General Pathway for Down's, Edwards' and Patau's Syndrome Screening - Full Clinical Guideline

Reference No.: Maternity/10:2017/D4

FASP Screening for Down's Edwards' and Patau's syndrome

FASP – Down's, Edwards' & Patau's screening (1ST Trimester Combined screening)

Eligible CRL 45-84mm (11+2–14+1) ALERT: software gestation discrepancy with Kettering General Hospital lab (KGH)

Screening is discussed, offered and consented at booking. Information on Low PAPP-A is provided. Documented in woman's hand-held records (HHR)

KGH lab Trisomy screening request form completed

Ultrasound scan (US), with Nuchal Translucency (NT) measurement by RDH Sonographer

FASP – Down's syndrome screening (2nd Trimester Quadruple screening)

Eligible HC 101-172mm (14+2–20+0) Optimum is 16 weeks. ALERT: software gestation discrepancy with KGH lab

Screening is discussed, offered and consented at booking (singleton pregnancy) & by Fetal Medicine (FM) / AN Screening MW (twin pregnancy). Documented in woman's hand-held records (HHR)

KGH lab Trisomy screening request form completed

Woman weighed at sampling in Kg, documented on request form, yellow gel top 5ml blood sample sent to KGH lab for testing by daily courier. See DTHFT Trisomy Screening SOP for process

If the result 'chance' is 1:150 or greater (increased chance) KGH lab phone & Fax report to FM, result checked against scan report with 2nd MW

Woman phoned by FM/ANS MW within 3 working days of receipt of faxed result, to offer next available specialist midwife counselling appointment for discussion & support

If the 'chance' is less than 1:150 (low chance) a result report & standard letter is sent to FM who send letter on to the woman to arrive within 2 weeks

Result is scanned onto electronic lab results system which is viewable by all DTHFT staff. Woman takes low chance letter to next routine CMW

For Low PAPP-A (< 0.415 MoM), report sent to FM to organise Obstetric Consultant booking appointment, and notify the CMW

The CMW will contact the woman to explain result, communicate the consultant booking appointment and inform her that she will be offered growth scans

Contents

1. Introduction

Antenatal screening aims to enable parents to make informed choices concerning their pregnancy outcome, through the timely offer of screening. National standards have been set by the UK National Screening Committee (UK NSC) and Public Health England (PHE) in an attempt to ensure a more coordinated approach to screening. Policy and standards are subject to review and development in the light of new evidence.

The NHS Screening programme: Fetal Anomaly Screening Programme (FASP) Standards (FASP, 2015a) aim to ensure that there is equal access to uniform and quality assured screening across England and that women are provided with high quality information so they can make an informed choice about their screening options and pregnancy choices.

The following document relates to the Down's, Edwards' and Patau's syndromes screening programme currently offered by Derby Teaching Hospitals NHS Foundation Trust (DTHFT) in primary care and at Royal Derby Hospital (RDH). The service is bench marked to the FASP standards (FASP, 2015a) and NHS Public health functions agreement 2017-18. Service specification no. 16. NHS Fetal Anomaly Screening Programme - Screening for Down's, Edwards' ad Patau's Syndromes (NHS England, 2017) or any subsequent updated versions.

2. Purpose and Outcome

- Outline the aetiology and incidence of Down's, Edwards' and Patau's syndromes including some characteristics and physical differences associated with these three distinct conditions
- Define the current minimum standards for antenatal screening for Down's, Edwards', and Patau's syndromes at DTHFT
- Provide flowcharts to use in practice to inform practitioners of all the care pathways within the Down's, Edwards' and Patau's syndrome screening programmes at DTHFT
- Inform practitioners of the Down's, Edwards' and Patau's syndrome screening education, training, audit and monitoring mechanisms at DTHFT.

3. Abbreviations

AN	-	Antenatal
AFP	-	Alpha - fetoprotein
ANC	-	Antenatal Clinic
AVSD	-	Atrial Ventricular Septal Defect
CMW	-	Community Midwives
CRL	-	Crown Rump Length
DR	-	Detection Rates
DTHFT	-	Derby Teaching Hospitals NHS Foundation Trust
FM	-	Fetal Medicine
NCARDRS	-	National Congenital Abnormality and Rare Disease Register
FASP	-	Fetal Anomaly Screening Programme
FPR	-	False Positive Rates
HCG	-	Human Chorionic Gonadotrophin
IVF	-	Invitro Fertilisation
MW	-	Midwife
NDSCR	-	National Down's syndrome Cytogenetics Register
NT	-	Nuchal Translucency
PAPP A	-	Pregnancy Associated Plasma Protein A
PHE	-	Public Health England
RDH	-	Royal Derby Hospital
QA	-	Quality Assurance
SQAS	-	Screening Quality Assurance Service
UE3	-	Unconjugated E3
UK NSC	-	United Kingdom National Screening Committee

4. Aetiology of Down's Syndrome

a) The nuclei of most human cells contain 46 chromosomes. In Down's syndrome, cells contain an extra copy of chromosome number 21 resulting in 47 chromosomes in total. The extra genetic material gained from this gives the characteristics of Down's syndrome also known as 'Trisomy 21' (T21). Most cases (95%) arise when the chromosomes donated by the mother or father have failed to divide correctly. Regular Trisomy is not hereditary, but it is known from statistical analysis that if a woman has a child with this type of condition then the chance will be ~1% higher of it occurring in the next pregnancy. Other types of Down's syndrome occur due to translocation of genetic material between chromosome 21 and another chromosome (this occurs in 4% of cases). The remaining 1% occurs when there is mosaicism, where normal and Trisomy 21 cells are found within the individual.

b) Incidence

Down's syndrome occurs in approximately 1:800 births. This figure is similar in all populations and is an overall population chance; it affects both boys and girls equally.

All women have a chance of having a baby with Down's, Edwards' or Patau's syndrome and this chance increases with age. The older a mother, the more chance she has of having a baby with the condition.

Example: for a woman who is 16 weeks pregnant her chances of having a pregnancy affected by Down's syndrome depending on maternal age are:

Age 20 years 1 in 1500 or 0.07%, age 30 years 1 in 900 or 0.1%, age 40 years 1 in 100 or 1% (FASP, 2015b).

c) Effects of Down's Syndrome

Some physical differences

- Learning disability – wide spectrum. Approximately 20% of children with Down's syndrome have mild learning difficulties, 70% have severe learning difficulties and 10% have profound learning difficulties.
- Developmental delay.
- 40-50% of children suffer with a congenital heart abnormality, more commonly complete AVSD. Cardiac surgery can be less tolerated in children with Down's syndrome.
- Over 50% have significant hearing impairment, sensorineural and/or conductive loss.
- Gastrointestinal tract abnormalities.
- Hypotonia and poor feeding.

These characteristics and physical problems are not exhaustive and if families require further information, please refer them to the Down's syndrome Association (www.dsa-uk.com) and/or a senior paediatrician.

5. Aetiology of Edwards' Syndrome

a) Edwards' syndrome (Trisomy 18) arises when human cells contain an extra copy of chromosome number 18. Edwards' syndrome occurs by the same mechanisms as Down's syndrome (see section 4a).

b) Incidence

About 1 in every 1,500 pregnancies is diagnosed with Edwards' syndrome (SOFT, 2015). In the absence of any prenatal detection programme Edwards' syndrome occurs in approximately 1:7900 births. The incidence increases with increasing maternal age (NHS, 2013a).

c) Effects of Edwards' Syndrome

For live-born infants, Edwards' syndrome is usually of far greater clinical severity than Down's syndrome, having a very limited lifespan, and often with multiple congenital malformations. About 50% of infants die within the first two weeks after birth, often from central apnoea or congenital abnormality; only around 8% survive beyond one year, but with severe learning disabilities. Growth restriction (both prenatal and postnatal) is usual. The median life expectancy of these Infants is 14 days (NHS, 2013a).

6. Aetiology of Patau's Syndrome

a) Patau's syndrome (Trisomy 13) arises when human cells contain an extra copy of chromosome number 13 (Trisomy 13). Patau's syndrome occurs by the same mechanisms as Down's syndrome (see section 4a).

b) Incidence

About 1 in every 4,000 pregnancies is diagnosed with Patau's syndrome (SOFT, 2015). In the absence of any prenatal detection programme the occurrence in live births is about 1 in 9,500. The incidence rises with increasing maternal age (NHS, 2013b).

c) Effects of Patau's Syndrome

For live-born infants, Patau's syndrome is usually of far greater clinical severity than Down's syndrome, having a very limited lifespan, and often with multiple congenital malformations. More than 50% of infants die within one month of birth. Only 8%-10% of infants survive beyond one year, but typically with severe learning disabilities. Long-term survival is most likely due to mosaicism (where the extra chromosome is not present in all cells), or due to only part of chromosome 13 being involved (partial trisomy 13), (NHS, 2013b).

If families require further information regarding Edwards' and Patau's syndromes; please refer them to the Support Organization for Trisomy 13/18 (www.soft.org.uk), and/or a senior paediatrician.

7. Low PAPP-A

As part of the 1st trimester trisomy screening test, blood samples are analysed for the biochemical marker Pregnancy Associated Plasma Protein-A (PAPP-A). A low level (< 0.415 MoM) of the first trimester marker PAPP–A should be considered a major risk factor for delivery of a SGA neonate as per the SGA risk-assessment tool.

A patient information leaflet (Appendix A) needs to be given to women at booking along with the screening booklet when consenting to first trimester screening.

Results will be sent to FM and they will then arrange a booking appointment with a Consultant Obstetrician, ideally to follow the 18-20 week FASP anomaly scan or to combine it with another ANC appointment if applicable. They will change the woman's pregnancy status on the electronic maternity system (Lorenzo) to consultant-led care and contact the CMW. The CMW will contact the woman and refer to the information leaflet that was provided at booking. The CMW will recommend for the woman to be changed to consultant led care to have growth scans arranged (see Small for Gestational Age Guideline) and offer the booking appointment.

8. Screening for Down's , Edwards' and Patau's syndromes offered at DTHFT

a) The 1st Trimester Combined Screening Test

Between 11+2 and 14+1 weeks gestation (**eligibility determined by CRL measurement of 45mm-84mm** at the early pregnancy dating scan and the nuchal translucency (NT) measurement being obtainable).The 1st Trimester Combined screening test enables women with singleton and twin pregnancies to choose screening for:

i) **Down's syndrome (T21)**
ii) **Edwards' and Patau's syndrome (T18)**
iii) **Down's, Edwards' and Patau's syndrome (T13)**

The Combined screening method involves an ultrasound scan (US) by a sonographer in the obstetric ultrasound scan (OUS) department to measure the NT of the baby and to date the pregnancy, immediately followed by a blood test in the Antenatal Services (ANS) phlebotomy room to quantify the biochemical markers: PAPP-A and free beta hCG. The chance of a pregnancy being affected by these conditions (depending upon screening choices) is calculated by specifically designed software (currently at the KGH Biochemistry Lab) using maternal age, NT measurement, biochemical markers. There are software adjustments for the effect on the maternal biochemical markers of ethnic origin, smoking status, +/-IVF pregnancy, +/- IDDM, and +/- any previous pregnancy affected by T21, T18, T13 or a neural tube defect (NTD).

If the CRL is >84mm, but the head circumference (HC) is between 101mm-172mm the woman should be referred to ANC MW, ANSC or FM MW for further discussion and offer of 2nd trimester Quadruple screening.

The 'chance' cut-off for offering further counselling and diagnostic testing is 1:150 for all of the conditions screened for; please note one 'chance' result is given for Down's syndrome and a separate combined 'chance' result is given for both Edwards' and Patau's syndrome. See care pathway flow chart A and B. For standardised SPR and DR please see Appendix B.

b) 1st Trimester Screening for Down's, Edwards' and Patau's syndromes in Twin Pregnancies

Women with a new diagnosis of a twin pregnancy at the dating scan appointment who are eligible and have consented to 1st trimester Combined trisomy screening should be referred to FM MW / ANSC or ANC MW by the sonographer for a discussion with a practitioner with a special interest / understanding of screening in twin pregnancies. The accuracy and detection rate is altered depending on chronicity of the twin pregnancy.

For women screened using the combined test, where a dichorionic twin pregnancy is identified the risks will be reported for each fetus. In a monochorionic twin pregnancy both fetuses are either affected or unaffected so the risk will be the same.

Monochorionic twins
The performance of 1st trimester screening in monochorionic twins is comparable to that in singleton pregnancies: a detection rate of 80% for a standardised screen positive rate of 3%.

Dichorionic Twins
In dichorionic twins, where one is affected and the other unaffected, the performance of the 1st trimester screening test is slightly reduced due to the biochemical blood test markers being less discriminatory. It performs better than 2nd trimester Quadruple screening due to the individual NT measurements. Recent data are not available to state a specific detection rate for a standardised screen positive rate in this scenario.

c) The 2nd Trimester Quadruple Down's syndrome Screening

The Quadruple test enables women with singleton and twin pregnancies (see section 8d) to opt for screening for Down's syndrome between 14+2 and 19+6 weeks gestation (**eligibility is determined by the HC measurement being 101mm-172mm)**. If the HC measures >172mm the woman is not eligible for screening as the pregnancy is too late for Quadruple screening (irrespective of gestation) and should be referred to an ANC MW, ANSC or FM MW for explanation and further discussion.

2nd Trimester Quadruple screening is a blood test which enables the quantification of the biochemical markers Alpha-Feta Protein (AFP), beta hCG, uE3 and Inhibin A. The chance of a pregnancy being affected by Down's syndrome is calculated by specifically designed software (at KGH lab) using the above biochemical markers and maternal age. There are software adjustments for the effect on the maternal biochemical markers of ethnic origin, smoking status, +/-IVF pregnancy, +/- IDDM, and +/- any previous pregnancy affected by T21, T18, T13 or a neural tube defect (NTD). The chance cut-off for offering further counselling and diagnostic testing is 1:150. For standardised SPR and DR please see Appendix B.

d) Second Trimester Screening for Down's Syndrome in Twin Pregnancies

Women with twin pregnancies who are eligible for the Quadruple screening should be referred to FM MW / ANSC by their CMW, the sonographer or the ANC midwife for a discussion with a practitioner with a special interest / understanding of screening in twin pregnancies. The accuracy and detection rate is altered depending on chronicity of the twin pregnancy.

Monochorionic Twins
The chance of a T21 birth from a monochorionic pregnancy is lower than that from a singleton pregnancy due to a higher fetal loss rate amongst affected pregnancies. The performance of screening in monochorionic twins is comparable to that in singleton pregnancies: a detection rate of 80% for a standardised screen positive rate of 3%.

Dichorionic Twins
The chance of a T21 birth of at least one baby from a dichorionic twin pregnancy is higher than that from a singleton pregnancy. In dichorionic twins, where one is affected and the other unaffected, the performance is poorer due to the markers being less discriminatory. In dichorionic twins the detection rate is 40-50% for a standardised screen positive rate of 3%.

'It should be noted that the 'chance' approach used in calculating a quadruple twin pregnancy 'chance' is referred to as a 'pseudo-chance'. This is the established methodology currently available and simply means that the chance would be accurate in predicting a false-positive rate (which relates only to the marker distributions in unaffected twin pregnancies). The 'chance' is a pregnancy related 'chance' is not fetal specific. The term chance cut-off of 1 in 150 is applied to the 'pseudo-chance'. Because the calculation of chance's in twin pregnancies relies on limited evidence and assumptions the chance estimate should be interpreted by suitably experienced practitioners [DTHFT FM department]*.'* (FASP, 2015b):

9. Guidance for Down's, Edwards' and Patau's Syndrome Screening in the Event of a 'Vanished' Twin

For a 'vanished' twin refer to the NHS Down's, Edwards' and Patau's syndromes Screening Programme Handbook for Laboratories (PHE, 2015): It states:

'When ultrasound shows there is an empty second pregnancy sac, the biochemical markers appear no different to those in a singleton pregnancy and the combined test of NT, PAPP-A and free beta HCG can be used to calculate the chance result.

When ultrasound shows that there is a second sac containing a non-viable fetus (sometimes called 'vanished' twin), it is possible there could be a contribution to the maternal biochemical markers for many weeks. It is recommended that in this event Antenatal Services undertake the 'chance' calculation based on the maternal age and nuchal translucency only (i.e. without biochemistry).' KGH Lab should be contacted by FM for this special request in this instance' (FASP, 2015b)

OUS will have appropriate policies, procedures and guidelines in place, in line with national and professional guidance to ensure a high quality standard of care for all women. The professional lead for this is the Chief Superintendent Sonographer of the Obstetric Ultrasound Scan department, with support from the Screening Support Sonographer and deputy.

Key of Responsibilities
- CMW
- Sonographer
- Radiography Assistant
- Fetal Medicine MW/ANSC

Pathway A

Care Pathway for Down's, Edwards' and Patau's Syndrome Screening by the 1st Trimester Combined Screening Test (Singleton pregnancy)

Woman attends midwife for booking 8-10 weeks screening options discussed and information booklet 'Screening tests for you and your baby' given. (PHE, 2017)

Box 1

Woman accepts test for
a) Down's
b) Edwards' and Patau's
c) Down's, Edwards' and Patau's

Action by Midwife: Accurately complete KGH screening request form & book dating scan apt with 1st trimester screening; document woman's decision in HHR. Gives request form to woman & inform to bring HHR with form to the scan apt.

Woman undecided.

Refer to booklet given by CMW in booking pack: "Screening tests for you and your baby".

Still unsure: visit NHS choices website 'antenatal screening' or arrange a discussion with the ANSC

Decision must be made before scan appointment. Sonographer cannot discuss options further.

Accepts any of the screening options highlighted in Box 1

Declines Combined screening.

Action by Sonographer: early pregnancy / dating scan only. Document patient's choice to decline 1st trimester combined screening

Dating scan & if CRL 45-84mm perform NT measurement

Action by Sonographer: Check woman's consent & correct screening choice on form. Complete US fields on form (i.e. CRL, NT etc). Send woman to phlebotomy room for blood tests (to measure PAPP-A & Free Beta hCG).Copies of US report in HHR & obstetric notes.

If NT unobtainable after 2 attempts (refer to ANC & 2nd trimester pathway)

If uncertain of woman's consent or choices refer to ANC MW

Action by Sonographer: If NT measurement is >= 3.5mm, complete blood test & refer woman to FM MW, (see pathway D)

Blood collection. (Yellow top bottle) for collection of markers PAPP-A & Free Beta hCG

Action by Radiography Assistant: Weigh the woman at sampling in Kg & enter on request form with date & time of sample & signature. Check **all fields** complete & correct. **Use the 'mask' with 2nd checker daily**

If CRL <45mm (too early for screening), woman is referred by sonographer to rebook apt scan within the screening window

Sample/Request dispatched to lab. See SOP for sample transport.

Action by Radiography Assistant: Fax daily worklist of women screened to KGH lab. Dispatch all samples to the collection point by 16.30hrs for courier collection to the lab. Copy of list filed in FM department.

If the chance is 1:150 or greater (increased chance) then the lab will email report to FM.

If the chance is less than 1:150 (low chance) a report will be sent to FM who will arrange for the result to go to woman via standard letter within 2 weeks

All result reports are checked and actioned by one of the following:
1. FM Sp MWs.
2. AN Screening Sp MW
3. AN Services Senior Midwife

FM MW checks high-chance result report with a 2nd MW against scan report on electronic system. Woman phoned by FM or AN Midwife within 3 working days of receipt of faxed HR result, to offer next available specialist midwife counselling appointment for discussion & support.

Woman takes low chance letter to next routine appointment with community midwife.

Pathway B

Care Pathway for Down's, Edwards' and Patau's Syndrome Screening in a **Twin Pregnancy**

1st Trimester Combined Screening for women with a twin pregnancy

Key of Responsibilities
- CMW
- Sonographer
- Radiography Assistant
- FM MW/ANSC

Twin pregnancy identified in advance of dating scan

Twin pregnancy diagnosed at time of early pregnancy / dating scan

Woman wishes to consider screening for
a) Down's
b) Edwards & Patau's
c) Down's, Edwards' & Patau's

Woman does not wish to consider screening for Down's, Edwards' or Patau's Syndrome.

Complete early pregnancy / dating scan. If Down's and /or Edwards' and Patau's screening wished, appointment with FM MW / ANSC to discuss Combined screening choices in multiple pregnancies and change maternity tariff.

CMW to refer to FM MW for discussion regarding screening in twin pregnancy prior to scan & combined screening >11+2 weeks

CMW to arrange dating scan from 11 weeks gestation and Consultant booking

ANC Midwife to arrange booking, dependent on chorionicity.

Woman's choice to proceed with 1st trimester Combined screening

Woman to proceed with combined screening

Does not wish to have 1st trimester Combined screening after discussion.

Sonographer to perform dating scan & NT measurements if CRLs 45-84mm. For 'vanished' twin refer to FASP statement p.8

Would wish Combined screening for, but not eligible as gestation too late (CRLs >84mm). ANC MW to refer the woman to a FM MW for counselling about 2nd trimester Quadruple screening (if HC 101-172mm)

Arrange a Consultant booking appointment as appropriate for chorionicity.

Increased chance
If the chance is 1:150 or greater on either or both twins, the lab will fax report to FM. FM MW checks result report with a 2nd MW against scan report on system. Woman phoned by FM or AN Services team member within 3 working days to offer next available specialist midwife counselling appointment for discussion & support. The reported result is scanned onto the woman's electronic records

Low chance
If the chance is less than 1:150 for both twins, a report will be sent to FM who will arrange for the results to be sent to the woman via standard letter within 2 weeks of the screening test. The result is scanned onto the woman's electronic records

All result reports are checked and actioned by one of the following:
1. FM Sp. MWs
2. AN Screening MW
3. ANS Senior MW

Following the early pregnancy / dating scan, ANC midwife to arrange a consultant booking appointment, dependent on chorionicity.

Woman takes low chance letter to next routine appointment with community midwife.

Care Pathway for 2nd Trimester Downs Syndrome Screening for Singleton and Twin Pregnancies

Pathway C

Key of Responsibilities
- CMW
- Sonographer
- Radiography Assistant
- FM MW/ANSC

Woman attends community midwife (CMW) booking too late for 1st trimester combined screening (i.e. known >14+1 weeks gestation).
OR
Identified as CRL >84mm on ultrasound scan

Twin pregnancies

2nd Trimester Down's syndrome Quadruple screening discussed, refer to 'Screening tests for you and your baby' in booking pack. If woman is identified as having a twin pregnancy please see Box 2

CMW to arrange urgent early pregnancy dating scan, complete KGH screening request form & inform woman to take to scan apt. Advise if CRL >84 & HC 101-172mm eligible for 2nd trimester Down's Quad screening

Wishes to have Down's syndrome screening

Does not wish Down's syndrome screening

HC 101-172mm (14+2 – 19+6 weeks' gestation)

HC >172mm (>19+6 weeks' gestation)

Is this a twin pregnancy?

Yes

No

BOX 2: Refer the woman to a FM MW for counselling about 2nd trimester Quad screening in twin pregnancies (see p.7-8)

CMW or ANC MW to discuss and consent for 2nd Trimester Down's syndrome screening. If accepts, form to be completed & the blood sample to be taken for markers (AFP, β hCG, uE3 and Inhibin A) at current visit (document acceptance or declined)

Too late for 2nd trimester Quad Down's syndrome screening. Sonographer to perform FASP anomaly scan following verbal or HHR consent.

Continue planned care pathway for pregnancy and await birth outcome.

Sample to be taken 5ml yellow top gel bottle, send to RDH pathology & forwarded to KGH lab next day. To be spun by RDH lab if will not arrive in KGH lab within 2 day sample window. See sample transport SOP

Referral for Consultant opinion for discussion re: Fetal anomaly screening, as late booking & care pathway for pregnancy to be planned as appropriate. Referral to ANSC or ANC MW to inform woman she is no longer eligible for 1st or 2nd Trimester screening for Edwards', Patau's and/or Down's syndrome.

Increased chance: If the chance is 1:150 or greater then KGH lab will fax the report to FM.

Low chance: If the chance is less than 1:150 a report will be posted to FM

All result reports are checked and actioned by one of the following:
1. FM Sp MWs.
2. AN Screening Sp MW
3. AN Services Senior Midwife

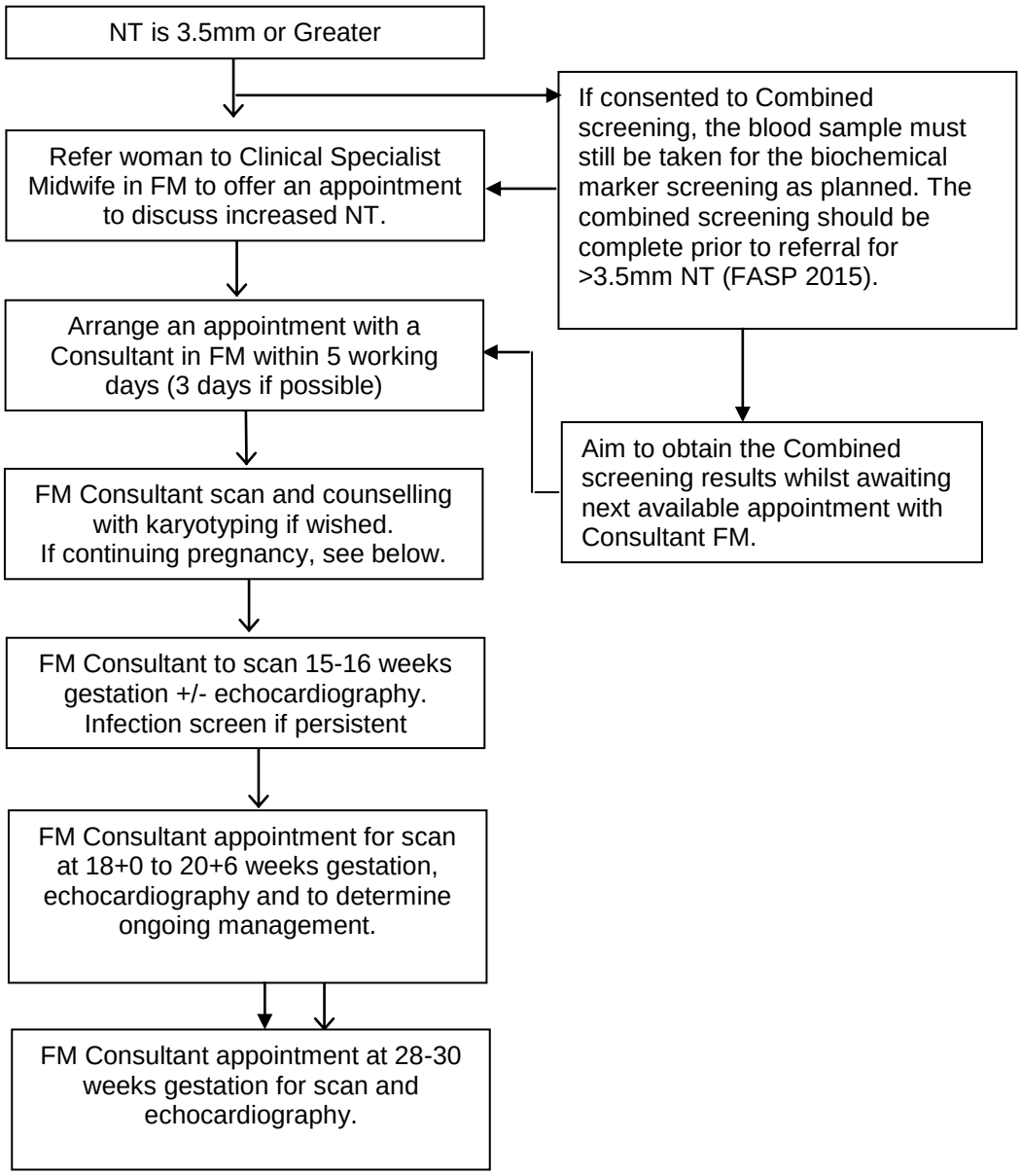
FM MW checks increased chance result report with a 2nd MW against scan report on system. Woman phoned by FM or AN Services team member within 3 working days of the faxed result to offer next available FM MW counselling appointment for discussion & support. The reported result is scanned and uploaded to the woman's electronic records at RDH

FM staff arrange for a standard low chance letter to be sent to the woman within 2 weeks of the test. The reported result is scanned and uploaded to the woman's electronic results at the RDH

Woman takes low chance letter to next routine appointment with CMW.

Pathway D

Care Pathway for Increased Nuchal Translucency (CRL 45-84mm)
11+2 to 14+1 weeks Gestation



Pathway E **Pathway 1 for 1st trimester Combined screening blood samples**

Actions by Radiography Assistant – See sample SOP Pathway G & on FLO

In the phlebotomy room (Antenatal Services), radiography Assistant to:
1. Weigh the woman in Kg & records on the KGH request
2. take Combined screening blood sample after the early pregnancy / dating / NT scan
3. enter date & time of sample; print name & sign request form
4. **Check all information is complete & correct on the request form.**
5. Use the form 'mask' with 2nd checker daily prior to sealing & packaging sample bags

Combined screenings samples to be stored in the fridge during the working day

Daily at 11:00 Check FM dept. have received a fax from the KGH lab, confirming receipt of the previous day's samples as per work list. If the fax has not been received the radiography Assistant phones KGH lab immediately on telephone no. 01536 492686

Samples received

When the last combined screening sample has been taken for the day, collect all samples from the fridge and follow the Packaging & Transport Instructions located in the phlebotomy room. See SOP:

ON ANY WORKING DAY PRIOR TO A:

1. **BANK HOLIDAY**
2. **WEEKEND**
3. **OR IF THE COURIER HAS BEEN MISSED**

SAMPLES SHOULD BE HAND DELIVERED TO RDH PATHOLOGY FOR CENTRIFUGATION PRIOR TO TRANSPORTATION TO KGH LAB ASAP. Blood bikers are used prior to Bank Holidays

Samples not received

Check samples have been collected from the RDH laboratory collection point

If samples are at the collection point, arrange centrifugation of the samples to improve stability & to be sent as URGENT

If samples are not at the collection point

URGENTLY inform one of the following Managers/Specialists:
1) OUS Superintendent / manager
2) AN Screening Coordinator
3) Specialist Midwife in FM
4) AN Services Senior MW, **who will instigate Pathway 2 for Combined screening blood samples** (appendix F)

Pathway F

Pathway 2 for combined screening bloods

Non-arrival of combined screening blood samples in the Kettering laboratory as planned following the screening test

Actions by Manager or Specialist

The radiographer Assistant has informed a manager or SpMW that the previous day's 1st trimester Combined screening bloods have not reached the KGH Lab as expected.

Are the bloods at the collection point?

Yes

Contact RDH Pathology on ext 88527 to arrange for the samples to be spun urgently then sent to the collection point by 1600hrs on the same day.

Telephone the Kettering Lab on 01536 492686 to inform them the samples have been spun & will arrive in the KGH Lab the following day.

Complete datix & inform Matron (Community & AN Services) who will escalate to Risk Team

NO

1. Contact DX courier (quoting account number DX6760201)
2. ascertain the reason why the samples have not been delivered to the KGH Lab (tracking number DX 6800401)
3. Request Bar code number from the log book

Have DX couriers got the samples?

Yes

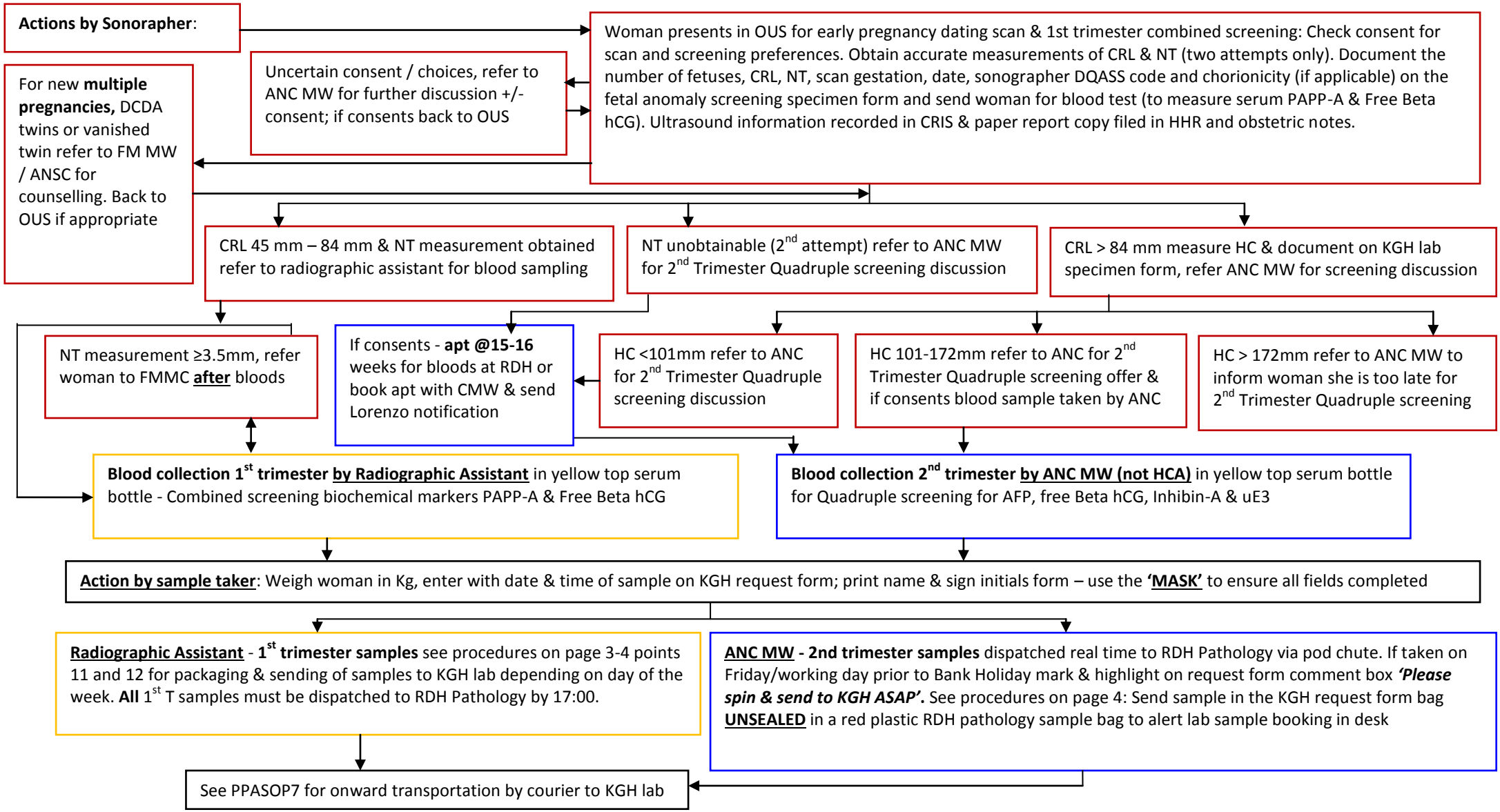
URGENT delivery to KGH lab. If unable to deliver within 4 hours samples must be refrigerated.

No

DX couriers to inform manager or specialist location of the samples and ETA at KGH lab.

Contact the KGH lab on 01536 492686 inform them of ETA of samples & request a phone call when samples arrive.

Pathway G – 1st & 2nd Trimester Trisomy screening samples pathway from SOP for bloods taken in ANC / Obstetric USS



10. Education and Training

- Education and training is achieved via mandatory professional study day sessions on a triennial basis. Workshops are also scheduled as appropriate to update staff on developments within the screening programme. The e-learning package 'Antenatal and Newborn screening' moved to the Health Education England (HEE) e-Learning for Healthcare (e-LfH website in April 2017). It is to be completed as part of mandatory training by all midwives on an annual basis. Compliance is monitored annually by Professional Development Lead Midwife. Registration is via the Learning for Healthcare (e-LfH) website http://portal.e-lfh.org.uk/

  The medical staff and medical students education and training is organised by the FM team in conjunction with the Clinical Curriculum Administrator in Medical Education Management.

- All newly employed healthcare professionals involved in the screening process are offered training and the opportunity to work with the specialist midwives in FM and ANSC.

- All education and training provided is evaluated and audited.

11. Audit and Monitoring of the Down's, Edwards' & Patau's Syndrome Screening Programme

- The DTHFT internal Antenatal and Newborn Screening Board and FM Team are responsible for establishing links and enabling quality assurance at a local level in line with national standards. Any issues are escalated via Trust Governance, Divisional Management Team and the Maternity Risk Groups as appropriate.

- Where appropriate (e.g. a suspected or detected abnormality) information is also sent for inclusion in the NCARDRS and the National Down's Syndrome Cytogenetics Register (NDSCR). NCARDRS notification forms should be completed contemporaneously, a copy filed in maternal obstetric notes and sent by secure email with a copy of the scan report to PHE.NcardrsEmsy@nhs.net .

- The Trust ANNB screening annual audit and report (pertaining to the previous fiscal year is produced by the ANSC and Neonatal Screening Midwife in conjunction with the members of the Antenatal and Newborn Screening Board (approved and signed off by the Head of Midwifery). It is sent to Regional SQAS team at PHE.MidsAndEastQA@nhs.net and shared with NHS England North Midlands Screening & Immunisation Team.

12. Local & Regional Contacts

Antenatal screening coordinator	01332 789924
Bereavement Specialist Midwife Office	01332 789791
Chair of Antenatal & Newborn Screening Board	Secretary 01332 785204
City Hospital Nottingham Cytogenetics	0115 9627617 or
Clinical Lead Obstetrician:	Secretary 01332 785687
Clinical Lead Paediatrician: Office	01332 785719
Clinical Specialist Midwives (FM)	01332 785409
Duty Consultant Biochemist RDH	01332 789383
Matron (Primary Care & Antenatal Services)	01332 789570 or 07788 388437
Newborn screening midwife	01332 785069
NHS England North Midlands Screening & Immunisation Lead	0113 8248070 or 07721231714
Obstetric Ultrasound Office	01332 785326
Regional Genetics Centre - City Hospital Nottingham,	01159 627728
Regional Cytogenetics Department	Internal #630 ext 56617
Sheffield Diagnostic Genetic Services	01142 717009
Trisomy Screening Lab Provider & Lead Biochemist (KGH)	01536 492686 / 01536 492692
Senior QA Advisor, Midlands & East Screening Quality Assurance Service	0115 8441315 / 07909 887831

Help desk - 020 368 20890 PHE.screeninghelpdesk@nhs.net

Voluntary Sector or Charitable Representatives

- Antenatal Results & Choices (ARC) 0845 077 2290 or 020 771 37486
- Down's syndrome Association Helpline 0333 121 2300
- Support Organization for T13/T18 (SOFT) 0330 088 1384 email: enquiries@soft.org.uk

13. Resources & Useful Websites

- NHS Screening
  www.screening.nhs.uk
- NHS Choices
  www.nhs.uk/screening
- Fetal Anomaly Screening Programme
  https://www.gov.uk/guidance/fetal-anomaly-screening-programme-overview
- Continuous Professional Development
  http://portal.e-lfh.org.uk/
- Antenatal Results & Choices
  www.arc-uk.org
- MIDIRS Informed Choice Leaflets
  www.infochoice.org
- Down's Syndrome Association
  www.downs-syndrome.org.uk
- Database of Individual Personal Experiences
  www.healthtalkonline.org
- Support Organization for T13/T18 (SOFT)
  http://www.soft.org.uk/

Screening tests for you and your baby booklet has been translated into 12 different languages and there is an easy to read format. Please see the below links:

- www.screening.nhs.uk (professionals)
- www.nhs.uk/conditions/pregnancy-and-baby/pages/screening-tests-abnormality-pregnant.aspx (for pregnant women) for online screening information and support).
- Information is also available in an 'easy to read' format at https://www.gov.uk/government/publications/screening-tests-for-you-and-your-baby-description-in-brief (PHE, 2017).
- Screening Tests for you and your baby' is available to download in 12 different languages at https://www.gov.uk/government/publications/screening-tests-for-you-and-your-baby-description-in-brief (PHE, 2017).

14. References

DTHFT Standard Operating Procedure for: *The management of 1st and 2nd Trimester screening blood samples taken in Obstetric Ultrasound / Antenatal Clinic at Royal Derby Hospital for Down's, Edwards' & Patau's Syndromes.* Available on FLO & embedded:

SOP 07_17 1st & 2nd Trimester Trisomy scr

Fetal Anomaly Screening Programme (FASP, 2015a) Standards 2015-16, Version 0.8, NHS Fetal Anomaly Screening programme (Public Health England) April 2015: https://www.gov.uk/government/publications/fetal-anomaly-screening-programme-standards

Fetal Anomaly Screening Programme (FASP, 2015b): Fetal Anomaly Screening Programme handbook (June 2015). Available to download at: https://www.gov.uk/government/publications/fetal-anomaly-screening-programme-handbook

Fetal Anomaly Screening Programme FASP (2015c): Down's, Edwards' and Patau's syndromes screening programme: Handbook for Laboratories, version 1.0, NHS Fetal Anomaly Screening Programme (Public Health England) April 2015.

NHS England (2017). NHS Public health functions agreement 2017-18. Service specification no. 16. NHS Fetal Anomaly Screening Programme - Screening for Down's, Edwards' ad Patau's Syndromes (Trisomy 21, 18 & 13). https://www.england.nhs.uk/wp-content/uploads/2017/05/serv-spec-16.pdf

NHS National Genetics and Genomics Centre, (2013a). Edwards' Syndrome. [Online] Available from: <www.geneticseducation.nhs.uk>

NHS National Genetics and Genomics Centre, (2013b), Patau's Syndrome. [Online]. Available from: < www.geneticseducation.nhs.uk>

PHE (2017) 'Screening tests for you and your baby' https://www.gov.uk/government/publications/screening-tests-for-you-and-your-baby-description-in-brief

Appendix A

Derby Teaching Hospitals NHS
NHS Foundation Trust

Information for Women

LOW PAPP A (Pregnancy Associated Plasma Protein-A)

Results for your 1st trimester combined screening for Down's, Edwards' & Patau's syndromes

All eligible pregnant women are offered 1st trimester screening tests. At the Royal Derby Hospital part of this screening involves taking a blood sample to analyse for the pregnancy hormone HCG (Human Chorionic Gonadotrophin) and a pregnancy protein called PAPP-A (Pregnancy Associated Plasma Protein-A).

Your chance of having a baby affected with Down's, Edwards' or Patau's syndromes is calculated using your age and:

- The measurement of the fluid at the back of your baby's neck, known as the nuchal translucency (NT), which is done during your early pregnancy dating scan
- The levels of the two pregnancy hormones (free Beta HCG & PAPP-A), which is by a blood test at the dating scan appointment

In some pregnancies the PAPP-A that we look for in the blood test is found to be at a slightly lower level than average. This is not likely to cause any problems. However, a low level of PAPP-A is occasionally thought to have some association with reduced fetal growth later on in pregnancy.

If your PAPP-A result is low your community midwife will inform you. S/he will recommend your care is transferred to the consultant team so regular scans to monitor your baby's growth can be offered and arranged.
These scans will be offered monthly starting from around 28 week's gestation. This allows us to assess whether your baby is continuing to grow to its full potential. We aim to complete your booking appointment in the antenatal clinic at the Royal Derby Hospital with the consultant team on the same day that you attend for your fetal anomaly scan, at around 20 weeks.

It is important that you also continue to see your community midwife at regular intervals to ensure your pregnancy is progressing well. If your community midwife has any concerns, you will be referred to the hospital sooner.

If you have any additional questions regarding this information please ask your community midwife

Reference: Royal College of Obstetricians and Gynaecologists. Small-for-Gestational-Age Fetus, Investigation and Management (Green-top Guideline No. 31). www.rcog.org.uk

P3150/1899/11.2017/VERSION1:Last reviewed 11.2017

Appendix B

A Table of Standardised Detection Rates and Screen Positive Rates for the Combined and Quadruple Screening

Screening strategy	Thresholds	
	Acceptable	Achievable
T21	Standardised DR 85%	
	Standardised SPR 1.8-2.5%	Standardised SPR 1.9-2.4%
T18/T13	Standardised DR 80%	
	Standardised SPR 0.1-0.2%	Standardised SPR 0.13-0.17%
T21/T18/T13	Standardised DR 80%	
	Standardised SPR 1.8-2.5%	Standardised SPR 1.9-2.4%
Quadruple (T21)	Standardised DR 80%	
	Standardised SPR 2.5-3.5%	Standardised SPR 2.7-3.3%

* **The DR and SPR for the quadruple test relate to singleton pregnancies only**

Appendix C

Service Specification for Down's, Edwards' and Patau's Syndrome Screening

Service Standards for Fetal Anomaly Screening (Down's, Edwards' and Patau's syndrome) at RDH are offered in accordance with the FASP Service Specification 2017-18 or any subsequent version: https://www.england.nhs.uk/wp-content/uploads/2017/05/serv-spec-16.pdf

- To offer Down's, Edwards' and Patau's syndrome screening (from the 1st of March 2016) to all eligible pregnant women (with a singleton or twin pregnancy) before 14 weeks and 1 day of pregnancy (CRL 45-84mm) as part of the 'combined' screening strategy.
- To offer Down's syndrome screening (Quadruple test), from the 1st of March 2016, to all eligible pregnant women with a singleton or twin pregnancy between ≥14+2 and 19+6 weeks gestation (HC 101-172mm). See Pathway C.
- To provide adequate high quality information on the screening process to support each woman to make an informed decision on whether to accept or decline the offer of screening.
- Information at all stages of the screening programme to be available in writing and other formats that meet national standards (see booklet 'Screening tests for you and your baby').
- To use an appropriate interpreter when spoken English is not the woman's first language, to enable the woman to understand the information given.
- To document the offer of screening and the decision to accept or decline in the maternity hand-held records and by creating an 'Antenatal Screening' activity in the Lorenzo/ Maternity computer system.
- For women considering Quadruple screening in a twin pregnancy, a discussion with a healthcare professional with a special interest in multiple pregnancies should take place, to assist in facilitating an informed choice. Please see section 7c.
- Where there is an increased 'chance' report a FM MW checks the result report with a 2nd MW & reviews the scan report on ICM; the woman is contacted and invited to come to the FM unit to discuss the results with a midwife or doctor.
- Adequate high quality information and support will be provided to enable the woman and her partner to make a decision on the outcome of the pregnancy where it is confirmed that the pregnancy is affected by Down's, Edwards' or Patau's syndrome following a diagnostic test.
- To provide optimal management of the pregnancy, birth and new-born period for women where it is confirmed that the pregnancy is affected by Down's, Edwards' or Patau's syndrome following a diagnostic test, who chose to continue the pregnancy,
- To provide the optimal care and bereavement support for women where it is confirmed that the pregnancy is affected by Down's, Edwards' or Patau's syndrome following a diagnostic test, who opt for termination of pregnancy.
- To promote an appropriate level of knowledge for health professionals involved in the screening programme.
- To identify professional accountability and minimise potential 'chance' to comply with clinical governance. See flowcharts of care pathways A-F.
- To minimise the adverse effects of screening: anxiety, misunderstanding, inaccurate information, unnecessary investigation and follow-up, and inappropriate disclosure of patient specific information.
- To have in place systems for 'chance' assessment and management of adverse incidents occurring during the screening process. See flowcharts of care pathways A to F.

- Women, who request diagnostic testing for Downs's, Edwards' and Patau's syndrome on the basis of age alone, should be advised that the NT Plus is recommended first. The UK NSC does not support the offer of diagnostic testing on the basis of age alone. If the woman is not happy with this plan of care, refer to FM.

- In accordance with Fetal Anomaly Screening Programme handbook for Ultrasound Practitioners April 2015 only **two attempts** will be made to obtain the nuchal translucency (NT) measurement (twice on the couch). The second attempt may take place on the same day or at a later date. If after two attempts the NT cannot be measured the patient should be referred to an ANC midwife or the Antenatal Screening Co-ordinator for discussion regarding the offer of second trimester screening.

  Factors likely to limit the success in obtaining the NT are high BMI, fetal or uterine position and inadequate bladder filling.

Documentation Control

Reference Number: OBS/10:17/D4	**Version: 4**		**Status: Final**	
Version / Amendment	1	Dec 2010	Tracy Doucas Specialist Midwife Antenatal & Newborn Screening Coordinator Carole Adcock & Sue Rucklidge FM Sp. Midwives	New. To reflect National Screening Committee Standards
	2	Oct 2014	Carole Adcock - FM Specialist Midwife Liz MacGregor – Antenatal Screening Specialist	Review
	3	Aug 2015	Charlotte Daniels Specialist Midwife AN screening Sue Brealey Sonographer	Updated in line with additional screening requirements for T13/T18 & T21 (Public Health England)
	4	March 2017	Cindy Meijer – Risk, Guidelines& Audit Midwife	To add Low PAPP-A pathway
	5	Nov 2017	Tracy Doucas – Antenatal Screening Coordinator	To bring in line with QA post visit recommendations & new PHE national terminology requirements
Intended Recipients: All staff with responsibility for screening women antenatally				
Dissemination: Cascaded electronically through lead sisters/midwives/doctors; Published on Intranet, Article in Business unit newsletter; emailed via NHS.net				
To be read in conjunction with:				
Development of Guideline:	T. Doucas Specialist Midwife - Antenatal Screening Co-Ordinator			
Consultation with:				
Approved By:	14/11/17 Maternity Guidelines Group: Miss S Rajendran – Chair 30/11/17 Maternity Development & Governance Committee /ACD- Dr Janet Ashworth Head of Midwifery / Divisional Nurse Director: Mrs. J Haslam 11 /12 /17 Divisional Governance: Dr B Pearson - Chair			
Implementation date:	18/12/17			
Review Date:	November 2020			
Key Contact:	Cindy Meijer			