

This is a PREPRINT of an article published in: Fergusson DM, Lynskey MT, Horwood LJ. AIDS knowledge and condom use in a birth cohort of 16 year olds. *New Zealand Medical Journal*, 1994; 107: 480-483.

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## **AIDS Knowledge and Condom Use in a Birth Cohort of 16 Year Olds**

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## Abstract

**AIMS:** The aims of this study were to examine levels of AIDS knowledge and contraceptive practices in a birth cohort of 16 year old Christchurch born children.

**METHODS:** The study was based on the birth cohort of young people participating in the Christchurch Health and Development Study. At age 16 years 953 subjects were questioned about: (a) levels of AIDS knowledge using a 16 item AIDS knowledge questionnaire; (b) rates of sexual activity; (c) patterns of contraceptive use.

**RESULTS:** Members of this cohort had a generally very high knowledge of AIDS with 92% of the sample responding correctly to 14 or more of the 16 AIDS knowledge questions. Just over a quarter of this sample were sexually active during their 16th year and it was estimated that condoms were used in 59% of all sexual acts reported by sample members. There was a clear tendency for rates of condom use to decline with increasing sexual experience with this decline being due to the fact that as teenagers become more sexually experienced condoms were progressively replaced by other contraceptive methods. Those with high levels of AIDS knowledge used condoms at a higher rate of those with low levels of AIDS knowledge even when due allowance was made for the frequency of sexual activity and other potentially confounding factors.

**CONCLUSIONS:** The results of this study suggest that publicity and education about AIDS has been successful in producing high levels of knowledge about this condition in this cohort. However, this knowledge was not directly translated into high levels of condom use largely as a result of the fact that as teenagers became increasingly sexually experienced there was a tendency for condom use to be replaced by other methods of contraception and notably the contraceptive pill.

In recent years there have been concerns with developing public health policies to reduce risks of HIV infection and AIDS (1-3). One aspect of these concerns has focussed on providing protection to adolescent and young adult populations (4-6). This has resulted in increasing public campaigns and education to increase awareness of HIV and AIDS, to promote the use of condoms as a means of reducing the risk of sexually transmitted HIV, and to provide adolescent and young adult populations with easier access to condoms. While there have been continuing campaigns to promote both AIDS awareness and AIDS prevention amongst young populations, the extent to which these methods have been effective in increasing awareness of AIDS and leading to safer sex practices in New Zealand has not been fully evaluated. This issue has, however, been examined by Dickson et al. (7) in a group of Dunedin 18 year olds studied in 1991. These authors presented a generally pessimistic evaluation of the impact of AIDS education on the sexual practices of young people and noted that only 38% of the young women and 48% of the young men who were sexually active reported using condoms regularly.

The findings of the Dunedin study are, however, at variance with other New Zealand studies that have examined sexual practices in younger adolescent populations and have found high rates of condom use. For example, in a 1992 study of a birth cohort of Christchurch 15 year olds, Lynskey & Fergusson (8) found that 82% of those who were sexually active had used the condom while Lewis (9), in a 1986 study of Hutt Valley teenagers, found that 76% of sexually active females had used the condom.

Against this general background, this study reports on a study of AIDS knowledge and contraceptive practices in a sample of 16 year old Christchurch adolescents.

The aims of this study were:

1. To document the level of AIDS knowledge in a sample of 16 year old New Zealand adolescents.
2. To identify the social and other features associated with variations in AIDS knowledge.

3. To examine contraceptive practices (and particularly rates of condom use) amongst sexually active 16 year olds.

4. To examine the relationships between knowledge of AIDS and the use of condoms by sexually active adolescents.

### Method

The data described in this paper were gathered during the course of the Christchurch Health and Development Study. The Christchurch Health and Development Study is a longitudinal study of a birth cohort of 1265 Christchurch born children who have been studied at birth, four months, one year and annual intervals to the age of 16 years using a combination of methods including parental interviews, interviews with the young people, data provided by school teachers and information from official records including medical and police records. An overview of the design of this research has been provided previously (10). In 1993, when subjects were aged 16 years, the following measures were obtained.

1. AIDS knowledge. To measure levels of AIDS knowledge a series of 16 items were derived from the AIDS Knowledge Questionnaire developed by DiClemente et al. (11). The 16 items are shown in Table 1. The responses to this questionnaire were recorded by interviewers.

2. Sexual activity and contraceptive practices. At the age of 16 years the young people were questioned as to whether or not they had engaged in sexual intercourse within the preceding 12 months. If the respondents had been sexually active they were asked a series of further questions including: (a) the number of times they had engaged in sexual intercourse; (b) the number of times they had used some form of contraception and (c) the types of contraception they had used.

3. Covariates. To adjust any apparent correlations between sexual behaviours, knowledge of AIDS and contraceptive behaviours for potentially confounding factors

a series of control factors was used in the analysis. These variables comprised:

i) Measures of intelligence and scholastic achievement including: measures of intelligence based on the revised Weschler Intelligence Scale for Children (12); measures of reading comprehension based on the Progressive Achievement Tests (13) administered at 10 and 12 years of age; measures of mathematical reasoning based on the Progressive Achievement Tests (14) administered at 11 years and a measure of scholastic ability based on the Test of Scholastic Ability (15)

administered at 13 years.

ii) Measures of family and social factors including ethnicity, maternal age, maternal education, family size, socio-economic status and family stability.

iii) Measures of sexual experience and contraceptive knowledge including age of onset of sexual activity, frequency of intercourse, number of sexual partners and a measure of contraceptive knowledge based on the respondent's spontaneous recall and prompted recognition of different forms of contraception.

iv) Individual factors including gender and attention deficit and conduct disorder behaviours measured at age eight years using the Rutter (16) and Conners (17,18) parent and teacher questionnaires.

### Sample Size

Although the original cohort comprised 1265 children the analyses reported in this paper were based on a sample of 953 young people studied at the age of 16 years. This sample represents 75.3% of the original cohort and 85.8% of those cohort members still alive and resident in New Zealand.

### Results

#### Level of AIDS Knowledge

Table 1 shows the frequency of correct responses to a series of 16 items relating to AIDS knowledge derived from the questionnaire developed by DiClemente et al. (11). The Table shows that subjects had generally high levels of AIDS knowledge

and for most items over 90% gave the correct response. Levels of knowledge appeared to be similar for males and females, although females more often gave correct responses to the item on the effects of AIDS on the unborn child.

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INSERT TABLE 1 HERE  
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The distribution of correct responses to the 16 test items is shown in Table 2 and this confirms the impression conveyed by Table 1 that levels of knowledge were generally high. The Table shows that: just under half (46.9%) of the sample made correct responses to all items; levels of knowledge were similar for males and females; only 8% of the sample scored less than 14 on the test.

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#### Predictors of AIDS Knowledge

While Table 1 shows that levels of AIDS knowledge were generally high within the sample, there was some variation in knowledge levels. To examine the extent to which levels of AIDS knowledge were related to social, cognitive and other characteristics of the sample, the data were analysed using a multiple regression model in which levels of AIDS knowledge were regressed on a series of predictor variables. These predictors included: a) family and social factors; b) intelligence and school achievement; c) early behavioural adjustment and d) sexual experience and contraceptive knowledge. This analysis suggested that only two factors were predictive of variations in AIDS knowledge: the child's WISC-R IQ score at age eight years ( $p < .05$ ) and levels of reading comprehension at age 10 years ( $p < .001$ ) suggesting that, to some extent, variations in levels of AIDS knowledge reflected more general differences in levels of academic and cognitive ability. At the same

time the associations between cognitive test variables and AIDS knowledge were weak and the analysis suggested that those scoring in the lowest quartile of the distributions of IQ or reading comprehension scored between .5 to .9 points lower on the test of AIDS knowledge when compared with those having scores in the top quartiles of these distributions.

### Sexual Behaviours, Contraceptive Practices and AIDS Knowledge

Of the sample of 953 young people studied, 243 (25.5%) reported that they had been sexually active during the 12 month period preceding their 16th birthday. The contraceptive practices of the sexually active group are described in Table 3. This Table shows for males and females: the sample classified by frequency of intercourse; the rate of condom use per 100 reported acts; the rate of use of other contraceptive methods (principally the contraceptive pill) per 100 acts. The Table shows evidence of clear relationships between sexual experience and contraceptive practices:

1. For both males and females there was clear evidence to suggest that with increasing sexual experience there was declining use of condoms. Amongst males those reporting fewer than five sexual acts in the past year had an 87.3% rate of condom use compared to 61.2% for males who reported more than 50 acts. For females, those reporting fewer than five acts had an 85.4% rate of condom use compared to 44.6% for females reporting over 50 acts.
2. Conversely, for both males and females increasing frequency of intercourse was associated with increasing rates of use of contraceptive methods other than the condom. These methods comprised the contraceptive pill (85.5% of reports), the contraceptive injection (6.7%), the morning after pill (5.6%) and other methods including spermicide (2.1%).
3. There was consistent evidence to suggest that the rate of condom use was higher for sexually active males than for sexually active females. Sexually active males had

a rate of condom use of 65.5% per 100 acts compared to 56.2% per 100 acts for sexually active females ( $p < .001$ ). Overall 59.3% of reported acts involved the use of condoms.

4. The Table shows the apparently anomalous feature that the rates of condom use and other contraceptive use on occasions exceeded 100%. This feature is explained by the fact that a number of teenagers reported using multiple methods of contraception (typically both the pill and the condom) and thus the number of contraceptive methods used exceeded the number of acts of intercourse. Unfortunately, the method of questioning used did not record the number of occasions on which multiple methods were used but it was possible to obtain a lower limit estimate of this statistic by counting those individuals whose reported use of contraception exceeded the number of acts of intercourse. This estimate suggested that at least 22.2% of subjects who were sexually active used multiple methods of contraception on one or more occasions. Additionally, 23% of the sample reported having unprotected intercourse on at least one occasion in the last 12 months.

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 INSERT TABLE 3 HERE  
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#### The Association Between AIDS Knowledge and Contraceptive Use

Table 4 shows the mean rate of condom use related to levels of AIDS knowledge. In this Table the level of condom usage for each teenager was estimated by taking the ratio of his/her reported frequency of sexual acts involving the use of the condom to all reported acts. (Since the rates are computed for each individual and averaged across the sample, they are not directly comparable with the rates shown in Table 3 which shows the rates of condom use for the sample relative to the total number of acts reported by sample members).



The Table shows evidence of a clear relationship between mean rates of condom use and levels of AIDS knowledge. For both males and females increasing levels of AIDS knowledge were associated with increasing mean rates of condom use per 100 acts. In general, those with high levels of AIDS knowledge (16 correct responses) had mean rates of condom use that were between 1.5 to 1.7 times higher ( $p < .05$ ) than those with low levels of knowledge (less than 14 correct responses).

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INSERT TABLE 4 HERE  
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These results raise the possibility that the individual's level of AIDS knowledge, as reflected in their test score, may be causally related to levels of condom use. However, it is possible that this association arises from the effects of third or confounding factors that were associated with both AIDS knowledge and condom use. To explore this possibility the data were reanalysed using a regression model in which the rate of condom use was modelled as a function of the subject's level of AIDS knowledge and a series of potentially confounding variables. In all, 18 potential confounders were considered in the analysis and these fell into four broad groupings: (a) measures of sexual experience and contraceptive knowledge; (b) measures of academic ability and scholastic achievement; (c) measures of socio-demographic background; d) individual factors including gender and early behaviour.

Table 5 shows the relationship between levels of AIDS knowledge and condom use adjusted for the effects of confounding factors. The Table shows that the effects of adding confounders to the analysis were to reduce the strength of the association between AIDS knowledge and condom use somewhat but even after all confounders were considered there was still evidence of significant ( $p < .05$ ) relationships between AIDS knowledge and condom use: after adjustment for confounding factors, individuals with high levels of AIDS knowledge had rates of condom use that were

1.2 times higher than those with low levels of knowledge. Other significant predictors of condom use were frequency of intercourse ( $p < .0001$ ) and the individual's level of reading comprehension at the age of ten years ( $p < .05$ ).

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INSERT TABLE 5 HERE  
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## Discussion

In this paper we have addressed a series of issues relating to AIDS knowledge and contraceptive practices using data from a birth cohort of New Zealand children studied at the age of 16 years. The major findings and implications of this analysis are summarised below.

First, the findings of this study suggest that the net effect of publicity and education about HIV/AIDS has produced a situation in which the adolescent population is generally knowledgeable and informed about this condition. This was reflected in the finding that nearly 50% of the young people questioned in this research gave correct responses to all 16 items about AIDS. These findings are generally consistent with other studies of levels of AIDS knowledge in New Zealand community samples. For example Chetwynd (19) reported generally high levels of knowledge about HIV/AIDS in samples aged 16-60 years. She also noted that levels of knowledge had increased between 1987 to 1989 and that knowledge of the transmission of HIV/AIDS was highest amongst those under the age of 34. The findings here suggest that similar knowledge levels are present for younger samples.

However, the high levels of AIDS knowledge for the sample were not reflected entirely in their contraceptive practices. In particular, the estimates from this study suggest that amongst sexually active teenagers in the region of 59% of all acts were protected by condoms. This is somewhat lower than that reported for the same

sample studied at age 15 years (82%) (8) but higher than that reported for a sample of Dunedin 18 year olds (38% to 48%) studied in 1991 (7). The analysis provides an explanation of these differences. In particular, the results suggest that the rate of condom use varied with the stage of the individual's sexual career with condoms being used frequently in the early stages of this career but with condom use declining with increasing sexual experience and being replaced by alternative contraceptive methods and principally, the contraceptive pill. These results clearly suggest that there is a progressive tendency for condom use to decline with increasing sexual experience. It is likely that this occurs because many young people use contraception primarily as a method of birth control rather than HIV prevention and that, as a result, increasing sexual experience leads to the use of more efficient and less obtrusive methods of contraception.

An interesting result to emerge from the analysis was that levels of AIDS knowledge were related to rates of condom use even when due allowance was made for a large number of prospectively measured confounding factors describing: (a) patterns of sexual experience and contraceptive knowledge; (b) levels of cognitive ability and scholastic achievement; (c) measures of family social and demographic background; (d) measures of early behavioural adjustment. These results are consistent with at least three explanations of the linkages between AIDS knowledge and condom use. First, it could be suggested that the results arise because of a cause and effect linkage between knowledge levels and condom use. In support of this view there is some evidence to suggest that levels of AIDS knowledge may influence condom use. For example, in an evaluation of an AIDS education programme Walter and Vaughan (20) found that such education was associated with modest decreases in risk taking behaviour including the increased use of condoms. Similarly, both DiClemente et al. (21) and Siegel et al. (22) found that teenagers who knew that condoms were effective in preventing sexually transmitted diseases had a higher

rate of condom use than those who did not think that the use of condoms prevented sexually transmitted diseases.

An alternative explanation is that the association between AIDS knowledge and condom use may be a reflection of general concerns about HIV/AIDS. It seems reasonable to conjecture that teenagers who have high levels of concern about HIV/AIDS may express these concerns by showing both high levels of knowledge and increased rates of condom use. In such circumstances the correlation between AIDS knowledge and condom use could reflect the fact that both high levels of knowledge and high rates of condom use are symptomatic of individuals with a concern about HIV/AIDS. The final possibility is that the association may be spurious and arise from uncontrolled confounding factors. In particular, while we have controlled a relatively large number of prospectively collected confounding factors, the possibility remains that the association between AIDS knowledge and condom use reflects the effects of uncontrolled confounders.

The findings of this study have two major implications for AIDS prevention programmes for adolescents and young adults. First, the results strongly suggest that publicity and education about HIV/AIDS have produced a situation in which teenagers are generally knowledgeable about this condition and it is striking that 92% of the sample responded correctly to at least 14 of the 16 questions about AIDS. At the same time the evidence suggests that levels of knowledge tend to be lowest amongst the academically less able suggesting some need to tailor AIDS education and publicity to the needs of this group. Secondly, the results provide an explanation of the relatively low rates of condom use seen in young adult populations. The findings of this study suggest that this arises because, with increasing sexual experience, sexually active teenagers and young adults make progressive transitions away from the use of condoms and towards the use of alternative, more efficient and less obtrusive methods of contraception. These results suggest that a major priority in HIV/AIDS prevention programmes which

promote safer sex should centre on encouraging sexually active teenagers to sustain their use of condoms and, ideally, to use both the condom and an alternative method of contraception to meet the demands of both protection against sexually transmitted diseases and efficient birth control.

## Acknowledgment

This research was funded by grants from the Health Research Council of New Zealand.

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Table 1: Rate (%) of correct responses to AIDS knowledge questionnaire for males, females and the total sample

	% CORRECT RESPONSES			
	Males	Females	Total Sample	p
AIDS is a medical condition in which your body cannot fight off diseases	94.7	92.5	93.6	>.15
AIDS is caused by a virus	89.2	87.9	88.6	>.51
If you kiss someone with AIDS you will get the disease	96.4	97.9	97.2	>.16
If you touch someone with AIDS you will get the disease	98.3	99.4	98.8	>.10
Anybody can get AIDS	95.6	93.7	94.6	>.20
AIDS can be spread by using someone's personal belongings like a brush or comb	97.9	98.1	98.0	>.80
AIDS is not at all serious, like having a cold	99.0	99.4	99.2	>.40
Just being around someone with AIDS can give you the disease	98.3	99.0	98.6	>.39
Having sex with someone with AIDS is one way of getting it	98.5	99.8	99.2	>.05
If a pregnant woman has AIDS there is a chance it may harm her unborn baby	88.6	94.0	91.3	<.01
Most people who get AIDS usually die from the disease	92.8	94.6	93.7	>.20
Using a condom during sex can lower the risk of AIDS	97.3	96.2	96.7	>.30
Receiving a blood transfusion with infected blood can give a person AIDS	97.9	98.3	98.1	>.60
You can get AIDS by sharing a needle with a drug user who has the disease	99.6	99.8	99.7	>.50
People with AIDS usually have lots of other diseases as a result of AIDS	64.4	64.9	64.6	>.80
There is no cure for AIDS	97.5	96.0	96.7	>.20
N	474	479	953	

Table 2: Distribution of correct responses on AIDS knowledge questionnaire

Number of Correct Responses	Males <sup>1</sup>		Females <sup>1</sup>		Total	
	N	%	N	%	N	%
<14	36	7.6	40	8.4	76	8.0
14	74	15.6	72	15.0	146	15.3
15	157	33.1	127	26.5	284	29.8
16	207	43.7	240	50.1	447	46.9
Total	474	100	479	100	953	100

1 Chi square test showed no significant difference in responses of males, females ( $\chi^2_3 = 5.82$ ;  $p > .10$ )

Table 3: Frequency of intercourse and rates of contraceptive usage per 100 acts for sexually active sample members (N = 243)

Frequency of Intercourse (Times)	CONTRACEPTIVE USE PER 100 ACTS					
	N	MALES		N	FEMALES	
		Condoms	Other Contraceptive		Condoms	Other Contraceptive
1 - 4	64	87.3	16.9	46	85.4	22.9
5 - 14	19	70.5	19.5	25	76.6	27.1
15 - 49	15	66.9	33.4	34	77.7	51.5
50+	12	61.2	37.2	28	44.6	59.9
TOTAL	110	65.5	33.1	133	56.2	54.8
p <sup>1</sup>		<.001	<.001		<.001	<.001
1 Chi-square test						

Table 4: Mean rates of condom use per 100 acts by level of AIDS knowledge for sexually active sample members (N = 243)

Number of correct responses to AIDS knowledge questionnaire	MALES		FEMALES	
	N	Mean rate of condom use	N	Mean rate of condom use
<14	9	61.0	13	46.6
14	15	65.9	26	72.1
15	41	71.0	34	71.2
16	45	94.3	60	80.00
p		<.01		<.05

Table 5: Rates of condom use by level of AIDS knowledge adjusted for covariates

Number of Correct Responses to AIDS Knowledge Questionnaire	Adjusted Rate of Condom Use	
	Males	Females
<14	70.5	61.9
14	75.4	66.8
15	80.3	71.7
16	85.2	76.6

Significance of Factors: Gender:  $p < .10$ ; AIDS knowledge:  $p < .05$

Significant Covariates: Frequency of Intercourse:  $p < .0001$ ; Reading comprehension 10 years  $p < .05$

Non Significant Covariates:

a) Sexual Experience. Age of onset of sexual activity ( $p > .25$ ); number of sexual partners ( $p > .40$ ); contraceptive knowledge ( $p > .30$ );

b) Cognitive Factors. WISC-R IQ 8 years ( $p > .10$ ); mathematical reasoning 11 years ( $p > .25$ ); Reading comprehension 12 years ( $p > .65$ ); scholastic ability 13 years ( $p > .80$ )

c) Family and Social Factors. Ethnicity ( $p > .20$ ); maternal age ( $p > .70$ ); maternal education ( $p > .20$ ); family size ( $p > .60$ ); socio-economic status ( $p > .40$ ); changes of parents ( $p > .60$ ).

d) Individual Factors. Conduct disorder 8 years ( $p > .10$ ); attention deficit-hyperactivity 8 years ( $p > .90$ )