outlined in Part I (see 37) the analysis gives estimates of the correlations between the trait components of maternal and teacher conduct disorder scores taking into account the effects of both systematic and random errors of measurement. Three major correlates of the trait component of conduct disorder are identified: the child's sex; family social position; and changes of parents. It is concluded that the relationships between observed conduct disorder scores and variables of interest are embedded in a complex set of associations which include systematic and random errors of measurement.

39. Fergusson, D.M., Horwood, L.J. Estimation of method and trait variance in ratings of conduct disorder. **Journal of Child Psychology and Psychiatry**, 1989; 30(3): 365-378.

Extends two previous analyses of conduct disorder at six and seven years (see 37, 38) and fits a structural equation model to data for the seven, eight and nine year period. On the basis of the fitted model it was estimated that between 28% and 40% of the variance in maternal and teacher ratings was ascribable to variations in the child's generalised behavioural tendencies and the remaining variance to either method-specific factors or random errors of measurement. In addition, it was found that when method effects were taken into account, the

trait component of conduct disorder scores was very stable and the correlation between measures taken at adjacent years was estimated to be in the region of +0.90.

## B.2 Breastfeeding and Cognitive Development

Also see: 9, 10, 14, 15, 16

40. Fergusson, D.M., Beautrais, A.L., Silva, P.A. Breastfeeding and cognitive development in the first seven years of life. **Social Science and Medicine**, 1982; 16(9): 1705-1708.

Examines the relationship between breastfeeding practices and childhood intelligence and language development at ages three, five and seven years for the birth cohort of children being studied in the Dunedin Multidisciplinary Child Development Study. The results showed that even when a number of control factors were taken into account, there was a tendency for breastfed children to have slightly higher test scores than bottlefed infants. It is concluded that breastfeeding may be associated with very small improvements in intelligence and language development or, alternatively, that the differences may have been due to the effects of other confounding factors not entered into the analysis.

41. Fergusson, D.M., Horwood, L.J., Shannon, F.T. Breastfeeding and subsequent social adjustment in six-to-eight-year-old children. **Journal of Child Psychology and Psychiatry**, 1987; 28(3): 379-386.

Examines the relationship between breastfeeding practices and measures of conduct disorder. While there were significant associations between the duration of breastfeeding and ratings of conduct disorder at the bivariate level, when errors of measurement and confounding factors were accounted for, the correlations between breastfeeding and measures of conduct disorder tended to become both small and statistically non-significant. It is concluded that the analysis provides no evidence to suggest that breastfeeding makes a major contribution to the subsequent social adjustment of children.

## B.3 Lead and Cognitive Development

Also see: 83, thesis 3

42. Fergusson, D.M., Fergusson, J.E., Horwood, L.J., Kinzett, N.G. A longitudinal study of dentine lead levels, intelligence, school performance and behaviour Part I. Dentine lead levels and exposure to environmental risk factors. **Journal of Child Psychology and Psychiatry**, 1988; 29(6): 781-792.

First paper in a series of three which examines the relationships between body lead burden and behavioural/cognitive development. Describes the process of

data collection and gives the distribution of dentine lead values in the sample. In addition, the relationships between dentine lead values and a number of variables - social background, residence in old weatherboard housing, residence on busy roads, pica - describing exposure to sources of lead, are analysed. All factors proved to make significant contributions to variations in dentine lead values and the implications of the results are discussed.

43. Fergusson, D.M., Fergusson, J.E., Horwood, L.J., Kinzett, N.G. A longitudinal study of dentine lead levels, intelligence, school performance and behaviour Part II. Dentine lead and cognitive ability. **Journal of Child Psychology and Psychiatry**, 1988; 29(6): 793-809.

Second paper in a series of three which examines the relationship between body lead burden and behavioural/cognitive development. Results show small, consistent and stable correlations between dentine lead measures and all measures of cognitive ability including intelligence, word recognition and teacher ratings of school performance. After adjustment for the effects of confounding covariates, sample selection factors, and possible reverse causal effects, the correlations between intelligence and dentine lead levels became non-significant. However, small but statistically significant correlations persisted between dentine lead levels and all measures of school performance after adjustment for confounding factors. It is concluded that low level lead exposure may have deleterious effects on levels of scholastic achievement in children.

44. Fergusson, D.M., Fergusson, J.E., Horwood, L.J., Kinzett, N.G. A longitudinal study of dentine lead levels, intelligence, school performance and behaviour Part III. Dentine lead levels and attention/activity. **Journal of Child Psychology and Psychiatry**, 1988; 29(6): 811-824.

Third paper in a series of three which examines the relationship between body lead burden and behavioural/cognitive development. Results show small but relatively consistent and stable correlations between dentine lead measures and inattentive/restless behaviour. However, after control for various confounding factors there was only a small, but statistically significant, correlation between lead levels and inattentive/restless behaviour. It is concluded that there is a very weak causal association between lead levels and attention/activity levels in children.

## B.4 Life Events

45. Beautrais, A.L., Fergusson, D.M. Shannon, F.T. Family life events and behaviour problems in preschool-aged children. **Pediatrics**, 1982; 70(5): 774-779.

Results from this study show that mothers experiencing a large number of life events reported higher rates of child-rearing problems. The correlation between

family life events and child-rearing problems persisted when a number of family and social background factors were taken into account. Discusses possible explanations for the relationship between family life events and maternal reports of child-rearing problems.

46. Fergusson, D.M., Horwood, L.J., Shannon, F.T. Relationship of family life events, maternal depression, and child-rearing problems. **Pediatrics**, 1984; 73: 773-776.

Results showed that rates of child-rearing problems steadily increased with both increasing levels of family life events and maternal depressive symptoms. Further analysis suggested that the apparent correlation between family life events and reports of child-rearing problems was mediated by the effects of maternal depression, so that women subject to large numbers of adverse life events suffered increased rates of depression and in turn reported higher rates of problem behaviour in their children. There was no significant correlation between family life events and reports of child-rearing problems when the effects of maternal depressive symptoms were taken into account. It is concluded that the association between family life events and child-rearing problems arises because life events provoke depressive symptoms in women, and in turn, this alters the way in which they perceive or evaluate their child's behaviour.

47. Fergusson, D.M., Horwood, L.J., Gretton, M.E., Shannon, F.T. Family life events, maternal depression, and maternal and teacher descriptions of child behaviour. **Pediatrics**, 1985; 75(1): 30-35.

Extends a previous analysis of the relationship between family life events, maternal depression, and child-rearing problems (see 46) by including teacher descriptions of child behaviour. The findings suggest that family life events increase rates of maternal depression with the result that stressed, depressed women tend to see their children in a more negative light. However, independent of this, family life events make a small but significant contribution to the variability in child behaviour. In addition, the results suggest that whereas short term family crises may have little impact on child behaviour, the effect of a consistent history of adversity in the child's family may be more marked.

48. Fergusson, D.M., Horwood, L.J. Life events and depression in women: A structural equation model. **Psychological Medicine**, 1984; 14: 881-889.

Examines the reciprocal relationship between life event reports and depressive symptoms in the mothers of children in the study. The findings suggest that reports of life events are influenced by depressive symptoms, however, even when this tendency is taken into account, the major causal pathway appears to be from life events to depressive symptoms. It is concluded that it is unlikely

that the life events/depression correlation can be explained simply by a tendency for depressed women to over-report life events.

49. Fergusson, D.M., Horwood, L.J. The effects of test reliability on relationships between measures of life events and depression. **Social Psychiatry**, 1986; 21: 53-62.

Extends a previous paper which presented a structural equation model of the relationship between life events and depression (see 48) by including estimates of test reliability in the modelling process. The results show that the life event inventory was of low-to-modest reliability. When test reliability was taken into account, the structural equation model suggested a uni-directional pattern of causation, in which life event measures influenced depression measures. Concludes by discussing various theoretical implications of the findings.

50. Fergusson, D.M., Horwood, L.J. Vulnerability to life events exposure. **Psychological Medicine**, 1987; 17: 789-799.

Utilises a structural equation model which is designed to estimate the extent to which common vulnerability factors influence levels of life event exposure. The analysis suggests that in the region of 30% of the variance in life event reports over a six-year period was attributable to a common vulnerability factor. Modelling of this vulnerability factor suggested that two major determinants of vulnerability to life events were the level of social disadvantage of the woman and her level of neuroticism: women of socially disadvantaged backgrounds and women with high neuroticism scores showed a consistent tendency to report high life event exposure. Concludes with a discussion of the implications of the findings.

## B.5 Minor Psychiatric Symptoms

51. Horwood, L.J., Fergusson, D.M. Neuroticism, depression and life events: A structural equation model. **Social Psychiatry**, 1986; 21: 63-71.

Utilises a structural equation modelling approach which attempts to estimate the effects of both random and systematic errors of measurement on the correlation between neuroticism and depressive symptoms. The analysis suggests that simple correlations between neuroticism and depression measures are strongly biassed upward as a result of systematic errors of measurement. Further, there were consistent correlations between neuroticism measures, corrected for random and systematic measurement error, and life events scores, indicating that subjects who scored high on neuroticism had a greater susceptibility to adversity. Concludes with a discussion of the implications of the approach for understanding the relationships between measures of personality traits and psychopathology.

52. Fergusson, D.M., Horwood, L.J., Lawton, J.M. The relationship between neuroticism and depressive symptoms. **Social Psychiatry and Psychiatric Epidemiology**, 1989; 24: 275-281

Presents a structural equation model designed to estimate the reciprocal associations which may exist between mental state and personality trait variables. The fitted model suggests that while measures of neuroticism are contaminated by the effects of short term mental state on the reporting of personality, there is still a fairly substantial relationship between trait neuroticism and reports of depressive symptoms.

53. Duncan-Jones, P., Fergusson, D.M., Ormel, J.H., Horwood, L.J. A model of stability and change in minor psychiatric symptoms: results from three longitudinal studies. **Psychological Medicine**, 1990, Monograph Supplement 18, 1-18.

Presents a statistical model designed to estimate the contributions of stable and changing symptomatology to levels of minor psychiatric symptoms. The model is fitted to data obtained from the Christchurch Child Development Study and two overseas longitudinal studies - one Australian, one Dutch. Data from all three data sets were shown to fit the proposed model adequately. All three studies showed evidence of strong correlations between stable levels of symptomatology and the measure of trait neuroticism. It is concluded that neuroticism may be little more than a way of measuring the subject's characteristic level of minor psychiatric symptoms.

## C. COMMUNITY HEALTH SERVICES AND THEIR UTILISATION

### C.1 Medical Insurance

54. Fergusson, D.M., Horwood, L.J. Health insurance amongst families with school-aged children. **New Zealand Medical Journal**, 1985; 98: 435-438.

Results for the families in the study show that there has been a rapid increase in private medical insurance: in 1977 an estimated 18% of families had coverage, and by 1984 this figure had risen to 43%. Levels of coverage were correlated with a large number of family social background factors, however, multivariate analysis suggested that the primary determinants of insurance coverage were earning power and family structure. Concludes by discussing the social implications of the findings.

55. Fergusson, D.M., Horwood, L.J. Private medical insurance and elective surgery during early childhood. **New Zealand Medical Journal**, 1985; 98: 538-540.

Examines the relationship between private medical insurance coverage and rates of elective ear, nose and throat (ENT) surgery by the age of seven years. Results show that private medical insurance coverage was associated with differences in patterns of elective surgery with children whose families were covered by insurance being more likely to receive elective ENT surgery and far more likely to receive this treatment in a private hospital. These trends persisted when the child's history of ear/throat infections and family social/economic background were taken into account statistically. It is concluded that the results provide a clear example of the way in which a dual system of funding may produce distortions in patterns of health care delivery.

56. Fergusson, D.M., Horwood, L.J., Shannon, F.T. Reasons for holding health insurance: a study of a group of Christchurch families. **New Zealand Medical Journal**, 1986; 99: 371-373.

Examines the reasons for holding private medical insurance in the sample of 495 insured families within the study. Where health insurance was not provided by an employer - two thirds of cases - there were two major reasons for holding insurance: health insurance helped families meet medical bills; and insurance provided families with access to immediate health care if it was needed. A minority (24%) of those holding health insurance believed that public sector services were inadequate to provide health care, but only 9% of families were able to cite some specific shortcoming of public sector services which had impelled them to take out insurance cover. It is concluded that the rapid rise of private health insurance in New Zealand is a resultant of the net effects of three factors: promotional activities of insurance companies; declining real contribution of state health care funding; and the effects of growing public uncertainty about the quality of public sector health care services.

57. Fergusson, D.M., Horwood, L.J., Shannon, F.T. Medical insurance and childhood general practitioner contacts. **New Zealand Medical Journal**, 1989; 102: 609-610.

Examines the relationship between the duration of medical insurance coverage and rates of general practitioner consultations for morbidity, during the period from birth to ten years. Results show that children from insured families had higher consultation rates even when due allowance was made for known social/economic factors correlated with the ownership of insurance. Children from families that had been insured throughout the ten year study period made a mean of nine more general practitioner consultations than children from uninsured families. It is concluded that the presence of private medical insurance encourages the development of inequalities in childhood access to health care, with children from insured families having greater access to care than children from uninsured families.

## C.2 Utilisation of Health Services

58. O'Donnell, J.L., Fergusson, D.M., Horwood, L.J., Shannon, F.T. Health care in early infancy. **New Zealand Medical Journal**, 1978; 88: 315-317.

Examines the pattern of illness and health care during the first sixteen weeks of life of the cohort. Children from relatively disadvantaged families had a significantly lower incidence of immunisation at sixteen weeks of age and also had a lower likelihood of receiving routine postnatal care. Concludes by discussing a number of policy changes which might improve the distribution of health care resources.

59. Shannon, F.T., Fergusson, D.M., Clark, M.A. Immunisation in the first year of life. **New Zealand Medical Journal**, 1980; 91: 169-171.

Examines the immunisation history of the cohort with respect to the three month and five month triple vaccine (diphtheria, tetanus, whooping cough) and oral poliomyelitis. Results show that over 10% of the infants received either no immunisation, incomplete immunisation, or late immunisation during the first year of life. Failure to provide the child with the recommended course of immunisation was most common amongst families of non-European ethnic origin, single parent families and families with depressed living standards.

60. Fergusson, D.M., Horwood, L.J., Beautrais, A.L., Shannon, F.T. Health care utilisation in a New Zealand birth cohort. **Community Health Studies**, 1981; 5(1): 53-60.

Examines the relationship between preventive health care utilisation rates and family social background for the period from birth to two years. Results show a highly significant association between social background and the utilisation of preventive health care. Factors found to reduce preventive health care utilisation included: mother of non-European ethnicity; single parent family; low maternal education; high residential mobility; and large family size. Maternal age and family income were unrelated to health care utilisation when other variables were taken into account. Concludes with a discussion of the theoretical and practical implications of the results.

61. Beautrais, A.L., Fergusson, D.M., Shannon, F.T. Use of preschool dental services in a New Zealand birth cohort. **Community Dentistry and Oral Epidemiology**, 1982; 10: 249-252.

Examines the utilisation of preschool dental services for the period from birth to four years. Results show a highly significant association between the non-utilisation of dental care services and family social background. Factors associated with increased risks of non-utilisation of dental services included: mother of non-European ethnicity; low gross family income; single parent

family; non-attendance at preschool education facilities; failure to attend community nurse services; and a lower utilisation of routine child health care services. The implications of the non-utilisation of preschool dental care are discussed in the context of the more general problem of providing an adequate and equitable standard of health care for children.

62. Fergusson, D.M., Dimond, M.E., Horwood, L.J., Shannon, F.T. The utilisation of preschool health and education services. **Social Science and Medicine**, 1984; 19(11): 1173-1180.

Extends two previous analyses of the utilisation of health (see 60) and dental (see 61) services to incorporate examination of the utilisation of preschool education services for the period from birth to five years. Overall patterns of service (health, dental, education) utilisation show the presence of considerable inequities, with children in the lowest 8% of the distribution receiving seven or fewer of the available services, in contrast to the children in the top 8% of the distribution who received in excess of 15 services. Multivariate analysis suggested that the child's family social background and family composition made the largest direct contributions to variations in rates of service utilisation. It is concluded that the findings exemplify the way in which well intentioned social policies may emphasise rather than eliminate inequities in the care received by children.

## C.3 Community Health Services and their Utilisation: General Aspects

63. Fergusson, D.M., Beautrais, A.L., Shannon, F.T. Maternal satisfaction with primary health care. **New Zealand Medical Journal**, 1981; 94: 291-294.

Examines maternal reactions to child health care services for the period from birth to three years. Most mothers were well satisfied with the service provided by their family doctor but mothers were less satisfied with the service provided by the Plunket nurse, with 13% feeling dissatisfied. The results include a detailed breakdown of the areas of satisfaction and dissatisfaction with child health care services. A large majority of mothers favoured some form of compulsory system of routine child health care and the implications of this finding are discussed.

64. Fergusson, D.M., Horwood, L.J., Shannon, F.T. Attitudes of mothers of five-year-old children to compulsory child health provisions. **New Zealand Medical Journal**, 1983; 96: 338-340.

Examines maternal attitudes to the following compulsory child health provisions: the introduction of car seat restraint legislation; compulsory fencing of domestic swimming pools; the linking of child health care provisions to family benefit payments; and the desirability of water fluoridation. Overall, mothers showed strong support for the introduction of compulsory methods for

protecting child health. Concludes with a discussion of the implications of the findings for the introduction of compulsory child health provisions.

65. Fergusson, D.M., Horwood, L.J., Shannon, F.T. Patient perceptions of general practitioner fees. **New Zealand Medical Journal**, 1989; 102: 286-288.

Results from this survey of parental attitudes to general practitioner fees when the children were eleven, show that most parents thought that fees were too high. Over half of the parents thought child fees were too high, and over two thirds thought adult fees were too high. Results show that as the fee level charged increased, so too did the likelihood that the fee would be described as too high. Comparison of the fees paid by this cohort in 1980, with fees in 1988, indicated that child fees had increased at an average rate of 24% per annum during this period. Concludes with a discussion of the implications of these findings for health care delivery, and an examination of the possible impact of increases in GMS benefits on levels of dissatisfaction with fees.

## D FAMILY, SOCIAL ENVIRONMENT AND EDUCATION

### D.1 Family Background and Childhood Disadvantage

66. Fergusson, D.M., Horwood, L.J., Shannon, F.T. Birth placement and childhood disadvantage. **Social Science and Medicine**, 1981; 15E: 315-326.

Examines the relationship between birth placement and measures of childhood disadvantage for the period from birth to three years of age. Results show that children who entered single parent families at birth were subject to a systematic pattern of disadvantage, including poor preventive health care, greater risks of morbidity, depressed living standards, and greater family instability. Multivariate analysis showed that the apparent correlation between the child's birth placement and measures of childhood disadvantage, arose from the presence of a variety of conditions which were more prevalent in single parent families. These included: low income; greater frequency of changes of residence; problems and difficulties with child-rearing; adverse life events; and low maternal education level. The collective effect of the adverse conditions present for single parent families, was to produce a situation in which children in these families were disadvantaged when compared with children from two parent and adopted families. Concludes with a discussion of the implications of the findings.

67. Fergusson, D.M., Horwood, L.J., Shannon, F.T. Family ethnic composition, socio-economic factors and childhood disadvantage. **New Zealand Journal of Educational Studies**, 1982; 17(2): 171-179.

Examines the relationship between family ethnic composition, socio-economic factors, and measures of childhood disadvantage for the period from birth to

three years. Results show that measures of disadvantage vary systematically with the ethnic composition of the child's family: children with two Maori or Pacific Island parents were subject to the greatest disadvantage and children with two Pakeha parents to the least disadvantage; children with one Pakeha and one Maori or Pacific Island parent fell between these extremes. While statistical control for a series of social and economic factors reduced these differences, a significant relationship between family ethnicity and childhood disadvantage remained. Concludes with a discussion of the ways by which the disadvantage experienced by the Maori or Pacific Island child can be reduced or eliminated.

68. Fergusson, D.M., Horwood, L.J. Childhood disadvantage and the planning of pregnancy. **Social Science and Medicine**, 1983; 17: 1223-1227.

Examines the relationship between planning of pregnancy and subsequent childhood disadvantage in the areas of health, education, and family conditions, for the period from birth to three years. Unplanned children showed a systematic pattern of disadvantage in nearly all areas studied. However, multivariate analysis suggested that the apparent association between the planning of pregnancy and subsequent childhood disadvantage arose from a series of social and contextual factors associated with pregnancy planning practices. It is concluded that when the effects of maternal social background and the nuptial status of the child are taken into account, the effects of planning of pregnancy on levels of childhood disadvantage for this cohort were almost negligible.

Also see: 75, 76.

69. Fergusson, D.M., Horwood, L.J., Shannon, F.T. Social and family factors in childhood hospital admission. **Journal of Epidemiology and Community Health**, 1986; 40(1): 50-58.

Examines the relationship between social, economic, and family life event measures, and rates of hospital admission during the period from birth to five years. Both family social background and family life events made a significant contribution to the variability in the risk of hospital admission. However, economic factors made no significant contribution to rates of admission when the correlated effects of family social background and life events were taken into account. The effects of family life events on risks of admission appeared to be far more marked than the effects of family social background. Concludes with a discussion of possible explanations for the consistent association between life events and rates of morbidity during early childhood.

Also see 36.

## D.2 Family Breakdown/Stability

70. Fergusson, D.M., Horwood, L.J., Shannon, F.T. A proportional hazards model of family breakdown. **Journal of Marriage and the Family**, 1984; 46(3): 539-549.

Examines the rates of family breakdown during the period from birth to five years. Rates of family breakdown were related to a series of family formation and social factors using the proportional hazards model, and this showed marked differences in rates of breakdown on the basis of the characteristics of the child's family. The analysis showed that rates of breakdown were highest for children whose parents were in a de facto marriage, children with young parents, children whose parents had been married a short time at the birth of the child, unplanned children, and children in large families. Concludes by discussing various theoretical and empirical implications of the results.

71. Fergusson, D.M., Horwood, L.J., Dimond, M.E. A survival analysis of childhood family history. **Journal of Marriage and the Family**, 1985; 47: 287-295.

Examines changes in family placement for the cohort during the period from birth to six years. The results show considerable complexity in family history, with parental separation, reconciliation, or remarriage occurring with a high frequency. Overall, the findings suggest that once children left the traditional two-parent family, there was a strong possibility that they would be exposed to multiple situations involving both marriage formation and breakdown. Concludes by discussing the implications of the findings.

72. Fergusson, D.M., Horwood, L.J., Lloyd, M. The effect of preschool children on family stability. **Journal of Marriage and the Family**, 1990; 52(2): 531-538.

Examines the association between the number of preschool children in a family and rates of family breakdown for the period from birth to ten years. The analysis shows that with increasing levels of exposure to preschool children the risk of family breakdown decreased significantly. This association remained statistically significant when a range of confounding factors were controlled. It is concluded that the findings verify previous research which has suggested that the presence of preschool children in the family acts as a protective factor which reduces risks of family breakdown.

## D.3 Education

73. Fergusson, D.M., Horwood, L.J., Dimond, M.E. Who doesn't get to preschool? **New Zealand Journal of Educational Studies**, 1984; 19(1): 79-82.

Examines the utilisation of preschool education services for the period from birth to five years. By the age of five, 95% of the children had received some

period of preschool education. However, the level of participation in a continuous period of preschool education from age three to five was substantially lower, with less than a third of the children receiving such experience. Analysis of the social, familial, and other characteristics of children failing to receive consistent preschool education, suggested an "inverse care" relationship: those children who would most benefit from continuous preschool education were in fact those least likely to receive it. Concludes with a discussion of the implications of the findings.

74. Fergusson, D.M., Horwood, L.J., Shannon, F.T. Absenteeism amongst primary school children. **New Zealand Journal of Educational Studies**, 1986; 21(1): 3-12.

Examines school absenteeism amongst the cohort at eight years of age. Factors associated with high absenteeism included: high rate of medical contact; disadvantaged social background; Maori or Pacific Island ethnicity; low maternal education level; and depressed material living standards. In addition, children with high rates of absenteeism tended to be at greater risk of poor school performance. The findings suggest that inequalities operating at the preschool level continue into the school system, with the children who are at high risk of educational problems being the same children who are likely to have frequent school absences.

## D.4 Planning of Pregnancy, Nuptial Status, and Single Parenthood

75. Fergusson, D.M., Horwood, L.J., Wright, R., Stewart, L.R. Factors associated with planned and unplanned nuptial births. **New Zealand Medical Journal**, 1978; 88: 89-92.

Unplanned pregnancy was found to be a relatively common event (30.4%) but there was little evidence that unplanned children were unwanted. There was also no evidence to suggest that unplanned births were related to poor education, low socio-economic status or lack of knowledge of contraception. A large proportion (40%) of unplanned births were the result of contraceptive failure, in particular the failure or breakdown in the woman's usage of the contraceptive pill.

76. Fergusson, D.M., Horwood, L.J., Shannon, F.T. Factors associated with ex-nuptial birth. **New Zealand Medical Journal**, 1979; 89: 248-259.

Examines the background to 210 live ex-nuptial births to the mothers of children in the study. The results show that there is considerable variation in the factors associated with ex-nuptial birth, specifically: 47.6% of the children had been conceived within cohabiting situations; nearly one in five ex-nuptial children were the result of a planned pregnancy; one quarter of unplanned ex-nuptial pregnancies were the result of contraceptive failure and three quarters

were the result of contraceptive non-usage. In addition, maternal reactions to the birth and pregnancy varied with the mother's situation: cohabiting mothers reported considerably less adverse reaction to the birth than did non-cohabiting mothers.

77. Fergusson, D.M., Horwood, L.J. The adequacy of the Domestic Purposes Benefit for women with young infants. **New Zealand Social Work**, 1978; 2: 25-30.

Results show that of the 1199 mothers interviewed at four months, a total of 75 (6.3%) were receiving the Domestic Purposes Benefit or an equivalent benefit. Interviewer ratings of family living standards suggested that in about two thirds of cases the benefit level was sufficient to ensure average or better living standards. In addition, 71% of beneficiaries said that the benefit level was sufficient to meet their everyday living costs. However, mothers who were paying significantly higher rentals and those living alone, were more likely to report that the benefit level was inadequate. Concludes by discussing the implications of the findings for policies regarding the Domestic Purposes Benefit.

78. Fergusson, D.M. Annotation: Single parent families. **Australian Paediatric Journal**, 1984; 20: 169-170.

The rapid increase in the number of children in single parent families has raised a large number of issues about the health and well-being of children in these families. This annotation provides a brief summary of some of these issues within the framework of modern paediatrics.

## D.5 Family, Social Environment, and Education: General Aspects

79. Fergusson, D.M., Beautrais, A.L., Horwood, L.J., Shannon, F.T. Working mothers and daycare. **New Zealand Journal of Educational Studies**, 1981; 16(2): 168-176.

Examines maternal workforce participation and utilisation of daycare facilities during the period from birth to three years. By three years nearly half of the mothers had worked in paid employment and typically this took the form of part-time employment. Maternal response to questioning regarding satisfaction with participation or non-participation in the workforce suggested that, for the majority, participation in the workforce was secondary to their primary role of motherhood and child-rearing. In addition, the results suggested that the absence of daycare facilities was not seen as a major problem by the mothers in the study. It is concluded that calls for the greater provision of childcare facilities need to be treated with some caution.

80. Fergusson, D.M., Horwood, L.J., Kershaw, K.L., Shannon, F.T. Factors associated with reports of wife assault in New Zealand. **Journal of Marriage and the Family**, 1986; 48(2): 407-412.

Examines factors associated with reports of wife assault for the mothers of children in the cohort, during the period from two to seven years. Results show that wife assault occurred at a rate of 2% to 3% per year, with approximately 8.5% of wives reporting assault during the six year period. Analysis of factors associated with wife assault suggested that risks of assault are significantly increased in families in which there has been a lack of planning and foresight about family formation, and among families which are socially disadvantaged.

## E. METHODOLOGY AND MEASUREMENT

### E.1 Measurement

81. Fergusson, D.M., Horwood, L.J. The measurement of socio-economic status for 1109 New Zealand families. **New Zealand Journal of Educational Studies**, 1979; 14: 58-60.

Examines the measurement of socio-economic status (SES) in New Zealand by utilising data from the study. Analysis of the Elley/Irving scale suggested that the scale is an adequate measure of SES for use in the social sciences, but it fails to provide a comprehensive measure of the variability of social and economic conditions within New Zealand families. Results of a factor analysis suggested that a more adequate measure can be obtained by using a series of multiple indicators of SES, which measure both variability in material well-being and individual occupational and educational achievement. It is concluded that there is no one "best" method of measuring SES but rather the choice of method depends on overall intentions and available resources.

82. Fergusson, D.M., Horwood, L.J., Beautrais, A.L. The measurement of family material well-being. **Journal of Marriage and the Family**, 1981: 43: 715-725.

Reports on the development of measures of family material well-being based on observations of ownership and consumption behaviour in the families at one year. Results from factor analysis suggested that the material well-being of families could be measured along two distinct yet correlated dimensions: the level of family ownership, and the amount of economising behaviour the family was required to undertake. Concludes with a discussion of the advantages of direct measures of family material well-being over the traditional alternatives of income, expenditure, or family budget information.

83. Fergusson, D.M., Kinzett, N.G., Horwood, L.J. A longitudinal study of dentine lead levels and intelligence, school performance and behaviour the measurement of dentine lead. **Science of the Total Environment**, 1989; 80: 229-241.

Examines the measurement of dentine lead by analysis of shed deciduous teeth which were obtained from the cohort during the period from six to eight years. Estimates showed that between 15% and 20% of the variance in dentine lead values was attributable to random errors of measurement. In addition, dentine lead levels were influenced by small systematic errors of measurement arising from the age at which the tooth was collected and the type of tooth analysed. However, these sampling factors accounted for less than 3% of the variance in dentine lead values. Concludes by discussing the implications of the findings for the interpretations of correlations between lead levels and other variables.

Also see: 42, 43, 44.

84. Lawton, J.M., Fergusson, D.M., Horwood, L.J. Self-esteem and defensiveness: an analysis of the self-esteem inventory. **Psychological Reports**, 1989; 64: 1307-1320.

Examines the relationship between the self-esteem and defensiveness scales of the Coopersmith Self-Esteem Inventory using data on the cohort at age ten. Confirmatory factor analysis suggested that the data were consistent with an hierarchical model in which the observed self-esteem scores were fallible indicators of self-esteem in four specific areas of experience. Model estimates showed that between 28% and 54% of the variance in the self-esteem indicators arose from random errors of measurement, and a further 1% to 3% was due to the effects of defensiveness. It is concluded that confirmatory factor analytic methods should be used in further analyses of the relationship between self-esteem and other variables.

Also see: thesis 2.

## E.2 Statistical Modelling

85. Fergusson, D.M., Horwood, L.J. A Markovian model of childhood family history. **Journal of Mathematical Sociology**, 1983; 9(2): 139-155.

Presents a Markovian model designed to predict changes in childhood family history during the first four years for the cohort. Comparisons of the process of family change for children who entered de jure married two parent families, de facto married two parent families, and single parent families at birth, showed marked variations in the stability of childhood family situations. Concludes with a discussion of the empirical and theoretical implications of the model and its application to the cohort data.

86. Fergusson, D.M., Horwood, L.J. Structural equation modelling of measurement processes in longitudinal data. In M. Rutter (ed). **Studies of Psychosocial Risk: The Power of Longitudinal Data**. Cambridge University Press, 1988; 325-353.

Presents an introduction to the use of structural equation modelling methods in dealing with problems of measurement which recur in longitudinal data. Modelling is illustrated by using data from the study on the frequency of maternal depressive symptoms. Concludes with a discussion of the advantages and limitations of structural equation models.

Also see: thesis 1.

87. Fergusson, D.M., Horwood, L.J. A latent class model of smoking experimentation in children. **Journal of Child Psychology and Psychiatry**, 1989; 30(5): 761-773.

Presents a latent class model to estimate the accuracy of reports of child smoking behaviour. The model is fitted to data collected when the study children were nine. The analysis suggested that errors of measurement in reports of child smoking, largely arose from situations in which the children who had smoked described themselves as non-smokers. The consequences of this false reporting are shown to lead to an under-estimation of the prevalence of smoking experimentation, and an under-estimation of the strength of association between maternal and child smoking.

## APPENDIX A

### Papers Submitted and Awaiting Publication Decisions

Fergusson, D.M., Horwood, L.J., Lawton, J.M. Vulnerability to childhood problems and family social background.

Lloyd, M., Fergusson, D.M., Horwood, L.J. A longitudinal study of maternal participation in the full-time workforce: Part I. Entry into the full-time workforce.

Lloyd, M., Fergusson, D.M., Horwood, L.J. A longitudinal study of maternal participation in the full-time workforce: Part II. Exit from the full-time workforce.

Fergusson, D.M., Lloyd, M., Horwood, L.J. Family ethnicity, social background and scholastic achievement: an eleven year longitudinal study of a sample of Christchurch born children.

Fergusson, D.M., Horwood, L.J., Lloyd, M. Confirmatory factor models of attention deficit and conduct disorder.

Fergusson, D.M., Horwood, L.J., Lloyd, M. Teacher evaluations of the performance of boys and girls.

## APPENDIX B

### Unpublished Theses

1. Horwood, L.J. Aspects of the Theory and Methodology of Covariance Structure Modelling with Applications to Social Science Data. Unpublished M.Sc. thesis, University of Canterbury (Statistics), 1987.

2. Lawton, J.M. The Structure and Correlates of the Coopersmith Self-Esteem Inventory. Unpublished M.Sc. thesis, University of Canterbury (Psychology), 1988.

3. Fergusson, D.M. A longitudinal Study of Dentine Lead, Cognitive Ability and Behaviour in a Birth Cohort of New Zealand Children. Unpublished Ph.D. thesis, University of Otago (Paediatrics), 1988.

## APPENDIX C

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