SOUTH AUSTRALIAN & TASMANIAN MATERNAL SERUM ANTENATAL SCREENING PROGRAMME©

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First Trimester Screening NT Provider Progress Report 2

12/05/03

Dear Colleague,

Your NT Provider Code is _____.

You have been chosen from your practice to receive this progress report. Please review and discuss with your group. Results are confidential and coded so that only you know your code. To maintain confidentiality your code may change on any subsequent reports. If you wish to nominate another individual from within your organisation to receive these reports please let me know. If you have received a report without a code for your practice its because the number of submitted measurements were too few.

Nuchal Translucency Measurements

Enclosed are graphical representations of nuchal translucency (NT) measurements submitted to the SAMSAS programme from South Australia, Tasmania and Northern Territory, for the 6 month period October 2002 to March 2003.

The SAMSAS software uses the ASUM standard as published in the Aust. NZ J. Obst.Gynae. Aug. 2000 Vol 40 No.3 for the calculation of gestational age from the crown rump length. Our software is designed to detect discrepancies in submitted gestational age information; consequently we initiate corrections before risk calculations. Figure 1 shows the cleaned data as used by SAMSAS in its risk calculations.

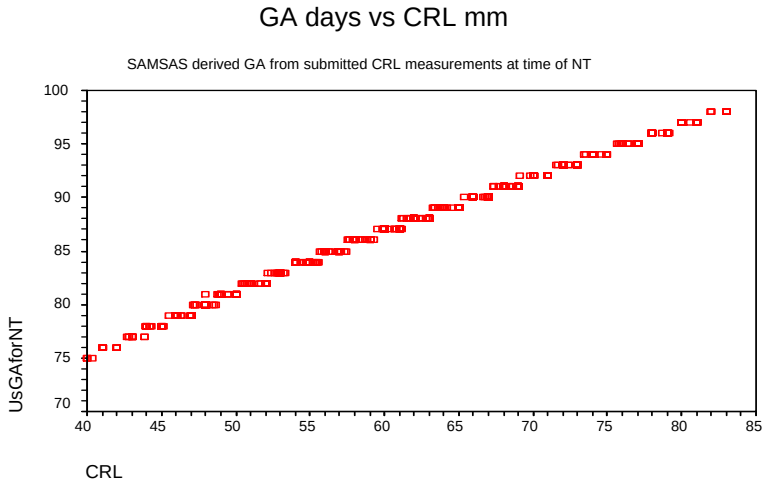


Figure 1

Most data presented in this report is in the form of a Box Plot. For those who are new to the program or who are not familiar with the Box Plot, it provides summary statistics visually, eliminating the need for detailed statistical knowledge. The Box includes the 25th percentile to the 75th percentile, with the median being the line in the box. 50% of cases measured fall within the Box. The tails or whiskers at either end of the box display the smallest and largest observed values that aren't outliers. From the length of the box you can determine the spread or variability of your measurements. If the Median value is not in the centre of the box, then your measurements are skewed.

Representing the NT measurements in multiples of the population median (MoM), eliminates variability from differences in gestational age, for example 1 MoM at 11 weeks is directly comparable to 1 MoM at 12 weeks etc, whereas the respective measurements in mm would be different.

Figure 2 shows the NT MoM distributions for each NT provider. From this display one is able to compare measurements between groups. Ideally for each group the median measurement should be 1 MoM with the box distribution being tight around 1 MoM. Those groups deviating from the reference line are advised to review their measuring technique. The recommended method of measurement is that published by Nicolaides, Increased fetal nuchal translucency at 11-14 weeks, *Prenat Diagn 2002; 22: 308-315.* Alternatively you can access newsletters of the NT Ultrasound, Education & Monitoring Program website, www.nuchaltrans.edu.au, where the method is also discussed. This site also contains information on various training and accreditation programs.

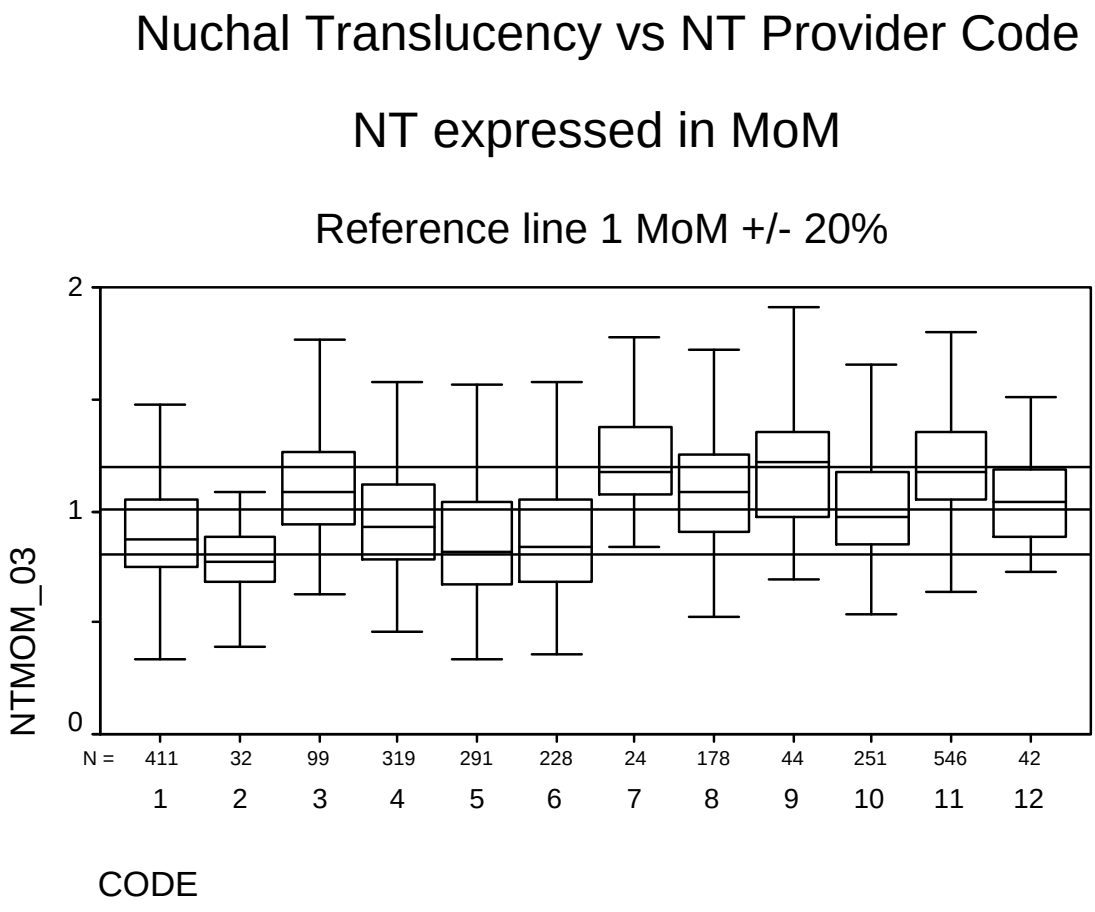


Figure 2

Figure 3 shows the NT MoM distribution for all NT providers combined. It also represents the normal population distribution for nuchal thickness in the screened population, according to current measurement practices.

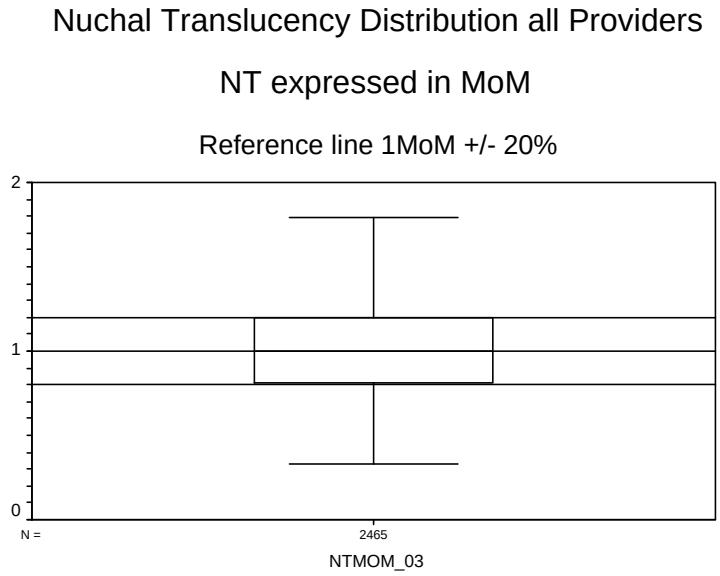


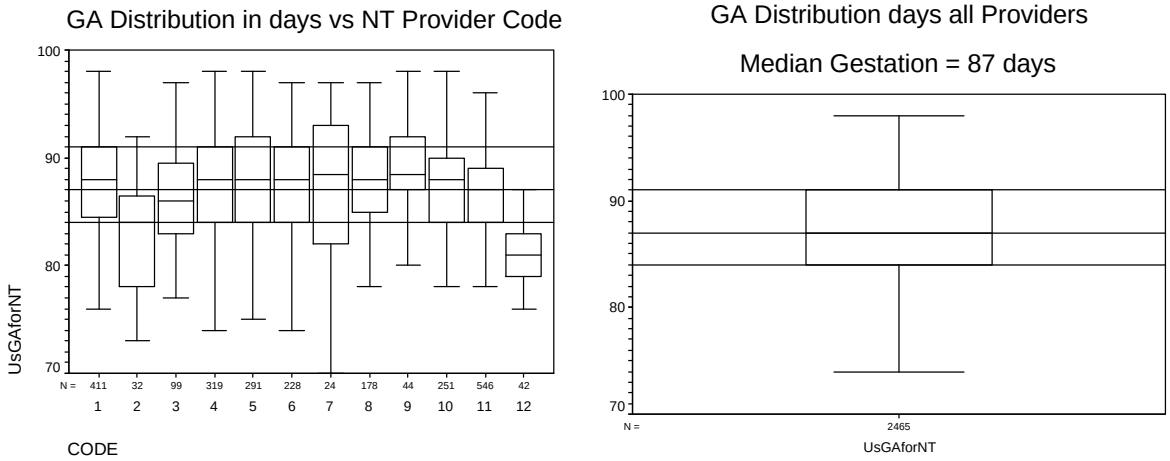
Figure 3

This boxplot is particularly pleasing as the median MoM achieved was 1 MoM +/- 20% indicating a degree of consistency in the NT measurement across all gestations but also suggesting that the median values being used by the SAMSAS programme are valid for the population being screened. However there is room for improvement for some individual providers, as can be seen from figure 2. Individual improvements will collectively lead to a tighter population distribution, improving the discriminatory algorithm.

To ensure on going uniformity in NT measurements, the NT median value and the spread of the distribution will be monitored over time for both individual NT providers and for all NT providers combined. Strict adherence to the recommended measurement method by all providers should reduce the spread.

Figures 4 & 5 show the gestational age distributions.

The median time for an NT measurement was 87 days or 12wks and 3 days, the box distribution being 12wks to 13wks, figure 5.



Figures 4 & 5

First Trimester Combined Screening Strategy Performance

As mentioned in the previous report, our expectations from first trimester screening programme was to have a performance that was at least as effective or better than second trimester screening programme. Two objective markers which can be used to measure effectiveness are recall and detection rates expressed as a % of the population screened. Recall rate is simply the number of pregnancies screened at increased risk of Down syndrome. The detection rate is the number of affected pregnancies screened at increased risk relative to the number of affected pregnancies in the screened population. When comparing detection rates one must allow for the fetal loss which would occur between the first and second trimester period. One such study has done this and results are summarised in table 1. Reference, *Prenat Diagn* 2001; 21: 788-793 What is the true fetal loss rate in pregnancies affected by trisomy 21 and how does this influence whether first trimester detection rates are superior to those in the second trimester?

Table 1 First trimester detection rate needed to be achieved to better that of the respective second trimester detection rate using various estimates of fetal loss and second trimester detection rates.

	60% Second trimester detection	65% Second trimester detection	70% Second trimester detection	75% Second trimester detection
1st Trimester detection needed	**67.72**	**72.18**	**76.52**	**80.7**

Table 2 compares the performance of the various screening modalities possible in first trimester to that in second trimester.

To make comparisons easier a fixed recall rate of 5% has been chosen. The first trimester data used is from 6,255 valid risks generated upto September 2002, the auditing of this data was performed as described in the paper *Ryall et al*., Karyotypes found in the population declared at increased risk of Down syndrome following maternal serum screening. *Prenat Diagn 2001:21: 553-557*. This process achieves ascertainment of 98.5% of the population screened.

Table 2

Screening Modality	Number Screened	% Recalled	Number Of Pregnancies Affected With Down syndrome	**% of affected pregnancies Detected**
2nd Trimester	11,782	5	21	61.9
1st Trimester Combined Biochemistry & Nuchal Translucency	**6,255**	**5**	**18**	**77.8**
1st Trimester Biochemistry Only	6,255	5	18	65
1st Trimester Nuchal Translucency only	6,255	5	18	50

Table 2 shows that the performance of the combined first trimester screening strategy (allowing for fetal loss) far exceeds that of the second trimester programme, first trimester biochemistry only and nuchal translucency only screening. Note, in all screening modalities we use maternal age risk at delivery in the risk calculation.

The actual detection for the above first trimester cases using the combined strategy was 88.9% (16/18) with a recall rate of 7.8%, using a risk cut off of 1:300. The median maternal age at delivery for this group was 31.7 years.

Figure 6 compares the separation of unaffected and affected populations using first and second trimester markers. From this it can be seen that the combined screening strategy in first trimester gives less overlap between the unaffected and affected populations, accounting for the greater sensitivity over the second trimester markers.

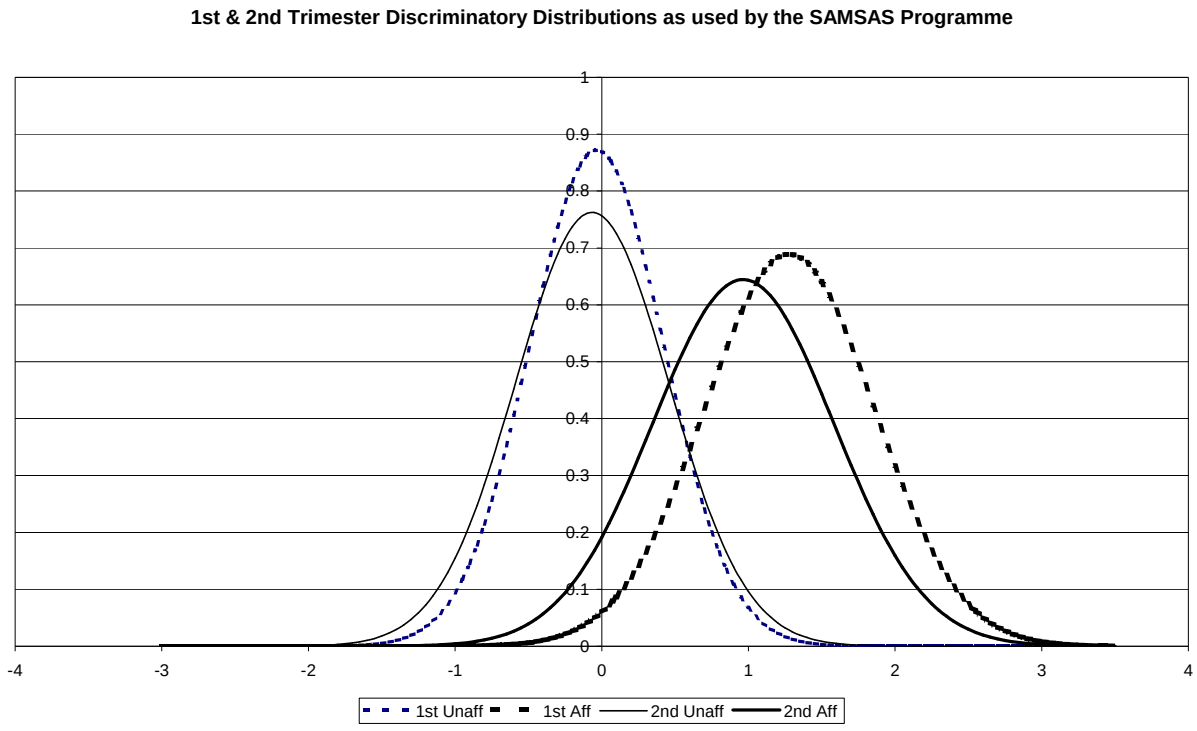


Figure 6

Figure 7 shows the distribution of each marker in the 18 affected cases with Down syndrome, in the screened population.

The median values were NT_MoM = 1.33, BHCG_MoM = 1.93 and PAPP_A_MoM = 0.33. It is worth noting this group of Downs have relatively low nuchal thicknesses, with only 8 of the 18 having measurements of more than 2mm. An explanation for this would be that some selection was occurring however this does not appear to be happening as the observed prevalence of Downs in this screened group of 1:347 (18/6255) is as expected. This finding does however further support the use of the combined screening strategy.

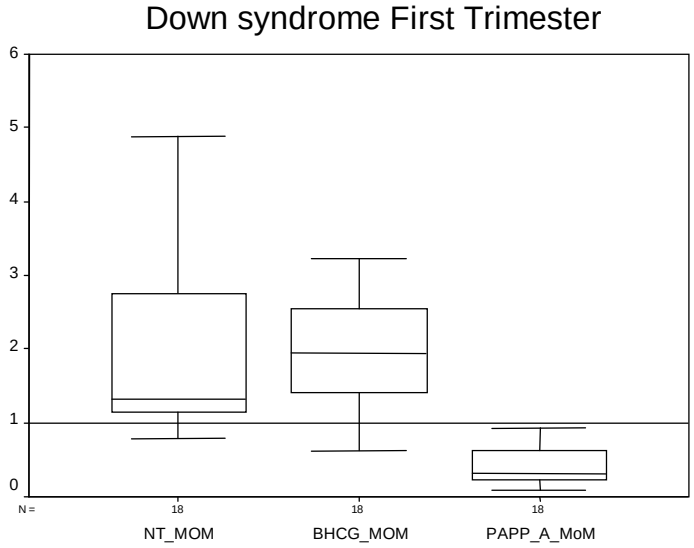


Figure 7

Summary

- Those groups deviating from the reference line are advised to look for possible reasons and take corrective action.

- The spread of NT measurements (1 MoM +/- 20%) from a population screening point of view is acceptable but could be improved.

- Strict adherence to and accreditation in the recommended method of measurement will assist in minimising variability and maintaining program performance.

- The combined screening strategy is the modality of choice for Down syndrome screening in first trimester.

- The data presented and the performances quoted in this report are those of the SAMSAS programme and do not apply to other software or testing centres.

In order to minimise delays in risk reporting, could all imaging groups ensure copies of NT reports are e-mailed or faxed to SAMSAS. If your practice uses Promedicus software you may send us a copy under Dr A SAMSAS or Dr SAMSAS, please contact Promedicus on 03 9426 9988 for any assistance.

Yours sincerely,

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