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ANTENATAL TESTING

Introduction

This paper examines issues arising in relation to universal HIV/AIDS antenatal testing and provides a policy statement on strengthening antenatal interventions based on current practice. It is hoped that discussion of these issues and a re-examination of current antenatal policy will assist in developing a best practice model for HIV/AIDS antenatal screening in Australia.

History of antenatal testing in Australia

The Australian approach to antenatal screening for HIV/AIDS in the public health system is based upon targeted testing for at risk groups and cost-benefit considerations. In the past few years there has been increasing discussion about shifting toward universal HIV antenatal testing and some evidence to indicate a shift in practice, particularly in the private sector.

Historically, HIV/AIDS screening was not routinely offered to all pregnant women but rather targeted towards people identified as being at risk of HIV infection. As HIV seroprevalance in pregnant women in Australia is extremely low, the benefits derived from early identification have not traditionally been [~~delete: not~~] considered sufficient to justify the expenditure of universal testing. To the end of 1998, 168 Australian women with HIV were known to have given birth, of whom half knew their HIV status¹.

Current public health sector recommendations support a continued focus upon sexual health history taking as the appropriate means of identifying at risk populations for testing². However, in both the private and public sector it is unknown to what extent women are routinely tested for HIV/AIDS.

¹ HCHECR. (1999) *HIV/AIDS and related disease in Australia. Annual Surveillance Report 1999*. Sydney: NCHECR; McDonald, A. et al. (1997). "Perinatal exposure to HIV in Australia". *Medical Journal of Australia*, vol. 166, pp.77-80.

² ANCARD/IGCARD. (1998) *HIV Testing Policy*. Canberra, Commonwealth Department of Health and Aged Care.

Antenatal approaches

The discussion about shifting antenatal testing practices in Australia requires consideration of a range of different approaches to ensure appropriate bio-medical outcomes for pregnant women and their children. Further, it raises issues relating to current practices and how antenatal intervention outcomes can be improved.

A range of different approaches can be identified that may contribute to identifying HIV prevalence in pregnant women, support HIV positive women in decisions relating to the management of pregnancy and birth, and provide bio-medical interventions to limit the transmission to the neonate or infant. These models include:

I suggest a minor re-ordering of these approaches, going from most coercive, state-led, to least coercive, individual-led:

➤ **Mandatory universal screening of all pregnant women**

This model requires, either by law or policy, that all pregnant women be tested for HIV/AIDS. Such an approach is primarily concerned with protection of the neonate and may limit decisions by women regarding birth management and treatment options. There is a range of significant implications with this approach including the cost, discrimination against a specifically targeted group within the community and enforcement and compliance with mandatory testing. **In addition testing HIV-positive during pregnancy creates significant psychological issues, and requires consideration of personal as well medical implications under time pressure.**

➤ **Offering voluntary HIV/AIDS screening to all pregnant women**

This is discussed at length in the paper. However, it is important to note that such an approach is strengthened by offering testing to women throughout pregnancy not just at first presentation. Further, the sexual partners of all pregnant women should also be tested. Research indicates that the timing and context in which screening is offered significantly affects the uptake of an offer to test³.

➤ **Routine availability of HIV/AIDS testing**

This model necessitates HIV/AIDS testing be available for all women who seek a test in Australia. It does not require that the test be offered. Such approaches are not effective unless pregnant women are aware of HIV testing options and receive information as to the benefits of testing, their risk of infection and appropriate pre-test counselling. Routine HIV/AIDS testing is

³ Simpson, W. M. et al. (1999) "Antenatal HIV testing: assessment of a routine voluntary approach". *British Medical Journal*. Vol. 318, pp. 1660-1661.

available for the majority of pregnant women in Australia but there is some suggestion that indigenous women, particularly those geographically isolated, do not have adequate access to quality testing services, knowledge about issues relating to perinatal transmission or adequate treatment options for both themselves or child.

➤ **Identifying at risk populations through sexual health screening and offering HIV/AIDS testing.**

The current Australian model requires health practitioners to undertake a comprehensive sexual health history and recommend HIV/AIDS testing based on risk behaviour assessment. A recommendation for testing is accompanied by pre- and post-test counselling. Sexual health history is usually conducted at the first antenatal presentation.

Issues have been raised with respect to the coverage and quality of such an approach. That is, whether all health practitioners assess all pregnant women's sexual health, whether they have adequate training to support quality assessment, make appropriate recommendations and provide pre- and post testing counselling. **It also appears to be unusual for practitioners to recommend testing for both partners. Further** questions also arise as to whether changes in pregnant women's practices or behaviour are monitored throughout the pregnancy, **ie is the woman made aware of the risk of acquiring HIV sexually (or otherwise) during pregnancy, and the enhanced risk of transmission to a child in this situation.** Suggested improvements in this approach are to extend the practice of identifying at risk populations by offering HIV/AIDS testing to both women and partners at regular intervals throughout pregnancy.

➤ **Encouraging pre-conception testing for all pregnant women**

This model encourages women and their partners to consider their own sexual and other risk behaviour practices prior to conception and test for HIV prior to conception. Such a model is useful for potential parents who are planning pregnancy, but requires significant contraceptive planning and is unrealistic for unplanned pregnancies. Integrated into other models of voluntary HIV testing and counselling it may be an affective component of limiting mother-to-child transmission rates. Increasing women's awareness of the benefits of pre-conception testing could be linked to other campaigns for women's pre-conception health such as campaigns to increase pre-conception folate intake.

Issues relating to universal antenatal testing

Re-emerging discussions about universal screening implies that current practices are not adequate. However, there are a number of significant issues relating to universal

HIV/AIDS screening as an appropriate model of antenatal intervention that require discussion. These issues include:

1. What factors are influencing the calls for universal screening?
2. To what extent is universal antenatal testing already taking place and why – duty of care, legal and ethical implications?
3. What laws and policies are currently in place in each jurisdiction with respect to antenatal screening?
4. Do women feel pressured to accept HIV/AIDS testing as a standard screening procedure?
5. Is adequate HIV/AIDS pre- and post-test counselling available?
6. Do health service providers, such as general practitioners, possess the necessary specialist skills to provide HIV/AIDS services?
7. Is the cost associated with routine screening justified given the extremely low rates of HIV/AIDS infection amongst pregnant women in Australia?

Some of these issues may be exacerbated for women who live in geographically isolated areas of Australia and therefore have access only to compromised service delivery. Consideration must also be given to the potential vulnerability of indigenous women, particularly in regional and rural areas of Australia, in exercising choices with respect to antenatal testing practices and policy.

What factors are influencing the calls for universal screening?

Therapeutic advances in limiting mother-to-child transmission of HIV appear to have driven a change of HIV testing practices and calls for universal antenatal screening. Amongst these advances are the development and availability of antiretroviral therapy for use during end term-pregnancy, delivery and in the neonate leading to significant decreases in perinatal transmission⁴. Longitudinal studies conducted worldwide highlight that bottle-feeding rather than breast-feeding reduces transmission⁵. The method of delivery is also implicated in transmission with caesarean section being cited in some

⁴ Shaffer, N. et al. (1999) “Short-course zidovudine for perinatal HIV-1 transmission in Bangkok, Thailand: a randomised controlled trial”. *Lancet*, vol. 353, pp. 773-780; Wiktor, S. et al. (1999) “Short-course zidovudine for prevention of mother-to-child transmission of HIV-1 in Abidjan, Cote d’Ivoire”. *Lancet*, vol. 353, pp. 781-785. Guay, C.A., Musoke, P., Fleming, T., Bagenda, D. et al. (1999) “Intrapartum and neonatal single-dose nevirapine compared with zidovudine for prevention of mother-to-child transmission of HIV-1 in Kampala, Uganda: HIVNET 012 randomised trial”. *Lancet*, vol. 354, No. 9181:795-802.

⁵ Dunn, D.T., Newell, M.L., Ades A.E. and Peckham, C.S. (1992) “Risk of human immunodeficiency virus type 1 transmission through breastfeeding”. *Lancet*, vol. 340, pp. 585-588.

studies as halving the rate of perinatal transmission, particularly when combined with antiviral prophylaxis and avoidance of invasive obstetric procedures during pregnancy and birth⁶. The use of antiretroviral agents during pregnancy and delivery has reduced perinatal transmission rates from 25% to 8%. When bottle-feeding is integrated with appropriate treatment and delivery regimes then mother to child transmission rates as low as 2% have been reported. However, the long-term toxicities that may arise from *in utero* exposure to antiretroviral agents are unknown⁷. In addition, variances in study results with respect to mother to child transmission rates are apparent and factors that may influence these differences should be considered. Potential factors that may influence study results include: HIV positive women's unequal access to information and medical services in different study populations; interpretation of research data and research methods used including appropriate design, access to participants and interpretation of data; and the virological and general health status of women involved in the study. Further, research indicates that the socio-economic status of women may influence the outcomes of trials and, ultimate implementation of strategies. For example, studies show that in resource poor settings with inadequate water supply bottle-fed babies may avoid HIV, but have the same mortality rate as HIV-infected breastfed babies⁸. In addition, HIV positive women have higher rates of morbidity and mortality following Caesarean sections than uninfected women, and this difference is intensified in resource poor environments.

Therapeutic advances, available in resource rich settings, is a significant factor influencing paediatric HIV service provides and other medical practitioners to include HIV/AIDS testing as a routine component of other general STI screening of pregnant women⁹. The implications arising from seeking such a policy shift do not appear to have been widely considered. Further, focusing discussion upon bio-medical aspects of antenatal prevention and treatment do not consider whether current practices are failing, if so how are they failing and how they could be improved.

To what extent is universal antenatal testing already taking place and why – duty of care, legal and ethical implications?

It is unknown to what extent routine antenatal testing is currently taking place although anecdotal discussion suggests that the practice is well established in the private health sector and gaining acceptance in the public sector as practitioners perceive “duty-of-care” towards patients to include testing. Some health practitioner’s may also consider their “duty-of-care” to extend to the foetus irrespective of their obligations to the patient. This

⁶ The International Perinatal HIV Group. (1999) “The mode of delivery and the risk of vertical transmission of human immunodeficiency virus type 1”. *New England Journal of Medicine*, vol. 340, pp. 977-987; Mandelbrot, L. et al. (1996) “Obstetric factors and mother-to-child transmission of human immunodeficiency virus type 1: the French perinatal cohorts. *American Journal of Obstetrics and Gynaecology*. Vol. 175, pp. 661-667.

⁷ Medscape. (1999) “Mother -to-child HIV Transmission and its Prevention”. *HIV/AIDS Clinical Management*, vol. 16.

⁸ Commentaries on Lancet Breast feeding article [2129] sea-aids@hivnet.ch

⁹ Ziegler J.B. (1999) “Antenatal Screening for HIV – Policies Revisited”.

interpretation of health practitioner's duty-of-care obligations is contrary to current ANCAHRD policy that specifies the appropriate approach is risk assessment of a patient following sexual health history taking, obtaining informed consent, and providing pre-test counselling when offering a test.

There also appears to be an increasing concern by health practitioners of the potential professional and legal ramifications of perinatal transmission in circumstances where HIV screening was not offered and a patient was unaware of their status. However, in the absence of repeated testing of both the patient and her partner throughout the pregnancy HIV/AIDS testing is still likely to leave practitioners open to legal risk. Health practitioners are currently obligated to undertake risk assessment based on sexual health and other risk behaviour and a failure to adequately follow this procedure may also have significant legal implications. Universal screening simplifies not only the potential legal ramifications of failing to assess a patient adequately but decreases the time necessary to take a full sexual and behavioural risk assessment. However, practitioners duty of care to pregnant women who are HIV positive and do not know their status is unlikely to be met by testing alone. The process of sexual health history taking is demonstrated as effective in educating women as to behaviours that place them at risk and assist in identifying any changes through pregnancy that increases this risk. Reliance upon testing alone (particularly if testing is mandatory, included as part of routine perinatal screening, or simply offered in the absence of information) undermines or limits women's ability to make informed choices.

It is known that 20% of pregnant women in Australia are tested for HIV/AIDS but under what circumstances is unknown¹⁰.

The Australian Standard of Care Guidelines - *Antiretroviral therapy for HIV infection in women and children*¹¹ - state that "early identification of the HIV-infected women is crucial to optimal management of the HIV-exposed and infected child as well as for the health of the infected woman" (1999: 16). The concern is that routine screening will become standard practice in the absence of broader policy considerations relating to the issues arising from such a shift in policy. It is crucial that health practitioners understanding of duty of care obligations is not limited to testing but maintain a focus on current policy. It may be necessary to provide increased training and skills for health providers to ensure that sexual health history taking procedures are adequate to improve assessment procedures and identify risk behaviours.

What laws and policies are currently in place in each jurisdiction with respect to antenatal screening?

¹⁰ Elford, J. et al. (1995) "Antenatal HIV antibody testing in Australia". Medical Journal of Australia, vol.163, pp. 183-185.

¹¹ Palasanthiran, P., Mijch, A., Lloyd, A., Fisher, C. and Ziegler, J.B. (1999) *Antiretroviral therapy for HIV infection in women and children: Standard of care guidelines*. Sydney: Alpha Biomedical.

Unlike other parts of the world - such as New York City¹² - no legislation exists in any Australian jurisdiction that prescribes mandatory screening of pregnant women or children. Instead state and territory government health authorities set policy with respect to antenatal screening. The extent to which this policy is adhered to is not known or adequately monitored and therefore testing practices are largely dependent upon individual practitioners. In New South Wales current policy is that HIV screening be offered to all pregnant women (the uptake of this offer is unknown) with strong 'recommendations' for testing made to those pregnant women considered at risk (the uptake of this recommendation is unknown). The Australian National Council on AIDS and Related Diseases recommends that pregnant "women found to be at higher risk of HIV ... should be encouraged to undergo HIV antibody screening"¹³. The term 'higher risk' is defined as persons who are assessed at risk by health practitioners on the basis of patient sexual history and other factors such as injecting drug use practices.

Do women feel pressured to accept HIV/AIDS testing as a standard screening procedure?

Research from overseas indicates that offering HIV testing to women does not necessarily result in a decision to test¹⁴. Rather it is women who are provided with appropriate pre-test counselling who are more likely to accept an offer of antenatal screening. **[delete: Further, women who are better informed as to the risk of HIV/AIDS are less likely to accept a test.]** How many Australian women are offered an HIV test is unknown and therefore cannot be quantified. Whether those offered are accompanied by appropriate pre-test counselling can also not be measured. A concern with routinely offering voluntary testing as a component of general STI screening may be that pregnant women would feel compelled to accept a test without the necessary knowledge to inform consent or an understanding of the implications of a positive result. Indeed, some research reports that women who are better informed about HIV/AIDS are less likely to accept a test and emphasises the important psychological and human rights implications of securing fully informed consent.

Is adequate pre- and post-test counselling available?

Any introduction of routine HIV screening for all pregnant women should be accompanied by policies and guidelines that set out requirements for pre- and post-test counselling. This approach has significant resource implications. Current services for pre- and post-test counselling services are already significantly overstretched, so it is likely that general practitioners would conduct the bulk of such counselling or that no pre-test counselling would be offered. Anecdotal discussion suggest this is already the

¹² Hanna, L. (1997). "New York State Begins Mandatory HIV Testing of Newborns", *Beta*, p.5.

¹³ ANCARD/IGCARD. (1998) *HIV Testing Policy*. Canberra, Commonwealth Department of Health and Aged Care, p.18.

¹⁴ Gibb, D. (1998) "Factors affecting uptake of antenatal HIV testing in London: results of a multicentre study". *British Medical Journal*, vol. 316, pp. 259-261.

case and that pre-test counselling is not conducted, particularly where HIV/AIDS testing is included as a component of routine STI testing.

Current antenatal policy specifies that pre- and post-test counselling is required prior to testing yet it is unknown to what extent this practice is occurring nor the quality of the pre-test counselling provided. In order to improve the coverage and counselling provided and address some of the concerns regarding practitioners skills in taking sexual health risk assessments improvements are necessary. Dedicated resources are required to properly train and accredit practitioners in this area. Training courses should include a broad range of issues such as cultural awareness and an improvement in attitudes towards current and former injecting drug users to limit discrimination.

Whilst current policies may be operational in larger regional centres universal coverage, particularly for indigenous women, is not guaranteed. Indigenous women's health care, particularly in remote and isolated communities, is significantly lower than for any other Australian community. Improvements in all aspects of antenatal care for indigenous women must be improved in a culturally appropriate manner. Whilst providing HIV/AIDS testing options for indigenous women is necessary an absence of culturally appropriate pre- and post test counselling, information and education programs, and HIV/AIDS prevention and treatment options in the context of broader antenatal facilities must be available.

Do general practitioners possess the necessary specialist skills to provide HIV/AIDS services?

Overseas research indicates that a decision to uptake testing is dependent upon the type of pre-test counselling given. It is of concern that general practitioners and obstetricians, particularly outside Metropolitan centres, may not possess the skills to provide pre- or post-test counselling. Although women are a low risk population, it is likely given the high number of tests being ordered that the majority of positive results returned would be false positives. In addition to the expense of confirming and retesting using more expensive Western Blot testing methods, it is a concern that in the absence of any training in this area a positive result may result in unnecessary terminations recommended by practitioners unaware of current HIV treatment options. Introduction of a policy of routine screening may result in many women being tested as part of general STI screening, however this may occur without adequate consent or counselling, and at significant financial outlay.

As discussed previously, training and accreditation programs for general practitioners would significantly improve skills not only in sexual health and other risk behaviour assessment but improve pre- and post-test counselling, assist in obtaining informed consent, act as an educative and preventative forum for informing women as to risk behaviours for HIV/AIDS transmission and involve pregnant women in decisions about managing their pregnancy. If voluntary testing is offered and available then improved

training for health providers provides an integrated approach that would also allow pregnant women to make informed decisions as to whether testing is appropriate¹⁵.

Is the cost associated with universal screening justified by low rates of HIV/AIDS infection amongst pregnant women in Australia?

Universal HIV antenatal screening policy has significant resource implications. The financial burden on health budgets - due to the increased cost of testing, verification and re-testing of positive results, pre- and post-test counselling, and the training of practitioners in HIV/AIDS issues – may be hard to justify given women remain a low risk population in Australia.

Whilst it is known that some pregnant women are tested for HIV without their consent in Australia, any proposal to extent testing on a voluntary basis to all pregnant women will be compromised by an absence of resources. Further, given the range of issues arising from universal testing it must be considered where scarce resources are best dedicated. Ziegler predicts that in an environment of universal testing, HIV testing rates of all pregnant women would increase to 100%. This scenario would result in an additional 200,000 tests being added to annual health budget in Australia¹⁶ at the estimated cost of \$2,400,000¹⁷. These costings relate to testing only and do not include the extra financial resources that would be required to support an expansion in pre- and post-test counselling services, medicare rebates for general practitioners and other infrastructure related costs. In addition, the figure quoted does not include the increased cost of re-testing (using more sophisticated and expensive Western Blot methods) due to the anticipated increase in false positive returns.

However, such an approach is likely to fail as research indicates that to increase uptake of HIV/AIDS testing of pregnant women to 100% mandatory legislation forcing pregnant women to test is required.

Other issues

The majority of medical literature investigating voluntary antenatal screening for HIV is supportive of universal testing. It generally seeks to explore how to improve uptake of testing¹⁸. It is assumed that once women are aware of their HIV status they will act according to medical advice. However, women who are non-compliant with medical regimes have not been considered in Australia. Guidelines do not exist as to management of this issue. There is an overwhelming focus on the well being of the child at the

¹⁵ Sherr et al. (2000) "Consent and antenatal HIV testing: the limits of choice and issues of consent in HIV and AIDS" (in press).

¹⁶ Ziegler, J. op cites.

¹⁷ Based on costs of a HIV/AIDS test at \$120.00 per test. Quoted price Qld Health. This figure does not include additional costs of re-testing, medi-care practitioner expenses, and pre- test counselling.

¹⁸ Simpson, W.M. et al. (1998) "Uptake and acceptability of antenatal HIV testing: randomised controlled trail of different methods of offering the test". *British Medical Journal*. Vol. 316, pp. 262-7.

expense of the treatment and care of the mother, or an acknowledgement that significant debate exists on the merits of different approaches to limiting HIV transmission to children, and parents' views on how to manage pregnancy may diverge from those views held by medical practitioners. In addition, many women with HIV who have given birth report prejudiced attitudes, or poor information and advice from health care professionals¹⁹. It is clearly unacceptable to increase detection of HIV positive pregnant women if adequate care and follow-up is not available.

There is a concern that to achieve the goal of universal screening of all pregnant women in Australia will require legislation that mandates compulsory testing. Such a practice is contrary to current health policies which acknowledge that educative practices such as access to resources and information informs an individuals decisions with respect to their treatment and care. Moreover, the policy of mandatory testing of any population has been consistently rejected as an approach which fails to respect human rights.

Is routine antenatal testing the best practice model for Australia?

It is argued that the benefits of routine antenatal testing for all pregnant women out-weigh the cost-effective arguments. However, cost benefit arguments are realistic when the population being tested for HIV/AIDS remains one of the lowest at risk groups in Australia. In realistic terms the expenditure cannot be justified. A danger exists that the introduction of universal screening for pregnant women will occur without serious discussion of the issues outlined in this paper. Until these issues are clarified and processes initiated to ensure that women who report as HIV positive during pregnancy can confidently make decisions regarding their own treatment and care a shift in policy is of great concern.

Anecdotal evidence suggests that women who know their HIV status in Australia and have chosen to have a child are generally well informed about treatment options, what health providers to use, and management of pregnancy options. However, there is an absence of services and resources for HIV positive women in Australia. Consideration should be given to directing limited financial resources at alternative initiatives for HIV positive women with children rather than costly and questionable universal screening measures.

Improving the current antenatal approach – an integrated model

Whilst it is acknowledged that an effective medical identification of HIV positive pregnant women is through universal testing the economic justification for dedicating significant resources does not exist. Given the range of issues identified with respect to antenatal testing, it must be considered whether the outcomes of providing treatment and care to pregnant women can be achieved through improving the current policies and

¹⁹ Positive Women Victoria – anecdotal discussion.

integrating elements of other antenatal models. To achieve this goal the following policy statements and recommendations are made:

Recommendation 1:

A more strategic commitment to identifying at risk populations – through comprehensive sexual health and other risk behaviour identification history taking - should be maintained.

Recommendation 2:

Dedicated financial resources are required to enhance general practitioner training in effective sexual health history and other risk exposure assessment practices.

Recommendation 3:

That an accreditation program for the training of general practitioners and other antenatal service providers for pre- and post-test counselling relating to antenatal testing that is culturally appropriate and non-discriminatory towards ‘at risk’ populations be established.

Recommendation 4:

That an accreditation program for the training of general practitioners and other antenatal service providers for the clinical management of HIV positive pregnant women, their children and partners that is culturally appropriate and non-discriminatory be established.

Recommendation 5:

That HIV/AIDS testing be made available to all Australian women regardless of geographic location.

Recommendation 6:

That duty-of-care obligations be consistent with ANCAHRD policy that specifies that the appropriate antenatal approach is risk assessment of a patient following sexual health and other risk behaviour history taking, obtaining informed consent and providing pre- and post test counselling when offering a test.

Recommendation 7:

That pre-conception testing be encouraged as a component to limiting mother-to-child HIV transmission and that the approach be integrated into reproductive health programs so that current ‘risk assessment’ procedures are first identified by potential parents. Such an approach would contribute to obtaining fully informed consent.

Recommendation 8:

That any integration of voluntary testing into current practice be accompanied by improved practices in current policies to facilitate increased awareness of the benefits of testing, be accompanied by partner and patient testing throughout pregnancy where risk is identified and comprehensive sexual health and behaviour assessment to educate women as to prior and ongoing transmission risks.

Recommendation 9:

That informed consent is obtained when offering voluntary testing and that it not be integrated into general antenatal screening.

Recommendation 10:

That current policy guidelines are matched by appropriate resources in rural and regional areas of Australia.

Recommendation 11:

That antenatal care for indigenous Australians be investigated and provided in a context that is culturally appropriate and includes appropriate pre- and post-test counselling, information and education programs, and HIV/AIDS prevention and treatment options.

Recommendation 12:

That mandatory testing is rejected as a means of compelling women to seek testing.

Glossary of Terms

- Antenatal: Pre-birth
- Antiviral: Opposing a virus: interfering with its replication; weakening or abolishing its action.
- Biomedical: (1) Pertaining to those aspects of the natural sciences, especially the biologic and physiologic sciences, that relate to or underline medicine 2. Biological and medical, ie., encompassing both the science(s) and the art of medicine.
- in utero*: Within the womb; not yet both.
- Neonatal: Relating to the period immediately succeeding birth and continuing through the first 28 days of life.
- Neonate: A neonatal infant.
- Paediatrics: The medical speciality concerned with the study and treatment of children in health and disease during development from birth through adolescence.
- Perinatal: Occurring during, or pertaining to, the periods before, during, or after the time of birth; ie., before delivery from the 28th week of gestation through the first 7 days after delivery.
- Prophylaxis: Prevention of disease or of a process that can lead to disease.
Active p., use of an antigenic (immunogenic) agent to actively stimulate the immunological mechanism.
Chemical p., the administration of chemicals or drugs to members of a community to reduce the number of carriers of a disease and to prevent others contracting the disease.
- Therapeutic: Relating to therapeutics or to the treatment, remediating, or curing of a disorder or disease.
- Virology: The study of viruses and of virus disease²⁰.

²⁰ All definitions drawn from: Stedman's Medical Dictionary 26th Edition. (1995) Baltimore, Williams & Wilkins.