Original Research Paper

The case for routine antenatal HIV screening

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KEY POINTS

- There is a good case for routine antenatal HIV screening
- Perinatal HIV transmission may occur in New Zealand
- Interventions reduce perinatal transmission, saving young lives
- Current ministry policy is for HIV screening according to risk
- If this policy is to be effective, GPs should actively seek risk factors at all times

Introduction

The developing epidemic of HIV infection in women in New Zealand presents an important public health problem.1 The concept of duty of care for early diagnosis and treatment for HIV-infected women has been raised, with a recent call for routine HIV testing in pregnancy "unless there are compelling reasons not to do so".2 Current public health policy is for HIV screening based on assessment of infection risks.

Until recently, approximately 10 per cent of those known to be HIV infected in New Zealand were women.3 However, 48.6 per cent of newly diagnosed HIV infections in New Zealand are now heterosexually acquired,4 much of this influenced by migration from areas where heterosexual infection is the norm. International data indicate that the cumulative risk of HIV transmission from an infected male to a female partner may be 10-30 per cent. All eight viral serotypes of HIV exhibit heterosexual transmission, although to date only type B has been implicated in homosexual transmission in New Zealand.5

Since HIV infection is largely asymptomatic in the early stages, pregnant women may be unaware of their status unless specifically tested.

GPs need to be alert to women who may be at risk in order to test them. Health care workers and the community in general have been slow to recognise that most infected New Zealand women are in the childbearing age group and many already have children by the time of diagnosis of their HIV status.1 Sadly, many women discover they are infected when HIV disease is diagnosed in their baby.6

Some diseases transmittable by sexual or perinatal means are already screened for in pregnancy in New Zealand, and routine HIV screening would require only incremental change to that policy.

The size of the problem

Although new AIDS notifications are decreasing in New Zealand, HIV prevalence is increasing due to increased survival of individuals infected with the virus.3 Although effective treatment lowers transmissibility by reducing viral load, it also has the effect of elongating the period available for transmission. The trend in New Zealand abortion figures7 is evidence of continuing vulnerability of the population through unprotected heterosexual activity.

The seroprevalence of HIV in New Zealand women of childbearing age is unknown. At present HIV testing is carried out only on request, or if practitioners recognise the risk factors. There have been recent calls for compulsory testing of immigrants. There are marked ethnic differences in current testing patterns. In the setting of sexual health clinics, where HIV testing is discussed routinely, Maori are tested at 60 per cent of the European rate and Pacific Island people at only 25-30 per cent, although the risk – through unprotected sex – applies to all clients of such services.8

Overseas estimates of HIV prevalence in pregnant women range 100-fold, from 0.02 per cent to over 2 per cent.1 Extrapolation of these prevalence values provides a rough and ready estimate of the potential size of the problem in New Zealand. There were over 57,000 live births annually in New Zealand during 1996-98.9

Derivation from the international antenatal HIV prevalence rates predicts between 12 and 1200 HIV-positive pregnant women annually in this country. Assuming that multiple births are infrequent, HIV-induced foetal loss is minimal and international transmission rates from an infected pregnant woman to her infant apply to New Zealand,10,11 this indicates that between two and 300 HIV infected infants might be born here annually.

Four perinatal HIV infections were reported in New Zealand from 1996 to mid-1999, two of these during 1998.4 These figures are consistent with antenatal HIV infection prevalence for this country at the lower end of the international range.

Benefits of antenatal screening

Detection of HIV in pregnancy could offer both personal and public health benefits to mother and child.

Women who know their HIV status can make informed decisions about their pregnancy1 and delivery.6 The risk of transmission from a pregnant woman to her offspring is reducible with perinatal prophylactic measures,10 perhaps to as low as 1 per cent11 with a combination of neonatal interventions for infants placed at risk by birth to a seropositive mother. Prophylaxis may include a perinatal antiretroviral regimen, elective caesarean section, avoidance of infant skin puncture at delivery and avoidance of breastfeeding by HIV positive mothers. It is estimated that one in seven children born to HIV positive mothers acquire the infection through breastfeeding.12

Early diagnosis will identify HIV positive women for active management including antiretroviral treatment and intensive screening for cervical dysplasia and carcinoma in situ.13

Since resistance to antiretroviral drugs is emerging, the focus for health services should be not only on treatments but also on reducing spread of the virus.4 Health professionals managing the mother and child can take appropriate precautions against blood-borne viral transmission while early diagnosis assists contact tracing.

Antenatal diagnosis of HIV infection also facilitates future family planning and implementation of appropriate social and psychological support for the family as ill health develops. Infected offspring require care and attention from parents who may themselves be unwell and also unemployed. For an HIV-infected infant the quality of life is impaired both by ill health and social stigmatisation. Such children exhibit escalated natural history with early onset of complications and usually death prior to puberty. Their health care is costly. The societal and economic impact of child infection is exacerbated by concurrent ill health of co-infected parents. Some countries have experienced societal problems in the care of orphaned children.

Timing of antenatal screening

The underlying philosophy of any HIV screening policy will dictate its focus and application in primary care. Differing logistics will apply to a screening programme designed to detect HIV infection among women planning pregnancy or all pregnant women (including those who terminate or miscarry), or only in women coming to delivery.

The precedent for routine antenatal screening of infections spread sexually or perinatally is already well established in New Zealand. Routine antenatal screening for hepatitis B carrier status, rubella immunity and markers of active syphilis is usually undertaken in the first trimester. Opportunity exists to add HIV screening to this panel of tests. A first trimester HIV test would capture women planning a therapeutic abortion and those destined to miscarry spontaneously as well as those progressing to term. It would also be timely for the woman for early commencement of antiretroviral therapy.

Since a window period applies between HIV infection and detection of seropositivity, HIV infection acquired after conception may not be detected by first trimester HIV testing, although seropositivity can be confirmed within four to six weeks of a known exposure risk if specially requested.

A second antenatal test is funded in New Zealand.14 Testing beyond the second trimester of pregnancy would detect infections acquired at conception and during the pregnancy. This timing might be more appropriate for pre-delivery HIV screening, but would capture only pregnancies intended to proceed to term.

The ideal time for HIV education and testing is preconception. Preconception testing would empower HIV positive women to make informed decisions about fertility and family planning, and might encourage HIV negative women to become proactive in management of their sexual health risks. New Zealand abortion figures7 indicate that an effective preconception health policy is still needed in this country.

Implications of routine screening

The prospect of HIV antenatal screening raises important ethical, social and financial considerations.

The present routine antenatal infection screening is a well-accepted package of tests. These are frequently performed with implied consent but minimal information. Many mothers-to-be would be surprised to discover, for instance, that they had been screened for syphilis. This is quite unacceptable for HIV testing. The ethics of informed consent in HIV testing have been well debated in New Zealand and elsewhere.15-19 Adherence to protocols for obtaining informed consent would be required. Some retraining in pre and post-test counselling skills may be necessary for GPs and their practice nurses.

The principles of informed consent and personal rights to refuse testing may conflict

with duty of care for population health on occasions. Confidentiality in this setting is also a difficult concept. The need to inform health care workers, HIV-exposed children, caregivers of infected children and sexual partners of infected women conflict with an individual's right to confidentiality of medical results.19 These are principles that command further debate both within the profession and by the general public.

The implementation of perinatal prophylaxis for infants of HIV positive mothers could also be fraught with ethical dilemmas. All children born to HIV positive mothers will warrant prophylaxis as infants who will not become infected are clinically indistinguishable from those who will. Current knowledge indicates some perinatal transmission is inevitable despite prophylactic practices.

Perinatal antiretroviral prophylaxis is relatively new. Optimal dose regimens are still evolving. Knowledge of toxicity to date has been extrapolated from animal models20 since long term sequelae in exposed infants have yet to be evaluated.21 The longest follow-up of children is about five years to date. Early experience with prophylaxis implied that six exposed infants would be dosed to prevent one HIV transmission.22 This may improve as new interventions become available.10

Moral and ethical obligations to treat HIV positive women or children may result in earlier commencement and longer lead time of treatment, with consequent labelling as patients within the medical model.

HIV positive women will need to choose between the psychological, behavioural, health and financial benefits of breast-
feeding and the opportunity to prevent a
one-in-seven chance of transmitting the virus to the baby in this manner.

The societal implications of antenatal HIV testing are equally extensive and tangled. Management of these issues will fall into the domain of GPs. The child with HIV-infected parents faces an uncertain future if parental ill health and death disrupt family dynamics and patterns of care. An infected infant also faces a future of chronic ill health. The offspring may carry a stigma from the womb for life, whether or not personally infected, as New Zealand society still has little experience with persons living with HIV infection and struggles to accept such individuals through fear of contamination.

The community in general will carry the burden of support of the infected parent and child and extended family, while some indirect and intangible societal costs of HIV infection will extend beyond the life of the mother or child.

Financial considerations

The financial implications of routine HIV testing in pregnancy could be examined from either a cost-alone, cost-benefit or cost-effectiveness analysis.

Cost-alone analysis considers the incremental cost of screening. In addition to the expense of an antenatal HIV laboratory test, adequate resources for informed consent and appropriate pre and post-test counselling are called for on moral and ethical grounds. It is probable that health professionals would seek compensation in the Maternity Benefit Schedule for extra time taken to counsel and test each patient, and there may be extra compliance costs including monitoring, quality assurance and continuing education of practitioners who carry out this task.

Ethical obligations to manage newly discovered infections carry significant cost implications. HIV infected mothers and children identified by screening would require social, psychological and medical management and support in their regions,

as well as specialist follow-up. Demand on pharmaceutical expenditure would increase if HIV positive women were treated and their infants were given prophylaxis in the perinatal period and beyond. On average New Zealanders live 10-15 years from diagnosis with the virus,3 but earlier diagnosis would extend this lead time.

To be delivered effectively, access to prophylactic regimens would be required wherever HIV positive women give birth. This would call for upskilling of appropriate local resource persons, GPs particularly, to manage the ongoing care of HIV positive women and their children. Demand for health care worker prophylaxis after occupational exposure might increase with increased awareness of HIV risk in perinatal and other settings. Ideally, additional resources would also be allocated for follow-up research on the effectiveness of these initiatives.

Cost-benefit analysis highlights opportunity costs. The benefits attained from one health initiative can be compared with benefits from equivalent expenditure on other initiatives. From a cost-benefit perspective, it is salutary to compare and contrast the cost-effectiveness of HIV screening with current antenatal screening practices.

Routine antenatal syphilis screening is a relic of a past era of more prevalent infection. Internationally there have been five economic analyses of syphilis screening, all prompted by awareness of the rarity of syphilis infection in modern society. Each study recommended screening on emotional rather than economic grounds, since society will not tolerate congenital syphilis.23 A positive syphilis test in pregnancy in New Zealand creates a therapeutic dilemma. The tests are non-specific. Positive tests in Pacific Islanders are often due to tropical yaws. These cannot readily be distinguished from positives due to sexually transmitted infection. Most syphilis markers in pregnant New Zealand women are biological false positive results due to the pregnancy.

Testing for rubella in the antenatal period is probably mistimed. It is most appropriate prior to conception to identify non-immune women requiring vaccination. Although intrauterine rubella infection has severe consequences for the foetus, interventions are limited and vaccination is contraindicated during pregnancy. Decisions to terminate pregnancy are facilitated only if the test identifies an infection early enough in the pregnancy.

Arguably antenatal hepatitis B screening most closely parallels HIV antenatal screening. Both tests identify a maternal infection with risk of foetal transmission. For both, effective perinatal interventions are available. Perinatal hepatitis B infections may result in chronic carriage and risk of long term sequelae including premature death in adulthood from liver complications. Acute hepatitis B incidence in New Zealand has fallen since the introduction of childhood vaccination.24 In contrast, perinatal HIV infections are increasing, HIV is not (yet) vaccine-preventable and seems invariably fatal for children, although timely intervention could prevent transmission, hence saving young lives.

Antenatal syphilis, rubella and hepatitis B screening were introduced under different disease prevalence burdens, and at a time when economic justification was not a prerequisite for implementation. Re-evaluation of the entire antenatal-screening policy in this country may be timely.

Cost-effectiveness analysis compares costs to achieve an identical outcome, such as the cost to save one life. The cost of a life in New Zealand was determined, for purposes of economic evaluation, to be $2,000,000 in 1990.25 At this value, even without inflation adjustment, it is evident that one child’s life saved would well

outweigh the incremental cost of 57,000 HIV tests.

A formal cost-effectiveness analysis for the New Zealand setting should consider: annual expected costs of screening, cost and efficacy of perinatal antiretroviral prophylaxis and elective caesarean sections for HIV positive pregnant women, possible consequences including long term sequelae of drug exposure, and the costs of follow-up and monitoring the programme. HIV antenatal screening may prove more cost-effective than the current antenatal syphilis, rubella or even hepatitis B policy in New Zealand.

Intuitively, antenatal HIV testing might be most cost-effective if offered only to women with identified risk factors. Risk factors include a history of sexual risk, past or present IV drug use, or blood product recipient. Women of reproductive age who are from HIV-endemic regions (especially sub-Sahara Africa) and those with past or current partners from these regions should be considered for testing. However, a policy of voluntary HIV-testing women based on perceived risk may fail to detect a large proportion of infected women.1 In addition, HIV has been known to be transmittable in unpredictable circumstances, including the receipt of blood that is seronegative in the window period of infection and in mutually monogamous relationships.

In effect, because HIV is sexually transmissible, all pregnant women are potentially at risk.

The sensitivity and specificity of any prescreening criteria should be validated for New Zealanders to ensure that a policy of testing women identified to be at risk could be successfully implemented.

Other policy considerations

Screening for sexually or perinatally transmissible infections is fundamental to good antenatal care in developed countries. HIV testing is a prerequisite for issue of a marriage licence in some states of the US, and the UK has just announced a policy on HIV antenatal screening.

Options for HIV screening in New Zealand include universal, selective or voluntary testing for all pregnant women; for women in the third trimester of pregnancy; or for all women of childbearing age. In overseas economic analyses, antenatal HIV testing has been shown to be more cost-effective than not testing.26 Routine antenatal HIV testing has been shown to be more cost-effective than selectively testing, even in low prevalence areas, as long as the test uptake is over 50 per cent.27 Active intervention to prevent perinatal HIV transmission has also been shown to be cost-effective.28

Treaty of Waitangi considerations should be paramount considerations in local health policy. It is evident that Maori and other ethnic groups are not currently accessing HIV testing services at the same rates as Europeans although article three of the treaty espouses the principle of equitable treatment for Maori citizens. This discrepancy could be addressed by routine antenatal screening. Culturally appropriate sexual and reproductive health services that reduce STD incidence and preserve fertility of Maori would also be consistent with article two, protection of taonga.

Over the next 20 years it is predicted that an ageing population coupled with diminishing employment and smaller tax-paying workforce will reduce financial and manpower support for disabled and chronically ill members of society.9 Antenatal HIV screening could reduce the burden of childhood HIV infection on future health

care needs. As outlined above, if New Zealand women were HIV tested once during pregnancy, approximately 57,000 tests would be required annually to detect 12 or more HIV infected pregnant women and to protect two or more infants from transmission.

Before implementing any routine antenatal HIV testing policy, New Zealand could learn from the problems, pitfalls and politics encountered in the endeavours to establish a hepatitis B screening programme.29

GPs are in a position to rectify discrepancies in service delivery and uptake without any need for change in national screening policy. The current HIV screening policy requires GPs to remain alert to HIV risk factors, proactively promote sexual health to patients within their own practices and discuss HIV screening with their pregnant patients.

Antenatal syphilis screening became routine because 20th century society could not tolerate the birth of a baby with congenital syphilis. Will we assume the same stance on perinatal HIV infections in the 21st century? That is a question for GPs to ponder into the coming millennium.

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