

Prenatal Screening and Diagnosis

A survey of health care providers'
knowledge and attitudes



Department of Health
Government of Western Australia

Produced by Genomics Branch
with assistance from Marketing and Campaign Support
Population Health Division
© Department of Health 2002
HP 8382



Department of Health
Government of Western Australia

Prenatal screening and diagnosis

A survey of health care providers' knowledge and attitudes

October 2002

Department of Health
Western Australia

Acknowledgments

The authors wish to acknowledge the contributions of:

The Royal Australian and New Zealand College of Obstetricians and Gynaecologists for their support;

King Edward Memorial Hospital, Clinipath, Western Diagnostics Inc. and St John of God Pathology for assistance with the collection of data;

All members of the Reference Group for their professional advice; and

All the health professionals who took the time to take part in the survey.

Citation

Rostant, K., Steed, L. & O’Leary, P. (2002). *Prenatal screening and diagnosis: A survey of health care providers’ knowledge and attitudes*. Genomics Occasional Paper 2. Department of Health, Perth, Western Australia.

Abstract

Objective: To survey and document the knowledge and attitudes of health care providers in Western Australia towards prenatal screening and diagnostic procedures for fetal anomalies including trisomies such as Down syndrome and structural abnormalities such as neural tube defects.

Design: A self-administered mail survey.

Sample: 30 obstetricians and 313 general practitioners. The average age of participants was 43.5 years, 50% were male, 50% were female, and 69% were situated in the metropolitan area and 24% in the rural area. A small percentage did not select their area of practice.

Results: Those who had not accessed specific prenatal resources had significantly lower knowledge scores and felt they had a greater need for information than those who did access specific resources. Relative to GPs, obstetricians were significantly more positive towards the value of the test, were more confident about the availability and ease of coordination of follow-up services and were more confident in their ability to understand and convey antenatal screening information. Moreover, GPs felt they had a greater need for additional information. Those health care providers who had attended at least three or more conferences or workshops in their professional lifetime were also significantly more confident in their ability to understand and convey antenatal screening information. Further group differences were found in attitudes towards the value of the tests and confidence in the availability and ease of coordination of follow-up services according to geographical area. Female health care providers were significantly more confident about the availability of follow-up services and had higher knowledge scores than male health care providers. They were also more likely to practice in the metropolitan area.

Conclusion: Overall, health care providers felt antenatal screening and diagnostic tests were valuable and knowledge was high, however, they felt they could benefit from further information. Given that antenatal practices are rapidly evolving, continuing education and ongoing professional development is critical and should be encouraged.

Table of Contents

Acknowledgments	ii
Citation	ii
Abstract	iii
1 Introduction	1
2 Method	5
2.1 <i>Participants</i>	5
2.2 <i>Measures</i>	5
2.3 <i>Procedure</i>	6
3 Results	7
4 Discussion	12
5 References	17
6 Appendices	20
<i>Appendix I: Members of the Reference Group</i>	
<i>Appendix II: Prenatal Screening and Diagnosis – Health Professional Survey</i>	
<i>Appendix III: Participant’s Covering Letter</i>	
<i>Appendix IV: Participant’s Reminder Letter</i>	

List of Tables and Figures

Table 1	The proportion of participants who answered selected items correctly or incorrectly (correct answers in parentheses)	8
Figure 1	Mean knowledge score and sighting informational resources	9
Figure 2	Mean attitude scores towards the value of the tests and follow-up services for each qualification	9
Figure 3	Mean rank attitude scores towards the ability to understand and convey information for each qualification.....	10
Figure 4	Mean attitude scores towards the value of the tests and follow-up services for each area	10
Figure 5	Mean rank attitude scores towards the ability to understand and convey information by number of educational activities.....	11

1 Introduction

Pre-test information plays a vitally important role for women in deciding whether or not to undergo prenatal screening and diagnosis. It has been suggested that information can positively influence the uptake of such procedures^{1,2} and also act as a deterrent^{3,4}. Either way, information has the ability to impact on the decision process. It is generally agreed that women should have access to accurate and consistent information and that the information received from a woman's health care provider is particularly important.⁵ However, the explanation and accuracy of this information may be limited if health care providers themselves have inadequate knowledge or practices.

Emery, Watson, Rose, and Andermann⁶ recently reviewed the knowledge and attitudes of primary carers towards genetics. Overall, knowledge was higher in doctors aged less than 40 years⁷, those with previous training in genetics, those participating in continuing medical education and those involved in obstetrics⁸. All participants in the studies of the review consistently noted genetics as an important area of medicine. Although health care providers felt the area of genetics was important, Emery et al.⁶ commented that they were uncertain of their role in genetics due in part to their lack of knowledge and need for educational support.

Many studies included in the review by Emery et al.⁶ indicated that many health care providers appeared to have inadequate knowledge of prenatal screening and diagnosis. Edwards, et al.⁹ argued, however, that knowledge rarely undergoes a valid testing process, as the questions asked do not reflect the range of practical issues relevant to the concerns and questions likely to be asked by the patients.

Preferably, the knowledge that is assessed should replicate the discussions that take place with the patients. This knowledge would include:

- the optimal time to perform first and second trimester screening and diagnostic tests;
- information on the advantages of undergoing the tests;
- how these tests are performed and which conditions the tests screen for;
- information on characteristics of the conditions and variability in severity;

- information on a woman's age risk and increased risks for advanced maternal age;
- the risks associated with having invasive tests;
- the percentage of women that receive an *at increased risk* result; and
- the possibility and frequency of false positive and false negative results.

Taking into consideration this argument of invalid knowledge assessment, there is still some evidence of inadequate knowledge regarding the presentation and meaning of test results.¹⁰ For example, in an analysis of women's experiences with second trimester maternal serum screening (MSS), Statham and Green¹¹ established that care providers in the United Kingdom (UK) often hold varying misconceptions with regard to the meaning of the results of screening tests and the interpretation of risk. In the study by Sadler¹², 59% of respondents correctly answered only half or less of the questions relating to knowledge of serum screening. In addition, Carroll et al.¹³ surveyed health care providers (general practitioners, midwives and obstetricians) in Canada in relation to MSS and found that over one third of care providers had inadequate knowledge in regard to the sensitivity of screening tests. Consequently, health professionals' knowledge levels remain areas of concern.

It has been further proposed that care providers can shape women's understanding of the meaning and purpose of screening tests¹⁴. Reutter and Ford¹⁵ (p.143) stated, "When the flow of information is from the professional to the client...there is the potential for the professional to assume the dominant role in the relationship". In a study conducted in the UK in 1994, the authors¹⁶ found that health care providers frequently disclose information that they perceive to be important in the decision-making process of pregnant women. Because of this selectivity it is possible that women may not be fully aware of the options and implications of such tests.

Care providers' own attitudes and beliefs may influence which clients are offered antenatal screening tests. For example, in the United States context Yankowitz, Howser, and Ely¹⁷ found that obstetricians tend to offer MSS tests to all pregnant women, whereas, family physicians frequently offer the test selectively to those women who they felt would benefit from the testing, specifically to women who would consider a termination of an affected fetus.

Doctors who offer antenatal screening tests based on their own opinions or biases, reflect the outmoded view that women are not able to make their own decisions. This belief further reinforces the health care provider's dominance in the relationship as suggested by Reutter and Ford¹⁵, further strengthening the attitude that "doctor knows best". Additionally, the findings indicate that health professionals fail to take into account the possibility that women's opinions regarding prenatal procedures may be altered by the provision of information. Furthermore, offering prenatal tests only to those who would consider a termination reflects the assumption that this is the only positive outcome to these procedures. Many other advantages, however, have been identified, including the alleviation of worry for many couples and emotional, physical and financial preparations for birth.¹⁷

Research in Australia regarding health care providers' knowledge and attitudes of prenatal tests has been limited compared to other countries. In one study conducted to determine GPs' self-reported need for genetic education, GPs believed their knowledge of genetics was poor and they felt inadequately prepared to manage patients with genetic conditions.¹⁸ GPs further identified genetic testing and counselling as areas in greatest need of guidance. In another study aimed at enhancing knowledge of hereditary diseases and their management, GPs acknowledged that further genetic education was required and identified that practical information in particular would be helpful, for example, identifying patients who might benefit from genetic counselling.¹⁹ Furthermore, de Crespigny²⁰ identified that Australian practitioners often lack continuing medical education and lack adequate ongoing experience.

Overall, these findings suggest that greater education and support is needed for health care providers. Hunter et al.²¹ proposes that education must encompass risk calculations, awareness of genetic services, ethical obligations, and the ability, as well as the confidence, to counsel correctly about testing. Health care providers' perception of their own knowledge is frequently overestimated relative to their actual knowledge.^{21,22} Consequently, they are less likely to be receptive to outside support and educational efforts. That is, individuals who perceive themselves to be knowledgeable will be confident that they are able to convey information to patients, thus are less likely to be

amenable to professional development. As a result, Edwards et al.⁹ suggest that education should focus on helping health care providers to identify important gaps in their knowledge.

The literature highlights the important deficits in knowledge in health care providers in the area of prenatal procedures and the impact that attitudes and beliefs may have on service provision. Given these findings and the lack of Australian research, the aim of the present study is to survey and document the knowledge and attitudes of health care providers in Western Australia towards prenatal screening and diagnostic procedures for fetal anomalies including trisomies such as Down syndrome and structural abnormalities such as neural tube defects. Currently, the Department of Health (WA) distributes written resources for the community regarding first and second trimester prenatal screening and diagnostic tests. Other resources are also distributed specifically for health professionals. The information gained from the present study will guide future advances in education and help in identifying the areas that are in greatest need of development.

2 Method

2.1 Participants

All obstetricians and general practitioners (GPs) in Western Australia (WA) who regularly see pregnant women were eligible for participation. The Royal Australian and New Zealand College of Obstetricians and Gynaecologists provided a master list of all actively practicing obstetricians in WA ($n = 62$) of which three were invited to participate in a Reference Group (see Appendix I). Of the remaining 59, 30 responded. Names and contact details were not available on the GPs seeing pregnant patients, thus surveys were sent to all 1925 GPs in WA. Of these 10 were returned as the wrong address. Responses were received from 463 (24%) GPs. Those who claimed they did not see pregnant patients on a regular basis ($n=140$) and those who reported they had retired ($n=10$) were excluded. The average age of participants was 43.5 years of age. Fifty percent (50%) were male and 50% were female. Sixty nine percent (69%) practiced in the metropolitan area, 24% practiced in the rural area and 7% did not specify their practice location. GPs graduated with their qualifications an average of 17 years previous, GPs with postgraduate qualifications 13.5 years previous and obstetricians an average of 18 years previous. Twenty six percent (26%) of all respondents had never attended an educational conference or workshop where prenatal screening or diagnosis was a significant part of the program.

2.2 Measures

The information was collected via an 89-item self-administered mail survey (see Appendix II) that took approximately 15 minutes to complete. The survey consisted of four sections targeting attitudes (23 items), service provision (30 items), knowledge (22 items) and demographic information (14 items). The response format comprised multiple choice, Likert scales and open-ended questions. Items were adapted from those constructed in earlier studies.^{10,13,21,23} Furthermore, a reference group consisting of three health professionals was established so that content validity could be assessed. The survey was also pilot tested on 50 health care providers, 8 obstetricians and 42 GPs.

2.3 Procedure

Following approval by the Curtin University Human Ethics Committee, the survey was mailed out together with a covering letter (see Appendix III) and reply paid envelope. Return of the completed survey was deemed consent to participate. To allow for anonymity of responses, participants were not required to include their name or contact details. As a result, a reminder letter (see Appendix IV) was sent to all health care providers eight weeks following the postage of the survey. Data were also collected from King Edward Memorial Hospital, Clinipath, Western Diagnostics Inc. and St John of God Pathology, to determine the number of first and second trimester prenatal screening tests being ordered by health care providers in WA.

3 Results

Of the 59 obstetricians, responses were received from 30 equating to a response rate of 51%. A final sample of 313 GPs who responded to the survey were eligible to participate. According to hospital and clinical data there are approximately 1625 GPs actively providing antenatal care in WA of which 75% are ordering less than six screening tests per year. This (1625) is the number of provider numbers against which a screening test has been ordered, however, it is possible that one GP has different provider numbers for each practice site, thus is likely to be an overestimate. Using this number of 1625, a final response rate of 19% was received from the GPs providing care, which is likely to be an underestimate.

A Principal Axis Factor analysis of the attitude items revealed six reliable factors: attitude towards the overall value of the tests, perceived ability to understand and convey first trimester information, perceived ability to understand and convey second trimester information, perceived need for greater information, perceived availability of follow-up services and perceived difficulty in coordinating follow-up services. The average scores for the attitude factors were four (agree) for the first three factors, three (neither agree nor disagree) for the next two factors and two (disagree) for the last factor on a five-point Likert scale, respectively. That is, health care providers felt the tests were valuable, were confident in their ability to understand and convey both first and second trimester information, they perceived follow-up services to be available and relatively easy to coordinate and they felt they had an average need for information. The six factors identified were found to have adequate internal consistency coefficients ranging from 0.66 to 0.95. Total knowledge scores were compiled. The mean total knowledge score was 19 out of a possible 23 (83%). Table 1 indicates the proportion of participants who answered selected questions correctly.

Table 1

The proportion of participants who answered selected items correctly (correct answers in parentheses).

Question	Correct
Following a screening test, what percentage of women receive an at increased risk result?	53% (5%)
When is the optimal time for first trimester screening to take place?	84% (11-13wks)
When is the optimal time for second trimester screening to take place?	84% (15-17wks)
A birth defect occurs in 5% (1 in 20) of all pregnancies	65% (True)
Most women (98%) who receive an at increased risk result have healthy babies	71% (True)
Second trimester maternal serum screening is routine for all pregnant women	84% (False)
A negative result from a chorionic villus sampling guarantees the absence of all birth defects and/or hereditary conditions	86% (False)

Further analyses were conducted in terms of the dependant variables (knowledge and the six attitude factors) and the demographic variables (age, qualifications, geographical area, gender, number of conferences or workshops attended where prenatal screening or diagnosis was a significant part of the program, perception of knowledge, access to information and years in practice). Results pertaining to service provision are presented and discussed elsewhere.²⁴

The data were screened for violations to the assumptions of normality using skewness and kurtosis statistics for each of the outcome measures. Statistics of greater than one were considered violations of this assumption. Following the removal of two outliers in the knowledge variable, normality for knowledge was not violated. Analyses were conducted using the statistics of t-tests and analyses of variance, however, where violations to the homogeneity of variance assumption were observed, nonparametric techniques of the Mann-Whitney U test and the Kruskal-Wallis Test were used.

Health professionals believed their knowledge of prenatal diagnosis to be significantly higher than their knowledge of prenatal screening ($t(333) = -4.99, p < 0.05$). Spearman rho correlations of -0.21 and -0.16 were found between actual knowledge levels and perception of screening knowledge and perception of diagnostic knowledge, respectively. Although the relationship was not significant, the direction is worthy of noting.

Those who had seen the community pamphlets ($t(276) = 3.08, p < 0.05$) and those who had seen the fact sheets for professionals ($t(229) = 2.46, p < 0.05$) had significantly higher knowledge levels than those who had not seen the pamphlets or fact sheets, respectively (Figure 1).

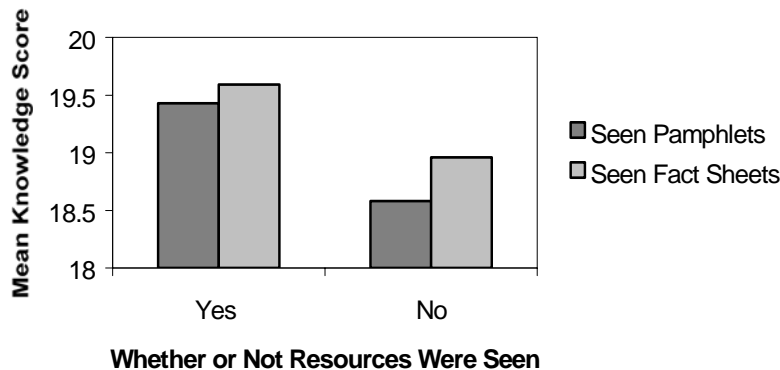


Figure 1. Mean knowledge score and sighting informational resources

Moreover, those who had not seen the fact sheets felt they had a greater need for additional information than those who had seen them ($t(232) = 2.97, p < 0.05$).

Obstetricians were significantly more positive towards the value of the screening test ($F(2, 330) = 0.75, p < 0.05$) and perceived follow-up services to be less difficult to coordinate ($F(2, 326) = 4.04, p < 0.05$) (Figure 2).

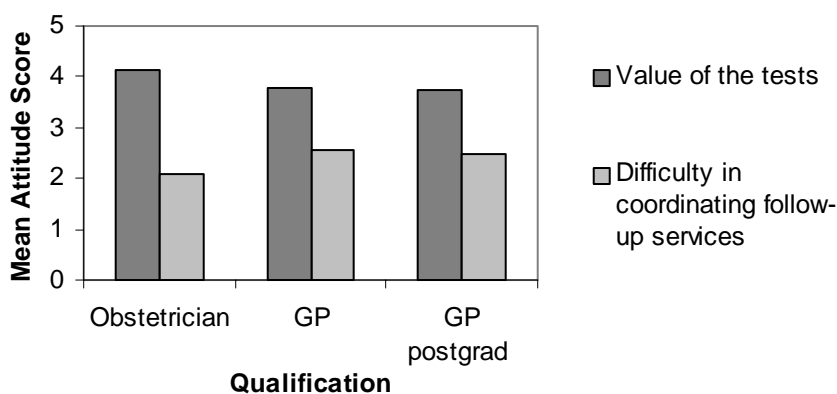


Figure 2. Mean attitude scores towards the value of the tests and follow-up services for each qualification

Obstetricians were also more confident in the availability of follow-up services ($\chi^2(2) = 21.92, p < 0.05$) than GPs or GPs with postgraduate qualifications.

GPs had a significantly greater need for additional information than obstetricians and GPs with postgraduate qualifications ($F(2, 332) = 8.17, p < 0.05$). Obstetricians were also more confident in

their ability to understand and convey both first ($\chi^2(2) = 27.84, p < 0.05$) and second ($\chi^2(2) = 26.41, p < 0.05$) trimester information (Figure 3).

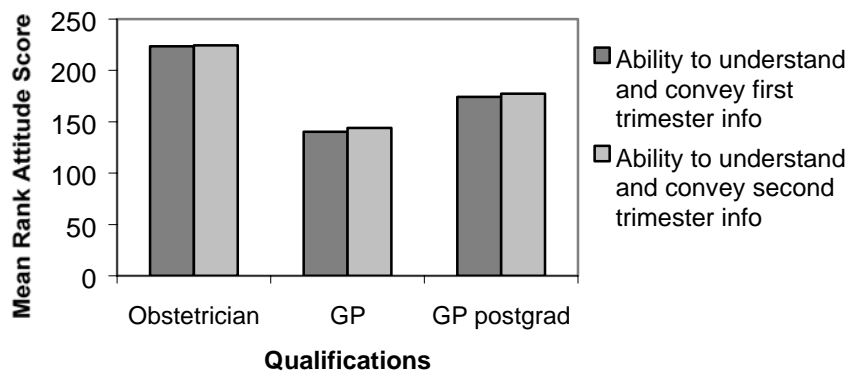


Figure 3. Mean rank attitude scores towards the ability to understand and convey information for each qualification

Those in the metropolitan area had significantly more positive attitudes towards the value of the tests ($t(315) = 2.61, p < 0.05$), and were more confident in the availability ($t(315) = 13.36, p < 0.05$) and ease of coordination ($t(312) = -3.4, p < 0.05$) of follow-up services than those in the rural area (Figure 4).

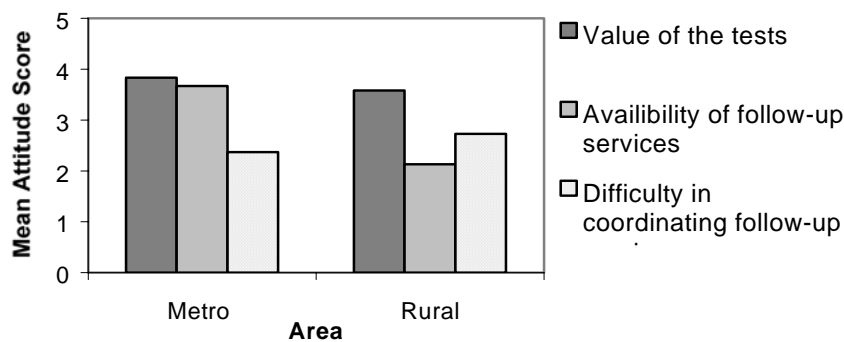


Figure 4. Mean attitude scores towards the value of the tests and follow-up services for each area

Female health care providers were significantly more confident in the availability of follow-up services ($U = 11347.5, p < 0.05$) and had significantly higher knowledge ($t(329) = -2.74, p < 0.05$) than male health care providers. A larger proportion of female health care providers were also more likely to practice in the metropolitan area ($\chi^2(1) = 16.61, p < 0.05$).

Those who had attended at least three or more conferences or workshops in their professional lifetime were more confident in their ability to understand and convey both first ($\chi^2(3) = 13.91, p < 0.05$) and second trimester information ($\chi^2(3) = 11.18, p < 0.05$) (Figure 5).

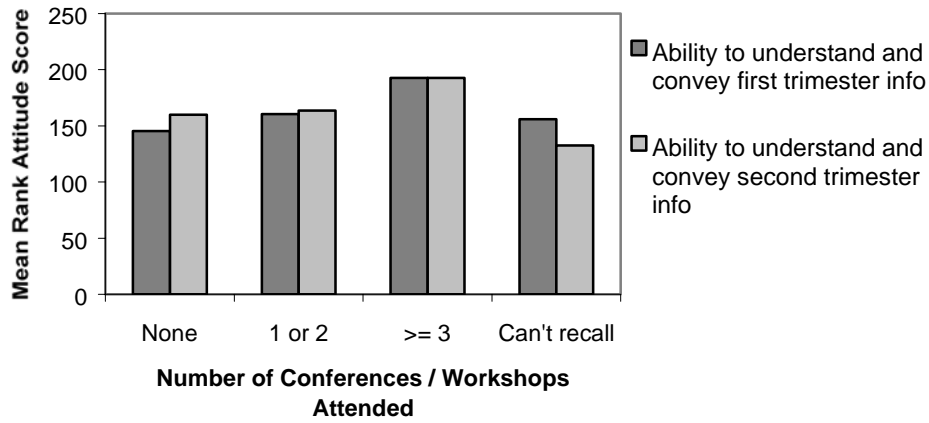


Figure 5. Mean rank attitude scores towards the ability to understand and convey information by number of educational activities

No relationship was found between knowledge and attitudes and age or years in practice.

4 Discussion

The importance of pre-test counselling about prenatal screening and diagnostic procedures has become increasingly evident. Equally apparent is the evidence indicating important deficits in health care provider knowledge and the influence of beliefs on service provision. Therefore, the aim of the present study was to survey and document the knowledge and attitudes of health care providers in Western Australia towards prenatal screening and diagnostic procedures for fetal anomalies including trisomies such as Down syndrome and structural abnormalities such as neural tube defects. The main outcome measures were knowledge and attitudes. The attitude factors included perceptions of the overall value of the tests, understanding of, and ability to, convey first and second trimester information, the need for greater information and the availability of and the difficulty in coordinating follow-up services.

Overall, health professionals' knowledge of prenatal screening and diagnosis was high with an average score of 83%. Consistent with previous reports, we believe that knowledge measures need to include items that are relevant to the discussions that take place with clients.^{6,16} The survey used in the present study accommodated this argument and included items covering information considered important for women in making an informed decision. For example, items covered such information as the conditions for which the tests screen, the protocol for prenatal procedures, the specificity of screening and diagnostic tests and the risks associated with invasive testing. Although we found that health care providers have a high level of knowledge, we are aware of the report of Smith et al.¹⁶ that health care providers will preferentially disclose information they perceive to be important. Therefore, it is unclear whether this high level of health care providers' knowledge is being communicated to women.

Although overall knowledge was high, specific gaps in knowledge were identified. Our results indicated that health care providers have knowledge deficits in the area of recall rates of screening tests. Forty seven percent (47%) answered incorrectly or were unable to identify that 5% of women who undertake either a first or second trimester screening test receive an *at increased risk* result. These results are similar to the findings by Carroll et al.¹³ where 30% of health care providers were

unable to select the false positive (recall) rate for MSS. This result indicates that almost half of the health care providers in the present study would either inform women incorrectly of the recall rate of screening tests or would be unable to inform a woman of this statistic altogether.

Close to a third of health care providers also answered incorrectly regarding the prevalence of birth defects and the false positive rate of screening tests. As noted above, this information is important for women in making an informed decision, thus the women being seen by these health care providers are unlikely to be receiving accurate information. Additionally, 16% chose incorrectly or were unable to identify the optimal time to undertake first and second trimester screening. This suggests that women may not be receiving appropriate management. In the absence of accurate gestational age information women may be offered unnecessary diagnostic testing, exacerbating levels of anxiety and increasing risks of spontaneous abortion.

Only small correlations were found between perceptions of knowledge and actual knowledge levels. Although this relationship is not significant it is interesting to note its negative direction. This result is similar to previous research, which has indicated a disparity between health care providers' perception of knowledge and actual levels of knowledge.²² Tracey et al.²² further reported that health care providers would not be able to accurately assess their learning needs if there is disparity between perceived and actual levels of knowledge. Consequently the ability of the health care providers in the current study to accurately assess their own educational needs is questionable. Health care providers further perceived their knowledge of prenatal diagnosis to be significantly higher than their knowledge of prenatal screening. In light of their inaccurate perceptions of knowledge, this result is debatable and requires further investigation.

Obstetricians were significantly more positive towards the value of the tests, more confident in regard to the availability and ease of coordination of follow-up services and were more confident in their ability to understand and convey both first and second trimester information. GPs felt they had a significantly greater need for additional information. These results are not surprising, as those who specialise in a particular area will feel more positive towards, and more confident in, providing services in that area. Nevertheless, it is important to recognise the needs of those who may not

specialise in an area yet do provide services, for example general practitioners providing antenatal care.

Geographical location was also important in that those in the metropolitan area had significantly more positive attitudes towards the value of the test and were more confident in the availability and ease of coordination of follow-up services such as genetic counselling. This result was also expected. Permaul-Woods et al.²⁵ in their research identified that distance was a significant barrier where those in rural areas of Ontario, Canada expressed significant concern regarding the availability of follow-up services. This lack of availability and resultant difficulty in coordinating follow-up services means that women in rural areas are also likely to have reduced access to information and reduced knowledge.

Those who had seen the community pamphlets and fact sheets for professionals had significantly higher knowledge levels than those who had not seen them. Furthermore, those who had not seen the fact sheets had a greater need for additional information. This suggests that the current resources available for both the community and health professionals are proving beneficial for increasing knowledge of prenatal screening and diagnosis in health care providers and are satisfying a need for information. This provides encouraging support for the effectiveness of these resources.

Previous research has also indicated that continuing medical education activities have proved beneficial in increasing knowledge of prenatal screening and diagnosis.^{6,8} Although these findings of knowledge are not supported by our results, attending conferences and workshops appear to benefit health care providers, by improving confidence in their ability to understand and convey both first and second trimester information to patients. de Crespigny²⁰ indicated, however, that according to data produced by the Australasian Society for Ultrasound and Medicine, Australian practitioners often lack continuing medical education, where only a small proportion attend conferences and workshops that are offered. Similarly, our results show that three quarters of health professionals only attended up to two educational programs in their professional lifetime. Given the benefits in attending such activities it is recommended that health professional educators offer regular continuing education and take an active role in encouraging their uptake.

Female health care providers were found to have significantly higher knowledge levels and were more likely to feel as though follow-up services, such as genetic counselling, are more readily available than their male counterparts. This may be due to the fact that the topic is seen to be more personally applicable to women. It is plausible that these women may have had the test/s or feel that it is a decision they may have to make in the future, and as such take a more active role in their own education for both personal and professional reasons. As a result, they are more likely to have higher knowledge and be more aware of available services relating to prenatal procedures. Additionally, a significantly higher proportion of female health care providers were likely to practice in the metropolitan area and as a result would have greater access to information and follow-up services.

With regard to the representativeness of the sample, it is important to note that we invited health care providers to return the survey if they were seeing pregnant women on a regular basis. Hospital and clinical data indicated that approximately 1625 GPs are ordering prenatal screening tests. Of these, 75% are ordering less than six first and/or second trimester screening tests per year. This number is likely to be an overestimate, as the search was conducted by provider number, however, it could be argued that this 75% did not respond to the survey, as they do not see pregnant patients on a regular basis.

However, currently in Western Australia between 30% and 40% of women choose not to undertake screening.²⁶ The health care providers seeing these women may be providing prenatal information, however, as these women choose not to undertake testing, the health care provider would not be ordering the test. It is unclear whether these health care providers are being included in the 1625 sample. They may, however, have been included in the current sample, as those who are seeing pregnant women on a regular basis were invited to participate regardless of whether they were actually ordering prenatal tests. It is uncertain, therefore, the extent to which the current sample is representative of those health care providers in Western Australia currently seeing pregnant patients on a regular basis.

On the whole, however, health care providers felt the tests were valuable, they were positive towards their ability to understand and convey both first and second trimester information, were

confident in the availability and ease of coordination of follow-up services and they felt they could benefit from greater information. Particular areas were identified where knowledge was lacking, however overall knowledge was high. Given the amount of time required to provide and explain information on prenatal tests, it is unclear whether this knowledge is being communicated to women.

The benefits of educational resources such as written material, workshops and conferences have been illustrated, thus we conclude that promotion continue in these areas with further efforts aimed at increasing their uptake and frequency. Of particular importance is ensuring that this information and education reaches those practicing in rural areas. The above-mentioned resources may be used as avenues to increase health professionals' knowledge and assist them to communicate this information and knowledge to women so that they may make an informed decision regarding the uptake of prenatal procedures. As indicated by Metcalfe et al.¹⁸, these resources need to contain information that would be relevant to day-to-day practice.

In addition, efforts should focus on informing health professionals where they can find information when it is needed.¹⁹ The increasing use of computers in the office means that Internet availability of information may also be useful. Furthermore, increased community education and awareness may encourage health professionals to increase their own knowledge levels and encourage them to provide women with comprehensive and accurate information.

5 References

1. French, B. N., Kurczynski, T. W., Weaver, M. T., & Pituch, M. J. (1992). Evaluation of the health belief model and decision making regarding amniocentesis in women of advanced maternal age. *Health Education Quarterly*, *19*(2), 177-186.
2. Marteau, T. M., Johnston, M., Kidd, J., Michie, S., Cook, R., Slack, J., & Shaw, R. W. (1992). Psychological models in predicting uptake of prenatal screening. *Psychology and Health*, *6*, 13-22.
3. Al-Jader, L. N., Parry-Langdon, N., & William Smith, R. J. (2000). Survey of attitudes of pregnant women towards Down syndrome screening. *Prenatal Diagnosis*, *20*, 23-29.
4. Santalahti, P., Hemminki, E., Latikka, A. M., & Ryyanen, M. (1998). Women's decision-making in prenatal screening. *Social Science and Medicine*, *46*(8), 1067-1076.
5. Dimivicus, J. (1997). *Information giving and decision making in ante-natal screening*. Paper presented at the Issues in Pregnancy Counselling: What do Women Need and Want?, Ruskin College, Oxford.
6. Emery, J., Watson, E., Rose, P., & Andermann, A. (1999). A systematic review of the literature exploring the role of primary care in genetic services. *Family Practice*, *16*(4), 426-445.
7. Wilkins-Haug, L., Hill, L. D., Power, M. L., Holzman, G. B., & Schulkin, J. (2000). Gynecologists' training, knowledge, and experiences in genetics: A survey. *Obstetrics and Gynecology*, *95*(3), 421-424.
8. Furr, L. A., & Kelly, S. E. (1999). The genetic knowledge index: Developing a standard measure of genetic knowledge. *Genetic Testing*, *3*(4), 193-199.
9. Edwards, A., Matthews, M. R., Matthews, S., Houston, H., & Wilkinson, C. (1998). General practitioners' self assessment of knowledge. *British Medical Journal*, *316*, 1609-1612.
10. Wilkins-Haug, L., Hill, L., Schmidt, L., Holzman, G. B., & Schulkin, J. (1999). Genetics in obstetricians' offices: A survey study. *Obstetrics and Gynecology*, *93*(5), 642-647.
11. Statham, H., & Green, J. (1993). Serum screening for Down's syndrome: Some women's experiences. *British Medical Journal*, *307*, 174-176.

12. Sadler, M. (1997). Serum screening for Down's syndrome: How much do health professionals know? *British Journal of Obstetrics and Gynaecology*, *104*, 176-179.
13. Carroll, J. C., Reid, A. J., Woodward, C. A., Permaul-Woods, J. A., Domb, S., Ryan, G., Arbitman, S., Fallis, B., & Kilthei, J. (1997). Ontario maternal serum screening program: Practices, knowledge and opinions of health care providers. *Canadian Medical Association Journal*, *156*, 775-784.
14. Press, N., & Browner, C. H. (1997). Why women say yes to prenatal diagnosis. *Social Science and Medicine*, *45*(7), 979-989.
15. Reutter, L., & Ford, J. S. (1997). Enhancing client competence: Melding professional and client knowledge in public health nursing practice. *Public Health Nursing*, *14*(3), 143-150.
16. Smith, D. K., Slack, J., Shaw, R. W., & Marteau, T. M. (1994). Lack of knowledge in health professionals: A barrier to providing information to patients? *Quality in Health Care*, *3*, 75-78.
17. Yankowitz, J., Howser, D. M., & Ely, J. W. (1996). Differences in practice patterns between obstetricians and family physicians: Use of serum screening. *American Journal of Obstetrics and Gynecology*, *174*(4), 1361-1365
18. Metcalfe, S., Hurworth, R., Newstead, J., & Robins, R. (2002). Needs assessment study of genetics education for general practitioners in Australia. *Genetics in Medicine*, *4*(2), 71-77.
19. Walpole, I. R., Watson, C., Moore, D., Goldblatt, J., & Bower, C. (1997). Evaluation of a project to enhance knowledge of hereditary diseases and management. *Journal of Medical Genetics*, *34*(10), 831-837.
20. de Crespigny, L. (1995). Standards of mid-trimester obstetric ultrasound in Australia. *The Medical Journal of Australia*, *163*, 31-32.
21. Hunter, A., Wright, H. A., Cappelli, M., Kasaboski, A., & Surh, L. (1998). Physician knowledge and attitudes towards molecular genetic (DNA) testing of their patients. *Clinical Genetics*, *53*, 447-455.

22. Tracey, J., Arroll, B., Barham, P., & Richmond, D. (1997). The validity of general practitioners' self assessment of knowledge: Cross sectional study. *British Medical Journal*, *315*(7120), 1426-1428.
23. Searle, J. (1996). Fearing the worst: Why do pregnant women feel 'at risk'? *Australian and New Zealand Journal of Obstetrics and Gynecology*, *36*(3), 279-286.
24. Rostant, K., Steed, L., & O'Leary, P. (2002a). *Prenatal screening and diagnosis: A survey of health care providers' experiences* (submitted for publication).
25. Permaul-Woods, J. A., Carroll, J. C., Reid, A. J., Woodward, C. A., Ryan, G., Domb, S., Arbitman, S., Fallis, B., & Kilthei, J. (1999). Going the distance: the influence of practice location on the Ontario maternal serum screening program. *Canadian Medical Association Journal*, *161*, 381-385.
26. Rostant, K., Steed, L., & O'Leary, P. (2002b). A survey of the knowledge attitudes and experiences of Western Australian women in relation to prenatal screening and diagnostic procedures (submitted for publication).

Appendix I

Members of the Reference Group

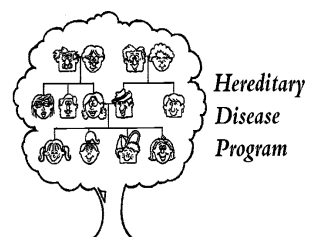
Dr Bev Hewitt	Ultrasound Specialist Park Ultrasound
Assoc Prof Jan Dickinson	University Department of Obstetrics and Gynaecology King Edward Memorial Hospital
Dr John Bates	Royal Australian and New Zealand College of Obstetrics and Gynaecology

Appendix II

Hereditary Disease Program
Department of Health

Prenatal Screening and Diagnosis Health Professional Survey

November 2001



The following survey relates to "prenatal screening" and "prenatal diagnostic" procedures, which are carried out during pregnancy to detect fetal anomalies, such as Down syndrome and neural tube defects (e.g. spina bifida).

1. Do you see pregnant patients on a regular basis?

- No => Please skip to question 82 on page 9
 Yes => Please continue

2. How many pregnant patients do you see per year? Av = 73.43

ATTITUDES

In this section we are interested in your attitudes towards fetal prenatal screening and diagnostic procedures. Please indicate the extent to which you agree or disagree with the statement by circling the relevant number for each question.

	Strongly Agree	Agree	Neither Agree nor Disagree	Disagree	Strongly Disagree
Example Summer is the best time of year.	1	2	3	4	5
Your Answer(s)					
3. Fetal prenatal screening tests are valuable.	45%	47%	6%	1%	0%
4. Prenatal screening tests benefit pregnant women.	36%	48%	13%	2%	0%
5. All pregnant women should have prenatal screening tests.	12%	17%	21%	36%	14%
6. Too many "normal" pregnancies are identified as <i>at increased risk</i> .	3%	29%	34%	29%	4%
7. Too many "abnormal" fetuses are missed.	1%	6%	34%	53%	5%
8. Women should undergo prenatal screening tests only if they plan on terminating an affected fetus.	11%	25%	13%	39%	12%
9. Prenatal screening / diagnosis causes too much anxiety for women and their families.	3%	13%	32%	46%	7%
10. Educating women regarding prenatal screening and diagnostic tests reduces their anxiety.	25%	58%	9%	7%	1%
11. I feel comfortable personally providing my patients with counselling for prenatal tests.	30%	62%	6%	2%	0%

	Strongly Agree	Agree	Neither Agree nor Disagree	Disagree	Strongly Disagree
12. I prefer to refer patients for counselling for prenatal tests.	1%	4%	13%	59%	22%
13. Counselling for prenatal tests is too time consuming.	2%	14%	21%	54%	1%
14. Counselling should not be required before the test, rather it should be done only when the results are positive.	1%	3%	4%	43%	48%
15. I understand the results provided by the first trimester screening report.	25%	66%	5%	2%	1%
16. I feel confident conveying this first trimester information to my patients.	24%	64%	7%	3%	1%
17. I feel confident in discussing with my patients, choices following first trimester screening results.	23%	65%	6%	3%	1%
18. It is difficult to coordinate first trimester screening and follow-up services.	4%	14%	21%	49%	10%
19. Follow-up services (e.g genetic counselling) for women with <i>at increased risk</i> first trimester screening results are readily available in my district.	10%	44%	13%	22%	10%
20. I understand the results provided by the second trimester screening report.	24%	67%	6%	2%	1%
21. I feel confident conveying this second trimester information to my patients.	24%	67%	5%	4%	1%
22. I feel confident in discussing with my patients, choices following second trimester screening results.	24%	63%	8%	5%	1%
23. It is difficult to coordinate second trimester screening and follow-up services.	2%	12%	21%	55%	9%
24. Follow-up services (e.g genetic counselling) for women with <i>at increased risk</i> second trimester screening results are readily available in my area.	10%	46%	14%	22%	8%
25. I do not feel comfortable discussing termination issues with my patients.	4%	9%	8%	51%	28%
26. More information on the best way to present results to patients would be helpful.	6%	45%	34%	14%	1%
27. I feel the need for greater information in the area of prenatal screening.	6%	37%	33%	22%	2%
28. I feel the need for greater information in the area of prenatal diagnosis.	6%	44%	31%	18%	1%
29. Women should sign written acknowledgment that education about prenatal screening/diagnosis was received before the test is ordered.	3%	12%	30%	44%	11%

EXPERIENCE

In this section we are interested in your experience with fetal prenatal screening and diagnostic tests.

30. Are there any characteristics of the patient that effect how you offer prenatal screening tests? (i.e. religion, language, socioeconomic status)

Yes 41% No 56%

Describe _____

31. To which pregnant women do you offer prenatal screening? (Please tick one)

All pregnant women 91% Only to women who request it 2%
Only to women older than 35 2% Only to women who 4%
at due date would consider a termination
Only to women with a family 1% Other (*Please describe*)
history of Down syndrome or _____
neural tube defect

32. How do you first introduce the screening test to your patients?

As a test available in 78% As a precaution because 4%
pregnancy they are *at increased risk*
As a test recommended 16% Other (*Please explain*)
in pregnancy _____
As an obligatory test in 1% _____
pregnancy

33. Do you prefer to offer first, as opposed to second, trimester screening ?

Yes 63% No 19% No Opinion 17%

Explain _____

34. In your experience, are there any barriers to providing first trimester screening?

Yes 57% No 41%

Describe _____

For the following please indicate the extent to which you agree or disagree with the statement by circling the relevant number for each question.

	Strongly Agree	Agree	Neither Agree nor Disagree	Disagree	Strongly Disagree
35. I always stress to my patients that tests are voluntary.	50%	44%	4%	2%	0%
36. I always explain the procedure of screening and/or diagnosis.	41%	55%	3%	0%	0%
37. I always explain the purpose of screening and/or diagnosis.	44%	55%	0%	0%	0%
38. I rarely make clear the implications of results.	4%	4%	7%	52%	31%
39. I always explain the risks associated with diagnosis.	29%	58%	7%	4%	2%
40. I rarely explain in depth the conditions that are being screened for.	2%	21%	22%	45%	11%
41. I always inform the patient of the possibility of false positives / false negatives.	31%	56%	8%	5%	1%
42. I always explain the sensitivity of the tests beforehand.	21%	50%	19%	8%	1%
43. I rarely offer additional information for the patients to take home with them.	4%	22%	15%	41%	18%
44. I always offer follow-up appointments to women to allow for information to be absorbed and for further questions, before a decision is made.	13%	50%	17%	17%	2%

At present, the following information is included on both the first and second trimester screening report:

- Whether the patient is *at increased risk* / *not at increased risk***
- An individual risk**
- An age risk**

45. Is there any additional information you would like to receive on these reports?

46. I discuss results with my patients in terms of:

- | | | | |
|--|------------------------------|----------------------------------|------------------------------|
| At increased risk /
not at increased risk | <input type="checkbox"/> 84% | An age risk | <input type="checkbox"/> 42% |
| An individual risk | <input type="checkbox"/> 53% | Other (<i>Please describe</i>) | <input type="checkbox"/> |
| | | _____ | |
| | | _____ | |

47. When I communicate *AT INCREASED RISK* results to women:

- | | | | |
|---------------------------------------|------------------------------|---|--------------------------|
| I do so as soon
as I receive them | <input type="checkbox"/> 90% | <i>At increased risk</i> results are
<u>not</u> communicated | <input type="checkbox"/> |
| I do so at the
next prenatal visit | <input type="checkbox"/> 7% | Other (<i>Please describe</i>) | <input type="checkbox"/> |
| | | _____ | |

48. When I communicate *NOT AT INCREASED RISK* results to women:

- | | | | |
|---------------------------------------|------------------------------|---|-----------------------------|
| I do so as soon
as I receive them | <input type="checkbox"/> 30% | <i>Not at increased risk</i> results
are <u>not</u> communicated | <input type="checkbox"/> 1% |
| I do so at the
next prenatal visit | <input type="checkbox"/> 64% | Other (<i>Please describe</i>) | <input type="checkbox"/> 3% |
| | | _____ | |

49. In most cases prior to screening, who in your practice discusses the majority of screening information with pregnant women?

- | | | | |
|--------------------|------------------------------|---|--------------------------|
| Myself | <input type="checkbox"/> 96% | Screening information is
not discussed prior to
screening | <input type="checkbox"/> |
| Midwife | <input type="checkbox"/> 2% | | |
| Genetic counsellor | <input type="checkbox"/> | Other (<i>Please specify</i>) | <input type="checkbox"/> |
| Clinic nurse | <input type="checkbox"/> | _____ | |

50. Who counsels women with *at increased risk* results?

- | | | | |
|--|------------------------------|---------------------------------|--------------------------|
| Myself | <input type="checkbox"/> 88% | Counselling is not offered | <input type="checkbox"/> |
| An Obstetrician
(other than yourself if
you are an Obstetrician) | <input type="checkbox"/> 20% | Other (<i>Please specify</i>) | <input type="checkbox"/> |
| | | _____ | |
| A Genetic Counsellor | <input type="checkbox"/> 15% | _____ | |

51. Please estimate the total time per patient that is spent discussing information:

- Prior to screening Av = 11 minutes
- Post screening (following an *at increased risk* result) Av = 21 minutes
- Post screening (following a *not at increased risk* result) Av = 5.5 minutes

52. From the time the ultrasound is performed or the blood is collected, on average, how long does it take to receive a first trimester not at increased risk result? Av = 4.2 days

53. From the time the ultrasound is performed or the blood is collected, on average, how long does it take to receive a first trimester at increased risk result? Av = 3.7 days

54. From the time the blood is collected, on average, how long does it take to receive a second trimester not at increased risk result? ___ Av = 5.0 ___ days

55. From the time the blood is collected, on average, how long does it take to receive a second trimester at increased risk result? ___ Av = 4.5 ___ days

56. If second trimester screening results show *at increased risk* for Down syndrome, the most appropriate action at my practice is to offer:

- | | | | |
|---------------------------------|------------------------------|---|------------------------------|
| Amniocentesis | <input type="checkbox"/> 74% | Dating ultrasound (if not already done) | <input type="checkbox"/> 22% |
| Detailed ultrasound | <input type="checkbox"/> 20% | Refer to Genetic services of WA | <input type="checkbox"/> 24% |
| Repeat maternal serum screening | <input type="checkbox"/> 4% | Ignore the result | <input type="checkbox"/> |

57. If second trimester screening results show *at increased risk* for a neural tube defect (raised AFP), in my practice the most appropriate action is to offer:

- | | | | |
|---------------------------------|------------------------------|---|------------------------------|
| Amniocentesis | <input type="checkbox"/> 25% | Dating ultrasound (if not already done) | <input type="checkbox"/> 11% |
| Detailed ultrasound | <input type="checkbox"/> 67% | Refer to Genetic Services of WA | <input type="checkbox"/> 26% |
| Repeat maternal serum screening | <input type="checkbox"/> 4% | Ignore the result | <input type="checkbox"/> |

58. What is the preferred source of antenatal screening information for yourself? (Please rate your top 3 e.g. 1 = highest preference to 3 = third highest preference)

- | | | | |
|---------------------------------------|--------------------------|--------------------------------|--------------------------|
| Laboratory | <input type="checkbox"/> | Newspaper | <input type="checkbox"/> |
| Radiology or Ultrasound | <input type="checkbox"/> | Information sheets / pamphlets | <input type="checkbox"/> |
| Written reference eg journal / books, | <input type="checkbox"/> | Internet | <input type="checkbox"/> |
| Colleagues | <input type="checkbox"/> | Other (Please describe) | <input type="checkbox"/> |
| | | _____ | |
| | | _____ | |

59. What is the greatest obstacle to providing patients with information on genetic issues?

- | | | | |
|--|------------------------------|--------------------------------------|------------------------------|
| Rapidity of advances in testing for genetic diseases. | <input type="checkbox"/> 34% | Lack of patient oriented literature. | <input type="checkbox"/> 24% |
| Constraints of office time to adequately address women's genetic concerns. | <input type="checkbox"/> 47% | Other (Please describe) | <input type="checkbox"/> |
| | | _____ | |
| | | _____ | |
| No perceived obstacles | <input type="checkbox"/> 14% | _____ | |

KNOWLEDGE

In this section we are interested in what you know with regards to fetal prenatal screening and diagnosis. **IT IS NOT A TEST. REMEMBER ALL ANSWERS ARE ANONYMOUS.**

60. How would you rate your knowledge of prenatal screening?

Very Good 7% Good 35% Adequate 52% Poor 3% Inadequate 1%

61. How would you rate your knowledge of prenatal diagnosis?

Very Good 6% Good 30% Adequate 55% Poor 6% Inadequate 1%

62. Following a screening test, what percentage of women receive an *at increased risk* result? (Please tick one)

1% 28% 10% 10%
5% 53% 15% 2%

63. Which of the following are risk factors for passing on hereditary conditions? (Please tick all that apply)

Maternal age 66% This is the first child 2%
Weight 3% The woman has had more than two miscarriages 46%
Family history of the condition 98% Smoking 10%
Partners that are close relatives 86% Exercise

64. When is the optimal time for first trimester screening to take place?

9-10 weeks 9% 12-15½ weeks 3%
11½ -13 weeks 84% 15-17 weeks

65. When is the optimal time for second trimester screening to take place?

9-10 weeks 12-15½ weeks
11½ -13 weeks 12% 15-17 weeks 84%

For the following statements, please indicate with a tick whether you believe they are “True”, “False” or you’re “Unsure”.

	True	False	Unsure
66. A birth defect occurs in 5% (1 in 20) of all pregnancies.	65%	20%	12%
67. Most women (98%) who receive an <i>at increased risk</i> result have healthy babies.	71%	13%	12%
68. If a <u>first</u> trimester screening test shows <i>at increased risk</i> , further tests can be done to clarify a diagnosis.	93%	1%	3%
69. <u>Second</u> trimester maternal serum screening detects only Down syndrome.	2%	93%	2%
70. <u>Second</u> trimester maternal serum screening is routine for all pregnant women.	11%	84%	2%
71. If <u>second</u> trimester maternal serum screening shows <i>at increased risk</i> , further tests can be done to clarify a diagnosis.	95%	2%	0%
72. Women who have normal second trimester maternal serum screening results can be certain that they will have a healthy baby.	2%	96%	1%
73. Prenatal screening tests pick up 100% of abnormalities.	0%	97%	0%
74. If an <i>at increased risk</i> result is given this means the fetus definitely has Down syndrome or a neural tube defect.	1%	96%	0%
75. Amniocentesis and fetal karyotyping can clarify the existence of Down syndrome.	96%	1%	0%
76. Amniocentesis is routinely offered to women aged 35 to 37 years or older.	50%	41%	6%
77. Folic acid is important in preventing 70% of neural tube defects.	93%	2%	3%
78. The best time to start taking folic acid is as soon as the pregnancy is confirmed.	7%	91%	0%
79. The results of chorionic villus sampling are 99% accurate.	65%	11%	22%
80. A negative result from a chorionic villus sampling guarantees the absence of all birth defects and/or hereditary conditions.	2%	86%	9%
81. There is a chance of miscarriage associated with chorionic villus sampling and amniocentesis.	97%	0%	0%

BACKGROUND

The following questions ask for general background information.

82. Had you heard of the Department of Health's Hereditary Disease Program before today?

Yes 66% Not sure 6%
No 26%

83. Have you seen the Hereditary Disease Program's pamphlets on prenatal screening and diagnosis for women?

Yes 64% Not sure 16%
No 18%

If so, how useful do you find them?

Extremely Useful 12% Very Useful 37% No opinion 13% Not very useful 5% Useless 0%

To what proportion of pregnant women do you give the pamphlets? Av = 59 %

What changes would you suggest for the pamphlets?

84. Have you seen the Hereditary Disease Program's fact-sheets for health professionals?

Yes 30% Not sure 29%
No 38%

If so, how useful do you find them?

Extremely Useful 4% Very Useful 21% No opinion 11% Not very useful 2% Useless 0%

What changes would you suggest for the fact-sheets?

85. What is your year of birth? Av = 43.5 years

86. What is your gender?

Male 50% Female 50%

87. In what postcode is your workplace situated? Metro = 69%, Rural = 24%

88. What is your highest qualification? *(Please tick one)*

- | | | | | | |
|-----------------|--------------------------|----|---|--------------------------|-----|
| Obstetrician | <input type="checkbox"/> | 9% | General Practitioner | <input type="checkbox"/> | 40% |
| Other Specialty | <input type="checkbox"/> | | General Practitioner with postgraduate qualifications (eg Dip Obstetrics) | <input type="checkbox"/> | 50% |

89. What year did you graduate with this qualification? Av = 15.3 years previous

90. Since graduating, how many educational conferences or workshops have you attended in which prenatal screening or diagnosis was a significant part of the program?

- | | | |
|--------------|--------------------------|-----|
| None | <input type="checkbox"/> | 26% |
| 1 or 2 | <input type="checkbox"/> | 43% |
| ≥3 | <input type="checkbox"/> | 24% |
| Can't recall | <input type="checkbox"/> | 5% |

Please feel free to write any other comments you may have regarding your experience with prenatal screening and diagnostic procedures or this survey.

Appendix III

Participant's Covering Letter

Dear GP/Obstetrician,

You have been selected to take part in a short survey, which asks you about your experience with prenatal screening and diagnostic tests; it should take no more than 15 minutes to complete.

The Hereditary Disease Program at the Department of Health was established to provide information to the Western Australian community and professionals, to raise awareness of hereditary conditions and birth defects. To achieve this, we need to know more about health professionals' knowledge, attitudes and the services provided in relation to prenatal screening and diagnostic procedures.

By returning the **enclosed** survey you will be providing valuable information that will help the Hereditary Disease Program improve our services for health professionals.

The survey is completely voluntary and confidential. This means that you may withdraw your information at **any** time. Your responses will remain **ANONYMOUS**, as there is **NO** identifying information on the survey. As a result, you can feel free to answer the questions openly and honestly.

A pre-paid, addressed envelope is included. Please return the survey in this envelope by **Friday 30th November 2001**. Your return of the completed survey is deemed consent to participate.

If you have any questions please do not hesitate to contact me, Kristie Rostant. Alternatively, if you would like any further information regarding prenatal screening or diagnostic tests please contact the program on telephone (08) 9222 4436 or e-mail hdphelp@health.wa.gov.au.

The current research has been approved by Curtin University's Human Research Ethics Committee.

Once again, thank you for your help in completing this survey. We look forward to receiving your valuable comments.

Yours sincerely

Kristie Rostant
Coordinator
Hereditary Disease Program
Ph: (08) 9222 4137
Fax: (08) 9222 4471
E-mail: Kristie.Rostant@health.wa.gov.au

Dr Peter O'Leary
Program Manager
Hereditary Disease Program

Appendix IV

Participant's Reminder Letter

Dear GP / Obstetrician

RE: Prenatal Screening and Diagnosis – Health Professional Survey

You may remember receiving a survey during November of last year (2001) from the Department of Health WA. We understand that your lives are extremely busy and you are often invited to participate in a number of surveys from various parties throughout the year.

As we assured confidentiality and anonymity, we cannot determine who has and who has not returned the survey. If you have already returned it, we thank you very much for your participation and please disregard this notice.

However, only 24% have been returned. We would like you to return the survey even if you are not seeing pregnant women on a regular basis or if you are retired. If you have not returned the survey there is still time to send it in!

Please also keep in mind that in order for our program to assist health professionals with their educational needs we need to hear from you directly. There is added advantage in our program generating informational resources or organising seminars in this area for health professionals with your input, so if you feel that this is important we urge you to participate.

We need to know how we can help you!

It is completely voluntary, but we would also really value your input, so if you want to participate please send it in as soon as possible. If you need a new copy of the survey, any other information or had any further questions please do not hesitate to contact us.

Thanking you again.

Sincerely,

Kristie Rostant
A / Project Officer
Public Health Genomics Branch
(Previously Hereditary Disease Program)
Ph: (08) 9222 2141
E-mail: Kristie.Rostant@health.wa.gov.au

Dr Peter O'Leary
A / Director
Public Health Genomics Branch
Ph: (08) 9222 4137