Public Health Screening Programme

Annual Report

1 April 2019 to 31 March 2020

Health Services
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Section 1

Pregnancy Screening

Chapter 1 - Pregnancy Screening

Summary

Antenatal haemoglobinopathies screening for sickle cell and thalassaemia aims to identify couples who are at risk of having an affected child and thereby offer them information on which to base reproductive choices. **Communicable diseases in pregnancy screening** aims to identify infection and ensure a plan for treatment and management of affected individuals and their babies is put in place at the earliest opportunity. Screening allows undiagnosed infection to be identified and treatment to be given, which can reduce the risk of mother to child transmission, improve the long-term outcome and development of affected children, and ensure that women, their partners and families are offered appropriate referral, testing and treatment. **Down's syndrome and other congenital anomalies screening** aims to detect Down's syndrome and other congenital anomalies in the antenatal period. This provides women and their partners with informed choice regarding continuation of pregnancy. It also allows, where appropriate, management options (such as cardiac surgery or delivery in a specialist unit) to be offered in the antenatal period.

Pregnancy screening programmes are offered universally to all pregnant women during antenatal visits. During 2019/2020, 11,561 NHSGGC residents booked to attend antenatal clinics and 10,435 (90.3%) of first antenatal booking appointments were offered before or equal to 12 weeks and 6 days gestation.

Using OnoMap software we identified the ethnic origin of pregnant women as follows White British 7847 (67.9%), Asian Pakistani 591 (5.1%), Asian Indian 273 (2.4%), Black African 207 (1.8%), Chinese 155 (1.3%) and 577 (5.0%) of any other ethnic group

In November 2017 NHSGGC introduced BadgerNet, a new maternity Clinical IT application. A number of data sources were used in producing this report; BadgerNet; Trakcare and both local and national laboratory reports.

Gestational Diabetes Mellitus (GDM) and Obesity

Within NHSGGC, the assessment of pregnant women and risks associated with GDM are based on a BMI>= 35, previous macrosomic baby (weighing >4 kg at birth), family history of diabetes, previous gestational diabetes and mother's ethnic origin. Nearly a third of pregnant women 3,891 (33.7%) were recorded as having 'any risk' of GDM and were eligible to be offered an OGTT at 24-28 weeks gestation**.**

At the time of their booking appointment, 4,748 (41.1%) of pregnant women had a normal weight, 1,654 (14.3%) were overweight and 3129 (27.1%) obese. The total number of women who were within the severely obese categories of (35<=BMI >=45) was 1,110 (9.6%).

Haemoglobinopathies Screening

Of the 11,561 women booked for their first antenatal booking, 11,549 (99.9%) were offered haemoglobinopathies screening and only<5 refused. The blood is screened for risk of thalassaemia for all women who consented

The Family Origin Questionnaire (FOQ) is completed as part of routine early antenatal risk assessment. For low prevalence areas like NHSGGC, it provides the basis for testing for haemoglobin variants and in the interpretation of results and the need for partner testing. Across NHSGGC, 8,954 (77.5%) samples had a completed FOQ and this varied at hospital sites.

Infectious diseases

Uptake across NHSGGC was greater than 99% for all the screening tests. The screening identified 9 women infected with HIV (7 were previously known) and 52 infected with HBV (36 were previously known) and 9 women required treatment for syphilis.

Down's syndrome and other congenital anomalies screening

Of the 11,561 women booked at antenatal clinics, 7,801 (78.6%) were tested in the 1st Trimester and 2,152 (21.4%) in the 2nd Trimester. 176 high chance results were recorded for the 1st Trimester and 86 for the 2nd Trimester Down's syndrome screening**.**

Congenital anomalies screening

10,344 (89.5%) pregnant women consented for a fetal anomaly scan. 10,270 (99.3%) of scans were performed and 183 anomalies were detected.

COVID Pandemic and impact on Pregnancy and Newborn Screening

A national assessment was undertaken by NSD in March 2020 as part of the response to COVID and lockdown measures for all screening programmes across Scotland. (**Appendix 1.11**) The recommendation based on guidance from RCOG and the risk assessment was to continue Pregnancy & Newborn screening as this was part of routine appointments. Health Boards were asked to develop contingency plans around resource and resilience in order to ensure that services were able to continue.

Chapter Contents

1.1. Aims of Pregnancy Screening Programmes

Antenatal haemoglobinopathies screening for sickle cell and thalassaemia aims to identify couples who are at risk of having an affected child and thereby offer them information on which to base reproductive choices.

Communicable diseases in pregnancy screening aims to identify infection and ensure a plan for treatment and management of affected individuals and their babies is put in place at the earliest opportunity. Screening allows undiagnosed infection to be identified and treatment to be given, which can reduce the risk of mother to child transmission, improve the long-term outcome and development of affected children, and ensure that women, their partners and families are offered appropriate referral, testing and treatment.

Down's syndrome and other congenital anomalies screening aims to detect Down's syndrome and other congenital anomalies in the antenatal period. This provides women and their partners with informed choice regarding continuation of pregnancy. It also allows, where appropriate, management options (such as cardiac surgery or delivery in a specialist unit) to be offered in the antenatal period.

1.2. Eligible Population

The pregnancy screening programmes are offered universally to all pregnant women during antenatal visits.

1.3. The Screening Tests

Appendix 1.1 illustrates the gestational age when pregnancy tests are carried out. All pregnant women are offered pregnancy screening for the following conditions.

Antenatal haemoglobinopathies screening

The pregnant woman and her partner are asked to complete a family origin questionnaire, **Appendix 1.2**. The information from the questionnaire is used to assess the risk of either parent being a carrier for sickle cell and other haemoglobin variants.

In addition, a blood test is taken at the first antenatal booking to screen the woman for sickle cell, thalassaemia and other haemoglobin variants. Where testing shows that the woman is a carrier, the baby's father will also be offered testing. The full screening pathway is shown in **Appendix 1.3**. Scotland is a low prevalence area for haemoglobinopathy screening and details are included in **Appendix 1.4**.

Screening for sickle cell disorders and thalassaemia should be offered to all women as early as possible in pregnancy, and ideally by 10 weeks for parents to make an informed decision on whether to continue with the pregnancy.

1.4. Infectious diseases in pregnancy screening

Testing for HIV, hepatitis B and syphilis infection is carried out at first antenatal booking when a blood sample is taken. The full screening pathway is shown in **Appendix 1.5**, **Appendix 1.6**, **Appendix 1.7**, **Appendix 1.8** and **Appendix 1.9**.

Down's syndrome and other congenital anomalies

Screening for **Down's syndrome** can be carried out using two different screening methods depending on gestational age. The screening tests, using blood and ultrasound scans, together with maternal risk factors, are used to derive an overall risk of having a baby with Down's syndrome. The full screening pathway is shown in **Appendix 1.10**. Ultrasound scanning is used to look for other **congenital anomalies** between 18 and 21 weeks.

The decision to accept screening for Down's syndrome and other congenital anomalies raises particular ethical issues for women. Uptake of Down's syndrome or other congenital anomalies screening depends on whether women would wish further investigation or management.

1.5. Delivery of NHSGGC Pregnancy Screening Programmes

Each NHS Board has a statutory requirement to submit data on antenatal activity. In NHSGGC, 11,561 women booked to attend antenatal clinics and overall 90.3% (10,435) managed to book before or equal to 12 weeks and 6 days gestation. Work continues to encourage all pregnant women to book earlier through the Central Booking Line (**Table 1.1**)

Table 1.1: Number of women booked for their first antenatal appointments in NHSGGC 1 April 2019 to 31 March 2020 by gestation age.

Maternity Unit	<=12Wks 6Days	13Wks 0Days - 16Wks 6Days	17Wks 0Days - 20Wks 6Days	21Wks 0Days - 24Wks 6Days	25Wks 0Days - 30Wks 6Days	>=31 Wks 0Days	Total	% <=12 Wks 6Days
Princess Royal Maternity Hospital	3,154	217	73	51	36	35	3,574	*88.2*
Queen Elizabeth University Hospital	4,515	274	84	50	58	51	5,063	*89.2*
Royal Alexandra Hospital	276	80	24	14	14	15	2,924	*94.6*
Total	**10,435**	**571**	**181**	**115**	**108**	**101**	**11,561**	***90.3***

Source: BADGERNET, November 2020

Within NHSGGC, booking for the 1st antenatal appointment varied according to area of residence. 2,461 (85.7%) of pregnant women living in the most deprived areas booked by 12 weeks and 6 days compared to 1,859 (94.8%) of women living in the least deprived areas. Work continues to engage with and support women from more deprived areas to book earlier. (**Table 1.2**)

Table 1.2: Gestational age at first antenatal booking appointment by deprivation categories for period 1 April 2019 to 31 March 2020

SIMD 2016 Quintile	<=12Wks 6Days	13Wks 0Days - 16Wks 6Days	17Wks 0Days - 20Wks 6Days	21Wks 0Days - 24Wks 6Days	25Wks 0Days - 30Wks 6Days	>=31 Wks 0Days	Unknown	Total	% <=12Wks 6Dys
1 (Most Deprived)	2,461	215	69	42	33	34	16	2,870	*85.7*
2	2,158	147	50	34	25	27	13	2,454	*87.9*
3	2,002	111	33	19	20	12	10	2,207	*90.7*
4	1,955	59	15	13	12	10	6	2,070	*94.4*
5 (Least Deprived)	1,859	39	14	7	18	18	5	1,960	*94.8*
Total	**10435**	**571**	**181**	**115**	**108**	**101**	**50**	**11,561**	*90.3*

Source: BADGERNET, November 2020

The majority of pregnant women were aged between 25-34 years (6,990 - 60%) and those between 20-24 years (1,551) accounted for 13% of pregnancies. Only 374 (3.25%) of pregnant women were under 20 years of age. (**Table 1.3**)

Table 1.3: Age at first antenatal booking appointment by HSCP areas for period 1 April 2019 to 31 March 2020

	CHP Sector Decode								
Age at booking	East Dunbartonshire	East Renfrewshire	Glasgow City CHP - North	Glasgow City CHP - North	Glasgow City CHP - South	Inverclyde	Renfrewshire	West Dunbartonshire	Total
<20	7	7	87	67	92	27	41	46	374
20-24	68	49	321	250	372	121	212	158	1551
25-29	186	148	628	509	719	188	516	262	3156
30-34	351	341	566	729	846	176	574	251	3834
35+	295	283	363	463	639	124	345	134	2646
Total	**907**	**828**	**1965**	**2018**	**2668**	**636**	**1688**	**851**	**11561**

Source: BADGERNET, November 2020

Using OnoMap software, the ethnic origin of pregnant women was identified as follows, White British 7,847 (67.9%), Asian Pakistani 591 (5.1%), Asian Indian 273 (2.4%), Black African 207 (1.8%), Chinese 155 (1.3%) and 577 (5.0%) of any other ethnic group **(Table 1.4).**

Table 1.4: Number of NHSGGC residents booked for their first antenatal appointment by ethnic origin during 1 April 2019 to 31 March 2020

2001 Census Ethnic Group	Number	%
White - British	7,847	*67.9*
White – Irish	732	*6.3*
White – Any Other White Background	699	*6.0*
Asian or Asian British – Indian	273	*2.4*
Asian or Asian British – Pakistani	591	*5.1*
Asian or Asian British – Bangladeshi	40	*0.3*
Asian or Asian British – Any Other Asian Background	20	*0.2*
Black or Black British – Caribbean	2	*0.0*
Black or Black British – African	207	*1.8*
Other Ethnic Groups – Chinese	155	*1.3*
Other Ethnic Groups – Any Other Ethnic Group	577	*5.0*
Unclassified	418	*3.6*
Total	**11,561**	

Source: BADGERNET, OnoMap, November 2020

1.6. Gestational Diabetes Mellitus (GDM)

Pregnant women are assessed for their diabetes status at the time of booking and the BMI (Body Mass Index) is recorded. There were 69 women with Type 1 diabetes and 43 with Type 2 diabetes. **(Table 1.5)**

Table 1.5: Number and percentage of women booked for their first antenatal appointments by body mass index and current diabetes 1 April 2019 to 31 March 2020

	Current Diabetes				
Body Mass Index Categories	**No**	**Yes Type 1**	**Yes Type 2**	**Total**	**% Diabetic**
BMI<18.5	308	0	0	308	0.0
18.5<=BMI<25	4,727	18	3	4,748	0.4
25<=BMI<30	1,628	11	15	1,654	1.6
30<=BMI<35	3,110	13	6	3,129	0.6
35<=BMI<40	720	4	12	736	2.2
40<=BMI<45	235	1	2	238	1.3
BMI>=45	132	2	2	136	2.9
Unknown	589	20	3	612	
Total	**11,449**	**69**	**43**	**11,561**	**1.0**

Source: BADGERNET, November 2020

Women with gestational diabetes are at increased risk of having a large baby, a stillborn baby or a baby who dies shortly after birth. Within NHSGGC, the

assessment of pregnant women and risks associated with GDM are based on a BMI>= 35, previous macrosomic baby (weighing >4 kg at birth), family history of diabetes, previous gestational diabetes and mother's ethnic origin. Nearly a third of pregnant women 3,891 (33.7%) were recorded as having 'any risk' of GDM and were eligible to be offered an OGTT at 24-28 weeks gestation**. (Table 1.6)**

Table 1.6: Number of women booked for their first antenatal appointments in NHSGGC 1 April 2019 to 31 March 2020 and GDM risk factors

Maternity Unit	BMI >=35	Previous Macrosomic Baby	Family History Diabetes	Previous Gestational Diabetes	Origin Mother Risk	Any Risk*	Bookers Total	% Any Risk
Princess Royal Maternity Hospital (PRM)	352	44	576	140	598	1309	3574	*36.6*
Queen Elizabeth University Hospital (QEUH)	402	59	807	156	966	1785	5063	*35.3*
Royal Alexandra Hospital (RAH)	333	29	433	65	102	797	2924	*27.3*
Total	1087	132	1816	361	1666	3891	11561	*33.7*

Source: BADGERNET, November 2020

* Summed individual risks may exceed any risk total

1.7. Body Mass Index (BMI) and Pregnant Women

At the time of their booking appointment, 4,748 (41.1%) of pregnant women had a normal weight, 1,654 (14.3%) were overweight and 3,129 (27.1%) obese. The total number of women who were within the severely obese categories of (35<=BMI >=45) was 1,110 (9.6%). The BMI was not recorded for 612 women (5.3%) **(Table 1.7).**

Table 1.7: Number and percentage of women booked for their first antenatal appointments by body mass index and by maternity unit from 1 April 2019 to 31 March 2020

	Maternity Unit							
BMI Category	**Princess Royal Maternity Hospital (PRM)**	**%**	**Queen Elizabeth University Hospital (QEUH)**	**%**	**Royal Alexandra Hospital (RAH)**	**%**	**Total**	**%**
Underweight BMI<18.5	84	*2.4*	150	*3.0*	74	*2.5*	308	*2.7*
Normal 18.5<=BMI<25	1,428	*40.0*	2,236	*44.2*	1,084	*37.1*	4,748	*41.1*
Overweight 25<=BMI<30	522	*14.6*	672	*13.3*	460	*15.7*	1,654	*14.3*
Obese 30<=BMI<35	981	*27.4*	1,348	*26.6*	800	*27.4*	3,129	*27.1*
Severely Obese 35<=BMI<40	233	*6.5*	280	*5.5*	223	*7.6*	736	*6.4*
Severely Obese 40<=BMI<45	77	*2.2*	88	*1.7*	73	*2.5*	238	*2.1*

Severely Obese BMI>=45	51	*1.4*	45	*0.9*	40	*1.4*	136	*1.2*
Unknown	198	*5.5*	244	*4.8*	170	*5.8*	612	*5.3*
Total	**3,574**		**5,063**		**2,924**		**11,561**	

Source: BADGERNET, November 2020

1.8. NHSGGC Antenatal Haemoglobinopathies Screening Programme

Haemoglobinopathies

The haemoglobinopathies are a large group of inherited blood disorders which affect the haemoglobin (oxygen carrying) component of blood. They fall into two main groups – the haemoglobin variants (such as sickle cell disorders) which are associated with the production of abnormal forms of haemoglobin, and the Thalassaemia in which there is an abnormality in the amount of haemoglobin produced. Sickle cell disorders, caused by a haemoglobin variant HbS, often result in severe life threatening clinical symptoms. Those with beta thalassaemia major require regular blood transfusions to maintain life. All pregnant women will be offered screening for haemoglobinopathies based on a low prevalence screening model.

Hb D (Hb AD) is one of the haemoglobinopathy carrier traits. The person has inherited haemoglobin A from one parent and haemoglobin D from the other. They will not have an illness, not experience symptoms but the carrier status is important for future reproduction.

Hb E (HbAE) is another haemoglobinopathy carrier trait. The person has inherited haemoglobin A from one parent and haemoglobin E from the other. They will not have an illness, not experience symptoms but the carrier status is important for future reproduction.

The screening pathways for haemoglobinopathy screening are in **Appendix 1.2**, **Appendix 1.3** and **Appendix 1.4**.

Samples taken for haemoglobinopathies screening

Of the 11,561 women booked for their first antenatal booking, 11,549 (99.9%) were offered haemoglobinopathies screening and 2 refused. The blood is checked for risk of thalassaemia for all women who consented. **(Table 1.8)**

Table 1.8: NHSGGC Number of women who consented for haemoglobinopathies screening from 1 April 2019 to 31 March 2020

Maternity Unit	Total	HBO offered	HBO Consent Not Known	HBO Refused	HBO Test Performed	FOQ Completed	FOQ Not Completed	% FOQ Completed
Princess Royal Maternity	3,574	3,570	3	<5	3,568	2,327	1,247	*65.1*
Queen Elizabeth University Hospital	5,063	5,061	2	0	5057	4,011	1,052	*79.2*
Royal Alexandra Hospital	2,924	2,918	5	<5	2,916	2,616	308	*89.5*
Total	**11,561**	**11,549**	**10**	**<5**	**11,541**	**8,954**	**2,607**	***77.5***

Source: BADGERNET, November 2020

The Family Origin Questionnaire (FOQ) is completed as part of routine early antenatal risk assessment. For low prevalence areas like NHSGGC, it provides the basis for testing for haemoglobin variants and in the interpretation of results and the need for partner testing. Across NHSGGC, 8,954 (77.5%) samples had a completed FOQ recorded on BadgerNet and this varied across sites with the Princess Royal Maternity only completing the FOQ for 65.1% of the pregnant women. Laboratory staff test samples for haemoglobinopathies and thalassaemia even if the FOQ is missing **(Table 1.8)** The maternal samples tested for haemoglobinopathies identified 12 fetus **at risk** and 90 were identified as **not at risk**. Partner testing was not required in 6 cases and 23 partners should have been offered testing. Less than 5 carriers were identified. **(Table 1.9)**

Table 1.9: NHSGGC haemoglobinopathies screening outcome (HBO performed only) 1 April 2019 to 31 March 2020

	Maternity Unit			
Screening Outcome	**Glasgow Princess Royal Maternity**	**Queen Elizabeth University Hospital**	**Royal Alexandra Maternity Hospital**	**Total**
01:FAR (Fetus at Risk)	9	3	0	12
02:FNAR (Fetus Not At Risk)	34	50	6	90
04:Negative	3,439	4,846	2,825	11,110
05:PTNR (Partner Testing Not Required)	5	1	0	6
06:PTSBO (Partner Testing Should Be Offered)	18	4	1	23
07:Carrier	0	<5	0	<5
12:Screen to follow	2	21	20	43
Unknown	61	131	64	256
Grand Total	3,568	5,057	2,916	11,541

Source: BADGERNET, November 2020

Table 1.10: KPIs for Pregnancy and Newborn Screening - Haemoglobinopathy 2019-2020

KPI	Performance threshold	NHSGGC 2019/20
1.1 Coverage	Essential : ≥95% Desirable : ≥ 99%	99.1%
1.3 Completion of FOQ	Essential : ≥ 95% Desirable : ≥99%	77.5 %

1.9. NHSGGC Infectious Diseases in Pregnancy Screening

Infectious Diseases

These include Hepatitis B, Syphilis and Human Immunodeficiency Virus (HIV):
Hepatitis B infection can be passed on from mother to baby during birth. HBV is a virus that affects the liver. Babies can be immunised at birth to prevent being infected from mothers.

Syphilis is an infection that can damage the health of both mother and baby if not treated with antibiotics.

Human Immunodeficiency Virus (HIV) infected women can pass HIV to their babies during pregnancy, childbirth and through breastfeeding. Many women with HIV will not know that they are infected unless they are tested.

Screening tests and results for Infectious diseases

An estimate of the percentage uptake of each of the tests has been calculated by dividing the number requesting the test by the total number of samples.

The number of women referred for booking cannot be used as the denominator to calculate uptake as it is does not accurately represent the number of women who have been offered screening. Some women would not have been offered screening because they have had an early pregnancy loss. A small number of women will transfer out of the health board area.

Uptake across NHSGGC was greater than 99% for all the screening tests. The screening identified 9 women infected with HIV (7 were previously known) and 52 infected with HBV (36 were previously known) and 9 women infected with syphilis **(Table 1.11).**

Table 1.11: NHSGGC Infectious diseases tests and results 2019/2020

1 April 2019 - 31 March 2020					Results			
	Total number of samples	No. requesting individual test	No. not requesting individual test	uptake	Antibody detected[1,2,]		antibody not detected	
	(N)	(N)	(N)	%	(N)	%	(N)	%
HIV	14,292	14,290	2	99.9	9[1]	0.1	14,281	99.9
HBV	14,292	14,288	4	99.9	52[2]	0.4	14,236	99.6
Syphilis	14,292	14,976	2	99.9	9	0.1	14,281	99.9

Sources: West of Scotland Specialist Virology Centre

Notes:
1. 7 of the 9 HIV infections were previously known about
2. 36 of the 52 HBV infections were previously known about

1.10. NHSGGC Down's syndrome and Other Congenital Anomalies Screening Programme

Down's syndrome is characterised an extra copy of chromosome 21 (trisomy 21) and older mothers are more likely to have a baby with Down's syndrome although it can occur in women of any age.

1.11. 1st and 2nd Trimester Down's syndrome screening

Of the 11,561 women booked at antenatal clinics, 9,916 (85.7%) were tested either for the 1st or 2nd Trimester as detailed in **Table 1.12**

Table1.12: 1st and 2nd Trimester Screening for NHSGGC residents

NHS Greater Glasgow and Clyde	2019/2020	2018/2019	2017/2018
First Trimester	7,801	7,961	8,227
Second Trimester	2,115	2,393	2,209
Total Screens	9,916	10,354	10,436
% Second trimester	21.3	23.1	21.2

Source: Antenatal Screening Service for Fetal Down's Syndrome Lothian Laboratory 2020

The 1st Trimester samples are taken during 11 weeks +2 days to 14 weeks +1 day of pregnancy. The samples are sent to Lothian Laboratory and during 2019/2020, 7,801 (78.6%) samples were tested. There were 11 late samples (0.14%) and 429 samples (5.3%) had incomplete request details. The number of increased chance results was173 (2.17%). **(Table 1.13)**

Table 1.13: 1st Trimester Down's syndrome screening samples 2019/2020

2019/2020	Number of Samples	% samples	Late sample	% Late samples	In complete Request details	% In complete Request details	Increased chance results	% Increased chance results
1st Trimester	7,801	78.6	11	0.14%	429	5.3%	173	2.17%

Source: Antenatal Screening Service for Fetal Down's Syndrome Lothian Laboratory 2020

The 2nd Trimester samples are taken up to 20 weeks+0 days gestation and sent to Bolton Laboratory. During 2019/2020, 2,152 (21.4%) of samples were taken in the 2nd Trimester. There were 14 unsuitable samples (0.65%) and 86 high chance results were reported (4%). **(Table 1.14)**

Table 1.14: 2nd Trimester Down's syndrome screening samples 2019/2020

2019/2020	Number of samples	% Samples	Number of high chance results	% High chance results	Unsuitable samples	% Unsuitable samples
2nd Trimester	2,152	21.4%	86	4%	14	0.65%

Source: Bolton Labs November 2020

Key Performance Indicators for 1st Trimester Down's syndrome screening

The following data has been reviewed to provide evidence for the NSS Pregnancy and Newborn Screening Key Performance Indicators (KPIs), for 2019/2020 from the Lothian Laboratory for Scotland. **(Table 1.15)**

Table 1.15: KPIs for 1st Trimester Down's syndrome screening

KPI 5.2 Turnaround time	Number of results (numerator) reported to maternity services within 72 working hours of sample receipt in the laboratory. Overall 99.4 % of results (excluding December) were reported within 72 working hours of sample receipt, fulfilling the desirable target of ≥ 99
KPI 5.3 Completion of laboratory request forms	The proportion of laboratory request forms with complete data, as defined by the KPI list of required fields, is 98 %, which fulfils the essential performance criteria.
KPI 5.5 Screen Positive Rate (SPR)	The overall screen positive rate is 2.2 %.
KPI 5.6 Detection Rate (DR)	Information for detection rate is still pending.

Amniocentesis

163 amniocentesis samples were analysed by the Cytogenetics Laboratory and 32 abnormalities were detected (19.4%) and of these 11 had a diagnosis of Trisomy 21 (Down's syndrome) **(Table 1.16)**

Table 1.16: Amniocentesis Referrals 1 April 2019 to 31 March 2020

	Biochemical Screening	Maternal Age	Abnormalities on Scan	NIPT	Other	Total
Number of women (= number of tests)	69	0	58	4	32	163
% total referral reasons	42.3%	0	35.5%	2.4%	19.6%	
Number with normal results	63	0	38	0	30	131
Number with diagnostic trisomy	6	0	11	4	0	21
% number with diagnostic trisomy	8.6%	0%	19%	100%	0.00	
Number of other non trisomy abnormalities	0	0	9	0	2	11
Total number of abnormalities	**6**	**0**	**20**	**4**	**2**	**32**
% total number of abnormalities	**18.75%**	**0.00%**	**62.5%**	**12.5%**	**6.25%**	**19.42%**

Source: Cytogenetics Laboratory November 2020

Chorionic Villus Biopsies (CVS)

110 chorionic villus biopsies were analysed by the Cytogenetics Laboratory in 2019/2020. 41 abnormalities were detected (43.9%) and 27 of those had a diagnosis of Trisomy 21 (Down's syndrome) **(Table 1.17)**

Table 1.17: Chorionic Villus Biopsy referrals and outcomes 1 April 2019 to 31 March 2020

	Referral Type					
	Biochemical Screening	**Maternal Age**	**Abnormalities on Scan**	**NIPT**	**Other**	**Total**
Number of women (= number of tests)	20	0	58	3	29	110
% total referral reasons	18%	0	52.7%	2.7%	26.3%	
Number with normal results	18	0	24	1	26	
Number with diagnostic trisomy	2	0	22	2	1	27
% total with diagnostic trisomy	10.0%	0.0%	38%	66.6%	3.4%	
Number of other non trisomy abnormalities	0	0	12	0	2	14
Total number of abnormalities	**2**	**0**	**34**	**2**	**3**	**41**
% total number of abnormalities	**4.8%**	**0%**	**83%**	**4.8%**	**7.3%**	

Source: Cytogenetics Laboratory November 2020

1.12. Other Congenital Anomalies Screening

Fetal Anomalies Scan

All women are offered an ultrasound scan between 18 and 21 weeks to confirm the gestation age and identify any possible problems that may require medical intervention during pregnancy or after birth.

The number of women who gave consent for a fetal anomaly scan was 10,344 (89.5 %) of all bookers and 10,270 (99.3%) of scans were performed **(Table 1.18).**

Table 1.18: Uptake rate for other congenital anomalies (fetal anomaly scan) for the period 31 March 2019 to 1 April 2020

Maternity Unit	Number of bookers	FAS consented	% Consented	Number of fetal anomaly scans performed*	% fetal anomaly scans performed
Princess Royal Maternity Hospital	3,574	3,192	*89.3*	3,172	*99.4*
Queen Elizabeth University Hospital	5,063	4,492	*88.7*	4,465	*99.4*
Royal Alexandra Hospital	2,924	2,660	*91.0*	2,633	*99.0*
Total	11,561	10,344	*89.5*	10,270	*99.3*

Source: BADGERNET November 2020

Of the 10,270 fetal scans performed, 183 anomalies were suspected. **(Table 1.19)**

Table 1.19: Outcome of fetal anomaly scans performed for the period 1 April 2019 to 31 March 2020

Maternity Unit	Number of bookers	Number of Fetal scans performed	Anomaly not suspected	Anomaly Suspected	% Anomaly Suspected
Princess Royal Maternity Hospital	3,574	3,172	3,358	65	*2.0*
Queen Elizabeth University Hospital	5,063	4,465	4,657	89	*2.0*
Royal Alexandra Hospital	2,924	2,633	2,721	29	*1.1*
Total	11,561	10,270	10,736	183	*1.8*

Source: BADGERNET November 2020

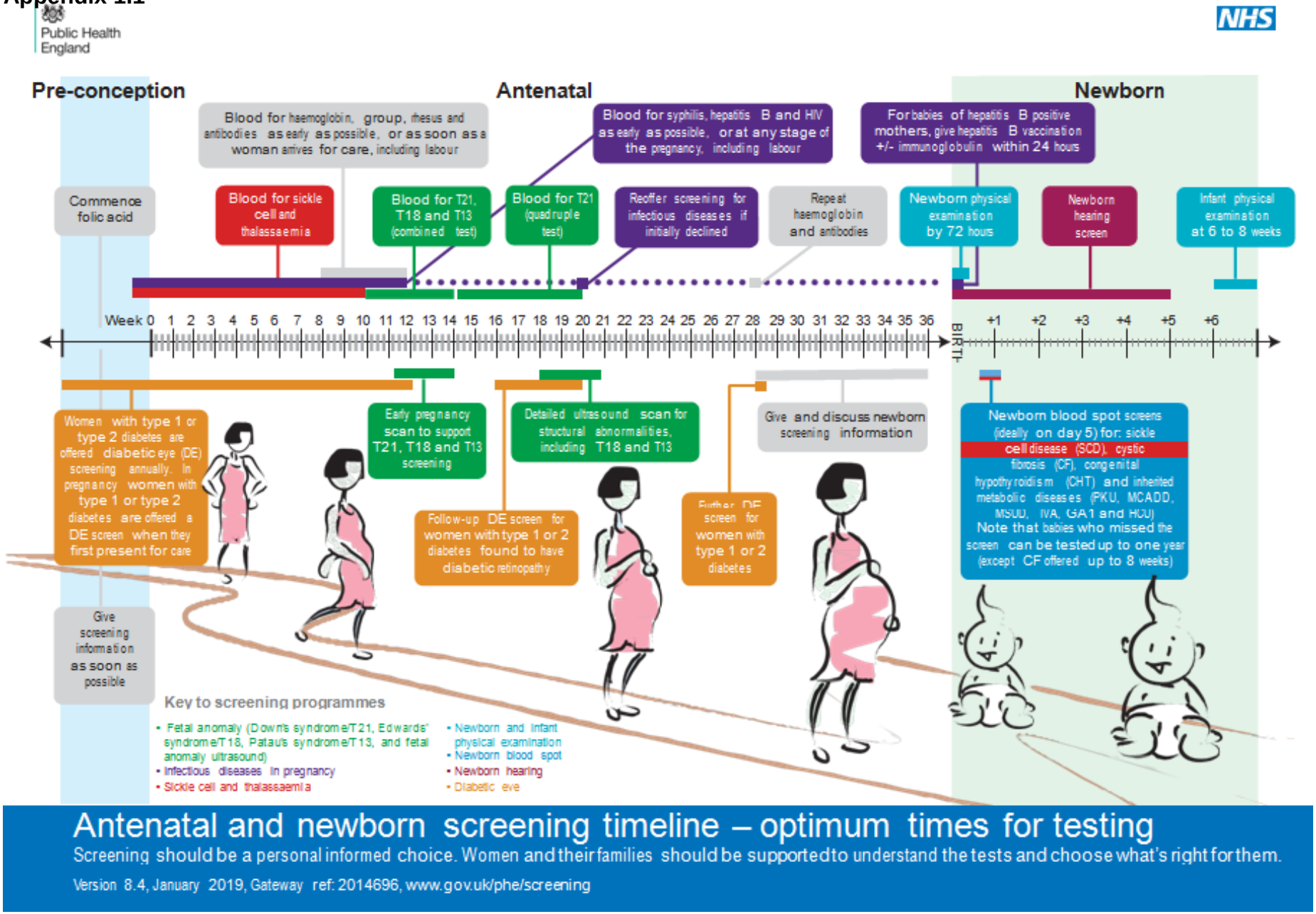
1.13. Information Systems

The report contains data extracted from BadgerNet, Trakcare and Laboratories.

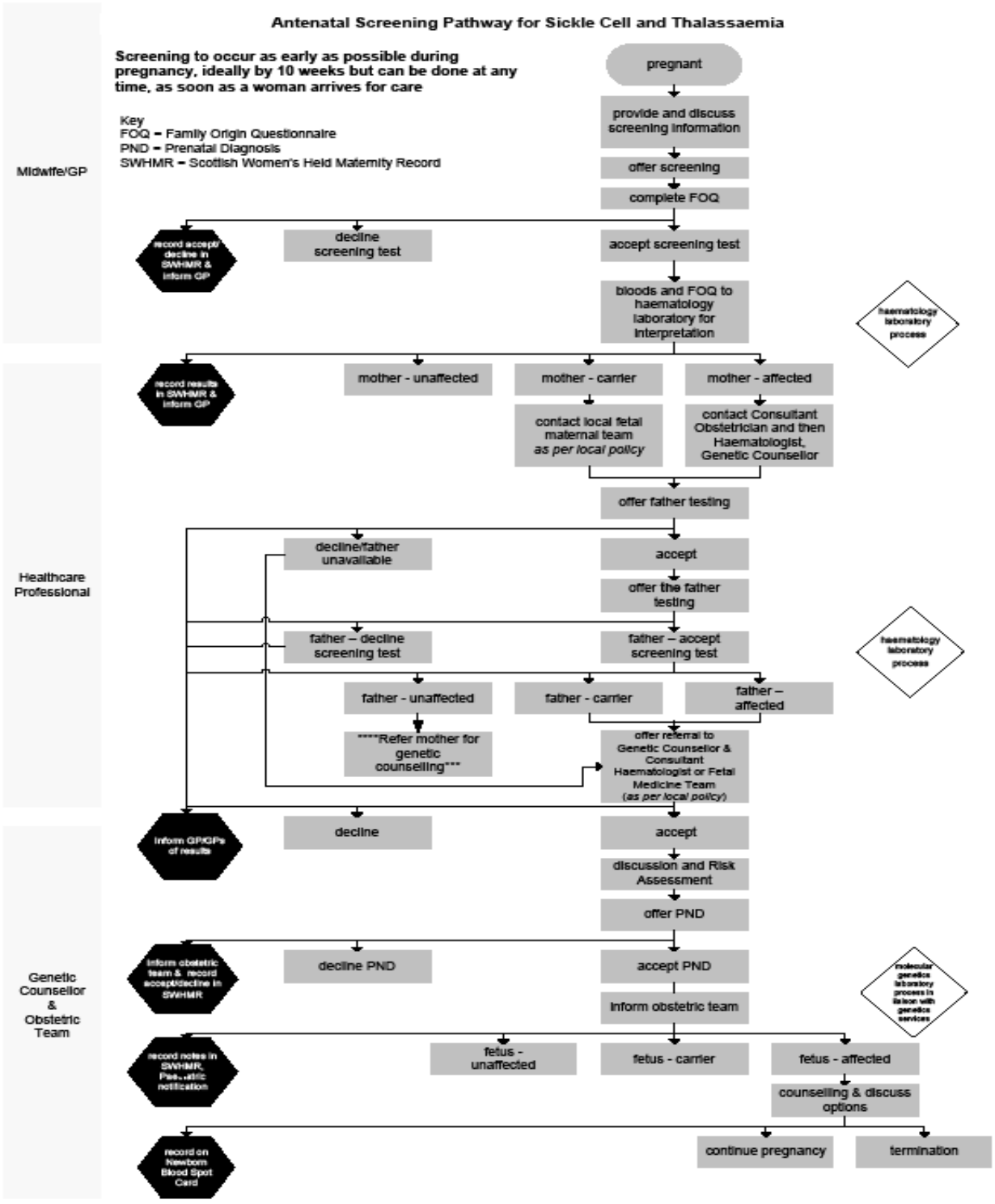
1.14. Challenges and Priorities

- Implement changes to meet programme KPIs.
- Meeting the testing and reporting timelines for pregnancy screening programmes
- Reviewing all pregnancy data from BadgerNet and addressing any quality issues.
- Developing national reports for all Pregnancy Screening from Badger Net.
- Setting up reports to capture all Pregnancy Screening Programmes against the NSD Key Performance Indicators

Appendix 1.1


Public Health England
NHS
Pre-conception
Antenatal
Newborn
Blood for haemoglobin, group, rhesus and antibodies as early as possible, or as soon as a woman arrives for care, including labour
Blood for syphilis, hepatitis B and HIV as early as possible, or at any stage of the pregnancy, including labour
For babies of hepatitis B positive mothers, give hepatitis B vaccination +/- immunoglobulin within 24 hours
Commence folic acid
Blood for sickle cell and thalassaemia
Blood for T21, T18 and T13 (combined test)
Blood for T21 (quadruple test)
Reoffer screening for infectious diseases if initially declined
Repeat haemoglobin and antibodies
Newborn physical examination by 72 hours
Newborn hearing screen
Infant physical examination at 6 to 8 weeks
Week 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36
BIRTH
+1 +2 +3 +4 +5 +6
Women with type 1 or type 2 diabetes are offered diabetic eye (DE) screening annually. In pregnancy women with type 1 or type 2 diabetes are offered a DE screen when they first present for care
Early pregnancy scan to support T21, T18 and T13 screening
Detailed ultrasound scan for structural abnormalities, including T18 and T13
Give and discuss newborn screening information
Newborn blood spot screens (ideally on day 5) for: sickle cell disease (SCD), cystic fibrosis (CF), congenital hypothyroidism (CHT) and inherited metabolic diseases (PKU, MCADD, MSUD, IVA, GA1 and HCU)
Note that babies who missed the screen can be tested up to one year (except CF offered up to 8 weeks)
Follow-up DE screen for women with type 1 or 2 diabetes found to have diabetic retinopathy
Further DE screen for women with type 1 or 2 diabetes
Give screening information as soon as possible
Key to screening programmes
• Fetal anomaly (Down's syndrome/T21, Edwards' syndrome/T18, Patau's syndrome/T13, and fetal anomaly ultrasound)
• Infectious diseases in pregnancy
• Sickle cell and thalassaemia
• Newborn and infant physical examination
• Newborn blood spot
• Newborn hearing
• Diabetic eye
Antenatal and newborn screening timeline – optimum times for testing
Screening should be a personal informed choice. Women and their families should be supported to understand the tests and choose what's right for them.
Version 8.4, January 2019, Gateway ref: 2014696, www.gov.uk/phe/screening

Appendix 1.2


Antenatal Screening Pathway for Sickle Cell and Thalassaemia
Screening to occur as early as possible during pregnancy, ideally by 10 weeks but can be done at any time, as soon as a woman arrives for care
Key
FOQ – Family Origin Questionnaire
PND – Prenatal Diagnosis
SWHMR – Scottish Women's Held Maternity Record
Midwife/GP
Healthcare Professional
Genetic Counsellor & Obstetric Team
pregnant
provide and discuss screening information
offer screening
complete FOQ
record accept/ decline in SWHMR & inform GP
decline screening test
accept screening test
bloods and FOQ to haematology laboratory for interpretation
haematology laboratory process
record results in SWHMR & inform GP
mother - unaffected
mother - carrier
mother - affected
contact local fetal maternal team as per local policy
contact Consultant Obstetrician and then Haematologist, Genetic Counsellor
offer father testing
decline/father unavailable
accept
offer the father testing
father – decline screening test
father – accept screening test
haematology laboratory process
father - unaffected
father - carrier
father – affected
****Refer mother for genetic counselling***
offer referral to Genetic Counsellor & Consultant Haematologist or Fetal Medicine Team (as per local policy)
Inform GP/GPs of results
decline
accept
discussion and Risk Assessment
offer PND
Inform obstetric team & record accept/decline in SWHMR
decline PND
accept PND
Inform obstetric team
molecular genetics laboratory process in liaison with genetics services
record notes in SWHMR, Paediatric notification
fetus - unaffected
fetus - carrier
fetus - affected
counselling & discuss options
record on Newborn Blood Spot Card
continue pregnancy
termination

Appendix 1.3

Screening for Haemoglobinopathies
Family Origin Questionnaire (FOQ)

NHS SCOTLAND

Hospital Name .....
CHI No. .....
Estimated Delivery Date .....
Surname .....
Forename .....
Date of Birth .....
Address 1 .....
Address 2 .....
Postcode .....

Screening test declined ☐

This form must be attached securely to the haematology laboratory request form with the antenatal blood samples. A second copy of the form should be added to the patient's maternity record. (A third copy can be added to the hospital records if applicable). The completion of this form is an ESSENTIAL part of the screening process.

What are your family origins?

Please tick all boxes in ALL sections that apply to the woman and the baby's father

		Woman	Baby's father
A.	**AFRICAN OR AFRICAN CARIBBEAN (BLACK)**		
1/	Caribbean Islands	☐	☐
2/	Africa (excluding North Africa)	☐	☐
3/	Any other African or African-Caribbean family origins (please write in…)		
B.	**SOUTH ASIAN (ASIAN)**		
1/	India or African-Indian	☐	☐
2/	Pakistan	☐	☐
3/	Bangladesh	☐	☐
C.	**SOUTH EAST ASIAN (ASIAN)**		
1/	China including Hong Kong, Taiwan, Singapore	☐ #	☐ #
2/	Thailand, Indonesia, Burma	☐ #	☐ #
3/	Malaysia, Vietnam, Philippines, Cambodia, Laos	☐ #	☐ #
4/	Any other Asian family origins (eg Caribbean-Asian) (please write in…)		
D.	**OTHER NON-EUROPEAN (OTHER)**		
1/	North Africa, South America etc	☐	☐
2/	Middle East (Saudi Arabia, Iran etc)	☐	☐
3/	Any other Non-European family origins (please write in….)		
E.	**SOUTHERN & OTHER EUROPEAN (WHITE)**		
1/	Sardinia	☐ #	☐ #
2/	Greece, Turkey, Cyprus	☐ #	☐ #
3/	Italy, Portugal, Spain	☐	☐
4/	Any other Mediterranean country	☐	☐
5/	Albania, Czech Republic, Poland, Romania, Russia etc	☐	☐
F*	**UNITED KINGDOM (WHITE) refer to guidance at the back**		
1/	England, Scotland, N Ireland, Wales	☐	☐
G*	**NORTHERN EUROPEAN (WHITE) refer to guidance at the back**		
1/	Austria, Belgium, Ireland, France, Germany, Netherlands	☐	☐
2/	Scandinavia, Switzerland etc	☐	☐
3/	Any other European family origins, refer to chart (eg Australia, N America, S Africa) (please write in…)		
	*Hb Variant Screening Requested by F and/or G *(ie request from low risk group)*	☐	☐
	# Higher risk for alpha zero thalassaemia		
H.	**DON'T KNOW (incl. pregnancies with donor egg/sperm)**	☐	☐
I.	**DECLINED TO ANSWER**	☐	☐
J.	**ESTIMATED DELIVERY DATE (please write in if not above)**		
K.	**GESTATION AT TIME OF TEST**		

OFFER haemoglobin variant screening to all women if they or their baby's father have answers in a shaded box

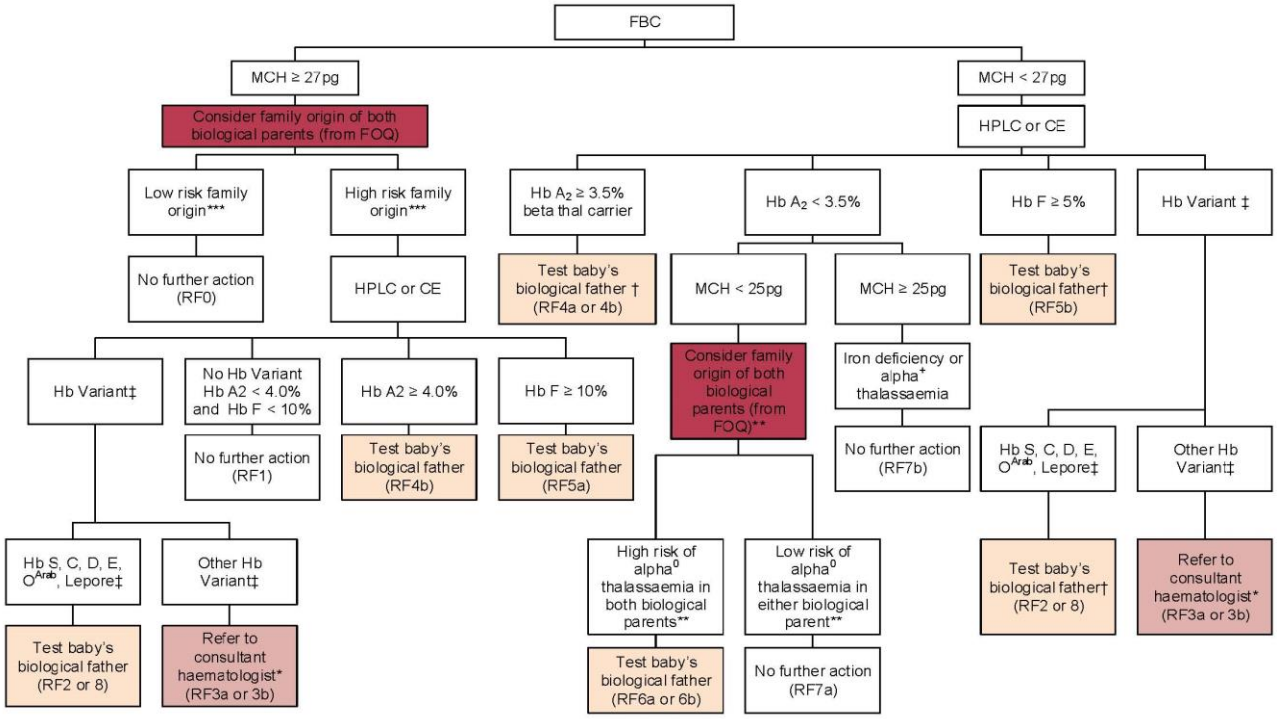
Signed _____ Print Name _____

Job Title _____ Contact Tel No _____ Date _____

(By Health Care Professional completing the form)

Appendix 1.4

Haemoglobinopathy Screening in Low Prevalence Areas



* Refer analytical results to consultant for an opinion on the need for a clinical referral or consult the laboratory support s ervice helpline.

** Consider at high risk if any ethnic origins in China (including Hong Kong), Taiwan, Thailand, Cambodia, Laos, Vietnam, Indonesia, Burma, Malaysia, Singapore, Philippines, Cyprus, Greece, Sardinia, Turkey, or if ethnic/family origin is uncertain or unknown. Reconsider low risk couples if fetal anaemia/hydrops seen on ultrasound scanning or if family history of hydrops fetalis.

*** Low risk or high risk as determined by the family origin questionnaire. **Note: If baby's father is in high risk group, test the mother's sample regardless of her family origins.**

† In all cases consider coexisting α^0 thalassaemia if both parents are from a high risk area and MCH <25pg.

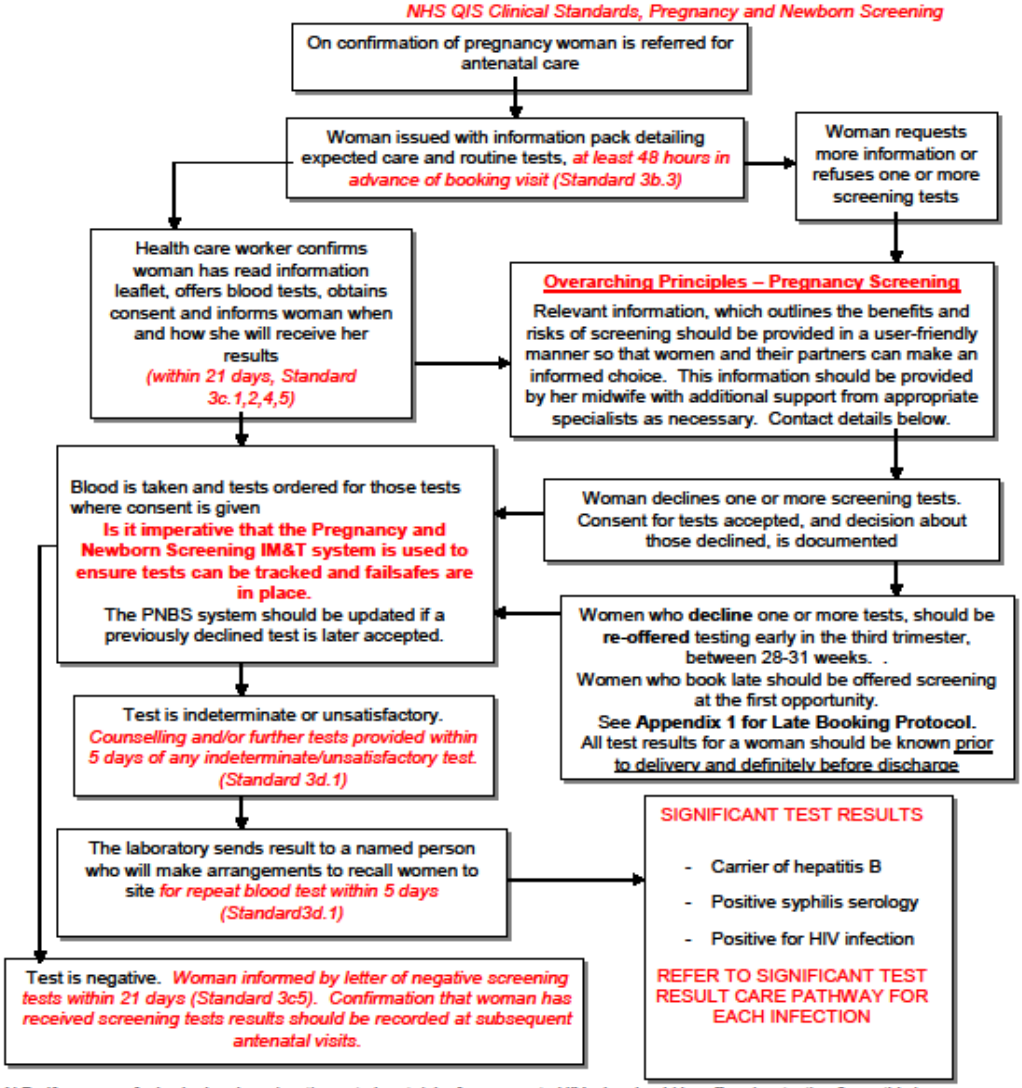
‡ Consider co-existing beta thalassaemia

Appendix 1.5

Offering Routine Antenatal Communicable Disease Screening Tests

"The primary aim of screening women for these conditions is to ensure a plan for treatment and management for affected individuals and their babies".

NHS QIS Clinical Standards, Pregnancy and Newborn Screening



N.B. If a woman feels she has been/continues to be at risk of exposure to HIV, she should be offered re-testing 3 monthly in pregnancy. If a woman develops symptoms of hepatitis or an STI she should be referred to the relevant professional (hepatologist/SHA) for appropriate assessment.

Special Needs in Pregnancy (SNIPs) –RAH – 0141 314 6199 or 0141 887 9111 then page 56311 **VOL** – 01389 817 270
IRH – 01475 504 833 **Glasgow** - 0141 221 5267 or 0141 211 5366 or 0141 211 5337 (secretary)
Sexual Health Advisors, Sandyford – 0141 211 8634
Counselling and Support Team (CAST), Brownlee Centre 0141 211 1089

Version No	V5.3
Revised:	24 May 2016
Approved by:	Communicable Diseases in Pregnancy Steering Group
Date Approved:	April 2011
Next revision date:	May 2019

Appendix 1.6

Managing Communicable Diseases Screening Tests In Late Bookers

Late bookers are women who present for the first time on or after 24 weeks pregnancy. This is the stage at which the baby is potentially viable if early labour occurred.

The results of the communicable disease screening tests could affect the management at or after delivery, therefore all communicable disease screening test results for a woman should be known prior to delivery and certainly before discharge.

If a woman presents to maternity services as a late booker i.e. on or after 24 weeks it is important to ensure that screening has been offered and results are received:

1) The woman presents to the antenatal clinic, and there is no immediate risk of delivery:

- Seek informed consent for screening (HIV, Syphilis, hepatitis B)
- Fill one 9ml purple topped EDTA bottle and complete a virology request form, clearly indicating which tests (HIV, Syphilis hepatitis B) are to be carried out. Even if a woman does not consent to all four tests, please fill one 9ml purple topped EDTA bottle. Do not send two 5ml bottles, or other combinations to make up to 9 ml, the machines in the lab won't accept them and the sample will not be processed.
- Ensure tests are recorded on PNBS
- Mark the sample as URGENT and telephone the West of Scotland Specialist Virology Centre to let them know it is in the system. (Tel 0141 201 8722)
- Send the sample to the virus lab, via normal routine processes
- Ensure that the name and contact details of the person and a deputy who will be responsible for any positive results are clearly appended
- Note that to view a result on portal a CHI number is essential

2) The woman presents to maternity assessment i.e. in pain, bleeding etc., therefore the risk of delivery is high:

- Seek informed consent for screening (HIV, Syphilis, hepatitis B, rubella)
- Fill one 9ml purple topped EDTA bottle and complete a virology request form, clearly indicating which tests (HIV, Syphilis hepatitis B) are to be carried out.
- Please fill one 9ml bottle regardless of how many tests are requested. Sending multiple 5 ml tubes is not acceptable and the sample will not be processed.
- Ensure tests are recorded on PNBS at next opportunity
- Mark the sample as 'URGENT'.
- In hours (i.e. 9.00 – 17.00 Monday – Friday and 9.00 – 12.30 Saturday), telephone the Laboratory (Tel 0141 201 8722) and
- Explain that an urgent sample is being sent
- Discuss the travel arrangements

- Arrange when and to whom the results will be communicated. You must provide the laboratory with adequate contact details to include the name and preferably two contact numbers of the main results recipient and a deputy.
- Out of hours you must telephone the on-call virologist via the Switchboard 0141 211 3000 and discuss the above.
- If the timing of the local transport systems does not facilitate urgent transfer order a taxi to ensure the sample reaches the laboratory. (see NHSGGC Amended Protocol Ordering and Use of Taxis and Couriers October 2011)

http://www.staffnet.ggc.scot.nhs.uk/Corporate%20Services/Communications/Briefs/Documents/amended%20taxi%20protocol%20-20phase%201_acute%20services.pdf

In normal hours the lab is able to process and produce results within 1-2 hours of receipt. Note that reactive samples will need to be confirmed on the next day.

Note that to view a result on portal a CHI number is essential.

3) The woman presents in labour:

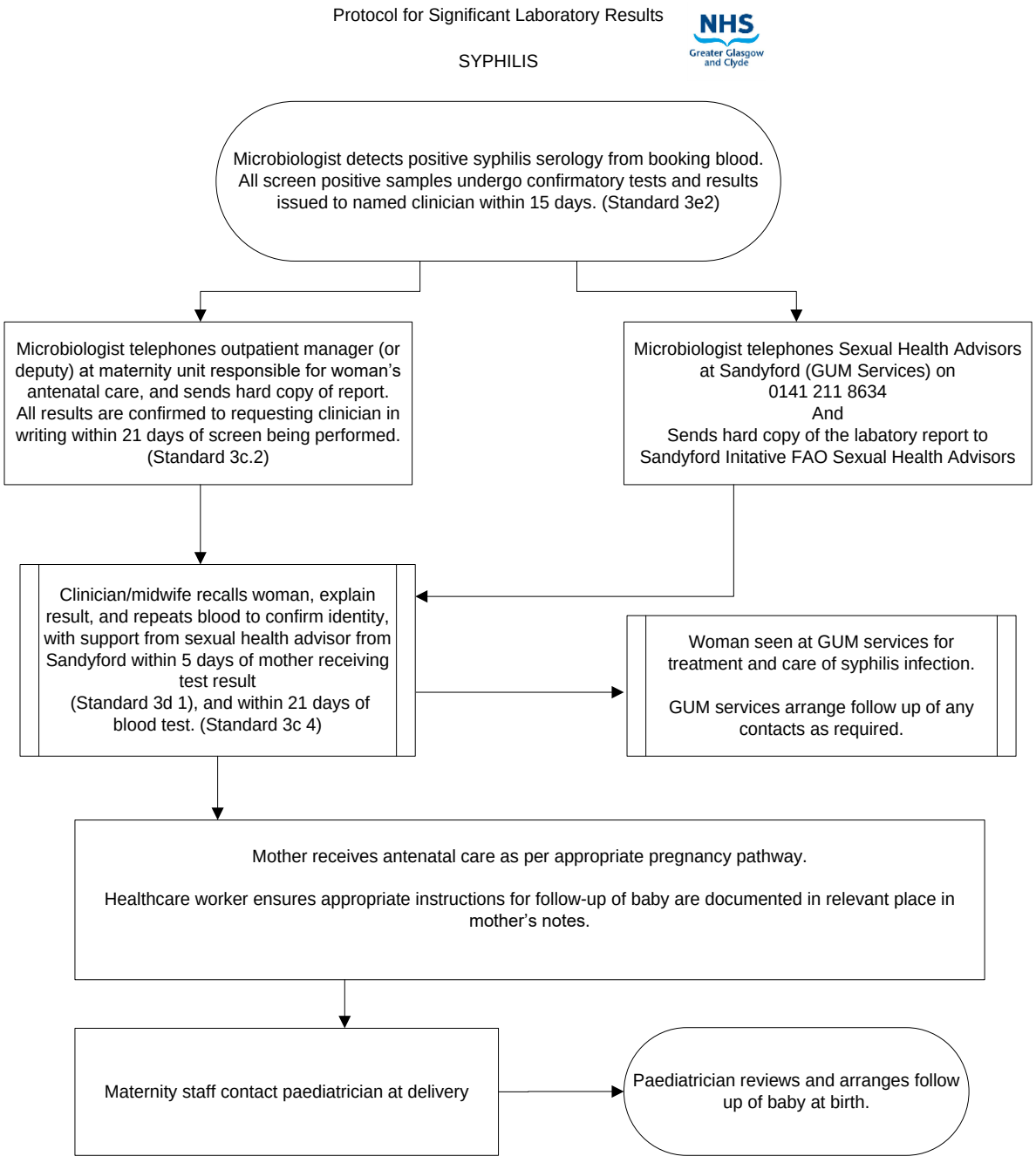
- It is the responsibility of the labour ward staff to ensure that virology screening tests are offered and results received. Even intrapartum diagnosis can significantly, positively modify neonatal outcome therefore it is important to ensure women are offered screening tests no matter how late.
- It is essential that you telephone the virology lab as soon as possible to discuss emergency testing of the woman.
- Seek informed consent for screening (HIV, Syphilis, hepatitis B,).
- Fill one 9ml purple topped EDTA bottle and complete a virology request form, clearly indicating which tests (HIV, Syphilis hepatitis B) are to be carried out.
- Please fill one 9ml bottle regardless of how many tests are requested. Sending multiple 5 ml tubes is not acceptable and the sample will not be processed.
- Mark the sample as 'URGENT'.
- In hours (i.e. 9.00 – 17.00 Monday – Friday and 9.00 – 12.30 Saturday), telephone the Laboratory (Tel 0141 201 8722) and explain that an urgent sample is being sent discuss the travel arrangements.
- Arrange when and to whom the results will be communicated. You must provide the laboratory with adequate contact details to include the name and preferably two contact numbers of the main results recipient and a deputy.
- Out of hours you must telephone the on-call virologist via the Switchboard 0141 211 3000 and discuss the above.
- Order a taxi to ensure the sample reaches the laboratory (see NHSGGC Amended Protocol Ordering and Use of Taxis and Couriers October 2011).

http://www.staffnet.ggc.scot.nhs.uk/Corporate%20Services/Communications/Briefs/Documents/amended%20taxi%20protocol%20-20phase%201_acute%20services.pdf

- As with ALL emergency blood tests ensure results are followed up immediately they are available. In normal hours the lab is able to process and produce results within 1-2 hours of receipt.

- Communication with paediatricians is essential as their management may be significantly altered by these results however the responsibility for taking and sending these investigations and obtaining these results remains with the midwifery / obstetric team.
- Ensure tests are recorded on PNBS at next opportunity.

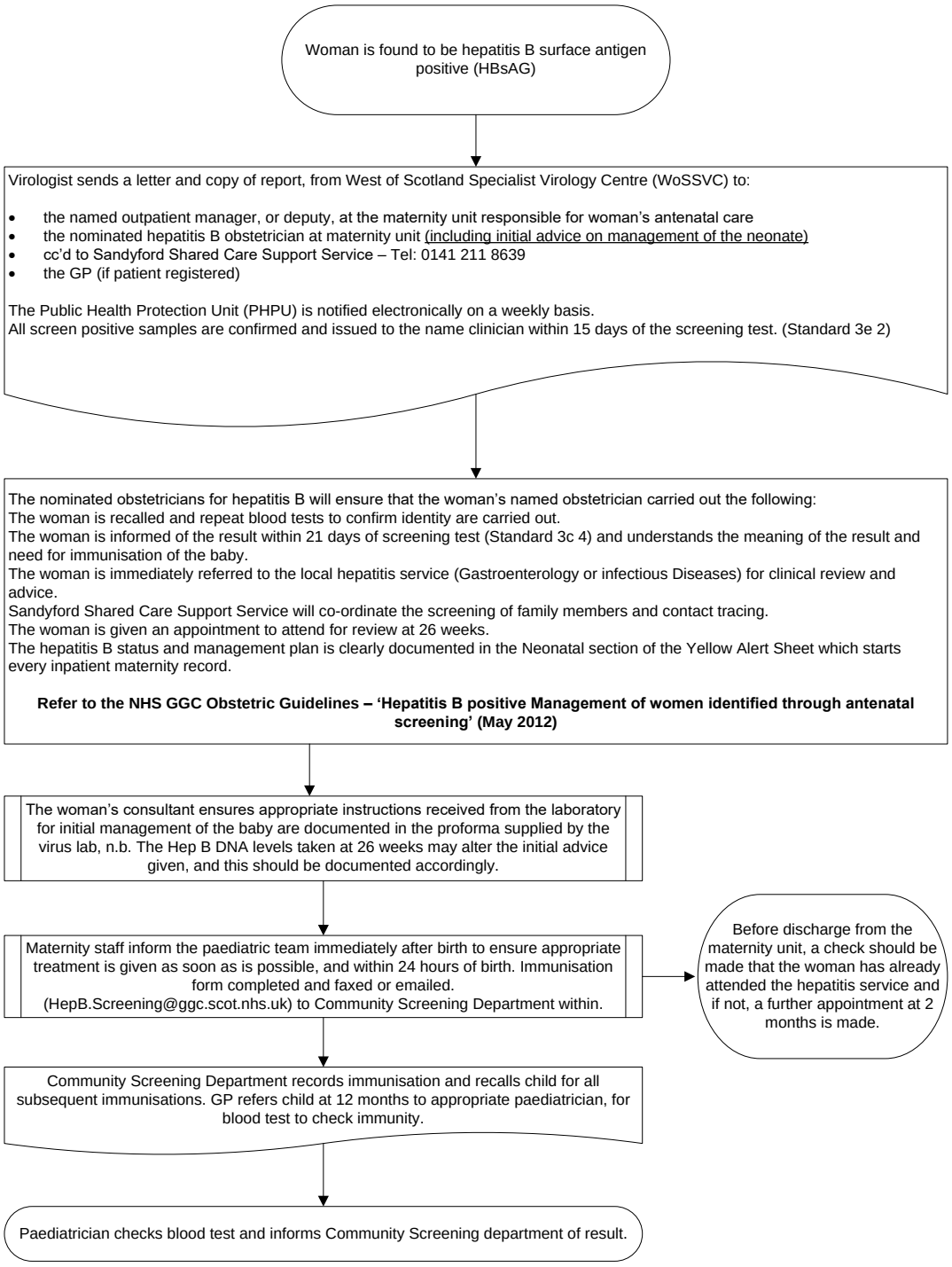
Appendix 1.7



Version No:	V4.2
Approved by:	Communicable Diseases in Pregnancy Steering Group Lead Author Dr Gillian Penrice added 6.1.2016
Date Approved:	December 2011 Checked 1 2016
Next Revision Date:	December 2014 Next Review 31/01/2017

Appendix 1.8

Protocol for Significant Laboratory Results
HEPATITIS B (HBsAG)



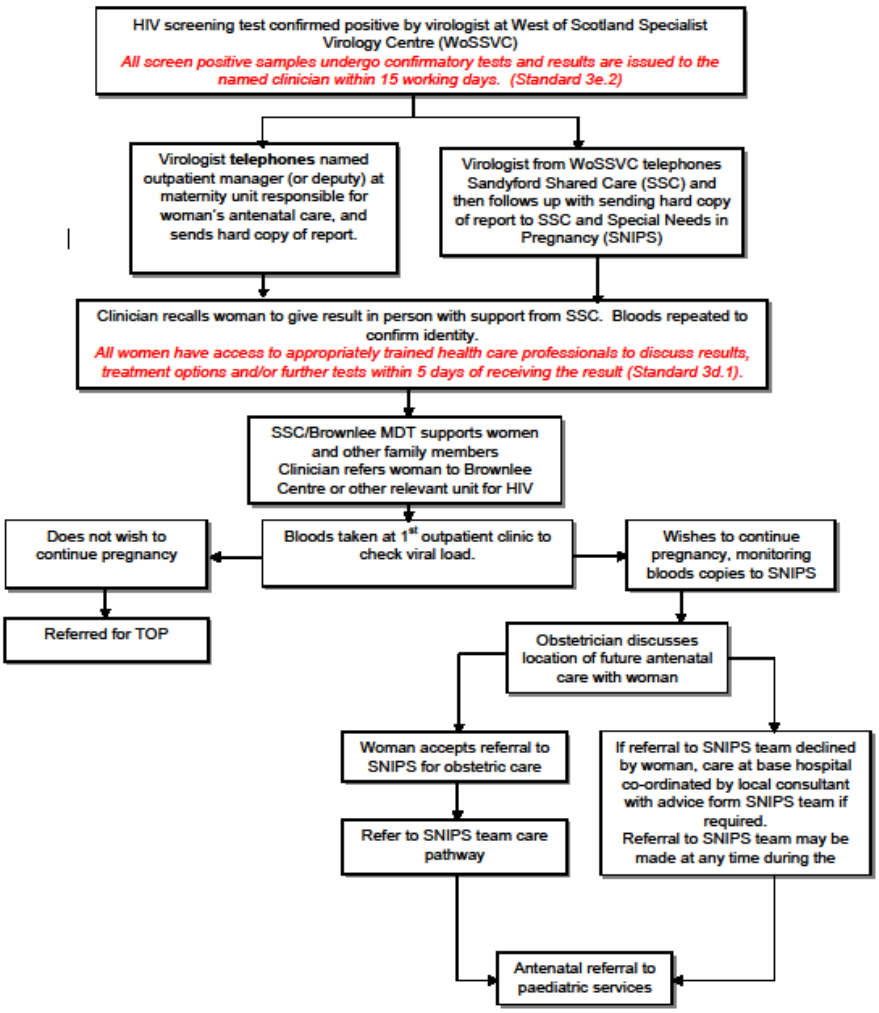
Version No:	2
Approved by:	Communicable Diseases in Pregnancy Steering Group Lead Author Dr Gillian Penrice added 5.1.16
Date Approved:	12.5.2014 on site – live from 16.6.2014
Next Revision Date:	June 2017

Appendix 1.9

NHS Greater Glasgow and Clyde

Protocol for Significant Laboratory Results

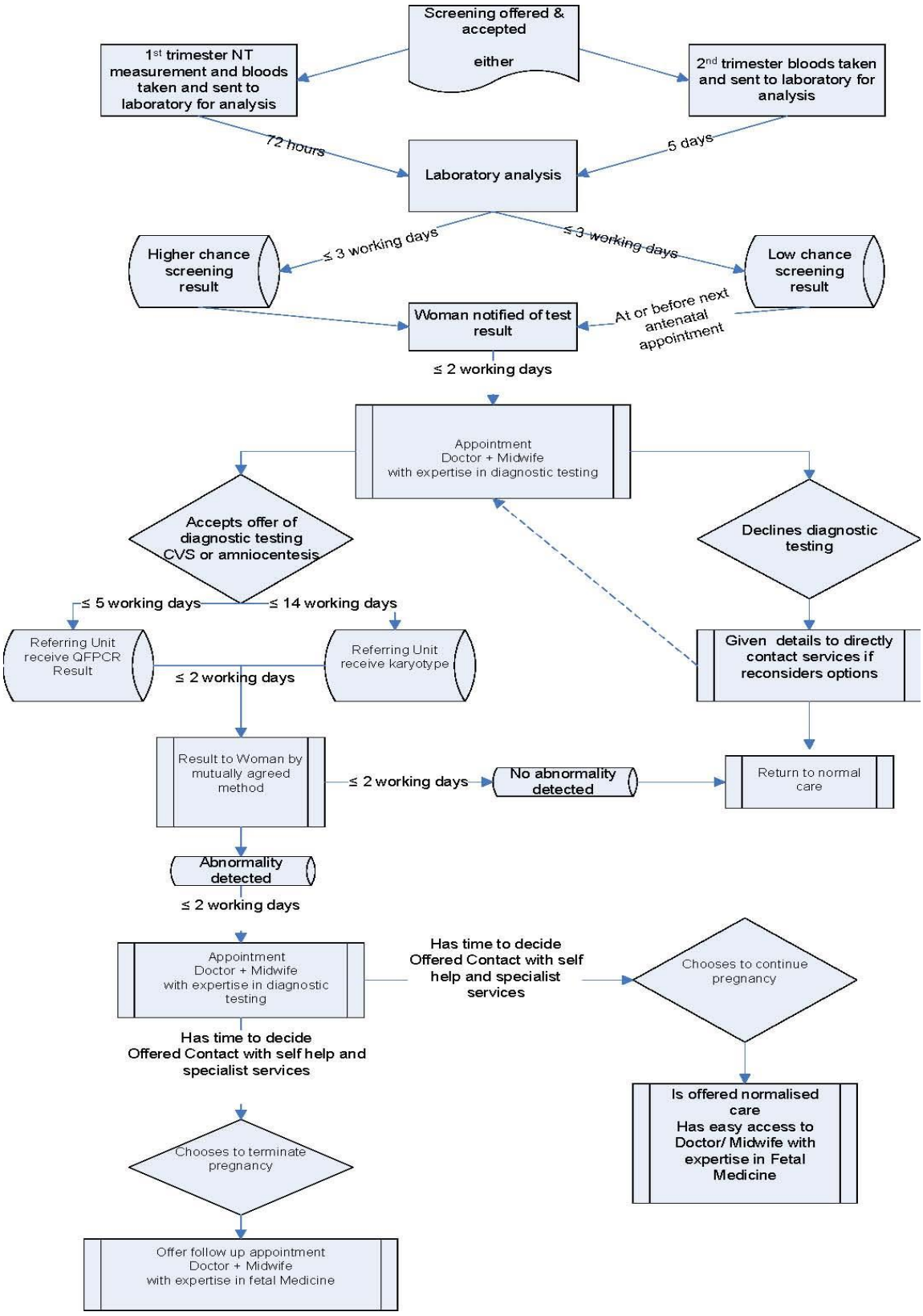
HIV



Version No: V5.1
Approved by: Communicable Diseases in Pregnancy Steering Group Lead Author - Dr Gillian Penrice added 5.1.2016
Date Approved: On site 12.6.14 Live from 16.6.14
Next revision date: June 2017

Appendix 1.10

Down's syndrome screening pathway for women accepting screening



Appendix 1.11

Assessment of Risk to Pregnancy & Newborn Screening Programmes should screening programmes be dialled down /temporarily suspended:

Reason for continuation: Pregnancy & Newborn screening is undertaken as part of the routine care provided to pregnant women and new born babies. As screening is completed during regular appointments, the programme should continue to be offered as long as this is possible.

Considerations: Guidelines from RCOG have noted that pregnant women do not appear to be more susceptible to the consequences of COVID-19 than the general population and there have been no reported deaths of pregnant women from the virus (https://www.rcog.org.uk/en/guidelines-research-services/guidelines/coronavirus-pregnancy/covid-19-virus-infection-and-pregnancy/).

As above, screening is offered during routine care appointments so additional appointments resulting in increased contact would be unlikely to be required for the majority of women. It should be noted that women who receive a higher chance from a screening test may need additional appointments if they decide to have a diagnostic procedure, but this would be very small numbers.

Newborn bloodspot screening is part of routine appointments for babies and if certain conditions are identified early intervention and treatment is required. Specific guidance on the impact of COVID-19 on newborns has not been provided by RCOG, but they do note that there have been no reports of the virus being passed from mother to baby during pregnancy. Assurances have been given by the Scottish Newborn Screening Laboratory that contingency plans have been reviewed and will be enacted if required specifically around laboratory staffing to ensure that samples are received and processed.

Boards will be asked to provide clear contingency plans around resourcing and local resilience plans should they have staff shortages in order that they are able to continue providing pregnancy and newborn screening services.

Risk Assessment:

Impact Description: Impact on programme should screening be suspended	
Clinical	Missed screening opportunity for identifying fetal anomalies or conditions identified through the new born blood spot programme resulting in possible diagnosis delay and subsequent delay to possible treatment or medical intervention. Consideration of • Continuation of services as this is part of routine prenatal and post-natal care pathway and is not an additional appointment • Continuation of pathway for those that have already accepted screening and had samples taken or have received results from initial screening and wish diagnostic testing

	• Possible delay to clinical or medical interventions for serious conditions causing risk to unborn babies or new born babies
Business	Delays will entail need for action plans when programme fully resumes Consideration: • Additional laboratory staff to deal with increase of screening or diagnostic samples • Additional midwife and sonographers required to support increase in clinic appointments due to short sample life for testing
Staff	• Availability of programme staff to run programme should there be outbreak • Re-allocation of screening programme staff for essential services within Boards, particularly laboratory staff • Already increased risk around availability of sonographers for P&N screening programme
Reputation	• Public may query why screening is suspended /delayed • Communication of any interim arrangements • Pregnant women may wish to not attend appointments or bring new born babies to appointments due to possible risk of contact with COVID-19

Recommendation: Based on guidance from RCOG and risk assessment above the recommendation is to continue Pregnancy & Newborn screening as this is part of routine appointments, unless staff resource is not available and this should be addressed at Board level but raised to NSD. Boards have been asked to develop contingency plans around resource and resilience in order to ensure that services are able to continue.

It should be noted that a separate risk and impact assessment is being undertaken regarding the T13, T18, and NIPT implementation to inform a decision around possible delay.

Appendix 1.12

Members of Pregnancy Screening Steering Group (At March 2019)

Dr Emilia Crighton	Deputy Director of Public Health (Chair)
Ms Sally Amor	Health of Health Improvement, NHS Highland
Dr Catriona Bain	Clinical Director, Obstetrics and Gynaecology
Ms Donna-Maria Bean	Lead Sonographer (Obstetrics & Gynaecology)
Ms Vicki Brace	Consultant Obstetrician
Mr Paul Burton	Information Manager
Mrs Lin Calderwood	HI&T Screening Service Delivery Manager
Ms Pam Campbell	Site Health Records Manager
Ms Margaret Cartwright	Sector Laboratory Manager
Mrs Diana Clark	Lead Midwife
Dr Rosemarie Davidson	Consultant Clinical Geneticist
Mr Ian Fergus	Site Technical Manager, Diagnostics
Mrs Jaki Lambert	Lead Midwife (Argyll and Bute)
Dr Robert Lindsay	Associate, Glasgow University
Ms Marie-Elaine McClair	Interim Clinical Service Manager
Dr Louisa McIlwaine	Consultant Haematologist
Ms Michelle McLauchlan	General Manager, Obstetrics
Ms Barbara McMenemy	Acute Addiction Manager
Dr Gillian Penrice	Consultant in Public Health Medicine
Mrs Uzma Rehman	Public Health Programme Manager
Mrs Elizabeth Rennie	Screening Programmes Manager
Dr Jim Robins	Consultant Obstetrician, Clyde
Dr Nicola Williams	Head of Molecular Genetics

Appendix 1.13

Members of Communicable Diseases Steering Sub Group (At March 2019)

Dr Gillian Penrice	Public Health Protection Unit (Chair)
Dr Tamer Abdelrahman	Honorary Virology Registrar
Ms Donna Athanasopoulos	Information & Publications Manager
Ms Catrina Bain	Clinical Director Obstetrics and Gynaecology
Ms Elizabeth Boyd	Clinical Effectiveness Co-ordinator
Mr Paul Burton	Information Manager
Mrs Lin Calderwood	National Portfolio Programme Manager
Mrs Louise Carroll	Programme Manager HIV/STIs
Mrs Diana Clark	Lead Community Midwife
Ms Flora Dick	Special Needs (SNIPS) Midwife
Ms Rose Dougan	Special Needs (SNIPS) Midwife
Ms Elizabeth Ellis	Staff Grade
Ms Dorothy Finlay	Lead Midwife
Ms Catherine Frew	Data Analyst, Specialist Virology Centre
Ms Claire Glover	Clinical Nurse Specialist
Ms Louise Jack	Midwife
Mrs Jaki Lambert	Lead Midwife
Mr Sam King	Sexual Health Advisor
Ms Victoria Mazzoni	Senior Community Midwife
Ms Karen McAlpine	Lead Midwife
Ms Valerie McAlpine	Senior Charge Midwife
Ms Marie-Elaine McClair	Interim Clinical Service Manager
Mrs Katie McEwan	Clinical Service Manager
Ms Michelle McLauchlan	General Manager, Obstetrics
Ms Jane McOwan	Technical Manager, Specialist Virology Centre
Ms Elizabeth Rennie	Programme Manager
Dr Jane Richmond	Obstetrician and Gynaecologist
Ms Linda Rhodick	Medical Secretary/Data Co-ordinator
Dr James Robins	Consultant Obstetrician & Gynaecologist
Ms Samantha Shepherd	Clinical Scientist
Ms Claire Stewart	Clinical Service Manager
Dr Andrew Thomson	Consultant Obstetrician & Gynaecologist

Chapter 2 – Newborn Bloodspot Screening

Summary

Newborn bloodspot screening identifies babies who may have rare but serious conditions. Most babies screened will not have any of the conditions, but for the small numbers that do, the benefits of screening are enormous. Early treatment can improve health and prevent severe disability or even death. Every baby born in Scotland is eligible for and routinely offered screening.

Newborn babies are screened for phenylketonuria; congenital hypothyroidism; cystic fibrosis; sickle cell haemoglobinopathy, medium chain acyl-CoA dehydrogenase deficiency (MCADD), maple syrup urine disease (MSUD), isovaleric acidaemia (IVA), glutaric aciduria type 1 (GA1), homocystinuria (HCU).

The total number of babies eligible for screening was 11,238 and of these 11,113 (98.8%) of babies were screened. Results were not available for the 75 (0.7%) babies and 50 (0.4%) babies transferred in after day seven.

The uptake of Newborn Bloodspot screening was greater than 97% across all HSCP areas and deprivation categories.

The breakdown of the ethnicity groups for babies tested within NHSGGC shows that 7,790 (67.9%) of babies screened were UK White, 870 (7.58%) South Asian and 531 (4.63%) were of Southern and Other European ethnic groups.

Following screening 12 babies were diagnosed with congenital hypothyroidism (CHT), <5 babies were diagnosed with PKU (phenylketonuria) and 5 tested positive for cystic fibrosis.

The results for Haemoglobinopathy showed that although 6 babies were diagnosed with haemoglobinopathy variants, 75 babies were identified as haemoglobinopathy carriers.

The phrase less than five has been used in line with NHS Scotland information governance which is intended to protect privacy and avoid identifying individuals.

Newborn Bloodspot Screening and COVID

The Scottish Screening Committee provided an assessment of all national screening programmes to the Scottish Government in March 2020 to decide whether to pause or continue with screening.

The Assessment of Risk to Pregnancy & Newborn Screening Programmes concluded that they should be continued. The reason given for the continuation was that Pregnancy & Newborn screening is undertaken as part of the routine care provided to pregnant women and new born babies. As screening is completed during regular appointments, the programme should continue to be offered as long as this is possible. The full assessment is in **Appendix 2.2**

Chapter Contents

2.1. Newborn Bloodspot Screening

Newborn bloodspot screening identifies babies who may have rare but serious conditions. Most babies screened will not have any of the conditions, but for the small numbers that do, the benefits of screening are enormous. Early treatment can improve health and prevent severe disability or even death. Every baby born in Scotland is eligible for and routinely offered screening.

Newborn bloodspot screening aims to identify, as early as possible, abnormalities in newborn babies which can lead to problems with growth and development, so that they may be offered appropriate management for the condition detected.

The diseases screened for are phenylketonuria; congenital hypothyroidism; cystic fibrosis; sickle cell haemoglobinopathy, medium chain acyl-CoA dehydrogenase deficiency (MCADD), maple syrup urine disease (MSUD), isovaleric acidaemia (IVA), glutaric aciduria type 1 (GA1), homocystinuria (HCU).

2.2. Eligible Population

Newborn Bloodspot screening is offered to all newborns. Eligible babies are the total number of babies born within the reporting period (2019-2020), excluding any baby who died before the age of 8 days.

2.3. The Screening Test

The bloodspot sample should be taken on day 5 of life whenever possible. There are separate protocols in place for screening babies who are ill, have a blood transfusion or are born prematurely and when repeat testing is required.

Newborn siblings of patients who have MCADD are offered diagnostic testing at 24 – 28 hours of age as well as routine testing.

Blood is taken by the community midwife from the baby's heel using a bloodletting device and collected on a bloodspot card consisting of special filter paper. It is then sent to the National Newborn Screening Laboratory in Queen Elizabeth University Hospital for analysis.

Detailed pathway is shown in **Appendix 2.1**.

2.4. Live births by HSCP areas

There were 11,238 live births recorded on SMR02 compared to 10,974 on National Records for Scotland during 2019/20. The details by HSCP areas are in **Table 2.1**

Table 2.1: Number of live and still births NHSGGC residents, 1 April 2019 to 31 March 2020

HSCP	Number of live births 2019/2020
East Renfrewshire	796
East Dunbartonshire	870
Glasgow City	6,251
Renfrewshire	1,650
Inverclyde	597
West Dunbartonshire	810
NHSGGC	**10,974**

Source:
https://www.nrscotland.gov.uk/statistics-and-data/statistics/statistics-by-theme/vital-events/general-publications/weekly-and-monthly-data-on-births-and-deaths/monthly-data-on-births-and-deaths-registered-in-scotland

2.5. Delivery of NHSGGC Newborn Bloodspot Screening Programmes

Figure 2.1 illustrates newborn bloodspot uptake rates and the results of the screening programme from 1 April 2019 to 31 March 2020.

The total number of babies eligible for screening was 11,238 and of these, 11,113 (98.8%) babies were screened. Results were not available for the 75 (0.7%) babies and 50 (0.4%) babies transferred in after day seven.

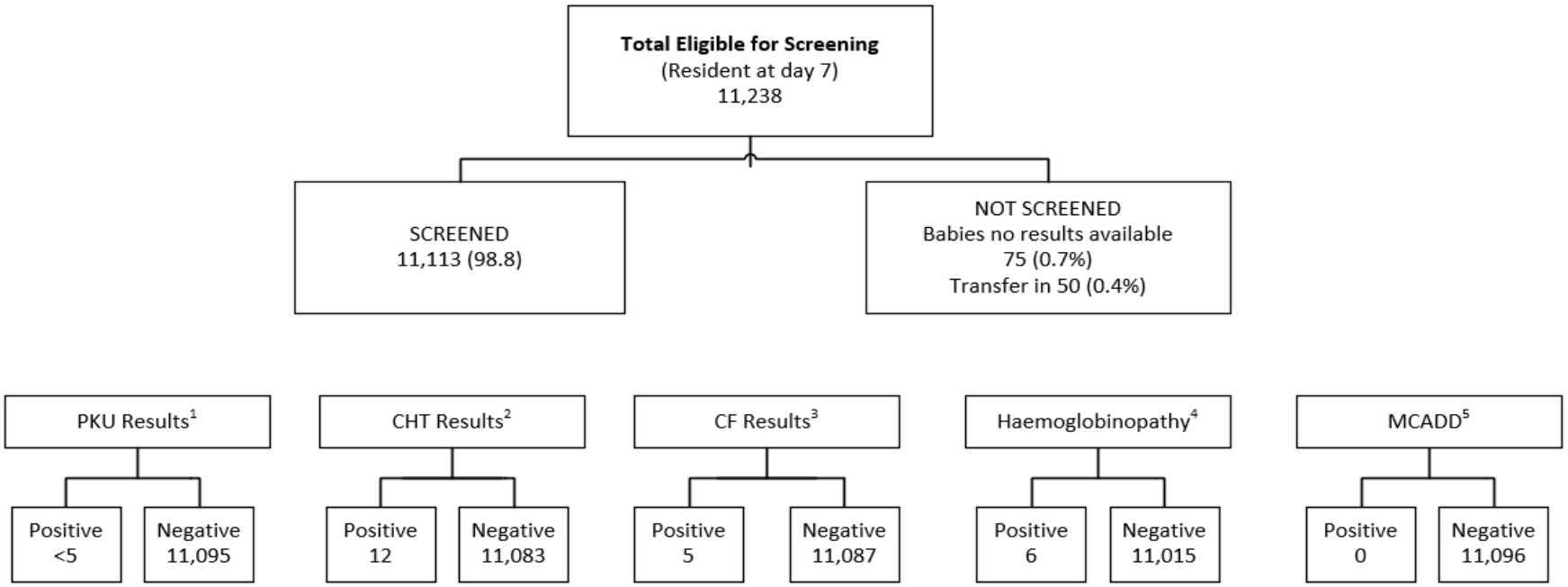
Following screening, 12 babies were diagnosed with congenital hypothyroidism (CHT), <5 babies were diagnosed with PKU (phenylketonuria) and 5 tested positive for cystic fibrosis.

The results for Haemoglobinopathy showed that although 6 babies were diagnosed with haemoglobinopathy variants, 75 babies were identified as haemoglobinopathy carriers.

In this report the phrase less than five has been used in line with NHS Scotland information governance standards to protect the privacy of individuals.

Figure 2.1

NHS Greater Glasgow & Clyde Residents
Summary of Bloodspot Screening Uptake & Results for babies born 1 April 2019 to 31 March 2020



Source: Child Health (CH2008); Date extracted: July 2020

Notes:

1 Total includes 12 refusals and 5 verifications

2 Total includes 12 refusals and 6 verifications

3 Total includes 4 carriers, 12 refusals and 5 verifications

4 Total includes 75 carriers, 12 refusals and 5 verifications

5 Total includes12 Refusals and 5 verifications

The percentage uptake rate of Newborn Bloodspot screening was greater than 97% across all HSCP areas and deprivation categories. (**Table 2.2)**

Table 2.2: Uptake rate of Newborn Bloodspot screening by HSCP and deprivation
Percentage uptake of Bloodspot Screening by HSCP and SIMD, 1 April 2019 to 31 March 2020

	Most Deprived				SIMD 2016 Quintile				Least Deprived			
	1		**2**		**3**		**4**		**5**		**Total**	
HSCP	**No. Screened**	**% uptake**	**No. Screened**	**% uptake**	**No. Screened**	**% uptake**	**No. Screened**	**% uptake**	**No. Screened**	**% uptake**	**No. Screened**	**% uptake**
East Dunbartonshire	70	*100.0*	159	*98.8*	34	*100.0*	171	*100.0*	459	*99.4*	893	*99.4*
East Renfrewshire	62	*100.0*	83	*97.6*	67	*97.1*	130	*99.2*	456	*98.9*	798	*98.8*
Glasgow North East	1,257	*98.7*	239	*99.6*	187	*97.9*	207	*97.6*	11	*100.0*	1,901	*98.6*
Glasgow North West	918	*99.2*	241	*98.4*	201	*99.5*	161	*99.4*	352	*97.8*	1,873	*98.9*
Glasgow South	1,206	*99.2*	506	*98.4*	404	*98.3*	270	*99.3*	168	*100.0*	2,554	*99.0*
Inverclyde	296	*99.3*	86	*98.9*	82	*100.0*	97	*100.0*	55	*100.0*	616	*99.5*
Renfrewshire	472	*98.5*	335	*98.2*	276	*98.6*	296	*98.0*	277	*98.9*	1,656	*98.5*
West Dunbartonshire	406	*98.8*	222	*99.6*	98	*100.0*	77	*100.0*	19	*100.0*	822	*99.3*
Grand Total	4,687	*99.0*	1,871	*98.7*	1,349	*98.7*	1,409	*98.9*	1,797	*99.0*	11,113	*98.9*

Source: Child Health (CH2008); Date extracted: August 2020

2.6. Ethnicity of babies born in 2019/2020

The breakdown of the ethnicity groups for babies tested within NHSGGC shows that 7,790 (67.9%) of babies screened were UK White, 870 (7.58%) South Asian and 531 (4.63%) were of Southern and Other European ethnic groups **(Table 2.3).**

Table 2.3: NHSGGC Newborn Bloodspot screening – ethnicity of babies tested 1 April 2019 to 31 March 2020

African or African-Carib bean	South Asian (Asian)	South East Asian (Asian)	Other non-European (other)	Southern & other European (White)	United Kingdom (White)	North Europe (White)	Any Mixed Back ground	Not Stated
387	870	172	310	531	7,790	119	706	586
3.37%	7.58%	1.5%	2.7%	4.63%	67.9%	1.04%	6.15%	5.11%

Source: Scottish Newborn Screening Laboratory - Newborn Bloodspot Screening 2019/20

Note: Scottish Newborn Screening Laboratory figures cannot be mapped to NHS GGC new boundary and may include Lanarkshire, Highland patients,

2.7. Specimen Tests and Outcomes for 2019/2020

During 2019/2020, the Scottish Newborn Screening Laboratory received 12,342 newborn bloodspot cards from NHSGGC. The number and reason for repeat tests due to avoidable problems is detailed in **Table 2.4.**

Table 2.4: Number and reason for repeat samples

Reason	Number	Percentage
Insufficient sample	136	1.10
Sample taken <96 hours	63	0.51
Incorrect blood application	225	1.82
Compressed /damaged sample	62	0.50
Blood quality of sample	16	0.13
Missing CHI	99	0.8
Expired card used	7	0.06
>14 days in transit	10	0.08
Total	**618**	4.94%

Source: SNSL Report 2019-20

2.8. Key Performance Indicators for Newborn Bloodspot Screening

Table 2.5 below shows the Newborn Bloodspot Screening against Key Performance Indicators for NHSGGC during 2019-2020. (**Table 2.5)**

Table 2.5: NBBS KPIs and performance during 2019-20 for NHSGGC

NBBS KPI	Performance threshold	2019/2020
8.1 Coverage	95-99%	11,113 screened (98.8%)
8.2 Movers in	95-99%	137 children offered and 1 refused (100%)
8.3 Avoidable repeats	<1.0 to <2.0 %	4.94%
8.4 Null or incomplete result on CHIS	Essential – regular checks to identify babies	Checks carried out on daily basis for overdue NBBS result.
8.5 CHI number recorded on bloodspot card	98-100%	99.1% had valid CHI
8.6 Timely sample collection	95-99%	9,408 samples (96-120 hrs of life) (81%)
8.7 Timely receipt of sample in the lab	95-99%	10,895 samples received on time (94.6%)
8.8 Timely second sample for CF screening	95% taken on day 21-24	11 out of 19 samples (58 %)
8.9 Timely second sample for borderline CHT screening	95 – 99%	27 out of 34 samples (79%)
8.10 Timely second sample for CHT for preterm infant	95 – 99%	66 out of 121 samples (54.5%)
8.11 Timely processing CHD & IMD	Clinical referral within 3 days – 100%	All referred by 3 days
8.12 Timely entry into clinical care	IMDs appt by 14 days – 100%	100%
	CHT appt by 21 days – 100%	100%
	CF and HCU by appt by 28 days – 95-100%	100%
	CF appt by 35 days – 80- 100%	100%

2.9. Information systems

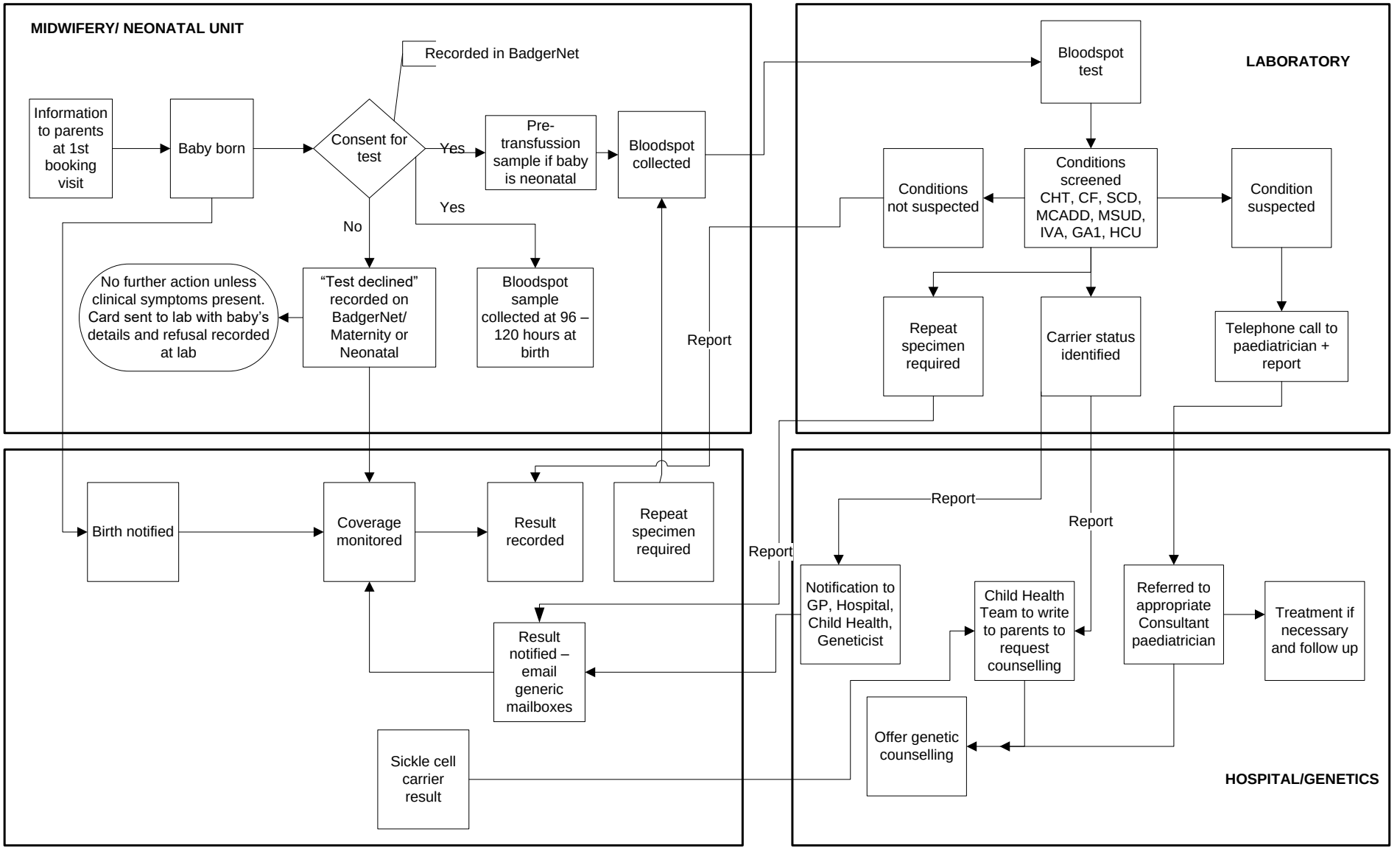
Pregnancy and Newborn Bloodspot screening tests results are provided by the National Laboratory's Information Management System and data are reported on the old former NHS Greater Glasgow and NHS Argyll and Clyde basis.

The results of the Bloodspot test are recorded against the individual child's record held within the Scottish Immunisation and Recall System (SIRS) application that supports the failsafe processes for newborn bloodspot screening.

2.10. Challenges and Service Improvements

- Support parents whose children are identified as carriers of Sickle Cell Disease to access genetic counselling.
- Ensure that the website with information about haemoglobinopathies for staff and parents in available on StaffNet and the BadgerNet App.

Appendix 2.1: NHSGGC Newborn Bloodspot Screening Pathway



Appendix 2.2

Assessment of Risk to Pregnancy & Newborn Screening Programmes should screening programmes be dialled down / temporarily suspended:

Reason for continuation: Pregnancy & Newborn screening is undertaken as part of the routine care provided to pregnant women and new born babies. As screening is completed during regular appointments, the programme should continue to be offered as long as this is possible.

Considerations: Guidelines from RCOG have noted that pregnant women do not appear to be more susceptible to the consequences of COVID-19 than the general population and there have been no reported deaths of pregnant women from the virus (https://www.rcog.org.uk/en/guidelines-research-services/guidelines/coronavirus-pregnancy/covid-19-virus-infection-and-pregnancy/). As above, screening is offered during routine care appointments so additional appointments resulting in increased contact would be unlikely to be required for the majority of women. It should be noted that women who receive a higher chance from a screening test may need additional appointments if they decide to have a diagnostic procedure, but this would be very small numbers.

Newborn bloodspot screening is part of routine appointments for babies and if certain conditions are identified, early intervention and treatment are required. Specific guidance on the impact of COVID-19 on newborns has not been provided by RCOG, but they do note that there have been no reports of the virus being passed from mother to baby during pregnancy. Assurances have been given by the Scottish Newborn Screening Laboratory that contingency plans have been reviewed and will be enacted if required specifically around laboratory staffing to ensure that samples are received and processed.

Boards will be asked to provide clear contingency plans around resourcing and local resilience plans should they have staff shortages so that they are able to continue providing pregnancy and newborn screening services.

Risk Assessment:

Impact Description: Impact on programme should screening be suspended	
Clinical	Missed screening opportunity for identifying fetal anomalies or conditions identified through the new born blood spot programme resulting in possible diagnosis delay and subsequent delay to possible treatment or medical intervention. Consideration of • Continuation of services as this is part of routine prenatal and post-natal care pathway and is not an additional appointment • Continuation of pathway for those that have already accepted screening and had samples taken or have received results from initial screening and wish diagnostic testing • Possible delay to clinical or medical interventions for serious conditions causing risk to unborn babies or new born babies

Business	Delays will entail need for action plans when programme fully resumes Consideration: • Additional laboratory staff to deal with increase of screening or diagnostic samples • Additional midwife and sonographers required to support increase in clinic appointments due to short sample life for testing
Staff	• Availability of programme staff to run programme should there be outbreak • Re-allocation of screening programme staff for essential services within Boards, particularly laboratory staff • Already increased risk around availability of sonographers for P&N screening programme
Reputation	• Public may query why screening is suspended /delayed • Communication of any interim arrangements • Pregnant women may wish to not attend appointments or bring new born babies to appointments due to possible risk of contact with COVID-19

Recommendation: Based on guidance from RCOG and risk assessment above, the recommendation is to continue Pregnancy & Newborn screening as this is part of routine appointments, unless staff resource is not available and this should be addressed at Board level but raised to NSD. Boards have been asked to develop contingency plans around resource and resilience in order to ensure that services are able to continue.

It should be noted that a separate risk and impact assessment is being undertaken regarding the T13, T18, and NIPT implementation to inform a decision around possible delay.

Appendix 2.3

Members of Newborn Bloodspot Screening Steering Group (At March 2019)

Dr Emilia Crighton	Deputy Director of Public Health (Chair)
Ms Sally Amor	Health of Health Improvement, NHS Highland
Mr Paul Burton	Information Manager
Dr Elizabeth Chalmers	Consultant Paediatric Haematologist
Mrs Diana Clark	Lead Midwife
Ms Barbara Cochrane	Metabolic Dietician
Ms Alison Cozens	Consultant in Inherited Metabolic Medicine
Dr Rosemarie Davidson	Consultant Clinical Geneticist
Dr Anne Devenny	Consultant Paediatrician
Ms Dorothy Finlay	Lead Midwife
Ms Patricia Friel	Lead Nurse
Dr Peter Galloway	Consultant Clinical Biochemist
Mrs Marie-Elaine McClair	Clinical Service Manager, Community Midwifery
Mrs Uzma Rehman	Programme Manager, Public Health
Ms Elizabeth Rennie	Programme Manager
Ms Sarah Smith	Principle Scientist, Newborn Screening Laboratory
Mrs Nicola Williams	Consultant Clinical Scientist

Chapter 3 - Universal Newborn Hearing Screening

Summary

Universal Newborn Hearing screening can detect early permanent congenital hearing impairment in babies as mild and unilateral losses. Of the 11,208 eligible babies, 11,078 were screened for hearing loss giving an uptake of 99%.

1,320 (12%) babies required a second stage follow up and, of these, 156 (1.0%) babies were referred to audiology. 54 babies were confirmed with a hearing loss (0.5 % of the screened population). 18 had confirmed bilateral hearing loss and 36 babies had confirmed unilateral hearing loss.

130 (1.1%) babies did not complete the screening programme, of these 2 parents declined or withdrew consent. The rest included babies who did not attend for screening (94), are deceased (20) or babies were unsettled (9) during the screening process.

Coronavirus Pandemic - Changes to UNHS

Following a national risk assessment the screening pathway was amended during 2020 due to the Covid-19 pandemic:

- From 16/03/2020 outpatient screening was stopped and babies were only screened whilst an inpatient.
- If a baby did not have a screening test result before discharge they were listed for deferred screening follow up.
- If a baby had a unilateral refer result on AABR1 and it was not possible to carry out AABR2 before discharge they were listed for deferred screening follow up.
- If a baby had a bilateral refer result on AABR1 and it was not possible to carry out AABR2 before discharge they were referred directly for immediate diagnostic audiology assessment.
- If a baby had a bilateral refer on AABR2 they were referred for immediate diagnostic audiology assessment.
- If a baby had a unilateral refer on AABR2 they were listed for deferred diagnostic audiology assessment.
- Deferred screening follow up was commenced on 25/05/2020 and transition to standard protocols with routine outpatient screening started after this.
- Deferred diagnostic audiology assessments were commenced on 18/05/2020 and transition to standard protocols started after this.

The effect of these changes to the KPI figures noted in Section 3.6 is in increased timescales to complete screening (KPI 7.1) and time to diagnostic audiology assessment (KPI 7.6 and KPI 7.7). Additionally there was a proportion of parents who opted to delay attendance at diagnostic audiology assessment due to the pandemic and this had an impact on KPI 7.7.

Chapter Contents

3.1. Universal Newborn Hearing Screening

Universal Newborn Hearing screening aims to detect early permanent congenital hearing impairment. In addition, babies with mild and unilateral losses are also identified and receive ongoing review.

3.2. Eligible Population

Universal Newborn Hearing screening programme is offered to all newborns by 4 weeks of corrected age. The corrected age is the actual age in weeks plus the number of weeks the baby was preterm. The eligible babies are those whose mothers were registered with a GP practice within the Health Board or resident within the area. The babies excluded are those who died before screening was complete or have not reached the corrected age for screening.

3.3. Screening Tests

Hearing tests are carried out on all babies born in NHS Greater Glasgow and Clyde using the Automated Auditory Brainstem Response (AABR). The screening is completed prior to discharge from hospital if this is not possible then an appointment is made at an outpatient clinic.

3.4. Repeat Screens

A second screening test may be required if the baby does not pass the initial test. This can be because the baby was unsettled during the test, there was fluid or a temporary blockage in the ear or the baby has a hearing loss. Detailed screening pathway is shown in **Appendix 3.1.**

3.5. Delivery of NHSGGC Universal Newborn Hearing Screening Programme

The uptake of Newborn Hearing Screening is high across all areas and ranged from 98.2% in Glasgow North East to 99.5% in both Renfrewshire and East Renfrewshire **(Table 3.1).**

Table 3.1: NHSGGC Residents Universal Newborn Hearing – Annual Uptake by HSCP, 1 April 2019 to 31 March 2020

HSCP	Not Screened	Screened	Total	% Uptake
East Dunbartonshire	11	868	879	*98.7*
East Renfrewshire	4	799	803	*99.5*
Glasgow North East	35	1,887	1,922	*98.2*
Glasgow North West	37	1,856	1,893	*98.0*
Glasgow South	25	2,557	2,582	*99.0*
Inverclyde	4	611	615	*99.3*
Renfrewshire	8	1,673	1,681	*99.5*
West Dunbartonshire	6	822	828	*99.3*
Total	**130**	**11,073**	**11,203**	***98.8***

Source: Scottish Birth Record (SBR) Extracted: September 2020

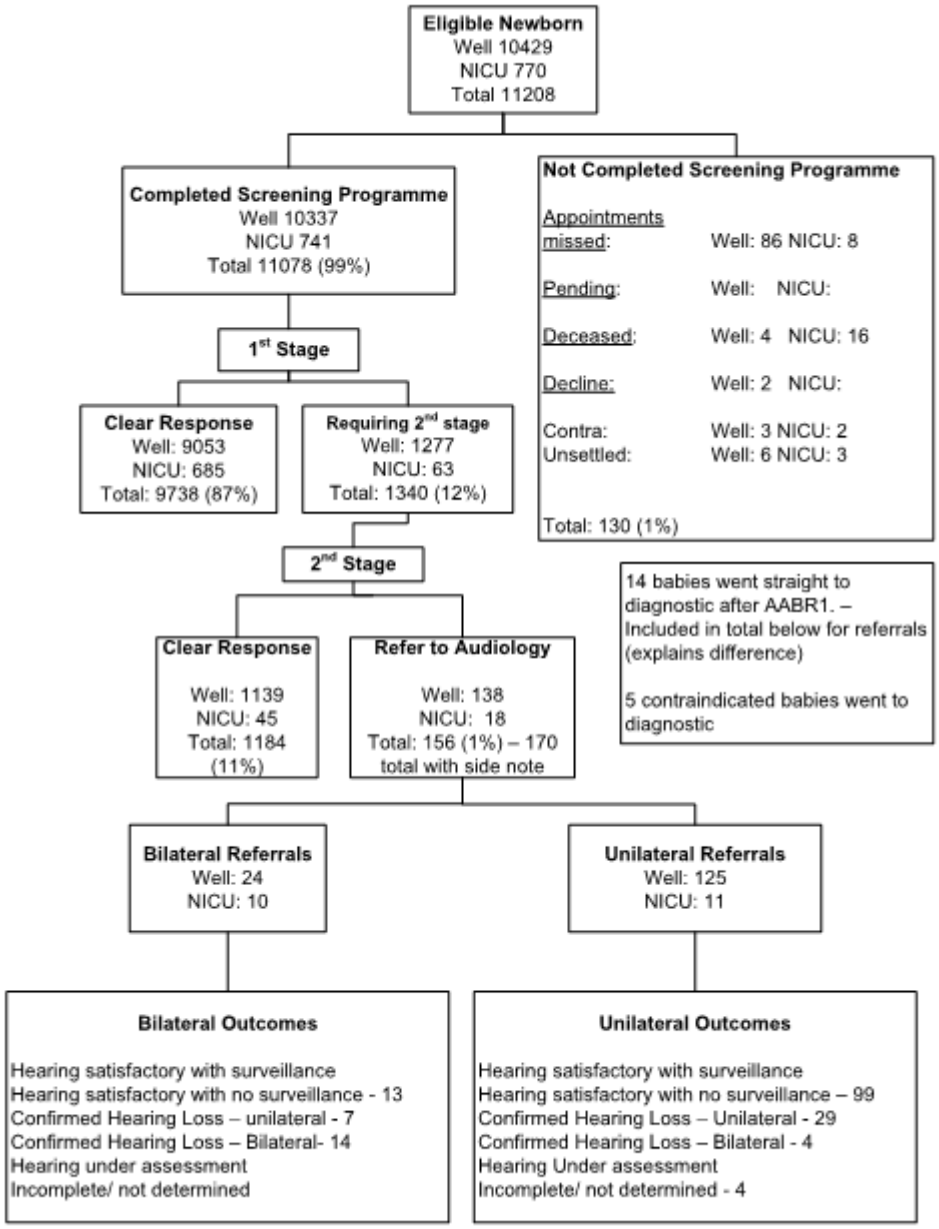
Universal Newborn Hearing screening can detect early permanent congenital hearing impairment in babies' as well mild and unilateral losses. Of the 11,208 eligible babies, 11,078 were screened for hearing loss, giving an uptake of 99%.

1,184 (11%) babies required a second stage follow up and of these, 156 (1.0%) babies were referred to audiology. 54 babies were confirmed with a hearing loss (0.5 % of the screened population). 18 had confirmed bilateral hearing loss and 36 babies had confirmed unilateral hearing loss.

130 (1.1%) babies did not complete the screening programme, of these 2 parents declined or withdrew consent. The rest included babies who did not attend for screening (94), are deceased (20) or babies were unsettled (9) during the screening process. **(Figure 3.1).**

Figure 3.1 Summary of NHSGGC Residents Universal Newborn Hearing Screening activity for period 1 April 2019 to 31 March 2020

13,859 Born, 11,208 GGC, 2,651 OHB



Definitions
1st Stage – is first AABR for Greater Glasgow and the first OAE for Clyde
2nd Stage – is the second AABR for Greater Glasgow and the second OAE and first AABR for Clyde
Results pending – includes all those babies who we are still trying to complete the screen
Incomplete/not completed – are all those babies we cannot complete a screen or diagnostic assessment for i.e. DNAs, deceased, transferred out or moved away etc.
Clear Response – is a pass (though some are followed up due to risk factors)
Hearing Under assessment – all babies who have referred from the screen and their diagnostic assessment is ongoing.

3.6. Universal Newborn Hearing Screening KPIs 2019-20

7.1 The proportion of babies eligible for UNHS for whom the screening process is complete by 4 weeks corrected age	11,073 completed screening i.e. 98.8%	**UNHS: Coverage** Essential ≥ 98% Desirable ≥99.5%
7.4 The proportion of well babies tested using the AABR protocol who do not show a clear response in both ears at AABR1	1,363 required 2nd stage 12%	**UNHS: Test Performance - (3) Referral rate for AABR1 for well babies** Essential ≤15% Desirable ≤12%
7.5 The proportion of babies with a screening outcome who require an immediate onward referral to audiology for a diagnostic assessment	180 referred to Audiology 1.6%	**UNHS: Test Performance - (4) Referral rate to diagnostic audiology assessment** Essential ≤15% Desirable ≤12%
7.6 The proportion of babies with a no clear response result in one or both ears or other result that require an immediate onward referral for audiological assessment who receive an appointment within the required timescale. The required timescale is either 4 weeks of scan completion or by 44 weeks gestational age.	81%	**UNHS: Time from screening outcome to initial appointment offered for = audiology assessment** Essential ≥97% Desirable ≥99%
7.7 The proportion of babies with a no clear response result in one or both ears or other result that requires an immediate onward referral for audiological assessment who receive an appointment within the required timescale. The required timescale is either 4 weeks of scan completion or by 44 weeks gestational age.	63.8%	**UNHS: Time from screening outcome to attendance at an audiology assessment appointment** Essential ≥90% Desirable ≥95%

3.7. Information Systems

The Universal Newborn Hearing Screening programme is supported by the Scottish Birth Record (SBR) to deliver hearing screening.

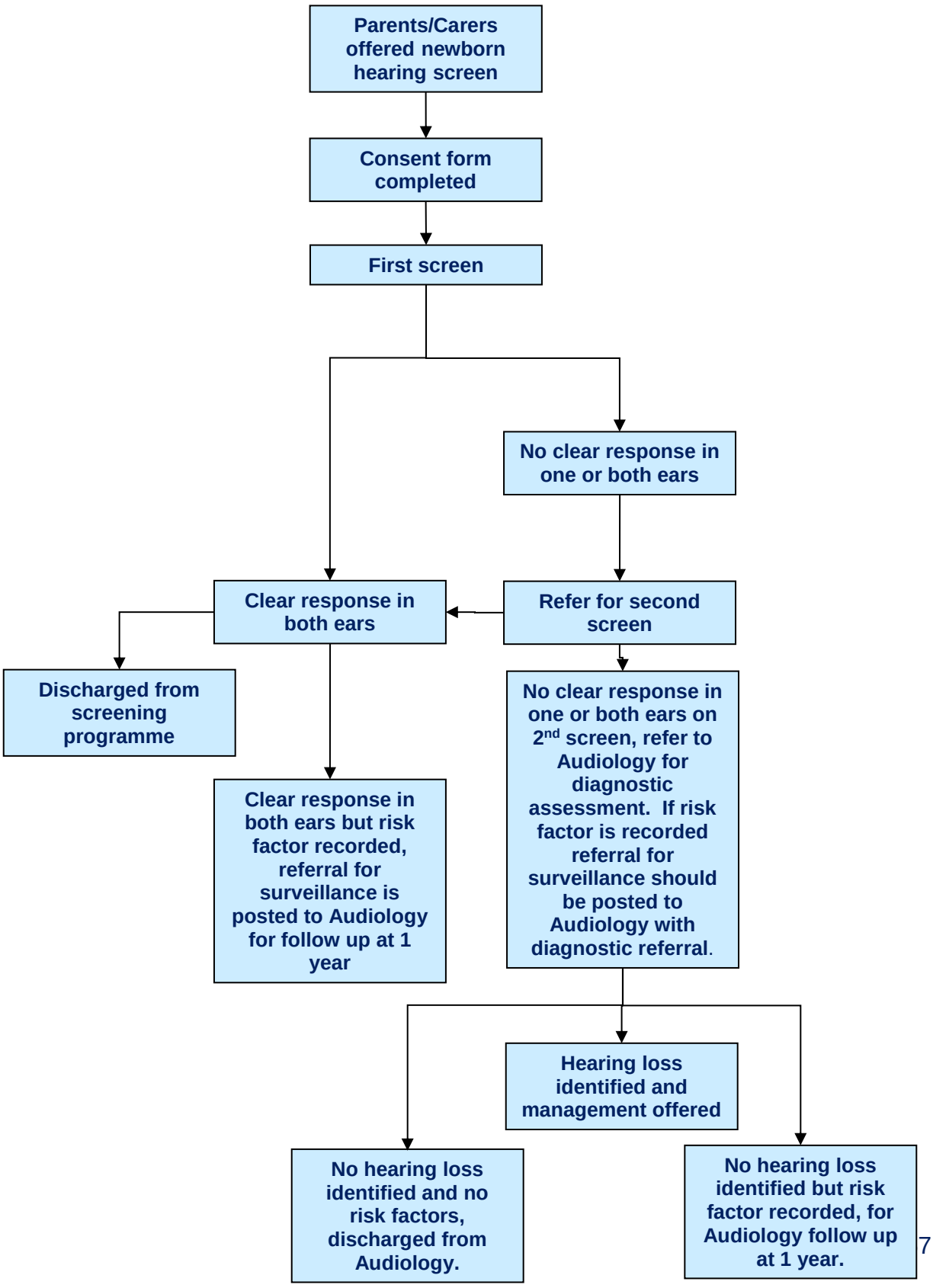
The Child Health Surveillance Programme Pre-School system (CHSP-PS) holds screening outcomes and is used as a failsafe to ensure all babies are offered hearing screening.

3.8. Challenges and Future Priorities

- Meet service KPIs.
- Maintain service performance and ensure that all babies are offered Universal Newborn Hearing Screening to meet national standards and targets.
- Replace old testing equipment across all sites.

Appendix 3.1

NHSGGC Universal Newborn Hearing Screening Pathway



Appendix 3.2

Universal Newborn Hearing Screening Programme Steering Group (At March 2019)

Dr Emilia Crighton	Deputy Director of Public Health (Chair)
Ms Isobel Cook	Midwife/Screener, Argyll and Bute
Mrs Dorothy Finlay	Lead Midwife
Patricia Friel	Lead Nurse, Neonatal
Mr James Harrigan	Head of Audiology
Ms Fiona Jarvis	Specialist Speech and Language Therapist
Ms Ainsley Keenan	Screening Manager
Alison McGrory	Health Improvement Principal
Dr Juan Mora	Consultant Audio logical Physician
Mrs Julie Mullin	Assistant Programme Manager, Screening Dept
Dr Andrew Powls	Consultant Neonatologist
Mrs Uzma Rehman	Public Health Programme Manager
Ms Patricia Renfrew	Consultant Practitioner, Argyll and Bute
Sandra Simpson	Assistant Programme Manager, Screening
Ms Vivien Thorpe	Clinical Scientist

Chapter 4 - Child Vision Screening

Summary

Pre-school Vision Screening Programme

Vision Screening is routinely offered to all pre-school age children resident in NHS Greater Glasgow and Clyde areas. Vision problems affect 3-6% of children and although obvious squints are easily detected, refractive error and subtle squints often go undetected and long-term vision loss can develop in adulthood. Most problems can be treated using spectacle lenses to correct any refractive error and occlusion therapy to treat strabismus (squint) – mainly using eye patches.

In 2019-2020, using the Community Health Index System, 2,536 children aged between four and five years old were identified as being eligible for pre-school vision screening. Of these, 7,575 (60.4%) children were screened representing a decrease of 25% from the previous year. The highest uptake was in East Renfrewshire 79.7% (916) and the lowest in Glasgow North West 45.5% (1,705). The lower uptake in screening was partly due to the COVID pandemic and lockdown resulting in children not at nursery and reduced time for re-visiting nurseries and/ or re-calling children to hospital sites.

As some numbers are small according to ethnic origin, combining all the White ethnic groups gives the uptake as 62.3% (6,373) and for Asian or Asian British 56.1% (552), Chinese 54.2 % (103) and Black or Black British 42.2%.

65.2% (4,939) children screened had a normal result, this ranged from 73.8% (454) in West Dunbartonshire to 55.8% (518) in Glasgow North East.

Of the 7,575 screened during 2019/2020, 2,759 (36%) were from the most deprived and 1,604 (21%) from the least deprived quintile. Deprivation also has an impact on vision and abnormal results following screening. The proportion of children with a normal result (NAD) ranged from 58.4% (1,610) among children living in the most deprived areas to 72.1% (1,156) in the least deprived area. Of the 1,837 (24.3%) children referred for further assessment, 28% (772) were from the most deprived area compared to 20.7% (332) from the least deprived area. 549 (7.2%) children already attending an eye clinic, 246 (8.9%) were from the most deprived area

The number of Pre-School children who missed out on screening in 2019/2020 was 4,961 and a process was established to appoint them at mop-up clinics. The data on uptake takes into account the children appointed at the mop-up clinics up to October 2020. The rest of the children will continue to be invited until March 2021.

Primary 7 School Vision Screening Programme

In 2019-2020, 12,427 Primary 7 school children were eligible for a vision test of which 8,198 (66.0%) were tested. The highest delivery was in East Dunbartonshire 89.4% (1,191) and the lowest was in West Dunbartonshire at 1.9% (20). P7 vision screening varied according to SIMD (child) with the uptake in the most deprived quintile recorded as 59.9% (2,896) compared to 82.1% (2,061) in the most affluent areas.

Using OnoMap software, the number and percentage of children screened by ethnicity was analysed. As some numbers are small according to ethnic origin, combining all the White ethnic groups gives the uptake as 66.4%% (6,998) and for Asian or Asian British 67.7% (549), Chinese 72.2% (104) and Black or Black British 57% (94).

Of the 8,198 children screened for vision impairments, 19.5% (1,596) were already wearing prescription spectacles. The highest percentage wearing glasses was in East Renfrewshire 21.8% (258) and the lowest in West Dunbartonshire 15% (3) and East Dunbartonshire 16.1% (1,191).

Glasgow North East sector had the highest percentage of pupils 31.4% (250) with visual defects compared to 7.4% (88) in Inverclyde. Visual defects were recorded as 25.7% (744) in children from the most deprived quintile compared to the most affluent quintile 11.3% (233).

Of the 8,198 children screened, 6,603 (80.5%) were screened using the Snellen test and 76.8% (5,070) of these children were recorded with an acuity of 6/6 which is normal. The highest percentage of children not wearing glasses and identified with poor acuity of 6/9 lived in Glasgow North East sector 27.9 % (177) and the lowest percentage in East Dunbartonshire 6.6% (66). The data for West Dunbartonshire shows 29.4% but only 20 children were screened. Similarly Glasgow North East sector also had the highest percentage of 11.7% (74) of children already wearing glasses and identified with poor acuity of 6/12 or worse and East Dunbartonshire had the lowest percentage at 2.3% (23).

COVID Pandemic and impact on Vision Screening

During March 2020, all nurseries and schools were closed due to the lockdown imposed as a response to the COVID Pandemic. This resulted in planned screening within nurseries and schools being cancelled.

Children who do not attend nursery or school, whose nursery is unknown or who miss their appointment within the nursery, are invited to a hospital Orthoptic clinic to have their vision screened during the summer holidays. This was not possible within the lockdown period in 2020 and had an impact on screening those that had missed out on vision screening.

Mop-up clinics started to appoint the pre-school children who missed screening from August 2020 and this will continue until March 2021. Parents received a letter advising them to take their child to an Optometrist if they had concerns about their vision.

Chapter Contents

Pre-school Vision Screening Programme

4.1. Background

Vision Screening is routinely offered to all pre-school age children resident in NHS Greater Glasgow and Clyde areas.

Amblyopia can be caused by either a squint (strabismus) or differences in the focusing power of each eye (refractive error) which results in the brain receiving different images from each eye. If these problems are not treated early in childhood, this can lead to reduced vision in one or in some cases, both eyes. The screening programme can also detect reduced vision due to other more uncommon causes.

Vision problems affect 3-6% of children and although obvious squints are easily detected, refractive error and subtle squints often go undetected and long-term vision loss can develop in adulthood. Most problems can be treated using spectacle lenses to correct any refractive error and occlusion therapy to treat strabismus (squint) – mainly using eye patches. These treatments can be used alone or in combination. Treatment is most effective when the brain is still developing (in young children) and when the child co-operates in wearing the patch and/or glasses.

The most common cause of poor vision is refractive error.

4.2. Aim of Vision Screening Programmes

The aim of the screening programme is to detect reduced visual acuity, the commonest causes of which are amblyopia and refractive error. There is emerging evidence that good screening and treatment result in lower incidence of significant permanent vision loss.

4.3. Pre-school vision test

The basic screen is a visual acuity test where children are asked to match a line of letters or pictures to a key card or to describe a line of pictures.

4.4. Eligible Population

All children resident in NHS Greater Glasgow and Clyde aged between four and five years are invited to attend screening for reduced vision.

4.5. Pre-school Vision Screening Pathway

The list of eligible children (the school intake cohort for the following year), with dates of birth between 1 March 2014 and 28 February 2015 were downloaded from CHI and matched against the lists received from nurseries.

Pre-school vision screening clinics take place in the nursery setting. Children who do not attend nursery or school, whose nursery is unknown or who miss their

appointment within the nursery, are invited to a hospital Orthoptic clinic to have their vision screened.

A proportion of children require further testing in secondary care following the initial screen. These children are referred for further assessment to a paediatric clinic in an ophthalmology department, though a small number may be referred to a community optometrist initially. The assessment appointment involves a full eye examination and allows clinicians to identify whether the screen test was a false positive and no further action is required or if the screen test was a true positive to enable the specific disorder to be identified and treated.

4.6. Delivery of Pre-school Vision Screening Programme 2019/20

In 2019/2020, using the Community Health Index System, 12,536 children aged between four to five years old were identified as being eligible for pre-school vision screening. 5,162 (41.2%) of all pre-school children within NHSGGC live in the most deprived quintile. The majority of these children are resident within the Glasgow City sectors 3,732 (72.3%) **(Table 4.1)**

Table 4.1: Total number of eligible NHSGGC child residents by HSCP area and deprivation 2019-2020

	SIMD Quintile 2016					
	Most deprived				Least deprived	
HSCP	**1**	**2**	**3**	**4**	**5**	**Total**
East Dunbartonshire	48	205	54	222	714	1,243
East Renfrewshire	75	78	95	200	702	1,150
Glasgow North East	1,404	200	169	235	9	2,017
Glasgow North West	1,018	264	194	150	310	1,936
Glasgow South	1,310	551	375	250	180	2,666
Inverclyde	346	84	103	112	84	729
Renfrewshire	522	353	319	315	348	1,857
West Dunbartonshire	439	268	109	87	35	938
Total	5,162	2,003	1,418	1,571	2,382	12,536
% of Total	**41.2**	**16.0**	**11.3**	**12.5**	**19.0**	

Source: Child Health - Pre-School Date Extracted: November 2020

Not all children eligible for vision screening are registered with a nursery. Those that miss screening in nursery are sent an appointment during the summer holidays to have their vision tested within a community or hospital clinic.

Due to the COVID Pandemic and lockdown in March 2020, the number of Pre-School children who missed out on screening in 2019/2020 was 4,961 and a process was established to appoint them at mop-up clinics.

The data in this report on uptake takes into account the children appointed at the mop-up clinics up to October 2020. The rest of the children will continue to be invited until March 2021.

Parents received a letter advising them to take their child to an Optometrist if they had concerns about their vision.

Inverclyde has the highest proportion of children registered with a nursery 94.7% (690) and North East Glasgow the lowest, 77.8% (1,569) **(Table 4.2)**

Table 4.2: Number of NHSGGC children eligible for screening, number and percentage registered with a nursery by HSCP 2019-2020

HSCP	Children eligible for screening	Registered with a Nursery	% Registered	Not registered with a nursery	% Not Registered
East Dunbartonshire	1,243	1,087	*87.4*	156	*12.6*
East Renfrewshire	1,150	1,082	*94.1*	68	*5.9*
Glasgow North East	2,017	1,569	*77.8*	448	*22.2*
Glasgow North West	1,936	1,618	*83.6*	318	*16.4*
Glasgow South	2,666	2,312	*86.7*	354	*13.3*
Inverclyde	729	690	*94.7*	39	*5.3*
Renfrewshire	1,857	1,752	*94.3*	105	*5.7*
West Dunbartonshire	938	867	*92.4*	71	*7.6*
Total	**12,536**	**10,977**	***87.6***	**1,559**	***12.4***

Source: Child Health - PS Date Extracted: Nov 2020

Using OnoMap software, the number and percentage of children screened by ethnicity was analysed. As some numbers are small according to ethnic origin, combining all the White ethnic groups gives the uptake as 62.3% (6,373) and for Asian or Asian British 56.1% (552), Chinese 54.2% (103) and Black or Black British 42.2% (103). **(Table 4.3)**

Table 4.3: Pre-school Vision Screening Uptake by Ethnicity 2019-2020

2001 Census Ethnic Group	Not Screened	Screened	Total	*% Screened*
White - British	2,910	4,992	7,902	*63.2*
White - Irish	534	929	1,463	*63.5*
White - any other white background	408	452	860	*52.6*
Asian or Asian British - Indian	121	145	266	*54.5*
Asian or Asian British - Pakistani	289	368	657	*56.0*
Asian or Asian British - Bangladeshi	16	31	47	*66.0*
Asian or Asian British - Other Asian	5	8	13	*61.5*
Black or Black British - Caribbean	5	6	11	*54.5*
Black or Black British - African	110	97	207	*46.9*
Other ethnic groups - Chinese	87	103	190	*54.2*
Other ethnic groups - any other ethnic group	268	278	546	*50.9*
Unclassified	208	166	374	*44.4*
TOTAL	4,961	7,575	12,536	

Source: Child Health - Pre-School, OnoMap software, July 2020

7,575 (60.4%) children were screened in 2019-2020, representing a decrease of 25% from the previous year. The highest uptake was in East Renfrewshire 79.7% (916) and the lowest in Glasgow North West 45.5% (1,705). The lower uptake in screening was partly due to the COVID pandemic and lockdown resulting in children not at nursery and reduced time for re-visiting nurseries and/ or re-calling children to hospital sites.

65.2% (4,939) children screened had a normal result, this ranged from 73.8% (454) in West Dunbartonshire to 55.8% (518) in Glasgow North East.

Overall 24.3% (1,837) children screened were referred for further investigations. The referral rates varied from 29.4% (259) in North West Glasgow to 17.7% (109) in West Dunbartonshire.

The percentage of children screened that were already attending an eye clinic was 7.2% (549), ranging from 10.2 % (52) in Inverclyde to 5.2% (32) in Inverclyde. **(Table 4.4)**

Table 4.4: Pre-school Vision Screening Uptake and Outcomes by HSCP Area 2019 to 2020

HSCP	Total Population	Total number of children screened	Total number of children not screened	% Uptake	% No Abnormality Detected (NAD) of those screened	% Referred of those screened	% Recalled of those screened	% Already attending Eye Clinic
East Dunbartonshire	1,243	670	573	*53.9*	*70.7*	*21.0*	*2.4*	*5.8*
East Renfrewshire	1,150	916	234	*79.7*	*67.5*	*25.3*	*0.4*	*6.8*
Glasgow North East	2,017	929	1,088	*46.1*	*55.8*	*28.1*	*7.3*	*8.8*
Glasgow North West	1,936	881	1,055	*45.5*	*61.5*	*29.4*	*2.5*	*6.6*
Glasgow South	2,666	1,671	995	*62.7*	*61.6*	*29.2*	*1.8*	*7.4*
Inverclyde	729	5,09	220	*69.8*	*65.2*	*18.5*	*6.1*	*10.2*
Renfrewshire	1,857	1,384	473	*74.5*	*70.2*	*18.3*	*4.3*	*7.3*
West Dunbartonshire	938	615	323	*65.6*	*73.8*	*17.7*	*3.3*	*5.2*
Total	**12,536**	**7,575**	**4,961**	***60.4***	***65.2***	***24.3***	***3.3***	***7.2***

Source: Child Health – Pre-School Date Extracted: November 2020

Of the 7,575 screened during 2019/2020, 2,759 (36%) were from the most deprived and 1,604 (21%) from the least deprived quintile.

Deprivation also has an impact on vision and abnormal results following screening. The proportion of children with a normal result (NAD) ranged from 58.4% (1,610) among children living in the most deprived areas to 72.1% (1,156) in the least deprived area.

A significantly larger proportion of children living in the most deprived areas were referred for further assessment, recalled or were already attending a clinic. Of the 1,837 (24.3%) children referred for further assessment, 28% (772) were from the most deprived area compared to 20.7% (332) from the least deprived area.

250 (3.3%) children were recalled back to be screened due to difficulties screening their vision during the first screen.

Of the 549 (7.2%) children already attending an eye clinic, 246 (8.9%) were from the most deprived area **(Table 4.5)**

Table 4.5: Pre-school Vision Screening Uptake and Outcomes by SIMD 2019-2020

SIMD	Number of Children Screened	No Abnormality Detected (NAD)	*% NAD*	Referred	*% Referred*	Recall	*% Recall*	Ongoing Follow up	*% Ongoing Follow up*
1 (Most Deprived)	2,759	1,610	*58.4*	772	*28.0*	131	*4.7*	246	*8.9*
2	1,201	786	*65.4*	289	*24.1*	43	*3.6*	83	*6.9*
3	958	667	*69.6*	213	*22.2*	23	*2.4*	55	*5.7*
4	1,053	720	*68.4*	231	*21.9*	34	*3.2*	68	*6.5*
5 (Least Deprived)	1,604	1,156	*72.1*	332	*20.7*	19	*1.2*	97	*6.0*
Total	**7,575**	**4,939**	***65.2***	**1,837**	***24.3***	**250**	***3.3***	**549**	***7.2***

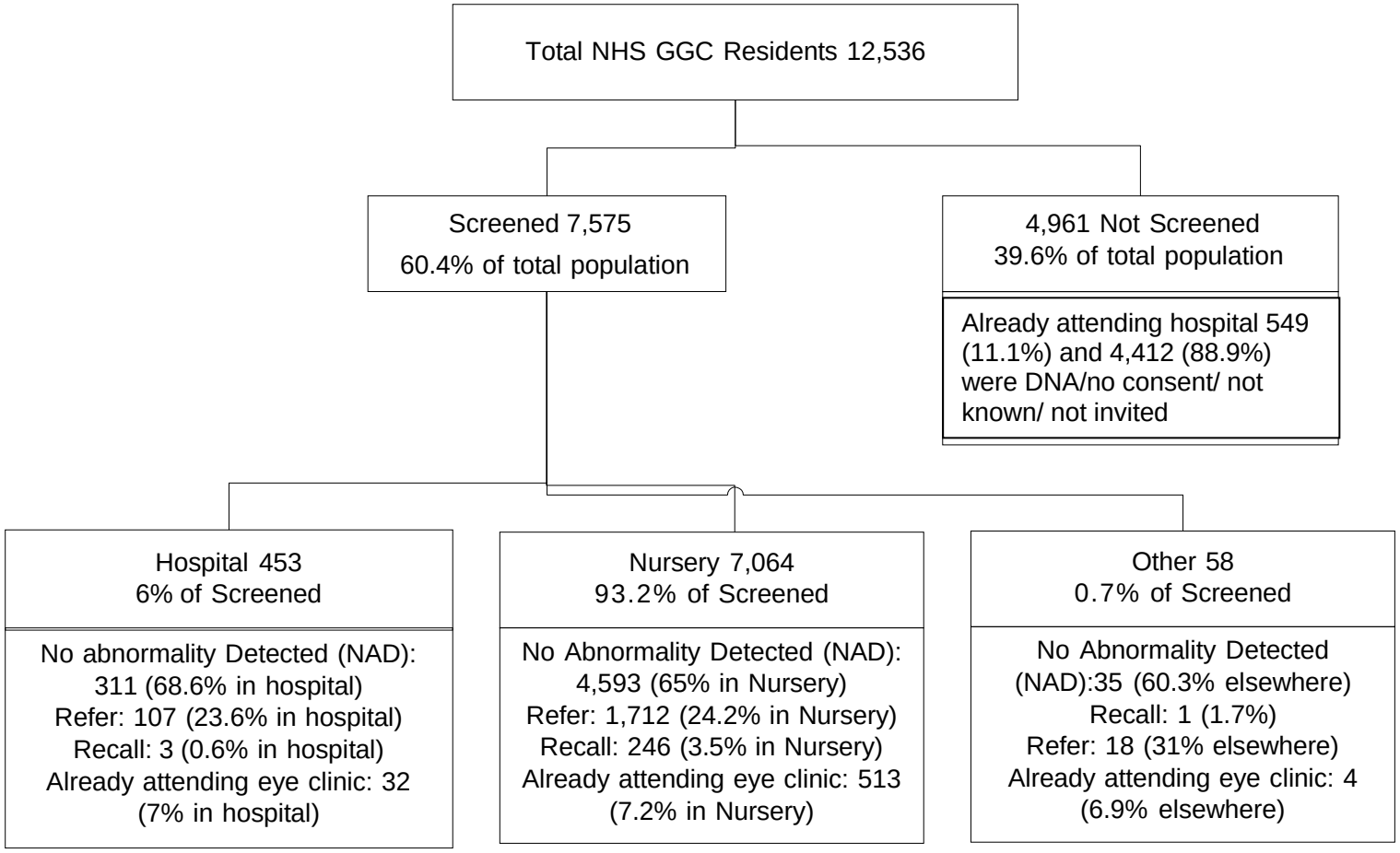
Source: Child Health Pre-School November 2020

The Pre-school vision screening summary of activity for the service in NHS Greater Glasgow and Clyde for the school year 2019/2020 is in **Figure 4.1**

7,064 children were screened in Nurseries and 4,593 (65%) had a normal result, 1,712 (24.2%) were referred and 513 (7.2%) were already attending an eye clinic. Those not screened in nursery were invited to attend the hospital based service. 453 (6%) children were screened within a hospital setting, 311 (68.6%) had a normal result, 107 (23.6%) were referred and 32 (7%) were already attending an eye clinic.

The number of Pre-School children who missed out on screening in 2019/2020 was 4,961 and a process was established to appoint them at mop-up clinics. The data on uptake takes into account the children appointed at the mop-up clinics up to October 2020. The rest of the children will continue to be invited until March 2021.

Figure 4.1 Summary of NHSGGC Pre-School Vision Screening Activity 2019-2020



Source: Child-Health-Pre-School
Data extracted: November 2020

Primary 7 School Vision Screening Programme

4.7. P7 Eligible Population

School children in Primary 7 resident in NHSGGC are offered a vision test prior to transfer to secondary education.

4.8. P7 Vision Test

A visual acuity test is carried out where children are asked to identify a line of letters using a Snellen chart or Logmar if a child is unable to manage a Snellen chart. Testing is also carried out on children who already have glasses.

4.9. P7 Vision Screening Pathway

P7 vision screening takes place in school and is carried out by a Healthcare Support Worker. Children that do not attend school or miss their appointment within the school are advised to attend their local community optometrist.

Parents/carers are issued with result letter.

The referral pathway for those with abnormal results is to the local community optometrist:

1. Parent/carer is given a referral letter to take to their local community optometrist for further examination if a child's visual acuity without glasses is 6/9 or poorer in one or both eyes or with glasses is 6/12 or poorer in the better eye.

2. Children who have specific visual abnormalities leading to visual impairment, if not already known are also referred to a community paediatrician.

3. If a child has a sudden onset squint, the School Nurse, GP and parent will be informed on the same day as this can be associated with more serious illness which needs urgent assessment and management.

4.10. Delivery of Primary 7 School Vision Screening Programme 2019 to 2020

In 2019-2020, 12,427 Primary 7 school children were eligible for a vision test of which 8,198 (66.0%) were tested. The highest delivery was in East Dunbartonshire 89.4% (1,191) and the lowest was in West Dunbartonshire at 1.9% (20). **(Table 4.6)**

Table 4.6: NHSGGC Primary 7 vision screening uptake by HSCP, 2019-2020

HSCP (School)	Not Screened	Screened	Total	% Uptake
East Dunbartonshire	141	1,191	1,332	*89.4*
East Renfrewshire	175	1,181	1,356	*87.1*
Glasgow North East Sector	863	796	1,659	*48.0*
Glasgow North West Sector	500	1,348	1,848	*72.9*
Glasgow South Sector	1,192	1,264	2,456	*51.5*
Inverclyde	17	819	836	*98.0*
Renfrewshire	316	1,579	1,895	*83.3*
West Dunbartonshire	1,025	20	1,045	*1.9*
Total	**4,229**	**8,198**	**12,427**	***66.0***

Source: CHSP_PS, November 2020

Using OnoMap software, the number and percentage of children screened by ethnicity was analysed. As some numbers are small according to ethnic origin, combining all the White ethnic groups gives the uptake as 66.4%% (6,998) and for Asian or Asian British 67.7% (549), Chinese 72.2 %(104) and Black or Black British 57% (94). **(Table 4.7)**

Table 4.7: NHSGGC Primary 7 Screening Uptake by ethnicity, 2019-2020

2001 Census Ethnic Group	Not Screened	Screened	Total	% Screened
White - British	2,685	5,553	8,238	*67.4*
White - Irish	571	1,016	1,587	*64.0*
White - any other white background	278	429	707	*60.7*
Asian or Asian British - Indian	67	131	198	*66.2*
Asian or Asian British - Pakistani	213	374	587	*63.7*
Asian or Asian British - Bangladeshi	17	38	55	*69.1*
Asian or Asian British - Any Other Asian Background	4	6	10	*60.0*
Black or Black British - Caribbean	0	3	3	*100.0*
Black or Black British - African	71	91	162	*56.2*
Other ethnic groups - Chinese	40	104	144	*72.2*
Other ethnic groups - any other ethnic group	152	300	452	*66.4*
Unclassified	131	153	284	*53.9*
Total	4,229	8,198	12,427	*66.0*

Source: CHSP_PS, November 2020

P7 vision screening varied according to SIMD (child) with the uptake in the most deprived quintile recorded as 59.9% (2,896) compared to 82.1% (2,061) in the most affluent areas. (**Table 4.8)**

Table 4.8: NHSGCC Primary 7 Screening uptake by SIMD (child) 2019-20

SIMD Quintile 2016 (Child)	Not Screened	Screened	Total	% Uptake
1 (Most Deprived)	1,939	2,896	4,835	*59.9*
2	842	1,251	2,093	*59.8*
3	515	924	1,439	*64.2*
4	483	1,066	1,549	*68.8*
5 (Least Deprived)	450	2,061	2,511	*82.1*
Total	**4,229**	**8,198**	**12,427**	***66.0***

Source: CHSP_PS, November 2020

Of the 8,198 children screened for vision testing, 19.5% (1,596) were already wearing prescription spectacles.

The highest percentage wearing glasses was in East Renfrewshire 21.8% (258) and the lowest in West Dunbartonshire 15% (3) and East Dunbartonshire (16.1%) 192. **(Table 4.9)**

Table 4.9: NHSGGC mainstream schools primary 7 vision screened pupils wearing spectacles 2019-2020

HSCP (School)	No Spectacles	Spectacles	Total	% Spectacles
East Dunbartonshire	999	192	1,191	*16.1*
East Renfrewshire	923	258	1,181	*21.8*
Glasgow North East Sector	634	162	796	*20.4*
Glasgow North West Sector	1,078	270	1,348	*20.0*
Glasgow South Sector	1,001	263	1,264	*20.8*
Inverclyde	672	147	819	*17.9*
Renfrewshire	1,278	301	1,579	*19.1*
West Dunbartonshire	17	3	20	*15.0*
Total	**6,602**	**1,596**	**8,198**	***19.5***

Source: CHSP_PS, November 2020

Visual defects identified as part of the primary 7 screening process indicate that Glasgow North East sector had the highest percentage of pupils 31.4% (250) with defects compared to 7.4% (88) in East Dunbartonshire. (**Table 4.10)**

Table 4.10: NHSGGC primary 7 vision screened pupils (mainstream schools) Visual defect outcome 2019-2020

HSCP (School)	No Visual Defect	Visual Defect	Total	*% Visual Defect*
East Dunbartonshire	1,103	88	1,191	*7.4*
East Renfrewshire	1,043	138	1,181	*11.7*
Glasgow North East Sector	546	250	796	*31.4*
Glasgow North West Sector	1,061	287	1,348	*21.3*
Glasgow South Sector	911	353	1,264	*27.9*
Inverclyde	688	131	819	*16.0*
Renfrewshire	1,303	276	1,579	*17.5*
West Dunbartonshire	14	6	20	*30.0*
Total	**6,669**	**1,529**	**8,198**	***18.7***

Source: CHSP_PS, November 2020

Visual defects were recorded as 25.7% (744) in children from the most deprived quintile compared to the most affluent quintile 11.3% (233). (**Table 4.11)**

Table 4.11: NHSGGC Primary 7 vision screened pupils by SIMD 2019-2020: Visual defect identified

SIMD Quintile 2016 (Child)	Not Screened	Screened	Total	% Uptake
1 (Most Deprived)	2,152	744	2,896	*25.7*
2	1,014	237	1,251	*18.9*
3	750	174	924	*18.8*
4	925	141	1,066	*13.2*
5 (Least Deprived)	1,828	233	2,061	*11.3*
Total	**6,669**	**1,529**	**8,198**	***18.7***

Source: CHSP_PS, November 2020

Of the 8,198 children screened, 6,603 (80.5%) were screened using the Snellen test and 76.8% (5,070) of these children were recorded with an acuity of 6/6 which is normal. A follow up with an Optometrist is recommended for children with an acuity worse than 6/9 (if not wearing spectacles) and acuity of 6/12 or worse for those with spectacles.

The highest percentage of children not wearing glasses and identified with poor acuity of 6/9 lived in Glasgow North East sector 27.9% (177) and the lowest percentage in East Dunbartonshire 6.6% (66) The data for West Dunbartonshire shows 29.4% but only 20 children were screened.

Similarly Glasgow North East sector also had the highest percentage of 11.7% (74) of children already wearing glasses and identified with poor acuity of 6/12 or worse and East Dunbartonshire had the lowest percentage at 2.3% (23). (**Table 4.12)**

Table 4.12: NHSGGC residents Primary 7 vision screened pupils (mainstream schools) 2019-2020 poor visual identified

HSCP (School)	Total Number of children Screened	Snellen Test	% Snellen Test	Acuity 6/6	% Acuity 6/6	Acuity 6/9	% Acuity 6/9	Acuity 6/12 or worse	% Acuity 6/12 or worse
East Dunbartonshire	1,191	999	*83.9*	910	*91.1*	66	*6.6*	23	*2.3*
East Renfrewshire	1,181	924	*78.2*	786	*85.1*	109	*11.8*	29	*3.1*
Glasgow North East	796	634	*79.6*	383	*60.4*	177	*27.9*	74	*11.7*
Glasgow North West	1,348	1,078	*80.0*	790	*73.3*	211	*19.6*	77	*7.1*
Glasgow South	1,264	1001	*79.2*	648	*64.7*	261	*26.1*	92	*9.2*
Inverclyde	819	672	*82.1*	540	*80.4*	94	*14.0*	38	*5.7*
Renfrewshire	1579	1,278	*80.9*	1,002	*78.4*	207	*16.2*	69	*5.4*
West Dunbartonshire	20	17	*85.0*	11	*64.7*	5	*29.4*	1	*5.9*
Total	**8,198**	**6,603**	***80.5***	**5,070**	***76.8***	**1,130**	***17.1***	**403**	***6.1***

Source: CHSP_PS, November 2020

4.11. P7 Child Health Screening Information Systems

Child Health Surveillance System–Pre-school (CHS-PS) currently supports the delivery of the pre-school vision screening programme across NHS Greater Glasgow and Clyde. School vision testing is supported by the Child Health Surveillance System- School (CHS-S). Both CHS-PS and CHS-S are being re-procured by NHS Scotland.

4.12. Pre-school and P7 Vision Screening Challenges and Future Priorities

- Ensure the co-operation of all nurseries to allow screening to take place taking into account GDPR requirements. Uptake is far higher in children who attend nursery compared to those not in nursery who are asked to attend hospital.
- Improve the recording of children who attend an Optometrist as a result of pre-school vision or Primary 7 vision screening.
- Work with NHS Scotland and other boards to ensure the safe and effective continuity of vision screening activities during a change of IT systems.
- Ensure children unable to benefit from screening in P7 during COVID can be offered this in 2021/2022

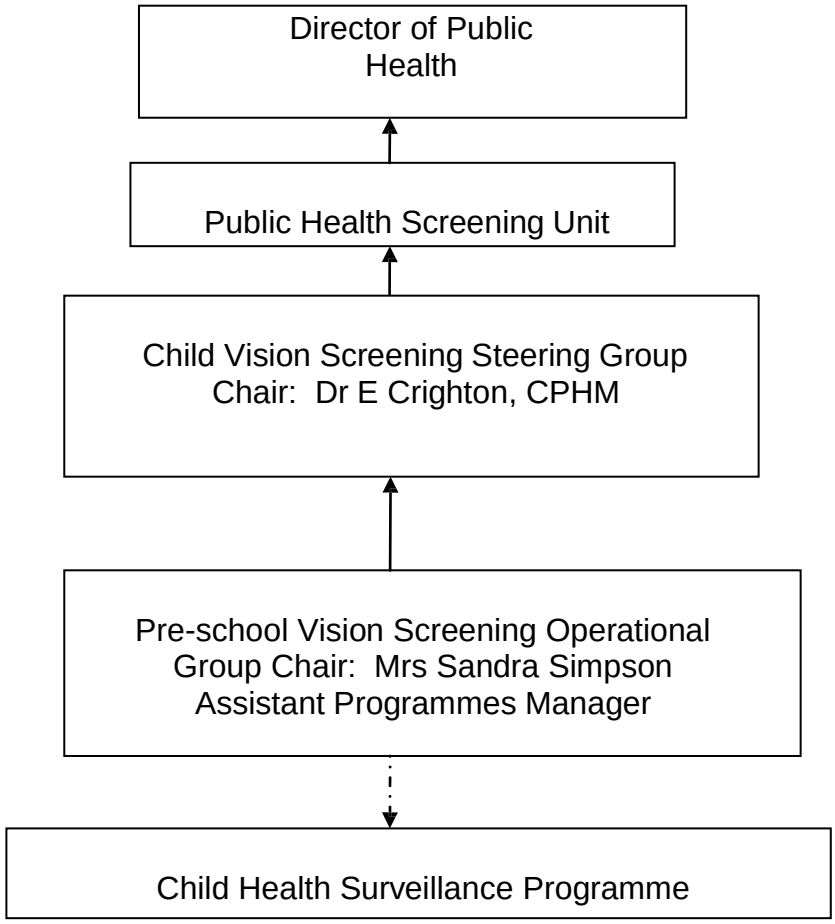
Appendix 4.1

Members of Child Vision Screening Steering Group (At March 2019)

Dr Emilia Crighton	Deputy Director of Public Health (Chair)
Ms Nikki meek	Optometrist
Mr Paul Burton	Information Manager
Mrs Sandra Simpson	Assistant Screening Programme Manager
Mrs Patricia Mackay	Team Lead Children & Families, South Glasgow
Mrs Carolyn MacLellan	Lead Orthoptist
Mr Eddie McVey	Optometric Adviser
Ms Morven Campbell	Vice chair, AOC
Ms Arlene Polet	Children's & Families Team Lead, Inverclyde
Mrs Uzma Rehman	Programme Manager, Public Health
Mrs Diane Russell	Lead Orthoptist
Ms Elaine Salina	Principal Optometrist
Ms Anita Simmers	Head of Vision, Science Dept, GCU
Dr Kathy Spowart	Paediatrician, Community Child Health
Mrs Claudine Wallace	Lecturer in Orthoptics, GCU

Appendix 4.2

Reporting Structure: Child Vision Screening Steering Group



Key:
_____ Direct Reports
- - - - - - - Network Link

Chapter 5 - Abdominal Aortic Aneurysm (AAA) Screening

Summary

An abdominal aortic aneurysm (AAA) is a dilatation of the aorta within the abdomen where the aortic diameter is 3.0 cm or more. Aneurysms are strongly linked to increasing age, hypertension, smoking, other vascular disease and a positive family history of AAA.

The aim of AAA screening is the early detection and elective repair of asymptomatic AAA in order to prevent spontaneous rupture. Screening is associated with a 40% reduction in aneurysm related mortality. All men aged 65 years in the NHSGGC area are invited to attend AAA screening by a single ultrasound examination. Men aged over 65 years of age are able to self-refer to the programme.

In 2019-2020, 6,385 men aged 65 were invited to participate in the AAA screening programme. 3,849 (60.3%) took up screening, therefore not meeting the minimum uptake standard of 70%. 46 men (1.2%) had an enlarged aorta (≥3cm). Of these, 6 men (0.1%) had an aorta measuring between 3cm to 5.49cm, requiring surveillance scans and 40 men (1.0%) had a large aneurysm measuring 5.5 cm or more, requiring surgical assessment and intervention.

Uptake is poorest in the most socio-economically deprived areas (54.1% in SIMD 1 vs. 66.9% in SIMD 5). The majority (94.5%) of men invited were of white ethnic origin and due to low numbers in some ethnic groups it is not possible to directly compare programme uptake across ethnic subgroups. There are also lower uptake rates in some HSCPs that are not wholly explained by socio-economic deprivation.

COVID Pandemic

The Scottish Government, on the advice of the Scottish Screening Committee, decided to temporarily pause the AAA screening programme as a result of the COVID pandemic. An assessment was undertaken and the recommendation was to:

- Pause all screening as soon as possible and agree that the treatment pathway for men with large AAAs are decided by the local vascular departments.
- Cancel all scheduled clinics and stop the issuing of any new invitations within 18/24 hours of a decision to pause screening.

Given the 8 week treatment time target for men with large aneurysm, decisions were taken to stop screening in mid-March 2020.

The impact of stopping screening and cancellation of clinics will have affected the uptake rate and referrals and treatment within Vascular Services. The full assessment is in **Appendix 5.3**.

Chapter Contents

5.1. Background

An abdominal aortic aneurysm (AAA) is a dilatation of the aorta within the abdomen where the aortic diameter is 3.0 cm or more. Aneurysms are strongly linked to increasing age, hypertension, smoking, other vascular disease and a positive family history of AAA.

Studies have found that approximately 7% of men aged 65 were found to have an AAA. It is less common in men and women under aged 65 years. When an AAA ruptures less than half of patients will reach hospital alive. When an operation is possible, mortality is as high as 85%.

5.2. Aim of the Screening Programme and Eligible Population

The aim of AAA screening is the early detection and elective repair of symptomatic AAA in order to prevent spontaneous rupture. Screening is associated with a 40% reduction in aneurysm related mortality.

AAA screening was implemented across NHS Greater Glasgow and Clyde in February 2013. The performance and quality of the programme is monitored via defined National AAA Screening Standards[1] and Key Performance Indicators (KPIs)[2].

All men aged 65 years who are resident in the NHSGGC area are invited to participate in the AAA screening programme. Men aged over 65 years of age are able to self-refer to the programme.

5.3. Screening Test and Screening Pathway

The screening test involves a single abdominal scan using a portable ultrasound machine. The AAA IT application is used to appoint and manage the patient through their screening pathway. The application obtains the demographic details of the participants by linking with the Community Health Index (CHI). Screening takes place in the New Victoria Hospital, New Stobhill Hospital, Golden Jubilee Hospital, Renfrew Health Centre, Inverclyde Royal Hospital and Vale of Leven Hospital. Individuals whose aortic diameter is less than 3.0 cm are discharged. Individuals with a positive result from screening (AAA dimensions between 3.0 and 5.4 cm) will be offered interval surveillance scanning and treatment. Men with clinically significant AAA (over 5.5 cm) will be referred to secondary care for assessment **(Appendix 5.1).**

Individuals with an AAA over 5.5 cm are assessed in vascular surgical outpatient clinic to assess willingness and fitness for either surgery or for referral to interventional radiological services for assessment for endovascular aneurysm repair

[1] http://www.healthcareimprovementscotland.org/our_work/cardiovascular_disease/screening_for_aaa/aaa_screening_standards.aspx (accessed October 2019)

[2] http://www.isdscotland.org/Health-Topics/Public-Health/AAA-Screening/2018-03-06-AAA-KPI-Definitions.pdf (accessed October 2019)

(EVAR). There is multidisciplinary team decision making for aneurysm patients (both screened and unscreened). Some patients will not go on to have an intervention, mainly due to fitness for surgery or a preference for no intervention after consultation and assessment.

Sometimes an image cannot be achieved if, for example, an individual has a high BMI, large abdominal girth, bowel gas or previous surgery, which can cause issues with visualisation of the aorta thus preventing accurate measurements and image capture using ultrasound. If an image cannot be achieved after two appointments the individual will be discharged from the programme and referred to Vascular Services for management locally.

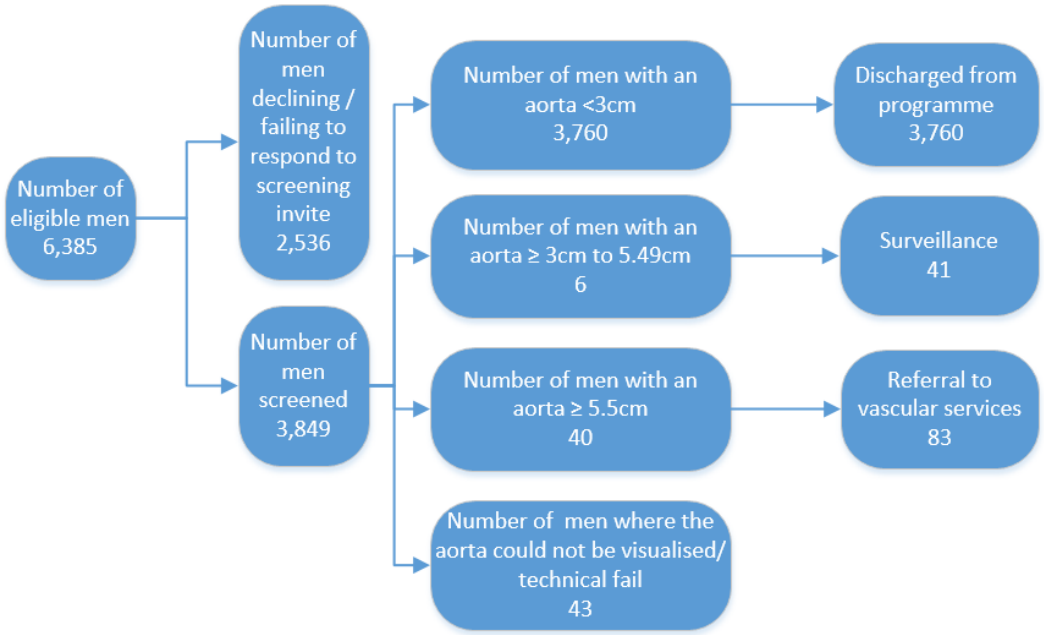
5.4. Programme Performance and Delivery

For the period 1 April 2019 to 31 March 2020, 6,385 men were eligible for screening. Of these, 3,849 men (60.3%) were screened before age 66 and 3 months.

In addition to national performance monitoring via annually published KPIs, local monitoring is undertaken on an annual basis to explore any local variation in programme performance and quality. As a result of differences in data extract dates, numbers in local data analysis may differ from those presented in national reports.

An overview of NHGGC AAA screening programme activity during 2019/2020 is provided in **Figure 5.1**.

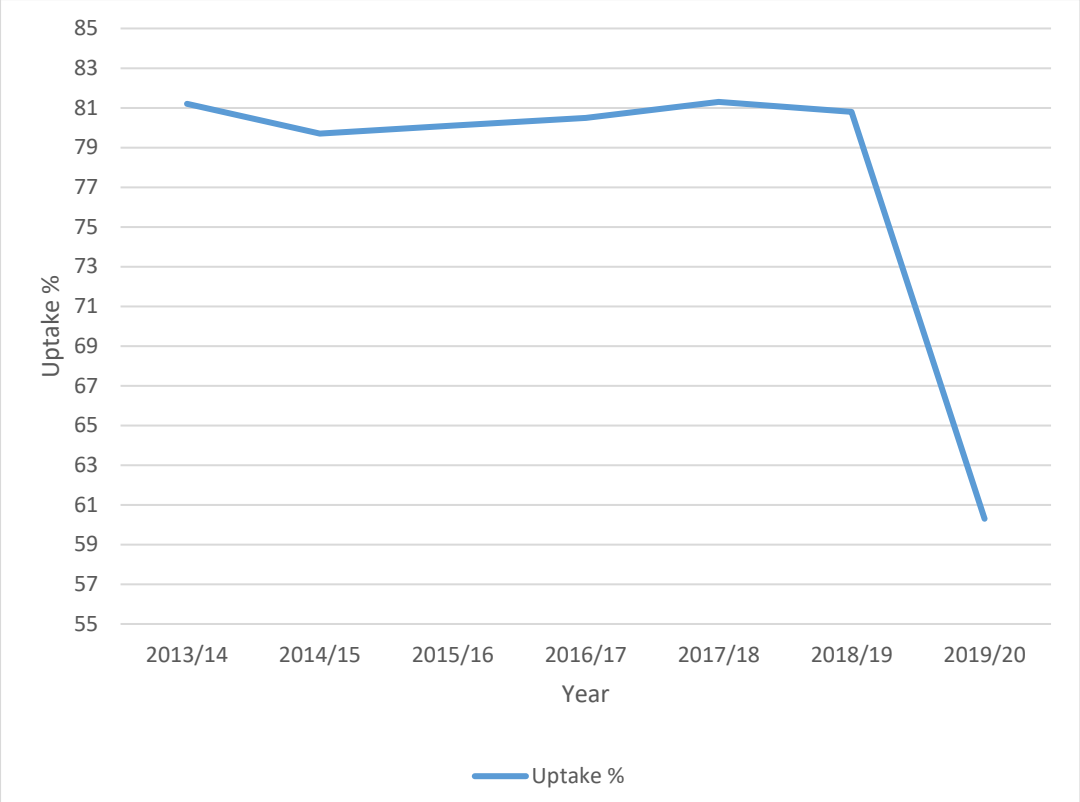
Figure 5.1: Overview NHSGGC AAA screening programme activity, 2019/2020



Source: AAA Application, September 2020

AAA screening was implemented across NHS Greater Glasgow and Clyde in February 2013 and uptake is shown below in **Figure 5.2.**

Figure 5.2: Uptake of AAA in NHSGGC from 2013/2014 – 2019/2020



Source: AAA Application 2020

During the period 2019-2020, the essential threshold for screening uptake (70%) was not met across any deprivation quintiles. Overall, men who resided in the most deprived areas had uptake rates 12.8% lower than men residing in the least deprived areas (54.1% vs. 66.9% respectively). **(Table 5.1)**

Table 5.1: Uptake of AAA screening among eligible population by SIMD quintile for NHSGGC, 2019-2020

SIMD Quintile 2016	Not Screened	Screened	Total	*% Screened*
1 (Most Deprived)	1,008	1,190	2,198	*54.1*
2	419	595	1,014	*58.7*
3	336	550	886	*62.1*
4	308	575	883	*65.1*
5 (Least Deprived)	465	939	1,404	*66.9*
Total	**2,536**	**3,849**	**6,385**	***60.3***

Source: AAA Application, September 2020

The majority (94.5%) of men invited were of white ethnic origin. **(Table 5.2)** Uptake of AAA screening differs between ethnic groups, with uptake variable across groups. However, due to low numbers in some ethnic groups it is not possible to directly compare programme uptake across ethnic subgroups.

Table 5.2: Uptake of AAA screening by ethnicity for NHSGGC, 2019-2020

2001 Census Ethnic Group	Not Screened	Screened	Total	*% Screened*
White - British	2,014	3,209	5,223	*61.4*
White - Irish	287	393	680	*57.8*
White - any other white background	65	66	131	*50.4*
Asian or Asian British - Indian	30	28	58	*48.3*
Asian or Asian British - Pakistani	52	47	99	*47.5*
Asian or Asian British - Bangladeshi	3	4	7	*57.1*
Asian or Asian British – any other Asian	2	3	5	*60.0*
Black or Black British - Caribbean	0	1	1	*0.0*
Black or Black British - African	3	2	5	*40.0*
Other ethnic groups - Chinese	22	14	36	*38.9*
Other ethnic groups - any other ethnic group	27	26	53	*49.1*
Unclassified	31	56	87	*64.4*
Total	**2,536**	**3,849**	**6,385**	***60.3***

Source: AAA Application, OnoMap, September 2020

The essential threshold for screening uptake (70%) was not met in all HSCPs, with a highest uptake rate of 70.2% in West Dunbartonshire HSCP and the lowest uptake rates of 50.6% in Inverclyde.

However, when the known effects of deprivation and ethnicity are taken into account by standardisation (Standardised Uptake Rate – SUR), the variation in uptake within HSCPs persist, although slightly reduced (19.3% difference between highest and lowest), with 50.8% SUR in Inverclyde compared to 71.1% SUR in West Dunbartonshire. (**Table 5.3)** This suggests that differences in local factors as well as demographic factors are also important in AAA screening uptake.

Table 5.3: Uptake of AAA screening among eligible population by Health & Social Care Partnership in NHSGGC, 2019-2020

HSCP	Not Screened	Screened	Total	*% Screened*	SUR %	SUR % LCI	SUR % UCI
East Dunbartonshire	245	443	688	64.4	*60.1*	*54.5*	*65.7*
East Renfrewshire	178	360	538	66.9	*62.2*	*55.8*	*68.6*
Glasgow North East Sector	420	503	923	54.5	*57.7*	*52.6*	*62.7*
Glasgow North West Sector	415	595	1,010	58.9	*59.6*	*54.8*	*64.4*
Glasgow South Sector	515	663	1,178	56.3	*58.6*	*54.1*	*63.0*
Glasgow City	1,350	1,761	3,111	56.6	*58.7*	*55.9*	*61.4*
Inverclyde	254	260	514	50.6	*50.8*	*44.6*	*56.9*
Renfrewshire	350	651	1,001	65.0	*63.3*	*58.4*	*68.2*
West Dunbartonshire	159	374	533	70.2	*71.1*	*63.9*	*78.3*
Total	**2,536**	**3,849**	**6,385**	**60.3**			

Source: AAA Application, September 2020; OnoMap
SUR = Standardised Uptake Rate; UCI = Upper Confidence Intervals; LCI = Lower Confidence Intervals

5.5. Abdominal Aneurysm Screening Results

Table 5.4 shows that 46 men (1.2%) had an enlarged aorta (≥3cm). Of these, 40 men (1.0%) had an aorta measuring between 3cm to 5.49cm, requiring surveillance scans and 6 men (0.1%) had a large aneurysm measuring 5.5 cm or more, requiring surgical assessment and intervention.

Table 5.4: Abdominal Aneurysm screening results for NHSGGC, 2019-2020

	Largest Measure (cm)				
Result Type	**<3**	**3 - 5.49**	**>=5.5**	**Not Known**	**Total**
External	1	0	0	0	**1**
Negative	3,759	0	0	0	**3,759**
Non Visualisation	0	0	0	40	**40**
Positive	0	40	6	0	**46**
Technical Fail	0	0	0	3	**3**
Total	**3,760**	**6**	**40**	**43**	**3,849**

Source: AAA Application, September 2020

5.6. AAA Mortality and Incident Audit

The Public Health Screening Unit leads a programme of audit of AAA screening. A multi-disciplinary group reviews all AAA related mortality and incidents in relation to the screening programme. This is an addition to the already established system of reviewing the cases of patients who have died from a ruptured aorta at regular Morbidity and Mortality meetings.

The Mortality and Incident Audit was established in autumn 2018 and all relevant cases since the programme began in 2013 were reviewed following national guidance. The Audit group will continue to review AAA mortality annually following publication (August) National Records for Scotland Mortality data.

5.7. AAA Key Performance Indicators

The AAA programme KPIs cover information on: invitation and attendance at screening, the quality of screening, and vascular referrals. NHSGGC met all desirable /essential threshold for seven of the 10 KPIs for the year ending March 2020. **(Appendix 5.2)**

5.8. Quality Improvement

Healthcare Improvement Scotland's 2017 external quality assurance review of the AAA programme in Scotland[3] made a number of recommendations. In 2018 NHSGGC put plans in place to implement and monitor these, which are reviewed at each AAA steering group meeting. Key areas progressed are: robust governance and monitoring arrangements, job plans to include protected time to support the programme, patient experience is included, clinics risk assessed for lone working, mortality and incident audit, regular consideration of screening pathway data, and outcome data from vascular treatment is discussed by local governance groups.

5.9. Challenges and Future Priorities

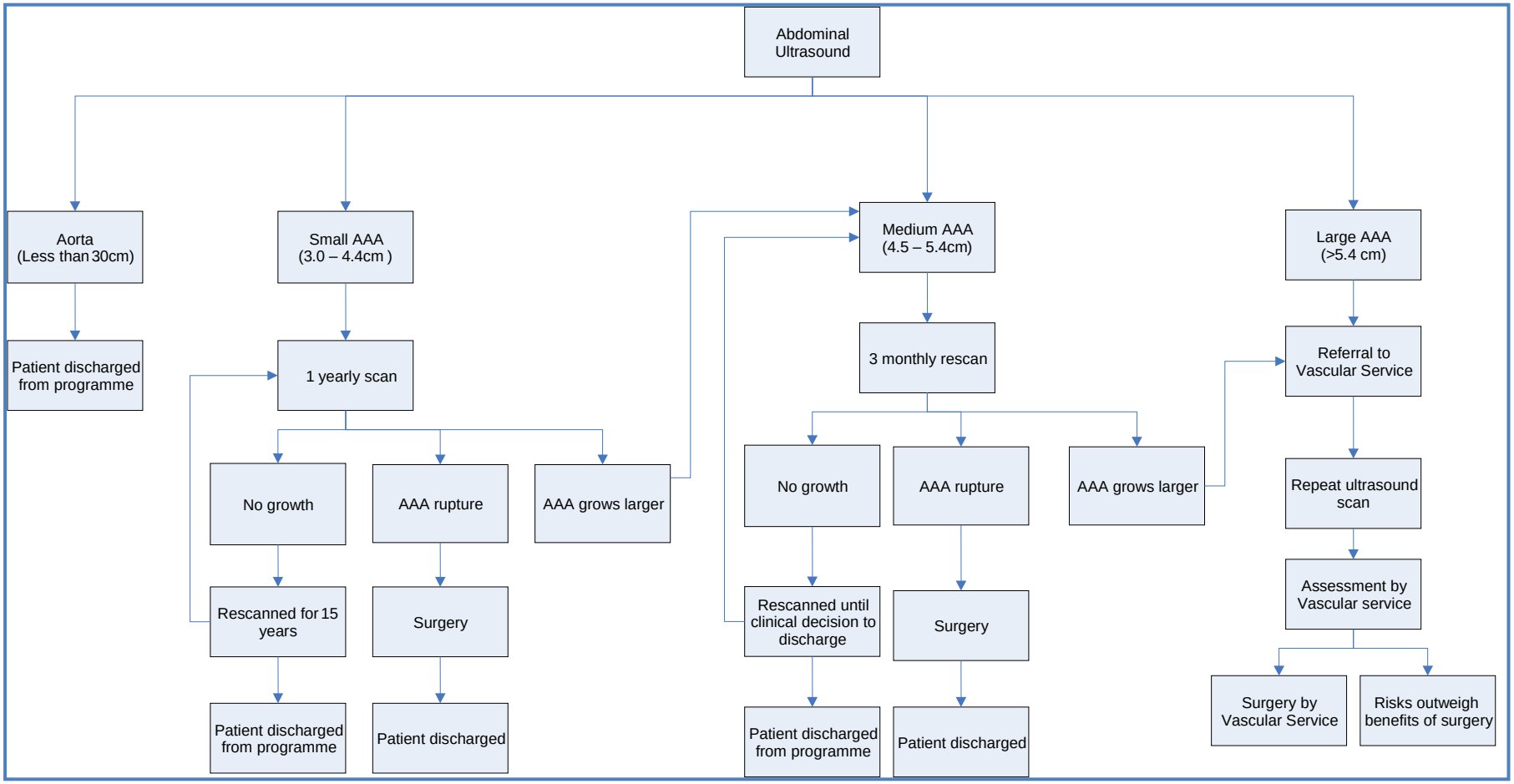
To maintain the screening staffing level and screening locations to ensure stability in the delivery of AAA Screening Programme.

- To continue to monitor vascular waiting times.
- To undertake patient experience with men under surveillance for AAA.

The ongoing review and implementation of the NHSGGC Adult Screening Inequalities Action Plan to enable a more coordinated approach to reducing inequalities in uptake through targeted intervention plans.

[3] http://www.healthcareimprovementscotland.org/our_work/cardiovascular_disease/screening_for_aaa/aaa_screening_review.aspx (Accessed 26th October 2018)

Appendix 5.1: Positive Abdominal Aortic Aneurysm Screening Pathway



Appendix 5.2: Abdominal Aortic Aneurysm Key Performance Indicators, NHS Greater Glasgow & Clyde (2015–2020)

KPI	Description	Essential Threshold	Desirable Threshold	Year ending 31st March 2015	Year ending 31st March 2016	Year ending 31st March 2017	Year ending 31st March 2018	Year ending 31st March 2019	Year ending 31st March 2020*
Invitation and attendance									
1.1	Percentage of eligible population who are sent an initial offer to screening before age 66	≥ 90%	100%	69.0%	99.9%	100.0%	99.9%	100.0%	99.9%
1.2	Percentage of men offered screening who are tested before age 66 and 3 months	≥ 70%	≥ 85%	79.7%	80.1%	80.5%	80.1%	81.2%	80.4%
1.3	Percentage of men residing in SIMD 1 areas (most deprived) offered screening who are tested before age 66 and 3 months;	≥ 70%	≥ 85%	72.8%	72.7%	73.1%	73.6%	75.4%	75%
1.4a	Percentage of annual surveillance appointments due where men are	≥ 90%	100%	93.3%	93.0%	94.0%	92.5%	95.3%	95.3%

	tested within 6 weeks of due date								
1.4b	Percentage of quarterly surveillance appointments due where men are tested within 4 weeks of due date	≥ 90%	100%	96.7%	98.6%	92.1%	87.4%	91.7%	96.5%
Quality of screening									
2.1a	Percentage of screening encounters where aorta could not be visualised	< 3%	< 1%	1.6%	2.4%	2.8%	3.3%	2.5%	2.2%
2.1b	Percentage of men screened where aorta could not be visualised	< 3%	< 1%	1.4%	2.1%	2.3%	2.6%	2.1%	1.9%
2.2	Percentage of screened images that failed the quality assurance audit and required immediate recall	< 4%	< 1%	0.4%	1.4%	1.0%	1.1%	0.9%	0.6%
Referral, clinical intervention and outcomes									
3.1	Percentage of men with AAA≥5.5cm seen by vascular specialist within two weeks of screening	≥ 75%	≥ 95%	81.8%	100.0%	100.0%	91.7%	100.0%	92.2%
3.2	Percentage of men with AAA≥5.5cm deemed appropriate for intervention/	≥ 60%	≥ 80%	77.8%	53.8%	62.5%	57.1%	60.0%	75%

	operated on by vascular specialist within eight weeks of screening								

*2018-19 KPI data awaiting validation
Source: ISD May 2019

Appendix 5.3

Assessment of Risk to Abdominal Aortic Aneurysm (AAA) Screening Programme should screening programme be dialled down /temporarily paused:

AAA screening is a screening programme for men aged 65 – a one off scan for most men (±98%) besides those with an AAA (<1.5%) who are put on a surveillance cycle or referred on for treatment.

Reasons why screening programme may need to be paused:
• Risk for either participants or staff picking up the virus • **Re-allocation of screening programme staff to support other essential services within Boards** • Minimising the impact on essential NHS services by cutting down on referrals • Availability of service staff to screen /operate the programme should there be outbreak • Participants may not travel/wish to attend routine screening appointments at this time
Considerations:
• A 18/24 hour notice period to cancel clinics - Invitations are issued for routine screening 3 weeks in advance of appointment dates • Communications with population /key stakeholders as to halt to service • Timing and lead in time for re-instatement of programme and action plans given delay to service
Risks:
Risks of continuing screening: • Participants picking up coronavirus - due to this screening age group (<65) they more at risk having complications from the virus compared to the under 65 age group • Screening staff picking up coronavirus • Local vascular departments not being able to take on any new referrals from the AAA screening programme. A man needing treatment might need to be in a ITU and this resource might be need by Boards for patients with coronavirus • **Not being able to clean the screening equipment sufficiently between episodes and thus the potential to be exposed to the coronavirus** • Resultant increased anxiety of men diagnosed with an aneurysm that don't get appropriate follow up care timeously. • Risk of cancelation of clinics being cancelled on GP/independent premises – as GP practices/independent venues may not agree to screening clinics going ahead • Inefficient usage of resources – there could be a spike in DNAs (as men invited to screening might deem it a greater risk attending than not) and that would mean clinical staff not being used to the full capacity • Limited staffing available to operate screening service (already a known shortfall of key clinical staff e.g. sonography) Risks of pausing screening: • Possible delay to diagnosis of an AAA

- Possible rupture of an AAA for not having AAA identified in the next 3 months. [There is ±15 large AAAs identified a year (±4 in a 3-month period) out of a screening population of ±26000 and the risk is for one of these to rupture. The likelihood of this happening is statistically very small. In contrast, this is set against the risk of an individual picking up the coronavirus by attending a screening clinic and increased risk of community infection thereafter as well as endangering the individual.]
- Reputation of the screening programme(s)/health service
- Not meeting the programmes KPIs

Recommendation:

Pause all screening as soon as possible and agree that the treatment pathway for men with large AAAs are decided by the local vascular departments.

This would involve cancelling all the scheduled clinics and stop the issuing of any new invitations.

This can be done within 18/24 hours of a decision to pause screening. Given that there is an 8 week treatment time target for men with large aneurysm we recommend that a decision is made as early next week as possible for the AAA programme.

This assessment and recommendation agreed in consultation with the AAA Programme Board and key stakeholders from the AAA screening programme including the Clinical Lead Mr Douglas Orr

Appendix 5.4

Members of Abdominal Aortic Aneurysm Screening Steering Group (At March 2019)

Dr Emilia Crighton	Deputy Director of Public Health (Chair)
Mrs Karen Bell	Clinical Services Manager, Surgery & Anaesthetics
Ms Lisa Buck	Public Health Programme Manager
Mr Paul Burton	Information Manager
Mrs Lin Calderwood	HI&T Service Delivery Manager
Mrs Mairi Devine	Lead Sonographer
Miss Mary Fingland	Glasgow LMC
Mrs Irene Fyfe	Health Records Services Manager
Mrs Antonella Grimon	AAA Data Administrator
Mrs Elaine Hagen	Screening Programme Support Officer, Screening
Dr Oliver Harding	Consultant in Public Health Medicine, NHS Forth Valley
Ms Heather Jarvie	Public Health Programme Manager
Dr Ram Kasthuri	Consultant Interventional Radiologist
Mr Calum McGillivray	Programme Support Officer, Screening Department
Ms Heather McLeod	Sonographer, NHS Forth Valley
Mrs Elizabeth Rennie	Programme Manager, Screening Department
Mrs Lynn Ross	General Manager, Diagnostics
Mr Wesley Stuart	Lead Clinician

Chapter 6 – Bowel Screening Programme

Summary

Colorectal (Bowel) Cancer was the third most common cancer in Scotland for both men and women in 2018. Ninety four percent of bowel cancers detected are among people aged over 50 years of age.

The aim of bowel screening is to detect bowel cancer at an early stage where treatment is more effective. In some cases, pre-cancerous polyps can be removed and cancer prevented. The programme invites all men and women between the ages of 50–74.

In 2018, 816 people residing in the NHSGGC area were diagnosed with bowel cancer. This gives an age-standardised incidence rate of 40.1 per 100,000 of the population for men, higher than the Scotland rate of 38.0 per 100,000. For women the age-standardised incidence rate is 29.4 per 100,000 of the population, higher than the Scotland rate of 29.1 per 100,000. In the same year, an age-standardised mortality rate of 15.7 per 100,000 population for men and 10.5 per 100,000 population for women was recorded.

Between 2018 and 2020, 382,260 NHSGGC residents were invited for bowel screening. Over half (56.4%) of those invited returned the screening test, of these 6,198 tested positive (3.4%). Of those individuals who had a positive result, 6,299 (91%) accepted a nurse pre-assessment and over three quarters (76.9%) had a colonoscopy. Subsequently, 253 cancers and 2,220 adenomas were detected.

Women were more likely to return a bowel screening test than men, 60.7% vs. 56% respectively. Uptake was lowest among those aged 50-54 years, at 51.6% and increased to 65.3% between 70 and 74 years, a difference of 13.7%. Uptake of bowel screening programme increased with decreasing levels of deprivation. It was lowest in people living in the most deprived Board areas (49.5%) and highest in the least deprived areas (68.7%). Ethnic groups also have lower uptake than White British.

Overall, 3.1% (6,916 of 223,043) of completed screening test were reported positive, meriting further investigation. Men have a higher positivity than women (3.7% vs. 2.5%, respectively); older people have higher positivity than younger people (4.3% aged 70-74 vs. 2.4% aged 50-54); and those living in our most deprived communities have higher positivity than the least deprived (4.2% vs. 2.2%, respectively).

Following the implementation of FIT in November 2017, there has been a 6.3% increase in uptake of bowel screening in NHSGGC.

Impact of COVID pandemic on Bowel Screening Programme

The Scottish Government announced a temporary pause to screening programmes including the Bowel Screening Programme on the 30 March 2020. There were a number of factors behind this decision, primarily to reduce the risk of participants becoming infected with the virus, to facilitate social distancing and to minimise the impact on essential NHS services as they respond to COVID-19. No further screening kits were issued to participants and those already returned to the laboratory were processed and letters issued. The full assessment is in **Appendix 6.2**

Chapter Contents

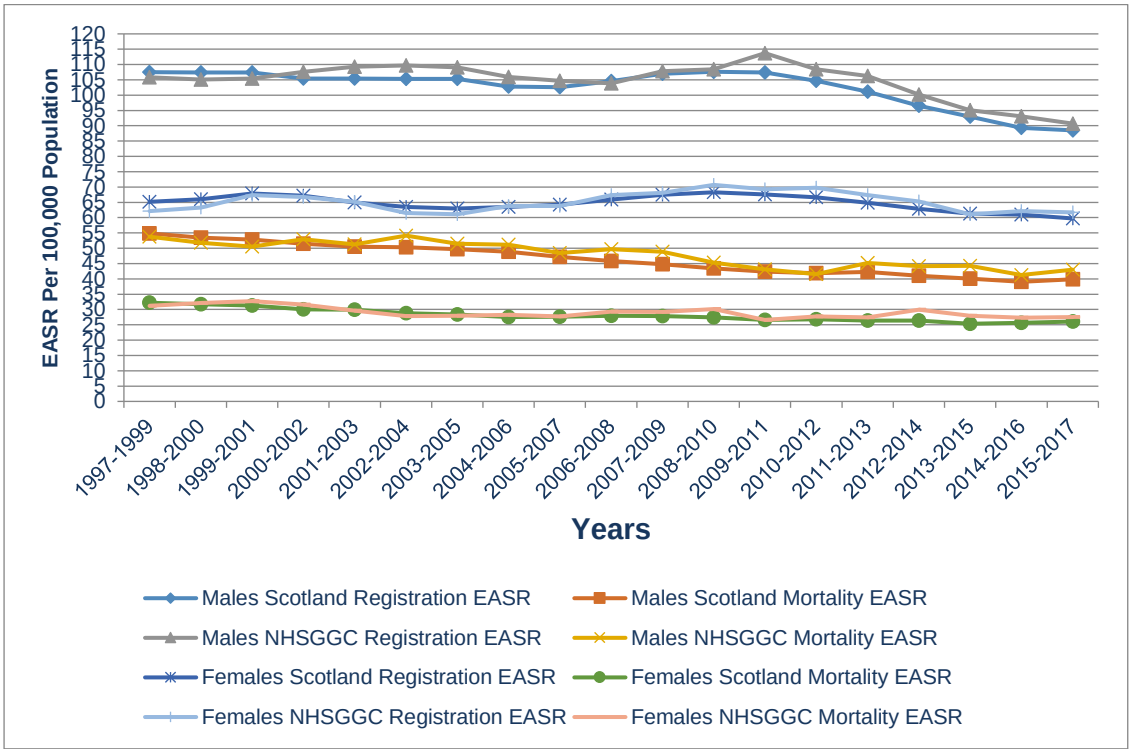
6.1. Background

Colorectal (Bowel) Cancer is the third most common cancer in Scotland for both men and women accounting for 12% of all cancers [4]. There were 3,511 people diagnosed with colorectal cancer in Scotland in 2018/19. This is an increase on previous years (3,319 diagnosed in 2017/18 and 3,312 in 2016/17). Ninety four percent of bowel cancers detected are among people aged over 50 years of age[5].

In 2018, 816 people residing in the NHSGGC area were diagnosed with bowel cancer. This gives an age-standardised incidence rate of 40.1 per 100,000 of the population for men, higher than the Scotland rate of 38.0 per 100,000. For women the age-standardised incidence rate is 29.4 per 100,000 of the population, higher than the Scotland rate of 29.1 per 100,000. In the same year, an age-standardised mortality rate of 15.7 per 100,000 population for men and 10.5 per 100,000 population for women was recorded.

Standardised incidence and mortality rates over rolling 3 year periods for bowel cancer for NHSGGC and Scotland are illustrated in **Figure 6.1**.

Figure 6.1: Colorectal Cancer Registration & Mortality 1997-2017 (Rolling 3 Years) European Age Standardised Rate (EASR) Per 100,000 Population



Source: Registration Source: ISD March 2019, Mortality Source: ISD September 2018

[4] https://beta.isdscotland.org/media/4312/2020-04-28-cancer-incidence-report.pdf (accessed Nov 2020)

[5] https://www.isdscotland.org/Health-Topics/Cancer/Publications/2019-10-29/2019-10-29-Cancer-Mortality-Report.pdf? (Accessed November 2020)

In the time period between 2007 and 2017, the age-standardised incidence rate of bowel cancer in Scotland decreased in both men and women (17.3% and 11.5% respectively) and mortality rates of bowel cancer in Scotland decreased in both men and women (11.0% and 6.4% respectively).

Recent decreases in incidence might reflect the removal of pre-malignant polyps at colonoscopies resulting from the Bowel Screening Programme.

The main preventable risk factors for bowel cancer are consumption of red and processed meats, overweight, alcohol consumption and smoking[6].

6.2. Aim of the Screening Programme

The Scottish Bowel Screening Programme was fully implemented across Scotland in 2009.

The purpose of bowel screening is to detect colorectal cancers at the earliest possible time so that treatment may be offered promptly. It is believed that very early detection of colorectal cancers in this way can result in more effective treatment which may be more likely to reduce deaths from colorectal cancer. In addition, the removal of precancerous lesions could lead to a reduction in the incidence of colorectal cancer.

The National Bowel Screening Programme performance and quality is monitored via defined Key Performance Indicators (KPI's)[7] and National Bowel Screening Standards[8]. **(Appendix 6.1)**

6.3. Eligible Population

The programme invites all men and women between the ages of 50–74 years of age registered with a General Practice. Other eligible individuals who are not registered with a General Practice such as prisoners, armed forces, homeless and individuals in long-stay institutions are also able to participate following NHS Greater Glasgow and Clyde local agreements. All eligible individuals will be routinely recalled every two years. Individuals may request screening above the age of 74.

6.4. The Screening Test and Pathway

In November 2017 the quantitative Faecal Immunochemical Test (FIT) was introduced throughout Scotland. This test is recommended as the first choice for population-wide colorectal cancer screening by the European Guidelines for Quality Assurance in Colorectal Cancer Screening[9].

[6] https://www.isdscotland.org/Health-Topics/Cancer/Publications/2019-04-30/Cancer_in_Scotland_summary_m.pdf (Accessed November 2019)
[7] https://beta.isdscotland.org/find-publications-and-data/conditions-and-diseases/cancer/scottish-bowel-screening-programme-statistics/(accessed Nov 2020)
[8] http://www.healthcareimprovementscotland.org/our_work/cancer_care_improvement/programme_resources/bowel_screening_standards.aspx (Accessed November 2019)
[9] https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4482205/ (accessed November 2019)

Previous to this date, the Guaiac Faecal Occult Blood test (gFOBt) testing kit was used. The FIT is easier to do, requiring only one sample (rather than the three for gFOBt), and this gives it higher user acceptability. FIT is more accurate at detecting cancers and also better at determining patients who are unlikely to have cancer.

Nationally the uptake of bowel screening has increased from 56.2% to 64.1%, for comparable 18-month periods before and after the introduction of FIT. Prior to this new screening test, national uptake had never previously reached the standard of 60%.

Inequality in uptake has reduced with the introduction of the new test, although there remain substantial differences between demographic groups. Specifically, uptake using FIT remains lower in men (61.8%) than in women (66.4%), but the gap using FIT (4.6 percentage points) is smaller than it was using FOBT (6.3 percentage points).

Similarly, uptake using FIT remains lower among people from the most deprived areas (51.8%) compared to people from the least deprived areas (72.9%). However, the increase in uptake after the introduction of FIT was greatest among people from more deprived areas. As a result, the difference between the most and least deprived has reduced from 23.1 percentage points to 21.2 percentage points.

The percentage of people testing positive was higher using FIT, with those referred for further investigation increasing from 2.2% using FOBT to 3.0% using FIT. As a result of increases in both uptake and positivity, the total number of people testing positive and therefore being referred for further investigation increased by 70% from 15,911 individuals using FOBT to 26,970 individuals using FIT. Consequently, the number of people diagnosed with cancer increased by 34% from 795 individuals using FOBT to 1,061 individuals using FIT.

https://beta.isdscotland.org/find-publications-and-data/conditions-and-diseases/cancer/scottish-bowel-screening-programme-statistics/

The National Bowel Screening Centre in Dundee issues invitation letters and screening kits to all eligible residents of NHSGGC to carry out the screening test at home. The kits are then posted by return to the National Laboratory for processing.

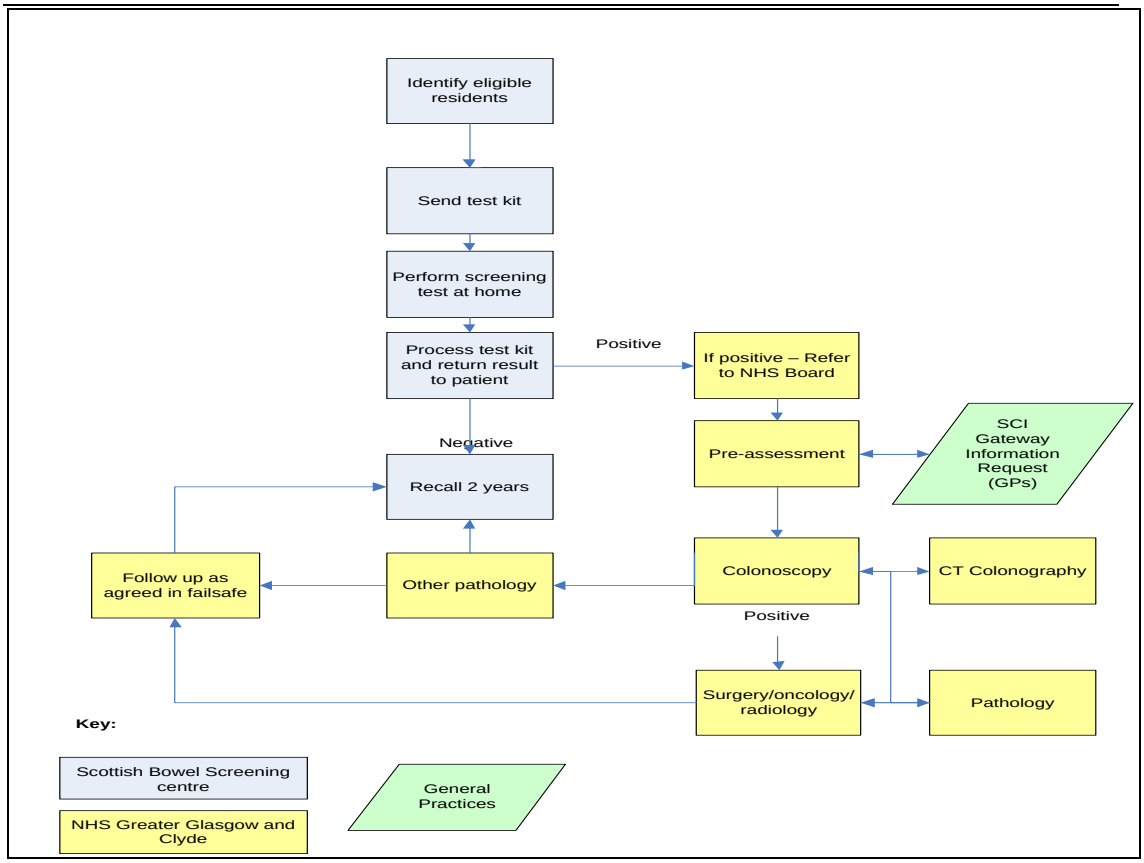
After analysis, the National Centre reports the results to patient, GP Practice and Health Board. The patient is informed by letter, an electronic notification is sent to the patient's general practitioner and results of all positive tests are sent to the Health Board via an IT system.

Patients with positive screening results are invited to contact NHS Greater Glasgow and Clyde administrative staff to arrange a telephone assessment and be offered a colonoscopy. Patients who are unable to undergo colonoscopy will be offered a CT colonography as an alternative where appropriate. If required, patients are then referred for further diagnostic investigations and treatment. Some patients may not be offered a colonoscopy, common reasons being an inability to tolerate any form of bowel prep, a recent change to health, a previous failed colonoscopy, or unsuitability due to physical incapability.

Anyone who has a positive result will automatically be invited again in 2 years' time, unless a permanent exclusion is placed on their record. **Figure 6.2** provides an overview of the bowel screening pathway.

If a patient refuses or does not turn up for colonoscopy, a letter is sent to the patient and their GP, asking them to get in touch within 6 months if they change their minds. Otherwise they will be removed from the waiting list. The patient will be invited to take part in bowel screening in two years' time.

Figure 6.2: Bowel Screening Pathway



6.5. Programme Performance and Delivery

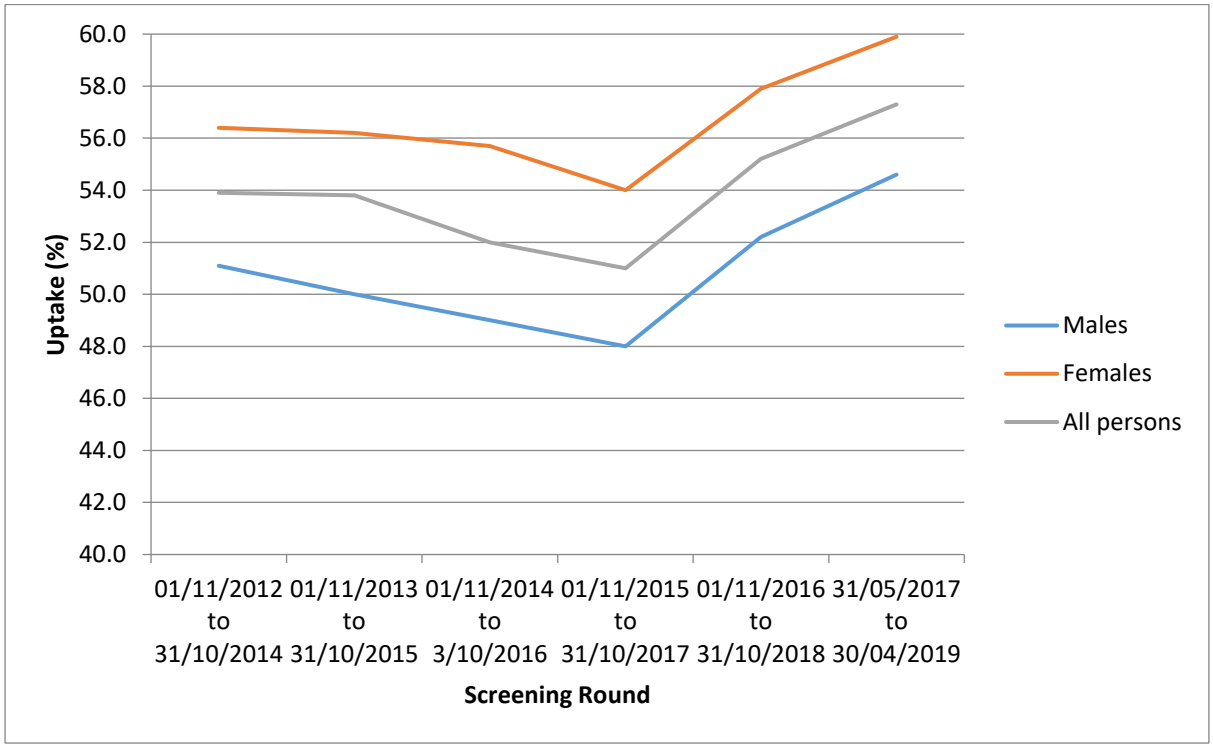
The bowel screening programme KPIs cover information on uptake of screening (completed kits), results of screening, quality of colonoscopy, and cancer diagnosis and staging. The KPIs are reported for a two year

(screening) period. **Appendix 6.1** summarises NHSGGC activity performance against KPIs for the time period 31 May 2017 to 30 April 2019.

NHSGGC does not meet the screening uptake KPI of 60%; the proportion of people with a positive screening result is higher than in the rest of Scotland, resulting in higher proportional demand for colonoscopies; the waiting times for colonoscopy are longer than in the rest of Scotland and the quality of endoscopy (evidenced by completion rate and adenoma detection rate) is higher than the rest of Scotland.

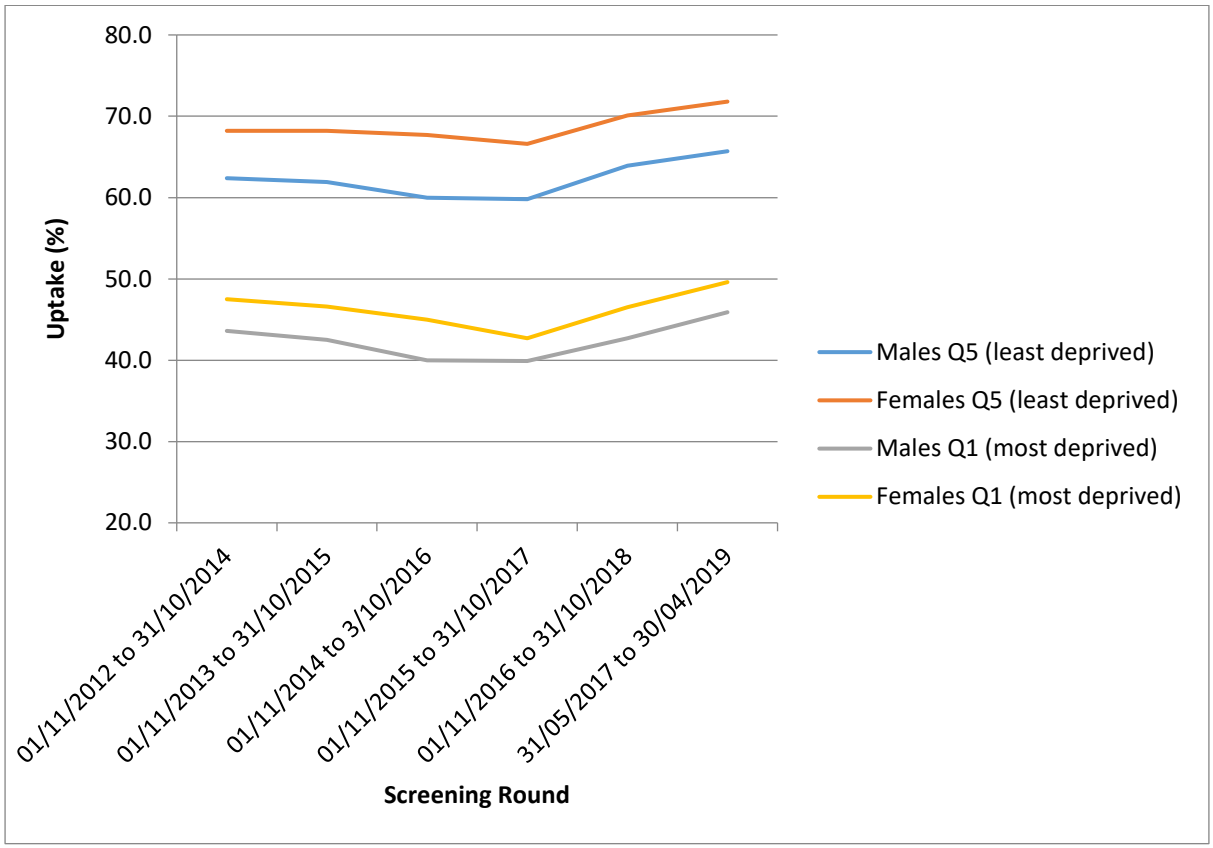
Following the implementation of FIT in November 2017, there has been a 6.1% increase in uptake of bowel screening in NHSGGC until 30th April 2019 compared with previous screening cycle. (**Figure 6.3**) This increase in uptake is evident for both sexes (**Figure 6.3**) and across all deprivation quintiles (**Figure 6.4**).

Figure 6.3: Uptake of Bowel Screening in Scotland and NHSGGC 2012-2018 by sex



Source:https://beta.isdscotland.org/find-publications-and-data/conditions-and-diseases/cancer/scottish-bowel-screening-programme-statistics/6-august-2019/

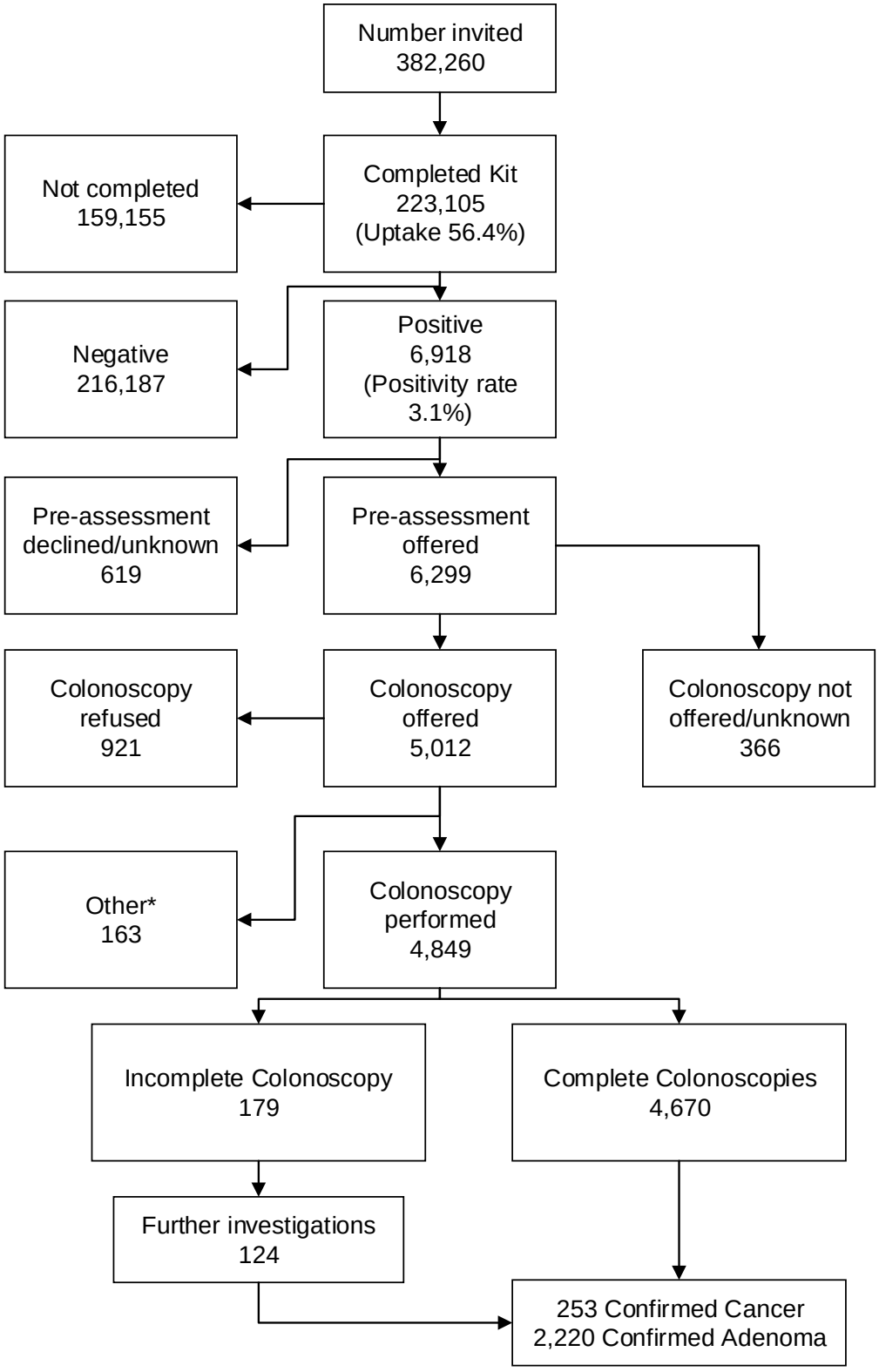
Figure 6.4: Uptake of Bowel Screening 2012-2019 by Deprivation (most and least deprived)



Source:https://beta.isdscotland.org/find-publications-and-data/conditions-and-diseases/cancer/scottish-bowel-screening-programme-statistics/6-august-2019/

Figure 6.5 summarises bowel screening activity between April 2018 and March 2020 by local analysis. During this time period, 382,260 NHSGGC residents were invited for bowel screening. Over half (56.4%) of those invited returned the screening test, of which 6,918 tested positive (3.4%). Of those individuals who had a positive result, 6,299 (91%) accepted a nurse pre-assessment and over three quarters (76.9%) had a colonoscopy. Subsequently, 253 cancers and 2,220 adenomas were detected.

Figure 6.5: NHSGGC Eligible Residents Bowel Screening Activity 1 April 2018 to 31 March 2020



Source: NHS Greater Glasgow and Clyde Bowel Screening IT System, Pathology, Cancer Audit (Extracted: November 2020)
* Clinical decision, DNA, deceased, no reason given

Analysis was undertaken to explore variations in uptake by sex, age, deprivation and ethnicity in Health and Social Care Partnership (HSCP) area.

Women were more likely to return a bowel screening test than men (60.7% vs. 56% respectively). **(Table 6.1)**

Table 6.1: Uptake of bowel screening by sex in NHSGGC, 2018-2020

Sex	Not Screened	Screened	Total	*% Screened*
Female	75,875	117,206	193,081	*60.7*
Male	83,280	105,899	189,179	*56.0*
Total	**159,155**	**223,105**	**382,260**	***58.4***

Source: Bowel Screening IT system (November 2020)

There was progressively greater uptake of bowel screening with increasing age **(Table 6.2).** Uptake was lowest among those aged 50-54 years, at 51.6% and increased to 65.3% between 70 and 74 years, a difference of 13.7%

Table 6.2 Uptake of bowel screening by age in NHGGC, 2018-2020

Age Group	Not Screened	Screened	Total	*% Screened*
50-54	52,738	56,265	109,003	*51.6*
(50-52)	17,835	19,386	37,221	*52.1*
55-59	33,127	40,207	73,334	*54.8*
60-64	35,025	53,359	88,384	*60.4*
65-69	18,513	36,150	54,663	*66.1*
70-74	19,752	37,124	56,876	*65.3*
Total	**159,155**	**223,105**	**382,260**	***58.4***

Source: Bowel Screening IT system (November 2020)

There was a consistent pattern that uptake of bowel screening programme increased with decreasing levels of deprivation **(Table 6.3).** It was lowest in people living in the most deprived Board areas (49.5%) and highest in the least deprived areas (68.7%). As previously noted in **Figure 6.4**, uptake has increased across all deprivation quintiles compared with previous screening rounds.

Table 6.3: Uptake of Bowel screening by SIMD in NHS Greater Glasgow and Clyde, 1 April 2018 to 31 March 2020

SIMD Quintile 2016	Not Screened	Screened	Total	*% Screened*
1 (Most Deprived)	67,025	65,615	132,640	*49.5*
2	27,555	35,854	63,409	*56.5*
3	20,171	30,573	50,744	*60.2*
4	19,197	35,843	55,040	*65.1*
5 (Least Deprived)	25,207	55,220	80,427	*68.7*
Total	**159,155**	**223,105**	**382,260**	***58.4***

Source: Bowel Screening IT system (November 2020)

Uptake of screening is lower than the target 60% in all ethnic groups in NHSGGC, but it is poorest in the non-white population **(Table 6.4).** However uptake has improved across all ethnic groups compared with previous screening rounds following implementation of FIT.

Table 6.4: Uptake of Bowel screening by ethnicity in NHS Greater Glasgow and Clyde, 1 April 2018 to 31 March 2020

2001 Census Ethnic Group	Not Screened	Screened	Total	*% Screened*
White - British	128,038	190,466	318,504	*59.8*
White - Irish	15,128	20,536	35,664	*57.6*
White – Any Other Background	5,017	4,351	9,368	*46.4*
Asian or Asian British – Indian	1,677	1,308	2,985	*43.8*
Asian or Asian British – Pakistani	4,007	2,387	6,394	*37.3*
Asian or Asian British – Bangladeshi	200	136	336	*40.5*
Asian or Asian British – Any other Asian	94	75	169	*44.4*
Black of Black British	6	5	11	*45.5*
Black or Black British – African	608	449	1,057	*42.5*
Other Ethnic Groups - Chinese	1,195	1,294	2,489	*52.0*
Other Ethnic Groups – Any Other Ethnic Group	2,358	1,612	3,970	*40.6*
Unclassified	827	486	1,313	*37.0*
Total	**159,155**	**223,105**	**382,260**	***58.4***

Source: Bowel Screening IT system (November 2020); OnoMap

Variations in bowel screening uptake across HSCPs persist **(Table 6.5).** They range from 52.8% in Glasgow City North East Sector to 67.8% in East Dunbartonshire HSCP. Only four HSCPs meet the minimum target of 60%. However, when the known effects of age, sex, deprivation and ethnicity are taken into account by standardisation, the differences in uptake across HSPCs are much smaller (SUR% ranging from 55.9% to 60.5%). This tells us that most of the differences in uptake across HSCP's are explained by their differences in population demographics rather than local practice. Following the implementation of FIT, all HSCPs have shown an increase in uptake during 2017-2019 screening round.

Table 6.5: Indirectly Standardised Uptake of Bowel screening by HSCP in NHS Greater Glasgow and Clyde, 2018-2020

HSCP	Not Screened	Screened	Total	*% Screened*	*SUR %*	*SUR % LCI*	*SUR % UCI*
East Dunbartonshire	12,890	27,117	40,007	*67.8*	*60.5*	*59.8*	*61.2*
East Renfrewshire	11,026	21,463	32,489	*66.1*	*59.0*	*58.2*	*59.8*
Glasgow North East Sector	26,533	29,646	56,179	*52.8*	*57.5*	*56.9*	*58.2*
Glasgow North West Sector	26,892	31,776	58,668	*54.2*	*55.9*	*55.3*	*56.5*
Glasgow South Sector	32,769	37,545	70,314	*53.4*	*56.6*	*56.1*	*57.2*
(Glasgow City)	86,194	98,967	185,161	*53.4*	*56.7*	*56.3*	*57.0*
Inverclyde	11,609	17,785	29,394	*60.5*	*60.3*	*59.4*	*61.2*
Renfrewshire	24,007	38,449	62,456	*61.6*	*59.4*	*58.8*	*60.0*
West Dunbartonshire	13,429	19,324	32,753	*59.0*	*60.1*	*59.2*	*60.9*
Total	**159,155**	**223,105**	**382,260**	***58.4***			

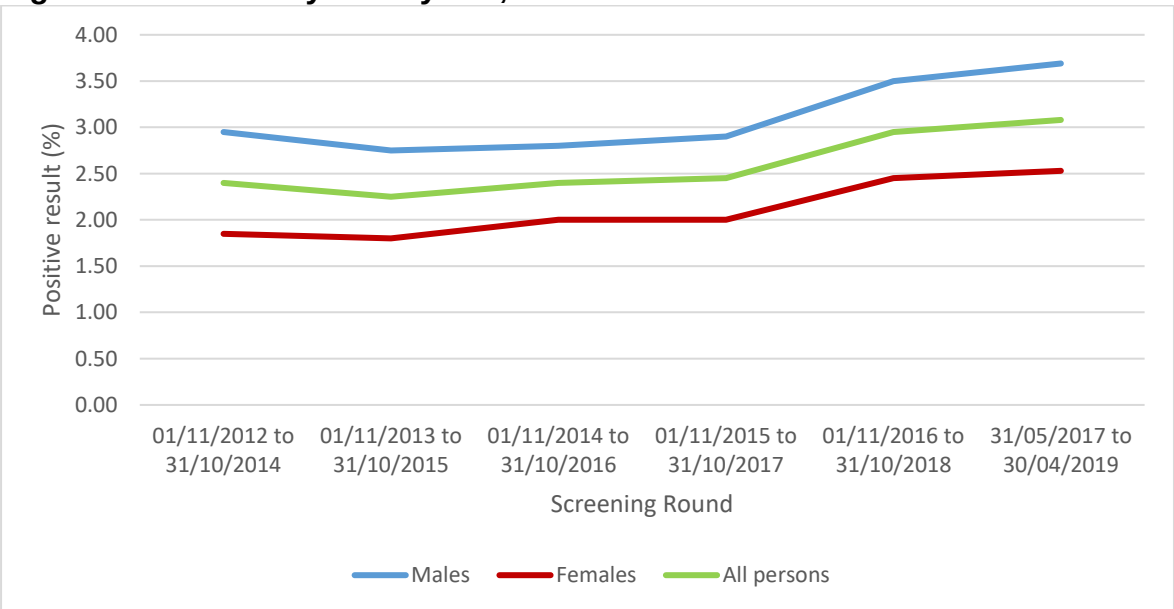
Source: Bowel Screening IT system (November 2020)

SUR = Standardised Uptake Rate; UCI = Upper Confidence Intervals; LCI = Lower Confidence Intervals

6.6. Screening Test Positivity

The increased sensitivity of the new FIT test compared with previous FOBt, has consequently led to an increase in the percentage of people with a positive test result **(Figure 6.6).**

Figure 6.6: Positivity rate by sex, 2012-2019



Source:https://beta.isdscotland.org/find-publications-and-data/conditions-and-diseases/cancer/scottish-bowel-screening-programme-statistics/6-august-2019/

Overall, 3.1% (6,916 of 223,043) of completed screening test were reported positive, meriting further investigation. Women have a higher positivity than men (3.7% vs. 2.5%, respectively); older people have higher positivity than younger people (4.3% aged 70-74 vs. 2.4% aged 50-54); and those living in our most deprived communities have higher positivity than the least deprived (4.2% vs. 2.2%, respectively) **(Tables 6.6 and 6.7).**

Table 6.6: Uptake for Bowel screening and positivity rate by age and sex for NHS Greater Glasgow and Clyde, 1 April 2018 to 31 March 2020

	% Screened			% Positive		
Age Group	**Male**	**Female**	**Total**	**Male**	**Female**	**Total**
50-54	55.2	48.2	51.6	2.1	2.7	2.4
55-59	57.5	52.1	54.8	2.3	3.1	2.7
60-64	62.5	58.2	60.4	2.5	3.8	3.1
65-69	67.4	64.8	66.1	2.6	4.4	3.5
70-74	65.4	65.2	65.3	3.4	5.3	4.3
Total	60.7	56.0	58.4	2.5	3.7	3.1

Source: Bowel Screening IT system (November 2020

Table 6.7: Bowel screening positivity rate by SIMD for NHS Greater Glasgow and Clyde, 1 April 2018 to 31 March 2020

SIMD Quintile 2016	Negative	Positive	Total	*% Screened*
1 (Most Deprived)	62,875	2,725	65,600	*4.2*
2	34,698	1,146	35,844	*3.2*
3	29,684	880	30,564	*2.9*
4	34,894	941	35,835	*2.6*
5 (Least Deprived)	53,976	1,224	55,200	*2.2*
Total	**216,127**	**6,916**	**223,043**	***3.1***

Source: Bowel Screening IT system (November 2020)

6.7. Adenoma and Polyp Detection

Of the 6,916 people who had a positive screening test, 4,875 people underwent a colonoscopy. Of these, 2,881 people (59.1%) had a polyp detected, 2,218 people (45.5%) had a confirmed adenoma detected and 253 (8.7%) people had a confirmed colorectal cancer diagnosis **(Table 6.8).**

Table 6.8: Adenoma and polyp detection rate by age and gender in NHSGGC, 2017-2019 (M=Male; F=Female)

	Patients having investigations* performed			% Polyps Detected			% Adenomas Detected			% Cancer Detected		
Age Group	M	F	Total	M	F	Total	M	F	Total	M	F	Total
50-54	504	440	943	298	169	467	226	127	353	9	11	20
55-59	443	342	785	278	156	434	209	115	324	20	7	27
60-64	692	504	1,196	473	249	722	376	183	559	38	28	66
65-69	550	336	888	388	179	567	317	128	445	39	30	69
70-74	612	450	1,062	445	246	691	350	187	537	47	24	71
Total	**2,801**	**2,072**	**4,873**	**1,882**	**999**	**2,881**	**1,478**	**740**	**2,218**	**153**	**100**	**253**

Source: Bowel Screening IT system (November 2020)

Table 6.9 shows the proportion of polyps identified at colonoscopy and the adenoma pathology diagnosis. 67.2% of men and 48.2% of women who underwent colonoscopies had polyps detected. Adenomas were diagnosed in 52.8% of men and 35.7% of women, and 5.5% of men and 4.8% of women had a confirmed cancer diagnosis.

Whilst more people from areas of greatest deprivation have had investigations performed, the detection rate of polyps, adenomas and cancers is roughly similar across the SIMD quintiles with higher polyp and adenoma detection rates among males.

Table 6.9: Polyp, Adenoma and Cancer detection rate by SIMD and gender in NHSGGC, 2018-2020 (M=Male; F=Female)

	Patients having investigations* performed			% Polyps Detected			% Adenomas Detected			% Cancer Detected		
SIMD Quintile 2016	**M**	**F**	**Total**	**M**	**F**	**Total**	**M**	**F**	**Total**	**M**	**F**	**Total**
1 (Most Deprived	1102	780	1882	67.2	50.1	60.1	54.0	36.4	46.7	3.9	4.6	4.2
2	444	368	812	68.5	43.2	57.0	53.8	32.3	44.1	8.1	3.8	6.2
3	347	268	615	67.4	54.5	61.8	53.0	38.1	46.5	6.1	4.5	5.4
4	375	302	677	68.5	47.4	59.1	51.7	35.4	44.5	5.9	4.3	5.2
5 (Least Deprived	533	354	887	65.1	45.2	57.2	49.9	36.2	44.4	5.8	7.1	6.3
Total	2801	2072	4873	67.2	48.2	59.1	52.8	35.7	45.5	5.5	4.8	5.2

Source: Bowel Screening IT system (November 2020) * Colonoscopy or other investigation

Data presented in **Table 6.10** shows the Dukes staging of the 253 people who had a confirmed colorectal cancer diagnosis.

Table 6.10: Dukes stage of colorectal cancel for NHSGGC, 2019

DUKES Staging	Number	%
A	87	34.4
B	41	16.2
C1	60	23.7
C2	4	1.6
D	10	4.0
Unknown	51	20.2
Total	**253**	

Source: Local Cancer Audit, November 2020

6.8. Quality Improvement in Colonoscopy

The Public Health Screening Unit leads a programme of bowel screening audit. It has been focused on the quality of colonoscopy services. A multi-disciplinary group reviews the performance of all individuals who carry out colonoscopy as part of screening. Three main measures are recorded: adenoma detection rate; completion rate; and complication rate. It is expected that all bowel screening Colonoscopists will undertake a minimum of 200 unselected colonoscopies per year and that they will have a minimum completion rate of 90% and a minimum adenoma detection rate of 35% in bowel screening colonoscopies. Any complications identified are flagged to sectoral clinical management teams for discussion at local Morbidity and Mortality meetings and it is expected that outcomes will be shared across the health board. Post colonoscopy cancer rates are now being audited.

6.9. Challenges and Future Priorities

An increase in uptake of bowel screening and increase in positivity following the implementation of FIT, has increased colonoscopy waiting times during 2019/2020. A significant amount of work was undertaken to increase screening colonoscopy capacity, reducing waiting times now less than 21 days at the time of this report. Waiting times continue to be closely monitored. Undertake review and options appraisal of current NHSGGC Bowel Screening Application to streamline programme administration and integration with existing clinical systems where appropriate.

To continue to work in partnership with CRUK and Bowel Cancer UK to support GP practices and communities to support eligible patients to participate in bowel screening programme and facilitate opportunities to share learning from successful initiatives. Continue to progress actions identified within NHSGGC Inequalities Plan for Adult Screening programmes to enable a more coordinated approach to reducing inequalities in uptake through targeted activities.

Appendix 6.1

Key Performance Indicators: November 2019 data submission
Invitations between 31 May 2017 to 30 April 2019

KPI	Key Performance: Indicator Description	Target	Scotland %	NHSGCC %
Screening Uptake				
1.	Overall uptake of screening - percentage of people with a final outright screening test result, out of those invited.	60%	61.6%	57.3%
2.	Overall uptake of screening by deprivation category *- percentage of people with a final outright screening test result for which a valid postcode is available, *by Scottish Index of Multiple Deprivation (SIMD) quintile 1 (Q1 most deprived) to quintile 5 (Q5 least deprived)	60%	Q1 48.9% Q2 56.7% Q3 62.9% Q4 67.3% Q5 70.8%	Q1 47.8% Q2 54.9% Q3 59.6% Q4 64.8% Q5 68.8%
3.	Percentage of people with a positive test result, out of those with a final outright screening test result.	N/A	2.76%	3.0%
Referral, clinical intervention and outcomes				
4.	Percentage of people where the time between the screening test referral date 0 to 4 weeks >4 to 8 weeks > 8 weeks	N/A	 30.7% 31.8% 37.5%	 13.5% 23.1% 63.4%
5.	Percentage of people with a positive screening test result going on to have a colonoscopy performed.	N/A	76.2%	73.4%
6.	Percentage of people having a completed colonoscopy, out of those who had a colonoscopy performed.	90%	95.3%	97.8%
7.	Percentage of people requiring admission for complications arising directly from the colonoscopy, out of those who had a colonoscopy performed.	N/A	0.39%	0.36%
8.	Percentage of people with colorectal cancer, out of those with a final outright screening test result.	N/A	0.117%	0.108%
9-14.	Percentage of people with colorectal cancer staged as 9. Dukes' A. 10. Dukes' B.	N/A	 37.5% 22.1% 26.1%	 42.9% 21.7% 25.0%

	11*. Dukes' C 13. Dukes' D. 14. Dukes' Not known. ** indicator 11 includes indicator 12 (previously Dukes' C2)*		7.2% 7.1%	6.7% 3.8%
15 – 16.	Percentage of people with colorectal cancer 15. Where the stage has not yet been supplied. 16. That has a recorded stage.	N/A	0% 100%	0% 100%
17.	Percentage of people with polyp cancer out of those with a final outright screening test result.	N/A	0.023%	0.006%
18.	Percentage of people with polyp cancer, out of those with colorectal cancer.	N/A	19.7%	5.8%
19.	Percentage of people with adenoma as the most serious diagnosis, out of those with a final outright screening test result.	N/A	0.925%	0.949%
20.	Percentage of people with high risk adenoma as the most serious diagnosis, out of those with a final outright screening test result.	N/A	0.138%	0.134%
21.	Positive Predictive Value of current screening test for colorectal cancer.	N/A	5.5%	4.8%
22.	Positive Predictive Value of current screening test for adenoma as the most serious diagnosis.	N/A	43.7%	42.0%
23.	Positive Predictive Value of current screening test for high risk adenoma as the most serious diagnosis.	N/A	6.5%	5.9%
24.	Positive Predictive Value of current screening test for high risk adenoma as the most serious diagnosis or colorectal cancer.	N/A	12.0%	10.7%
25.	Positive Predictive Value of current screening test for adenoma as the most serious diagnosis or colorectal cancer.	N/A	49.2%	46.7%
26 - 28	Percentage of people with a colorectal cancer that is a malignant neoplasm of the: 26. colon (ICD-10 C18) 27. rectosigmoid junction (ICD-10 C19) 28. rectum (ICD-10 C20)	N/A	66.9% 3.0% 30.1%	67.5% -% 32.5%

Source: https://beta.isdscotland.org/find-publications-and-data/conditions-and-diseases/cancer/scottish-bowel-screening-programme-statistics/ (Accessed November 2020)

Appendix 6.2

Scottish Bowel Screening Programme

The Scottish Bowel Screening Programme issues bowel screening kits to all eligible men and women aged 50 to 74 years of age across Scotland and for those over 75 years who self-refer into the programme. The kits are completed at home and returned to a central laboratory for testing.

Reasons why screening programme may need to be paused:

- Royal Mail decision made to stop circulation of mail (incoming/outgoing)
- Re-allocation of screening programme staff (26) to support other essential services within Boards e.g. laboratory staff assist in higher priority laboratories.
- Availability of service staff to operate the programme should there be outbreak, may lead to significant delays to testing therefore more feasible to pause programme to allow restart/retest.
- Colonoscopy services may not be fully available should Boards reduce/pause elective procedures

Considerations:

- Kits issued – timing /return timescales
  - For kits already in participant's homes, the participant has the expiry time of the actual tube to respond. This is an approximately 2 years.
- Processing of returned kits how long sample last?
  - The samples are stable for <14 days at room temperature and 120 days at 4^{o}C and longer than that frozen. The Bowel Screening Laboratory does not have the storage capacity to store more than a few days of samples so long-term storage i.e. more than a week is not feasible.
- Continuation of processing kits within the system.
- Onward clinical referral and care pathways agreed to minimise impact on essential services
- Additional Helpline measures to implement to update participants contacting the service.
- 3rd party suppliers of services e.g. Mailing / IT system impacted resulting in reduced support for programme.
- Required communications with screening population /Board Coordinators/key stakeholders as to halt to service and impact.
- Timing and lead in time for re-instatement of programme and action plans given delay to service. Start-up procedures/impact to be considered after short term or long term pause to programme.
- Change to participants recall date on BOSS (IT System).

Risks:

Risks for continuing

- Risk of diagnosed patients not being able to access colonoscopy services (which already have workload pressures) if elective procedures are paused by the host NHS Boards (this is already happening in some Boards) (High Risk)
- Increased anxiety in diagnosed patients if significant increased delay to colonoscopy services.

- Possible contamination of kits. Highest risk of infection are those that have faecal material inside the envelope and / or on the outside of the tube. These are segregated from the routine workload.
- Aerosol risk as sample tubes are pierced on the top of the tube. To minimise the risk of air borne particles, tubes are being carefully tipped into bags after testing and tubes are being left for approx 10 minutes after coming off analysers to allow settling and minimise risk. Low risk

Risks for pausing

- Delay to 24month screening cycle. Risk that participant will miss their last screening round
- Potential delay to diagnosis of bowel cancer or significant bowel disease.
- Financial risk
- Reputational risk

Recommendation:

- Proceed to pause the Screening Programme immediately in order to reduce pressure on colonoscopy services and prevention of raised anxiety in diagnosed patients.
- This will allow laboratory staff to be redeployed by NHS Tayside on critical COVID 19 work as appropriate whilst completing the current workload in the system.

Appendix 6.3

Members of Bowel Screening Steering Group (At March 2019)

Dr Emilia Crighton	Deputy Director of Public Health (Chair)
Mrs Fiona Aitken	Endoscopy W/L Coordinator
Dr Stuart Ballantyne	Lead Clinician for Radiology
Ms Lisa Buck	Public Health Programme Manager
Mr Paul Burton	Information Manager
Mrs Lin Calderwood	H&IT Service Delivery Manager
Mrs Lisa Cohen	CRUK, Facilitator Manager: West of Scotland
Mrs Ailsa Connelly	Lead Nurse, New Victoria Hospital
Dr Fraser Duthie	Lead Clinician for Pathology
Mr Patrick Finn	Consultant Surgeon, RAH
Ms Ailsa Forsyth	Lead Nurse, GGH
Miss Irene Fyfe	Health Records Manager
Mrs Alyson Goodwin	Lead Nurse, Theatres and Endoscopy
Dr Rachel Green	Chief of Medicine, Diagnostics
Dr Rob Henderson	CPHM, NHS Highland
Ms Julie Huntly	Lead Nurse, Clyde
Ms Heather Jarvie	Public Health Programme Manager
Dr Graeme Marshall	Clinical Director, Glasgow HSCP, NE Sector
Ms Natalie McMillan	Clinical Services Manager, North Sector
Dr David Mansouri	Clinical Lecturer, Glasgow University
Mrs Susan McFadyen	Interim General Manager
Mrs Tricia McKenna	Colorectal Nurse Endoscopist
Ms Gill Mitan	Administration Manager, North Sector
Dr Jude Morris	Consultant Physician and Gastroenterologist
Ms Eileen Murray	Staff Nurse, New VIC
Mr David Pickering	Clinical Service Manager, Gummer
Mrs Rebecca Reid	Clinical Services Manager, RAH
Mrs Elizabeth Rennie	Programme Manager, Screening Dept
Dr Andrew Renwick	Consultant, RAH
Mrs Ann Traquair-Smith	Clinical Services Manager, QEUH
Dr Jack Winter	Lead Clinician for Endoscopy (North)

Chapter 7 - Breast Screening Programme

Summary

Breast cancer is the most common cancer in women in Scotland, accounting for 28.8% of all new cancers diagnosed in women. In 2017, 897 new breast cancers were registered among women residing in NHSGGC. In the same year, 193 women with a diagnosis of breast cancer died. Between 2007 and 2017, age-standardised incidence rate of breast cancer in Scotland increased by 1.4%, however age-standardised mortality rate decreased by 13.4%.

During 2015-2016, the Scottish Breast Screening Programme implemented a new Scottish Breast Screening System (SBSS) IT system. Information Service Division publishes annual programme statistics which are presented in this report.

The purpose of breast screening by mammography is to detect breast cancers early. It is believed that very early detection of breast cancers in this way can result in more effective treatment, which may reduce deaths from breast cancer. Women aged 50-70 years are invited for a routine screen once every three years. Women aged over 70 years are screened on patient request.

The number of women eligible for breast screening in the 3 year screening round from 1st April 2015 to 31st March 2018 was 151,176, of which 99,399 attended (65.8%). This is lower than the national uptake rate of 71.2% and breast screening acceptable and achievable standards of 70% and 80% respectively.

The West of Scotland Breast Screening Service (WoSBSS) has optimised their appointing system, increasing the number of booked clients. Appointing figures have risen from approximately 8,000 screening slots per month to 10,000.

The Breast Screening Community Liaison Officer continues to work in partnership with Public Health, Primary Care, HSCP Health Improvement and 3rd Sector organisations to support participation in screening, including staff training, health road shows and community talks.

The Scottish Government announced a fundamental review of the Scottish Breast Screening Programme during 2019/2020. The recommendations from the review will be available in 2021.

COVID Pandemic and impact on Breast Screening

In response to COVID-19, risks assessments were drawn up for each of the national screening programmes outlining points of consideration and the risks associated with both continuing screening and ceasing screening.

The Scottish Government announced on the 30th March 2020 a temporary pause to a number of screening programmes including the Breast Screening Programme. The assessment is in **Appendix 7.1**

Chapter Contents

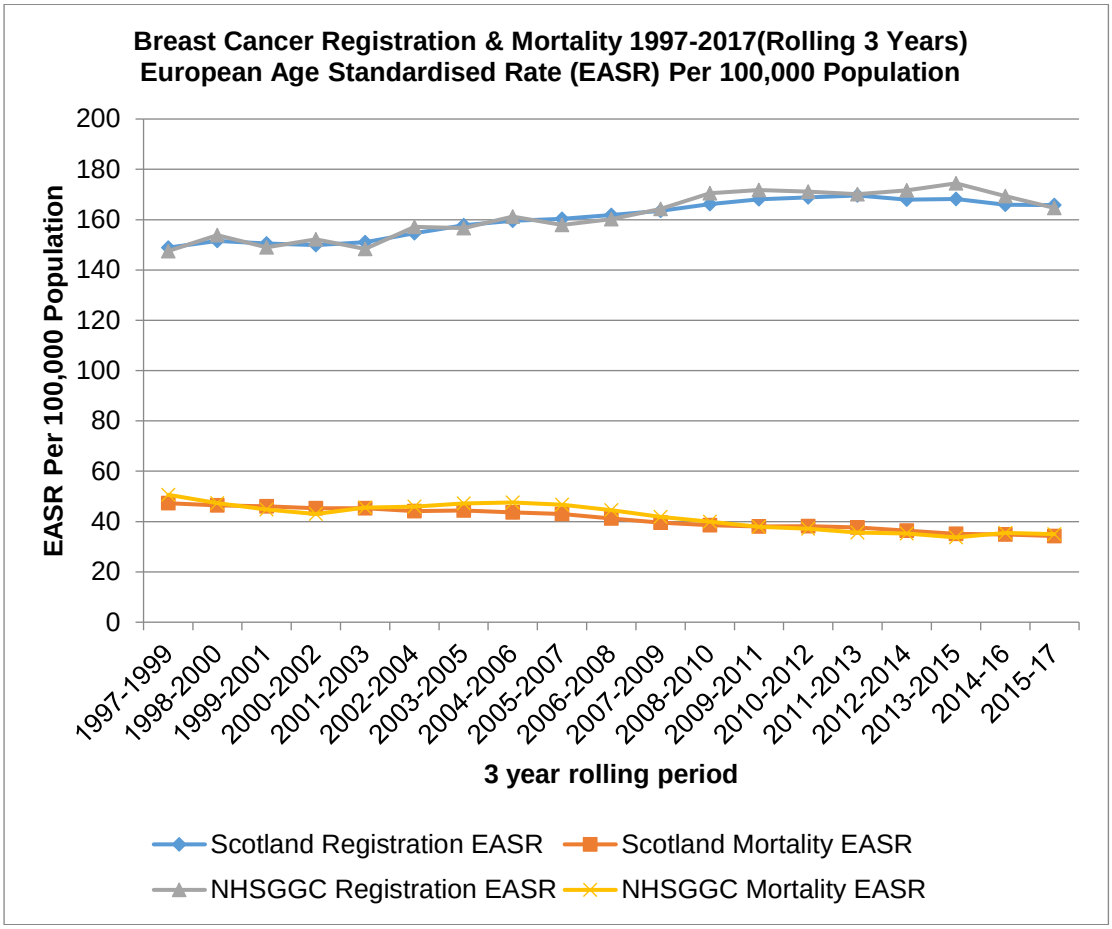
7.1. Background

Breast cancer is the most common cancer in women in Scotland, accounting for 28.8% of all new cancers diagnosed in women[10].

In 2017, the most recent year for which completed data are available, 897 new breast cancers were registered among women residing in NHSGGC. This gives an age-standardised incidence rate of 153.3 per 100,000 per population, as compared with the Scotland rate of 164.6 per 100,000. In the same year, 193 women with a diagnosis of breast cancer died in NHSGGC, giving a standardised mortality rate of 32.6 per 100,000 population, comparable with the Scotland rate of 32.5 per 100,000[11].

Standardised incidence and mortality rates over rolling 3 year periods for breast cancer for NHSGGC and Scotland are illustrated in **Figure 7.1**.

Figure 7.1: Breast Cancer Registration Incidence and Mortality 1997-2017 (Rolling 3 Years) European Age Standardised Rate (EASR) Per 100,000 Population



Source: Registration Source: ISD April 2019, Mortality Source: ISD October 2019

[10] https://www.isdscotland.org/Health-Topics/Cancer/Publications/2019-04-30/2019-04-30-Cancer-Incidence-Report.pdf (accessed November 2020)
[11] https://www.isdscotland.org/Health-Topics/Cancer/Publications/2019-10-29/2019-10-29-Cancer-Mortality-Report.pdf (accessed November 2020)

In the time period between 2007 and 2017, the age-standardised incidence rate of breast cancer in women in Scotland increased by 1.4%, however age-standardised mortality rate decreased by 13.4%. The increase in incidence of breast cancer is partly due to increased detection by the Scottish Breast Screening Programme and to changes in the prevalence of known risk factors, such as mother's age at birth of first child, smaller number of children, post-menopausal obesity and alcohol consumption.

7.2. Aim of Screening Programme and Eligible Population

The Scottish Breast Screening Programme was introduced in February 1987 following the publication of the Forrest Report (1986). Breast screening was implemented in 1988 in North Glasgow, 1991 in South Glasgow and in October 1990 in Argyll & Clyde.

The purpose of breast screening by mammography is to detect breast cancers early. It is believed that very early detection of breast cancers in this way can result in more effective treatment, which may reduce deaths from breast cancer.

Women aged 50 until age 70 years +364 days who are registered with a GP, and those women not registered with a GP but about whom the screening programme is made aware, e.g. women in long-stay institutions, are eligible for a routine screen once every three years. Women aged over 70 years are screened on patient request. Some women are excluded from routine invitation, for example those who have had bilateral mastectomy or who have signed a disclaimer form to remove themselves from the Scottish Breast Screening Programme call-recall system.

The Scottish Government announced a fundamental review of the Scottish Breast Screening Programme during 2019/2020. The review will be carried out by National Services Division and will involve a comprehensive appraisal of the current programme, current pressures and future options for delivery. It will also look at advances in technology and ways to increase participation and address health inequalities.

7.3. Programme Monitoring

The Scottish Breast Screening Programme (SBSP) delivery and quality is monitored against key programme statistics[12] and (new) National Breast Screening Service Standards[13]. The latest report for Scotland is presented below in **Table 7.1**; this data was not available by Health Board level

[12] https://www.isdscotland.org/Health-Topics/Cancer/Publications/2019-10-08/2019-10-08-Breast-Screening-Report.pdf? (accessed November 2020)

[13] http://www.healthcareimprovementscotland.org/our_work/standards_and_guidelines/stnds/breast_screening_standards.aspx (accessed November 2020)

Table 7.1: Scotland: Health Improvement Scotland Breast Screening Standards 2018-19. This data was not available by NHS Board.

Standard	Appointment type[3]	Age group	Acceptable Standard	Achievable Standard	Results 2018/19
Attendance rate (percentage of women invited)	All routine appointments	50-70 years	>= 70%	>=80%	**73.4%***
Invasive cancer detection rate (per 1000 women screened)	Routine- Initial screen (Prevalent) in response to first invitation	50-52 years	>= 2.7	>= 3.6	**6.5***
	Routine- Subsequent screen (Incident) (previous screen within 5 years)	53-70 years	>= 3.1	>= 4.2	**7.1***
Small (<15mm) invasive cancer detection rate (per 1000 women screened)	Routine- Initial screen (Prevalent) in response to first invitation	50-52 years	>= 1.5	>= 2.0	**2.8***
	Routine- Subsequent screen (Incident) (previous screen within 5 years)	53-70 years	>= 1.7	>= 2.3	**3.7***
Non-invasive cancer detection rate (per 1000 women screened)	Routine- Initial screen (Prevalent) in response to first invitation	50-52 years	>= 0.5	-	**1.7***
	Routine- Subsequent screen (Incident) (previous screen within 5 years)	53-70 years	>= 0.6	-	**0.9***
Standardised Detection Ratio (SDR) (observed invasive cancers detected divided by the number expected given the age distribution of the population)	Routine-All initial screens (Prevalent) and Subsequent screen (Incident) (previous screen within 5 years)	50-70 years	>= 1.0	>= 1.4	**1.62***
Recalled for assessment rate (percentage of women screened)	Routine- Initial screen (Prevalent) in response to first invitation	50-52 years	<10%	<7%	**7.9%***
	Routine- Subsequent screen (Incident) (previous screen within 5 years)	53-70 years	<7%	<5%	**3.2%***
Benign biopsy rate (per 1000 women screened)	Routine- Initial screen (Prevalent) in response to first invitation	50-52 years	< 1.5	< 1.0	**1.0***
	Routine- Subsequent screen (Incident) (previous screen within 5 years)	53-70 years	< 1.0	< 0.75	**0.3***

[1] Health Improvement Scotland Breast Screening Standards 2019.

[2] Breast Screening year runs from 1st April to 31st March.

[3] Routine appointments exclude self/GP referral appointments.

* Met acceptable standard

Source: Scottish Breast Screening Programme (SBSS) Information System - KC62 returns

7.4. The Screening Test and Pathway

The screening method used consists of two mammographic views. The test is a straightforward procedure involving two images being taken of each breast using an X-ray machine (also known as a mammogram).

The WoSBSS screens NHSGGC residents in either the static facility in Nelson Mandela Place or, in the majority of cases, in one of the 7 mobile units that visit pre-established sites across the NHSGGC area to ensure ease of local access for women. Eligible women registered within a GP practice within range of Glasgow city centre will be invited to attend appointments for screening in the static facility. For the 2019/2020 screening round, the service has been active in NHSGGC areas detailed in **Table 7.2**.

Table 7.2: 2019/2020 screening locations / facility

HSCP	Mobile Unit	Static (Nelson Mandela Place)
East Dunbartonshire	N/A	Bearsden, Milngavie,
East Renfrewshire	N/A	Thornliebank, Giffnock, Clarkston
Glasgow City	Parkhead/Bridgeton, Springburn, Maryhill, Gorbals, Toryglen	Carntyne, Govanhill, Woodside, Pollokshaws, Shawlands, Townhead, Charing Cross
Inverclyde	Greenock, Port Glasgow, Gourock, Kilmacolm, Johnstone	N/A
Renfrewshire	Renfrew , Paisley	N/A
West Dunbartonshire	Dumbarton	N/A

Every woman registered with a GP receives her first invitation to attend for a mammogram at her local breast screening location sometime between her 50th and 53rd birthdays and then three yearly until age 70 +364 days when women in her Practice are screened. A woman can request a screening appointment from the age of 50. However if her GP practice is being screened in the next six months, she will be advised to attend there. The WoSBSS also contacts all long-stay institutions (care homes, prisons, and mental health hospitals) to offer screening to eligible residents.

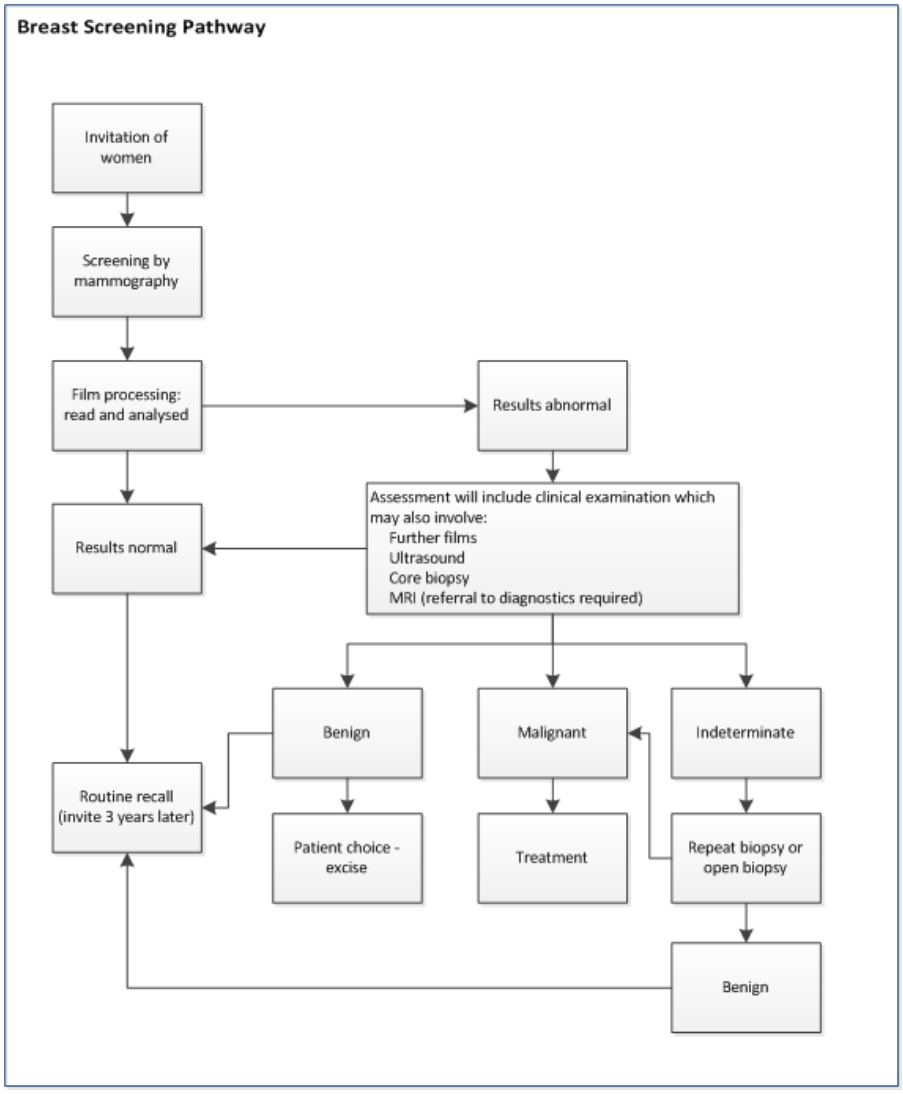
The mammograms taken during the screening visit are examined and the results sent to the woman and her GP. Women will be recalled if the mammogram was technically inadequate or will be asked to go to an assessment clinic for further tests if a potential abnormality has been

detected. Tests may include further imaging, clinical examination and possibly ultrasound and biopsy if required.

If a woman is found to have cancer, she is referred to a consultant surgeon to discuss the options available to her. These usually involve surgery. This could be either a lumpectomy to remove the lump and a small amount of surrounding tissue or a mastectomy to remove the entire breast. Surgery is likely to be followed by radiotherapy, chemotherapy, hormone therapy or a combination of these. The exact course of treatment will depend on the type of cancer found and the woman's personal preferences.

Assessment clinics are carried out in the WoSBSS situated in Glasgow. The surgical treatment is carried out by designated teams in QEUH, New Victoria Hospital, New Stobhill Hospital and Royal Alexandra Hospital. A small proportion of women with palpable tumours are referred for treatment to local breast teams. **Figure 7.2** illustrates the breast screening pathway.

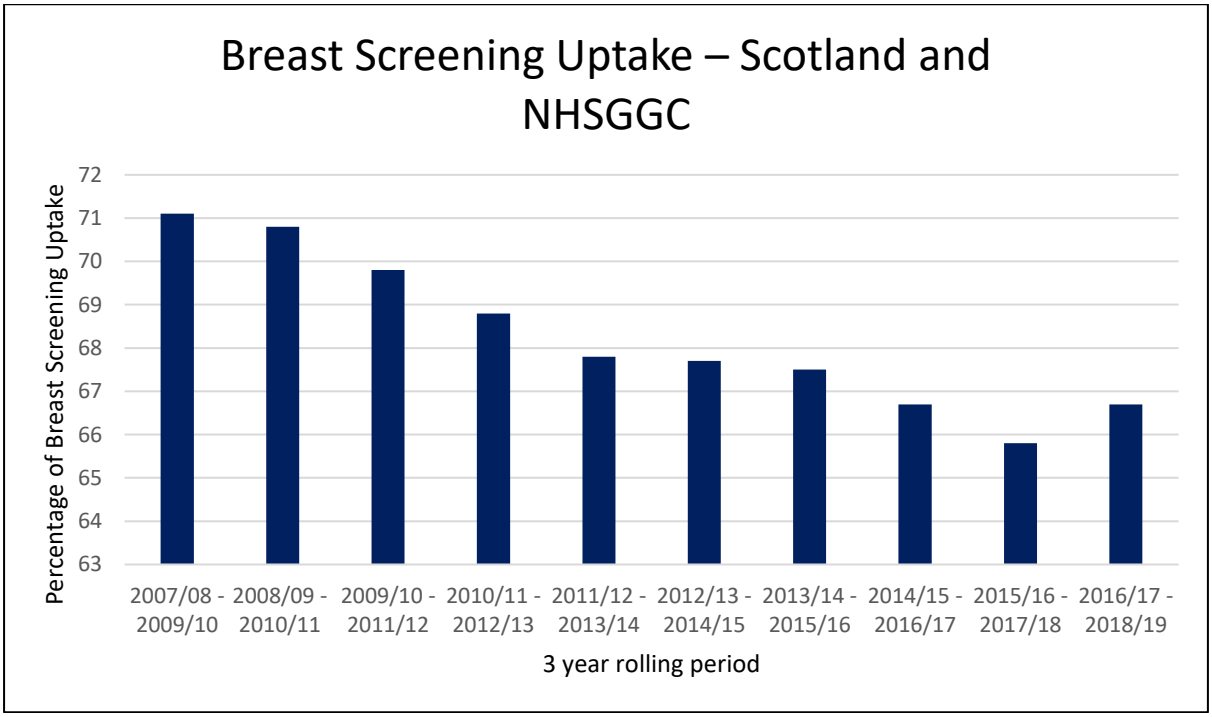
Figure 7.2: Breast screening Pathway



7.5. Delivery of Breast Screening Programme

The SBSP implemented a new Scottish Breast Screening System (SBSS) IT system in line with the change to digital mammography during 2015/2016. Information Services Division published annual programme statistics in April 2020 for the year 2018-2019, relating to breast screening uptake and outcomes[14]. Unfortunately at the time of this report, it was still not possible to run further local analysis from the SBSS system, e.g. further demographic breakdown of uptake. Uptake of breast screening has been consistently falling over the last decade **(Figure 7.3)**.

Figure 7.3: Breast screening uptake by NHS Board of Residence 1st April 2007 to 31st March 2019 (females aged 50-70 years)



Source: https://beta.isdscotland.org/find-publications-and-data/conditions-and-diseases/cancer/scottish-breast-screening-programme-statistics/(accessed Nov 2020)

The number of women aged 50-70 years residing in NHSGGC who were eligible for breast screening in March 2018 was 151,176 **(Table 7.3)**. A total of 99,399 of these women attended screening, an overall uptake rate of 65.8%, lower than the national uptake rate of 71.2% and breast screening minimum standard of 70% target of 80%. Uptake was lowest among women invited for their initial screen aged 50-52 years (63.2%) compared to women invited for subsequent screen, aged between 53-70 (83.3%).

[14] https://beta.isdscotland.org/find-publications-and-data/conditions-and-diseases/cancer/scottish-breast-screening-programme-statistics/ (accessed Nov 2020)

Table 7.3: Breast screening uptake covering screening round 2015/2016 to 2017/2018, NHSGGC & Scotland

	NHSGGC	Scotland
Prevalent uptake (Age 50-52)		
No of women screened	15,896	80,148
No of women invited	25,142	116,059
% Uptake (Age 50-52)	***63.2***	***69.1***
Incident uptake (Age 53-70)		
No of women screened	70,043	371,145
No of women invited	84,056	428,202
% Uptake (Age 53-70)	***83.3***	***86.7***
Overall uptake (Age 50-70)		
No of women screened	99,399	514,083
No of women invited	151,176	721,934
% Uptake (Age 50-70)	***65.8***	***71.2***

Source: ISD Breast Screening Programme report statistics (KC62) October 2019

The national SBSP statistics published in April 2020, in **Table 7.4** shows that women from more deprived areas are less likely to attend for breast screening, with 56.3% of women from the most deprived areas going for screening compared with 77.3% women living in the least deprived areas in NHSGGC[15].

Table 7.4: Uptake by Deprivation: Scotland and NHSGGC

	SIMD 1	SIMD 2	SIMD 3	SIMD 4	SIMD 5	All
Scotland	59.5	68.6	74.0	77.6	79.7	**72.3**
NHSGGC	56.3	65.5	69.4	74.8	77.3	**67.7**

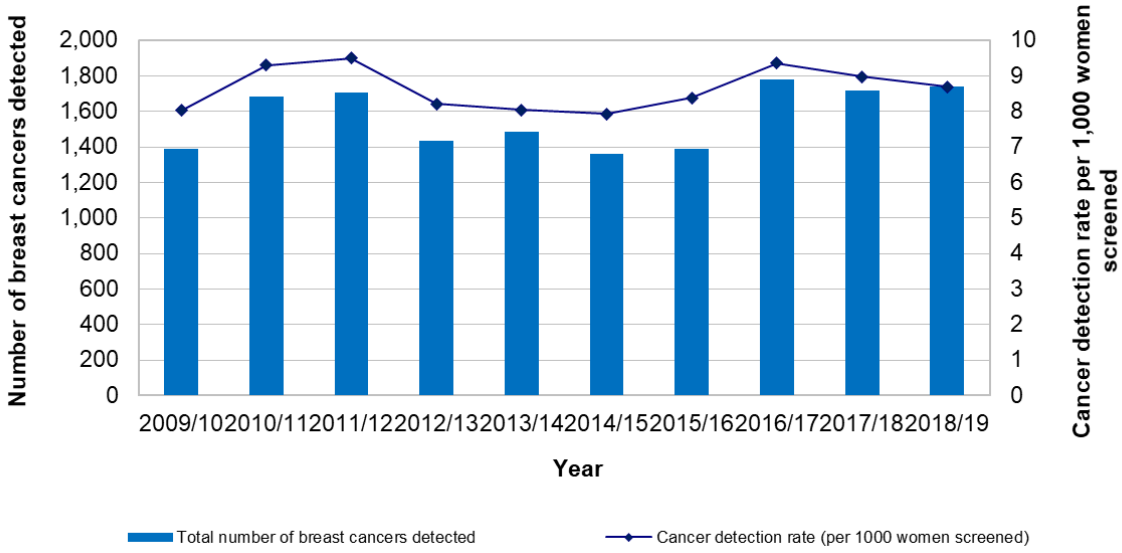
https://beta.isdscotland.org/find-publications-and-data/conditions-and-diseases/cancer/scottish-breast-screening-programme-statistics/ accessed Nov 2020

7.6. Breast Screening Outcomes

The national SBSP statistics published in April 2020 noted the number of screen-detected breast cancers in women of all ages in Scotland in 2018/2019 was 1,738, a rate of 8.7 per 1,000 women screened[16]. This represents a decrease in numbers and rates compared against the previous 2 years (2016-2017 and 2017-2018) **(Figure 7.4).**

[15] https://beta.isdscotland.org/find-publications-and-data/conditions-and-diseases/cancer/scottish-breast-screening-programme-statistics/
[16] https://beta.isdscotland.org/find-publications-and-data/conditions-and-diseases/cancer/scottish-breast-screening-programme-statistics/

Figure 7.4: Trends in the number of breast cancers detected, and cancer detection rates per 1,000 women screened: Scotland, 2009/2010 to 2018/2019 (All appointment types)



Source: https://beta.isdscotland.org/find-publications-and-data/conditions-and-diseases/cancer/scottish-breast-screening-programme-statistics/

7.7. Challenges and Future Priorities

Following difficulties faced by WoSBSS in securing accessible locations capable of accommodating the mobile units, a paper was submitted to NHSGGC Corporate Management Team in July 2019. The paper recommended support from HSCP and Acute facilities to work with WoSBSS to identify suitable locations for the mobile units, with a preference for NHS/Council locations.

Work is ongoing with support from NHSGGC Estates and Facilities Senior Management to secure locations for future screening rounds, enabling enhanced forward planning of appropriate community and GP practice engagement.

WoSBSS continue to actively monitor slippage in the system, overbooking appointments, and being sensitive to local uptake rates, the available screening appointments have now been optimised. The service now regularly has 10,000 screening slots per month where previously this figure was approximately 8,000.

The Community Liaison Officer appointed in 2004 is working in partnership with GPs, Public Health, HSCP Health Improvement colleagues and the community to improve understanding and uptake of the Screening Programme and inform development of priority actions in NHSGGC inequalities action plan. This will include actions as a matter of priority, targeting women invited for their initial screened aged 50-52 years

WoSBSS has secured approval to implement new telephony within the Service which will enable SMS and telephone reminders. This will be implemented during 2020.

Limited access to local reporting environment persists. However it is envisaged that this will be resolved to enable further demographic breakdown of NHSGGC resident population in relation to uptake and outcomes.

Practice based calling that can lead to a women missing screening invitations remains a challenge. However this will be considered in the scope of the National Review of Breast Screening during 2019/2020.

Appendix 7.1

Scottish Breast Screening Programme

Eligible Population: Women from 50 to 71st birthday are sent a letter of invitation for breast screening every 36 months for an appointment on a mobile unit or at a screening centre

Reasons why screening programme may need to be paused:

- Minimise the impact on essential NHS services
- Availability of service staff to screen women / operate the programme should there be outbreak
- Women may not travel/wish to attend routine screening appointments at this time
- Re-allocation of screening programme (approximately 130 clinical and 85 admin) staff to support other essential services within Boards, if they remain well
- Participants/staff travelling to centre and mobile units e.g. use of public transport
- Mobile unit locations: access to toilet facilities for staff not available as leisure facilities etc., closed given outbreak

Considerations:

- Invitations are issued for routine screening 3 weeks in advance of appointment dates
- Invitations for further assessment are issued 1-2 weeks from resulting for an appointment
- Continuation of reading and processing of results within the system should the service be paused. This could take approximately further 2- 3 weeks.
- Continuation/triage of assessment appointments to ensure women are appropriately managed and avoid delay to diagnosis.
- Onward clinical referral and care pathways would need agreed to minimise impact on symptomatic breast service/hospital services should Boards decide to reduce / pause elective work
- Communications with population / key stakeholders as to pause to service.
- Any technical issues for SBSS IT system. Safeguard process would identify those who have not been offered screening if system paused.
- Delays will entail need for action plans / lead in times when service fully resumes.
- Additional staff / appointments / clinics may be needed when the programme resumes.

Risks for continuing

- Onward transmission of Covid-19 to staff and otherwise well screening population by continuing to screen
- Limited staffing available to operate screening service (already staff in self isolation in addition to a known shortfall of key clinical staff e.g. radiology)
- New sites for mobile units require to be found given closure of toilet facilities on current / planned sites

Risks for pausing

- Delay to 36 month offer of invitation
- Possible delay to diagnosis of breast cancer. It is estimated that by suspending screening for a three month period, there would be a delay in diagnosing around 368 cases of breast cancer. Even if screening continued however, significant pressures on Acute Services would delay any surgical treatment for these women.
- Limited capacity to provide additional screening when programme reinstated
- Potentially IT risks in pausing and resuming SBSS processes (yet to be assessed).

Recommendation:
Immediately proceed to pause invitations and cancel all issued routine breast screening appointments within 48 hours of paused decision.

Continue to result caseload within the system and review women referred for further screening assessment with onward referral/management as appropriate within Board.

The NSD Breast Review will proceed as long as staff are available within NSD, however, a reduction in available resource may cause a pause to the review. This will be kept under consideration.

Appendix 7.2

Members of Breast Screening Steering Group (At March 2019)

Dr Emilia Crighton	Deputy Director of Public Health (Chair)
Celia Briffa-Watt	Public Health Specialist, NHS Lanarkshire
Paul Burton	Information Manager
Sandra Cairney	Associate Director of Public Health, Argyll & Bute Health & Social Care Partnership
Margo Carmichael	Health Improvement Lead for Breast Screening, NHS Lanarkshire
Dr Marzi Davies	Director, WoSBSS
Dr Rob Henderson	CPHM, NHS Highland
Dr Aileen Holliday	Clinical Effectiveness Coordinator, NHS Forth Valley
Marion Inglis	Administration Manager, WoSBSS
Ms Joan Main	Assistant General Manager, Diagnostics
Dr Graeme Marshall	Clinical Director, NE HSCP
Elaine Murray	Community Liaison Officer, WoSBSS
Lorna Nimmo	Superintendent Radiographer, WoSBSS
Dr Tasmin Sommerfield	CPHM, NHS Lanarkshire
	Manager, WoSBSS
Janice Tannock	Superintendent Radiographer/Operational

Chapter 8 - Cervical Screening

Summary

Cervical cancer was the eleventh most common cancer in females in 2017 in Scotland but also the most common cancer in women under the age of 35 years. In 2017, 61 new cervical cancers were registered among NHSGGC residents. This gives an age-standardised incidence rate of 10.5 per 100,000 population, comparable to the Scotland rate of 10.1 per 100,000. In the same year, 26 women who had a diagnosis of cervical cancer died in NHSGGC, giving a standardised mortality rate of 4.4 per 100,000 population higher than the Scotland rate of 3.7 per 100,000.

The aim of the Scottish Cervical Screening Programme (SCSP) is to reduce the number of women who develop invasive cancer and the number of women who die from it by detecting precancerous changes. Women aged 25-49 are offered screening every three years and women aged 50-64 are offered screening every five years. Women who were already enrolled in the screening programme aged less than 25 will continue to be screened every three years until they are 50.

Uptake in NHSGGC for 2019/20 was 74.5% against a target of 80%, a total of 208,455 women being adequately screened within the specified period. Uptake is poorest among women aged between 25 and 29 (49.5%), and among women from ethnic minorities (for Chinese women it was 31.3%). Uptake for women living in the least deprived areas was 66.9% compared with 59.5% in the most deprived areas however there is not a clear trend across socio-economic groups. The lower uptake rates in some HSCPs are not wholly explained by socio-economic deprivation.

Queen Elizabeth University Hospital processes all smear test specimens for NHSGGC and in 2019/2020 processed 81,505 cervical screening tests. Of all tests processed, 97.1% were of satisfactory quality i.e. there were enough cells in the sample. Of the satisfactory quality tests, 89.3% had a negative (normal) result, 8.9% had a borderline/low grade cell changes and the remaining 1.1% had high grade cell changes.

NHSGGC has carried out a multi-disciplinary review of all invasive cervical cancer cases since 2006 to audit the screening and management of every case. In 2019, none of the cases were screen detected. The majority of the cases presented to the service were incidental findings (50) and 31 were symptomatic.

A new approach to cervical screening was approved by the Scottish Government and implemented in April 2020. High risk HPV screening involves the same clinical examination (a cervical smear) but only women whose virology results are positive for specific types of Human Papilloma Virus will have cervical cytology.

In response to an NHSGGC internal audit of the Cervical Screening Programme, clear mechanisms have been established to use data to target promotional activities to vulnerable or excluded groups.

COVID Pandemic and impact on Cervical Screening

In response to COVID-19, risks assessments were drawn up for each of the national screening programmes including Cervical Screening and the implementation of HPV testing. (**Appendix 8.3** and **Appendix 8.4**)

On the 30th March 2020, The Scottish Government announced a temporary pause for Cervical Screening. There were a number of factors behind this decision, primarily to reduce the risk of participants becoming infected with the virus, to facilitate social distancing and to minimise the impact on essential NHS services as they respond to COVID-19.

For cervical screening no more prompts and reminders were sent to participants and both primary care and other clinics stopped taking samples. Results for those participants who had been screened before the pause continued to be processed. NHS Boards managed Colposcopy referrals appropriately.

HPV Primary Testing was implemented as planned on the 30th March 2020 and any samples taken after restart will be tested for HPV.

The Scottish Cervical Call Recall System (SCCRS) supports the SCSP and facilitates electronic screening test requesting and results reporting. The process of inviting the cohort for screening in the SCCRS, is initiated through the Recommended Call List (RCL) process. To pause screening in SCCRS, the IT supplier undertook the following actions:

1. Set the RCL date for all Health Boards to 32 (stops RCL from running)
2. Stop Practice Mailer RCL process from running overnight batch
3. Recall all prompts and reminders in the mailer queues, with a recall reason of Covid-19
4. Suppress transfer of prompt/reminder mailers to 3rd party print supplier
5. Ask 3rd party supplier not to print any received prompt/reminder files.

All other parts of the SCCRS workflow continued to operate as normal, so result letters and referral to colposcopy would still happen.

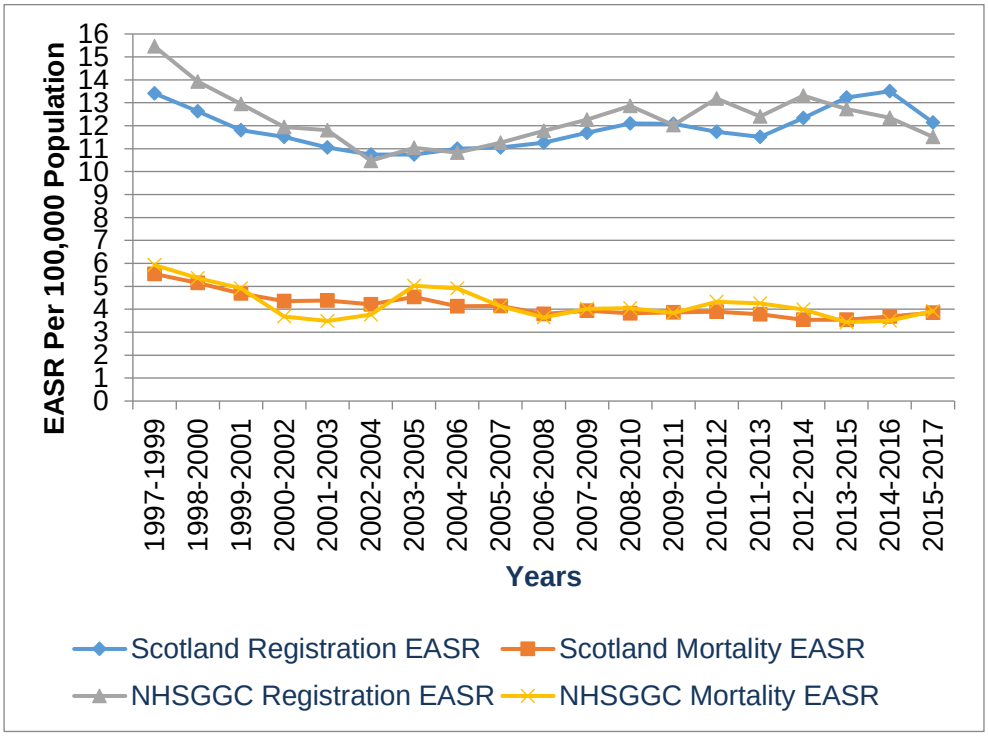
Chapter Contents

8.1. Background

Cervical cancer was the eleventh most common cancer in females in 2017 in Scotland and most common cancer in women under the age of 35 years[17]. In 2017, the most recent year for which completed data is available[18], 61 new cervical cancers (cancer of the cervix uteri) were registered among NHSGGC residents. This gives an age-standardised incidence rate of 10.5 per 100,000 population, comparable to the Scotland rate of 10.1 per 100,000. In the same year, 26 women with a diagnosis of cervical cancer died, giving a standardised mortality rate of 4.4 per 100,000 population higher than the Scotland rate of 3.7 per 100,000.

Standardised incidence and mortality rates over rolling 3 year periods for cervical cancer for NHSGGC and Scotland are illustrated in **Figure 8.1**. There has been a 3.8% increase in standardised incidence rate in the decade from 2007-2017, and a 2.0% reduction in standardised mortality rates of cervical cancer during the same time period.

Figure 8.1: Cervical Cancer Registration & Mortality 1997-2017 (Rolling 3 Years) European Age Standardised Rate (EASR) Per 100,000 Population



Source: ISD September 2018 (accessed Nov 2020)

[17] https://www.isdscotland.org/Health-Topics/Cancer/Publications/2019-04-30/2019-04-30-Cancer-Incidence-Report.pdf (accessed November 2020)
[18] https://www.isdscotland.org/Health-Topics/Cancer/Cancer-Statistics/Female-Genital-Organ/#cervix (accessed November 2020)

8.2. Risk Factors

Most cervical cancers are caused by oncogenic types of human papilloma virus (HPV), mainly types 16 and 18. While the majority of women clear the HPV virus, a minority have persistent HPV infection which can transform normal cervical cells into abnormal ones. These changes can occur over a period of 10 to 20 years through precancerous lesions to invasive cancer and death.

Other risk factors for cervical cancer include factors which increase exposure to the virus (such as having a high number of sexual partners), factors that make your body more vulnerable to infection or affect immune response (including HIV) and smoking.

8.3. Aim of Screening Programme and Eligible Population

The aim of the Scottish Cervical Screening Programme (SCSP) is to reduce the number of women who develop invasive cancer and the number of women who die from it by detecting precancerous changes. By taking a cytological smear from the cervix, followed where necessary by a diagnostic test, it is possible to identify changes in individual cells which may mean that the woman is at risk of developing invasive cancer at a later date. Prompt treatment can result in permanent removal of affected areas of the cervix and prevent the development of cancer.

Women who live in the Greater Glasgow and Clyde area and who have a cervix are invited for screening. From June 2016, a Change in Age Range and Frequency (CARAF) was made to reflect new evidence about the effectiveness of screening. The CARAF means that women aged 25-49 are offered screening every three years and women aged 50-64 are offered screening every five years. Women aged less than 25 who were already enrolled in the screening programme will continue to be screened every three years until they are 50.

8.4. Programme Monitoring

The national cervical screening programme delivery and quality is monitored against key programme statistics[19] and National Cervical Screening Standards[20].

The uptake of cervical screening is monitored using two different methods to define the eligible population:

[19] https://www.isdscotland.org/Health-Topics/Cancer/Publications/2019-09-03/2019-09-03-Cervical-Screening-Report.pdf (accessed November 2019)

[20] http://www.healthcareimprovementscotland.org/our_work/standards_and_guidelines/stnds/cervical_screening_standards.aspx (accessed November 2019)

1. National and Health Board level uptake: this method identifies all women in the Health Board area in the eligible age groups minus those who have no cervix (for example, following a total or radical hysterectomy).

2. General Medical Services (GMS) uptake: this method is used to calculate payments to GP Practices and includes several other exclusions such as repeated non-attendance (patients who have been recorded as refusing to attend review who have been invited on at least three occasions during the preceding 12 months).

8.5. The Screening Test and Pathway

A “smear test” involves collecting cells from the surface of the cervix or ‘neck of the womb’.

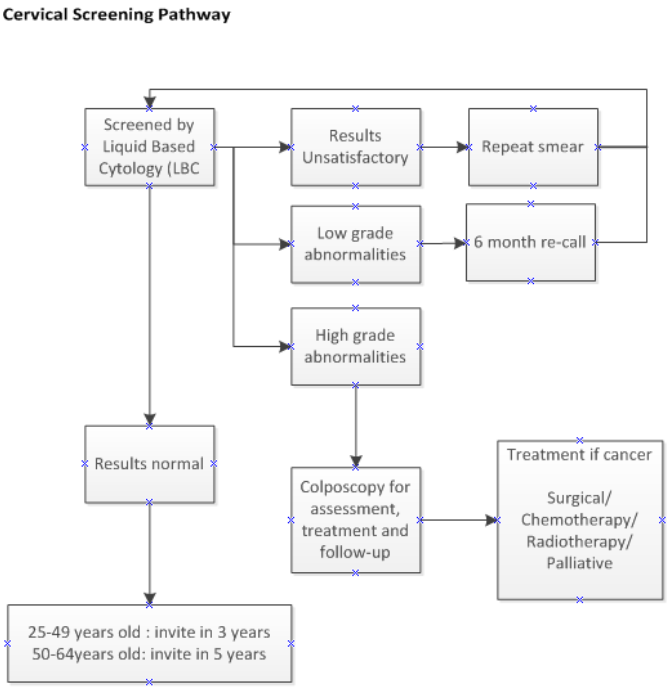
Liquid based cytology (LBC) is a way of preparing cervical samples for examination in the laboratory. The sample is collected using a special device which brushes cells from the neck of the womb. The head of the brush, where the cells are lodged, is broken off into a small plastic vial containing preservative fluid or rinsed directly into the preservative fluid.

The sample is sent to the laboratory where it is spun and treated to remove obscuring material, for example mucus or pus and a random sample of the remaining cells is taken. A thin layer of the cells is deposited onto a slide. The slide is then screened automatically and if there is evidence of any abnormality, examined under a microscope by a cytologist.

Figure 8.2 illustrates the pathway for the cervical screening programme. Following the invitation being issued, a woman will make an appointment to attend for a test.

Women can also have opportunistic smears at the time of attending medical care for another reason. Depending on the result of the test she will be recalled to attend, if eligible, in three years (normal result, aged 25-49) or five years (normal results, aged 50-64), six months (for a borderline result and low grade results); will have a repeat smear (if result not satisfactory) or will be referred to colposcopy for diagnostic tests and treatment **(Appendix 8.1).** Treatment of invasive cervical cancers follows agreed cancer treatment pathways.

Figure 8.2: Cervical screening pathway



The Scottish Cervical Call Recall System (SCCRS) provides women with a complete e-health record detailing their whole smear history which professionals involved with the screening programme access. Results are automatically available for the smear takers to view in SCCRS and patients are sent notification directly from Scottish Cervical Call Recall System. The system also produces individual, and practice performance automated reports.

The National Colposcopy Clinical Information Audit System (NCCIAS) is used by colposcopy staff for the clinical management and audit of all colposcopy referrals.

A new approach to cervical screening, High risk HPV primary screening, will be introduced in 2020. High risk HPV screening involves the same clinical examination (a cervical smear) but only women whose virology results are positive for specific types of HPV will have cervical cytology.

8.6. HPV Vaccination

Since 2008, all girls aged 11 to 13 years in their second year of secondary school are routinely offered vaccinations to protect them against the Human Papilloma Virus (HPV).

The purpose of the HPV immunisation programme is to protect girls from the two types of HPV that cause around 75% of cases of cervical cancer. The HPV vaccine does not protect against all cervical cancers, so regular cervical screening is still important.

67.2% of women within NHSGGC had a full HPV immunisation status compared to 64.4% with an incomplete record. 28.2% had no immunisation status. **Table 8.1**

Table 8.1: Update for Cervical Screening by Health Board and HPV Immunisation status: Scotland, 1 April 2019 to 31 March 2020
Percentage uptake of females who had a record of a previous screening test taken within the last 3.5 years by age

	HPV Immunisation status (Full[1])							HPV Immunisation status (Incomplete[1])						
	Age							Age						
NHS Board of Residence	23	24	25	26	27	28	23-28	23	24	25	26	27	28	23-28
Scotland	**59.2**	**61.0**	**65.9**	**71.5**	**74.2**	**75.7**	**68.7**	**49.6**	**45.6**	**54.5**	**67.3**	**68.1**	**71.7**	**65.9**
Ayrshire & Arran	59.9	60.0	67.4	73.8	75.8	76.2	**69.7**	14.3	50.0	50.0	59.7	64.7	67.3	**61.8**
Borders	63.3	60.9	67.8	70.6	73.1	70.3	**68.0**	33.3	50.0	28.6	69.2	67.9	85.4	**65.9**
Dumfries & Galloway	65.4	67.7	71.8	77.8	76.9	79.2	**74.1**	-	10.0	85.7	65.4	66.7	73.5	**65.9**
Fife	62.0	58.4	64.2	70.0	72.8	76.4	**67.4**	55.6	40.9	52.4	69.1	68.7	73.9	**65.4**
Forth Valley	62.9	61.9	68.3	71.8	77.9	74.6	**70.2**	71.4	34.8	58.8	60.3	67.0	72.1	**64.4**
Grampian	62.5	64.6	65.0	72.6	75.7	76.4	**70.1**	50.0	50.0	55.6	74.4	69.1	72.2	**68.3**
Greater Glasgow & Clyde	**54.4**	**58.9**	**64.3**	**70.3**	**72.9**	**75.0**	**67.2**	**34.6**	**36.9**	**53.8**	**62.7**	**70.3**	**70.3**	**64.4**
Highland	59.3	61.9	66.2	73.8	73.4	76.2	**69.3**	87.5	52.9	55.0	66.7	68.2	73.2	**67.2**
Lanarkshire	58.8	62.3	67.2	72.5	74.6	76.8	**69.6**	56.7	55.9	57.0	72.1	69.0	72.5	**68.6**
Lothian	58.9	59.8	65.3	69.6	73.4	75.0	**67.8**	58.8	45.5	51.3	66.9	66.6	68.4	**64.2**
Orkney	66.7	64.7	58.8	81.3	80.8	86.2	**73.4**	-	100.0	50.0	66.7	100.0	100.0	**85.7**
Shetland	69.2	62.0	71.4	84.6	85.9	69.3	**74.9**	-	-	-	66.7	42.9	100.0	**52.9**
Tayside	62.7	62.8	66.9	71.0	72.9	76.7	**69.0**	25.0	53.3	61.1	68.9	65.3	79.0	**68.4**
Western Isles	15.4	52.6	67.1	62.5	74.2	62.1	**61.1**	-	-	41.7	91.7	60.0	69.2	**62.2**

Source Public Health Scotland: Sept 2020

1. The Immunisation Status of FULL is where the individual has been Fully Immunised, i.e. had all HPV doses.
2. Incomplete is where the individual has had at least one of the Immunisations but not all of them.
3. Based on SCCRS population denominator (excluding medically ineligible women) ages 23-28.

8.7. General Medical Services (GMS) Delivery of Cervical Screening

The GMS contract introduced in 2004 included cervical screening in the additional services domain and awarded practices for providing the service under the Quality and Outcomes Framework (QOF).

QOF was disbanded in 2016/2017 and payment to practices continued based on their previous three year average achievement. There were previously two parts to the payments.

The first was QOF, which remunerated practices for having a protocol for the management of screening, carrying out the screening test and reaching a target and auditing their inadequate smears. This payment is now included in GP Practices' 'Global Sum'.

The second was ‘Additional Services’ which remunerated practices for:

- The provision of any necessary information and advice to assist women identified by the Health Board as recommended nationally for a cervical screening test in making an informed decision as to participation in the NHS Scotland Cervical Screening Programme;
- The performance of screening tests on women who have agreed to participate in the Programme;
- Arranging for women to be informed of the results of the test; and
- Ensuring the test results are followed up appropriately.

‘Additional Services’ remains part of the new contract and if GP Practices chose to “opt out” of delivering this their ‘Global Sum’ would be reduced by 0.84%.

Previously, the GMS cervical screening indicator was based on the percentage of women who had a cervical smear performed in the last 5 years. Points were awarded on a sliding scale to encourage GP practices continue to maintain high levels of uptake in cervical screening. The contract allowed GP practices to exception-report (exclude) specific patients from data collected to calculate achievement scores, therefore not penalising GP practices where exception reporting occurs.

During 2019/2020 contract year, there were 336,843 women aged 25 to 64 years residing in NHSGGC area and registered with an NHSGGC GP practice. Of these, 103,029 (30.5%) had a GMS exclusion applied, of which 13,649 (13.25%) women were recorded as having no cervix and not eligible for cervical screening. Therefore 323,194 women were eligible for cervical screening. **Table 8.2** outlines the reasons and number of eligible women with a GMS exclusion from cervical screening in the 2019-2020 contract year.

Table 8.2: Exclusions from cervical screening among eligible population for NHS Greater Glasgow and Clyde, 2019-2020

Exclusion	Frequency	*%*
Anatomically Impossible	20	*0.02*
CHI Exclusion	9,182	*8.91*
Co Morbidity	26	*0.03*
Defaulter	75,824	*73.59*
No Cervix	13,649	*13.25*
No Further Recall	266	*0.26*
Not Clinically Appropriate	561	*0.54*
Opted Out	2,940	*2.85*
Pregnant	553	*0.54*
Terminally Ill	7	*0.01*
Transferred Out by SCCRS	1	*0.00*
Total	**103,029**	

Source SCCRS August 2020

Table 8.3 shows the uptake of cervical screening by age by GMS and the target of 80% was only met in the 55-59 age group (85.7%) and 60-64 age group.

Table 8.3: GMS Uptake of cervical screening among eligible population by age for NHS Greater Glasgow and Clyde, 2019-2020 in previous 5.5 years

Age Group	Not Screened	Screened	Total	*% Uptake*
25-29	13,045	19,260	32,305	*59.6*
30-34	12,531	26,385	38,916	*67.8*
35-39	9,962	25,755	35,717	*72.1*
40-44	7,910	22,550	30,460	*74.0*
45-49	7,411	23,138	30,549	*75.7*
50-54	6,840	25,949	32,789	*79.1*
55-59	4,467	26,793	31,260	*85.7*
60-64	3,703	20,946	24,649	*85.0*
Total	**65,869**	**190,776**	**256,645**	***74.3***

Source: SCCRS August 2020

8.8. Programme Performance and Delivery

National cervical screening programme statistics cover information on uptake of screening, results of screening, quality of laboratory and colposcopy and cancer diagnosis. The statistics are reported for a one year period. **Appendix 8.2** provides a summary of NHSGGC activity against these national statistics for the time period 1st April 2019 and 31st March 2020.

National and Health Board level uptake is based on all women in the Health Board area in the eligible age groups, minus those who have no cervix (for example, following a total or radical hysterectomy).

Uptake is age-appropriate, based on being screened within the specified period (within last 3.5 or 5.5 years). There has been a decline over time in uptake of cervical screening in Scotland and NHS Greater Glasgow and Clyde, and the overall uptake target of 80% has not been reached nationally for a screening test taken within the last 5.5 years. **(Table 8.4)**

Table 8.4: Uptake for Cervical Screening by Health Board: Scotland, 1st April 2016 to 31st March 2020: Percentage uptake of females aged 50-64 who had a record of a previous screening test taken within the last 5.5 years

NHS Board of Residence		2016-17	2017-18	2018-19	2019-20
Scotland		**77.4**	**76.8**	**76.9**	**75.8**
Ayrshire & Arran		76.2	75.2	75.2	73.8
Borders		79.8	79.1	79.2	77.8
Dumfries & Galloway		78.7	77.6	77.4	76.1
Fife		76.5	75.8	75.8	74.7
Forth Valley		78.2	78.2	78.4	77.1
Grampian		80.0	79.2	79.1	78.0
Greater Glasgow & Clyde		**75.6**	**75.1**	**75.5**	**74.5**
Highland		77.3	76.5	76.7	75.5
Lanarkshire		75.4	74.9	75.2	74.4
Lothian		79.6	78.7	78.6	77.3
Orkney		79.8	78.0	78.5	77.9
Shetland		80.4	80.5	81.1	80.1
Tayside		78.5	78.1	78.3	77.3
Western Isles		76.3	75.1	74.5	73.8

Source Public Health Scotland: Sept 2020

In addition to national performance monitoring via annually published programme statistics, local monitoring is undertaken on an annual basis to explore any local variation in programme performance and quality. As a result of differences in data extract dates, numbers in local data analysis may differ from those presented in national statistics **(Appendix 8.2).**

Younger women have a poorer uptake of cervical screening than older women **(Table 8.5).** Among women aged 25 to 29, the uptake rate was 49.5% compared to women aged over 40, whose overall uptake rate ranged from 63.6% to 69.5%. No age group achieves the 80% target uptake.

Table 8.5: Uptake of cervical screening among eligible population by age for NHS Greater Glasgow and Clyde, 2019-2020 in previous 5.5 years

Age Group	Not Screened	Screened	Total	*% Uptake*
25-29	22,414	21,927	**44,341**	*49.5*
30-34	22,079	29,270	**51,349**	*57.0*
35-39	18,184	28,247	**46,431**	*60.8*
40-44	14,087	24,587	**38,674**	*63.6*
45-49	13,571	25,130	**38,701**	*64.9*
50-54	13,873	28,040	**41,913**	*66.9*
55-59	12,622	28,766	**41,388**	*69.5*
60-64	11,558	22,488	**34,046**	*66.1*
Total	**128,388**	**208,455**	**336,843**	***61.9***

Chi-Square Tests Linear-by-Linear Association p < 0.0001
Source: SCCRS (August 2019)

Uptake was higher in areas of lower deprivation. Uptake for women aged 25 to 64 in the least deprived areas was 66.9% compared with 59.5% in the most deprived areas. The target of 80% was not met in any deprivation quintile **(Table 8.6).**

Table 8.6: Uptake of cervical screening among eligible population by SIMD for NHS Greater Glasgow and Clyde, 2019-2020 in previous 5.5 years

SIMD Quintile 2016	Not Screened	Screened	Total	*% Uptake*
1 (Most Deprived)	49,7222	73,170	**122,892**	*59.5*
2	21,475	35,020	**56,495**	*62.0*
3	18,890	28,495	**47,385**	*60.1*
4	17,661	30,008	**47,669**	*63.0*
5 (Least Deprived)	20,640	41,762	**62,402**	*66.9*
Total	**128,388**	**208,455**	**336,843**	*61.9*

Source: SCCRS (August 2020)
Chi-Square Tests Linear-by-Linear Association p < 0.0001

There was a large variation in uptake across the different ethnic groups **(Table 8.7)**. The target of 80% was not met by any ethnic group. The highest uptake was among White – Irish and British ethnic category at 64.5% and 66.0% respectively, and the lowest uptake of 31.3% was among Chinese women.

Table 8.7: Uptake of cervical screening among eligible population by ethnicity for NHS Greater Glasgow and Clyde, 2019-2020 in previous 5.5 years

2001 Census Ethnic Group (OnoMap)	Not Screened	Screened	Total	*% Uptake*
White – British	86,687	168,394	255,081	*66.0*
White – Irish	7,504	13,613	21,117	*64.5*
White – Any Other White Background	11,703	9,408	21,111	*44.6*
Asian or Asian British – Indian	3,079	2,614	5,693	*45.9*
Asian or Asian British – Pakistani	4,331	4,951	9,282	*53.3*
Asian or Asian British – Bangladeshi	370	291	661	*44.0*
Asian or Asian British – Any Other Background	303	162	465	*34.8*
Black or Black British – Caribbean	15	19	34	*55.9*
Black or Black British – African	1,597	1,316	2,913	*45.2*
Other Ethnic Groups – Chinese	5,426	2,473	7,899	*31.3*
Ethnic Groups – Any Other Ethnic Group	4,420	3,612	8,032	*45.0*
Unclassified	2953	1,602	4,555	*35.2*
Total	**128,388**	**208,455**	**336,843**	***61.9***

Source: SCCRS (August 2020)

The target for cervical screening uptake (80%) was not met in any HSCP locality. The highest uptake was in East Renfrewshire (69.4%) and the lowest uptake rate of 53.1% was in Glasgow North West Sector, a difference in uptake of 16.3**% (Table 8.8).**

Table 8.8: Uptake of Cervical Screening by HSCP in NHS Greater Glasgow and Clyde, 2019-2020

HSCP	Not Screened	Screened	Total	*% Screened*
East Dunbartonshire	8,578	20,270	**28,848**	*70.3*
East Renfrewshire	7,550	17,141	**24,695**	*69.4*
Glasgow North East Sector	22,491	32,288	**54,779**	*58.9*
Glasgow North West Sector	31,557	35,659	**67,216**	*53.1*
Glasgow South Sector	26,830	41,330	**68,160**	*60.6*
Glasgow City	*80,878*	*109,277*	***190,155***	*57.4*
Inverclyde	7,031	13,576	**20,607**	*65.9*
Renfrewshire	15,912	32,047	**47,959**	*66.8*
West Dunbartonshire	8,439	16,140	**24,579**	*65.7*
Total	**128,388**	**208,455**	**336,843**	***61.9***

Source: SCCRS August 2020

8.9. NHSGGC Cytopathology Laboratories

Table 8.9 provides an overview of the number of cervical screening tests processed and the results of cervical screening tests carried out at NHSGGC laboratory for the period 1st April 2019 to 31st March 2020. This data is sourced from nationally produced annual reports from SCCRS Laboratory Reports.

The total number of smear tests processed in NHSGGC laboratory in 2019/2020 was 81,505. An essential criterion of the NHS HIS standards requires the laboratories to process a minimum of 15,000 smears annually and this has been achieved. These included repeat smears and smears taken at colposcopy as one woman can have more than one smear test.

Of the 81,505 cervical samples processed, 2,364 (2.9%) were reported as unsatisfactory smears. Quarterly comparative performance is fed-back to individual smear takers based on the proportion of unsatisfactory smears reported. The unsatisfactory smear rate in 2019/2020 (2.9%) was similar to other years in the past decade.

A total of 79,141 smears tests received by the laboratories (97.1%) were satisfactory and processed. Of these 70,684 (89.3%) were reported to be negative (normal).

In 2019/2020, 8,457 (10.7%) of satisfactory smears were reported as abnormal. Abnormal smears results include: borderline, low grade, moderate and severe dyskaryosis, severe and invasive dyskaryosis, glandular abnormality and adenocarcinoma. Of the Abnormal smears, 8.9% had a borderline/low grade cell change and the remaining 1.1% had high grade cell changes. **Appendix 8.1** shows the management and follow up advice for cytology results.

The introduction of High risk HPV screening in April 2020 will impact the workload of the NHSGGC Cytopathology laboratories. The Glasgow laboratory will be one of the two laboratories that will deliver the new pathway.

Table 8.9: Cervical screening tests processed and results of cervical screening tests carried out at NHSGGC Laboratory: 1 April 2019 to 31 March 2020

All screens	Unsatis-factory screens	Total	Result of satisfactory screens									
			Negative	Borderline		Dyskaryosis				Glandular abnormality	Endocervical Adeno-carcinoma	Endometrial or other malignancy
				Change in endocervical cells	Change in squamous cells	Low grade	High grade (moderate)	High grade (severe)	High grade dyskaryosis invasive			
81,505	2,364	**79,141**	70,684	191	4,018	3,422	415	308	17	18	0	5
	(2.9%)		(89.3%)	*(0.2%)*	*(5.1%)*	*(4.3%)*	*(0.5%)*	*(0.4%)*	*(0.02%)*	*(0.02%)*	(0.00%)	*(0.01%)*

Source: ISD, SCCRS Laboratory Report 09A

8.10 Colposcopy

Table 8.10 shows the activity data across NHSGGC colposcopy services. In 2019/2020, there were 5,131 new outpatients, 2,803 return and 5 inpatient episodes. New outpatient episodes include all patients attending colposcopy services; return episodes will include treatment visits following the diagnosis of cervical intra-epithelial neoplasia (CIN) in addition to standard follow up visits for colposcopy based indications.

Table 8.10: NHSGGC Colposcopy Services Workload 1 April 2019 to 31 March 2020

Attendance Status	Type of Episode		
	New Outpatients	Return/ Follow Up Outpatients	Inpatients
Patient was Seen (Attended)	3,586	1,850	5
Cancelled by Patient	792	190	0
Cancelled by Clinic or Hospital	404	480	0
COVID cancellation	34	4	0
Patient Did Not Attend	315	279	0
Total	**5,131**	**2,803**	**5**

Source: National Colposcopy Clinical Audit System (Extracted Jan 2021)
Numbers ≤5 redacted as per ISD Statistical Disclosure Control Protocol

Table 8.11 shows that there were 2,299 new outpatient attendance appointments following an abnormal screening smear.

The Vale of Leven and the New Victoria hospital were above the 90% target for cyto-version rates at 4-12 months after treatment if a smear was taken.

The majority of hospital sites met the target of 97% for adequacy of a cervix biopsy for histology.

The new referral for high grade dyskariosis having a biopsy ranged from 80.1% at Royal Alexandra Hospital to 97.1% at the New Victoria Hospital.

The percentage of women recommended for treatment was below the 20% target across all sites.

Table 8.11: NHS Greater Glasgow & Clyde: NATIONAL COLPOSCOPY CLINICAL INFORMATION & AUDIT SYSTEM 1 March 2019 to 30 April 2020

	Total New Outpatient Attendances	New Outpatient Attendances Abnormal Screening Smear	Cyto-reversion rates at 4 - 12 months after treatment if a smear is taken	Confirmed histological treatment failures at 12 months	Adequacy of cervix biopsy for histology	Proportion of women, referred with abnormal cytology, where SCJ is visualised, treated at 1st visit with CIN on histology	New referral for high grade dyskaryosis having biopsy	% Recommended for treatment as Inpatient
TARGET	None	>= 50 (per annum)	> 90%	<= 5%	> 97%	>= 90%	> 90%	< 20%
SCOTLAND	12,835	8,672	87.3	3.7	98.2	82.2	91.7	10.3
Greater Glasgow & Clyde	4,040	2,299	86.6	2.1	97.7	82.0	90.6	9.6
Royal Alexandra Hospital	539	420	87.5	0.5	97.4	83.8	80.1	12.2
Inverclyde Royal Hospital	220	82	75.9	2.5	97.1	44.4	87.2	6.9
Vale of Leven District General Hospital	67	56	90.0	0.0	98.1	100.0	86.4	8.3
Western Infirmary	0	0	0.0	0.0	0.0	0.0	0.0	0.0
New Victoria Hospital	1,316	673	94.1	0.9	99.2	78.9	97.1	10.6
Glasgow Royal Infirmary	8	3	0.0	0.0	100.0	0.0	0.0	0.0
Stobhill Hospital	1,711	1,028	83.3	3.2	96.9	86.0	92.9	8.5
Sandyford Initiative	179	37	87.5	5.0	98.9	100.0	93.3	5.0

8.11 Invasive Cervical Cancer Audit

The aim of the cervical screening programme is to reduce the incidence of and mortality from invasive cervical cancer. It is recognised that in order to assess the effectiveness of the cervical screening programme, the audit of the screening histories of women with invasive cervical cancer is fundamental. This audit is an important process that helps to identify variations in practice, encourages examinations of the reasons for these variations, and helps to identify the changes required to improve the quality of the service.

In 2019, we reviewed the notes of 81 women who developed invasive cervical cancer and had a pathology diagnosis made in NHS Greater Glasgow and Clyde laboratories.

Table 8.12 shows numbers and the distribution of women's age at diagnosis for years 2010 to 2019. The largest number of cervical cancers occurred in women aged between 30 and 39 years.

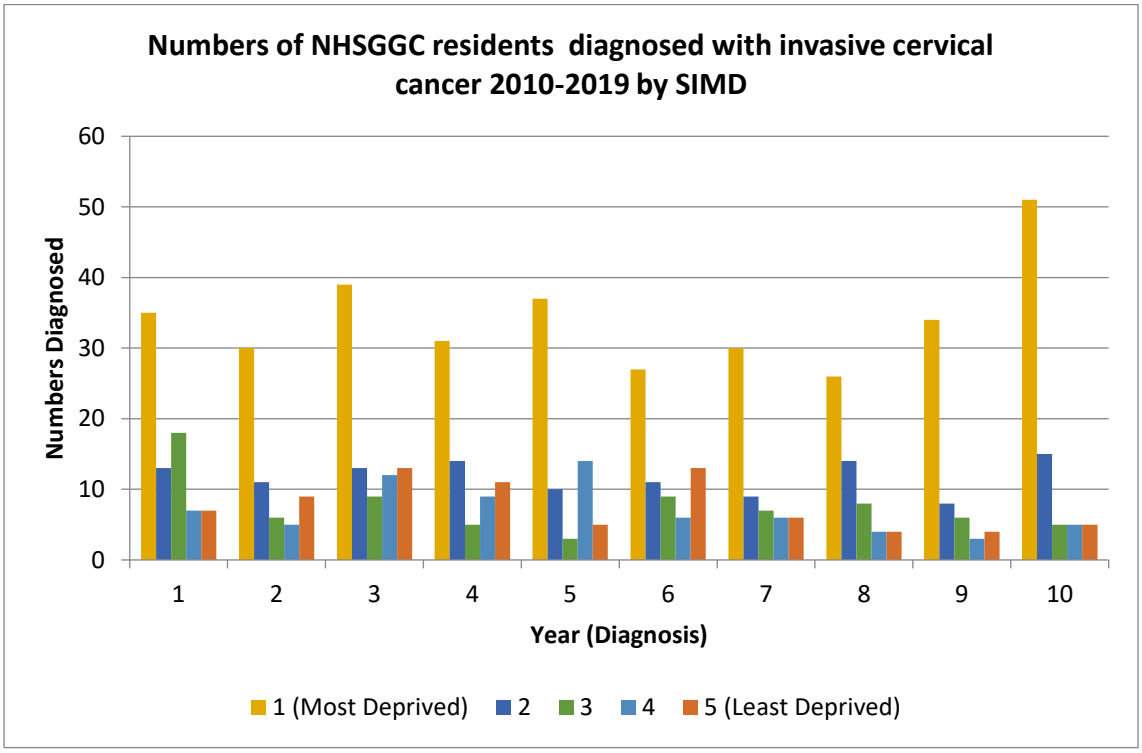
Table 8.12: Number of NHSGGC residents with invasive cervical cancers by age at diagnosis and year of diagnosis

	Year (Diagnosis)										
Age Group	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**Total**
20-29	10	7	12	6	9	8	16	7	7	6	88
30-39	23	16	27	23	21	18	9	20	14	22	193
40-49	22	10	17	17	14	16	10	13	13	18	150
50-59	7	10	9	10	11	9	10	6	13	17	102
60-69	5	7	11	3	6	10	8	4	5	13	72
70-79	10	8	7	7	5	4	3	5	3	3	55
80+	3	3	3	4	3	1	2	1	0	2	22
Total	80	61	86	70	69	66	58	56	55	81	682

Source: NHSGGC Invasive Cancer Audit (November 2020)

Figure 8.3 shows numbers of women diagnosed for years 2010 to 2019 by SIMD. Women from the most deprived quintile are more likely to be diagnosed for cervical cancer,

Figure 8.3: Numbers of NHSGGC residents diagnosed with invasive cervical cancer 2010-2019



Source: NHSGGC Invasive Cancer Audit (November 2020)

Table 8.13 shows the distribution of clinical stage at diagnosis over an eight year period from 2010 to 2019.

Table 8.13: Number of women with invasive cervical cancers by clinical stage by year of diagnosis

	Year (Diagnosis)										
Clinical Staging	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**Total**
Not Known	21	12	20	19	14	11	19	13	17	**27**	**173**
1a1 (less than 3mm deep and >=7mm wide)	0	≤5	≤5	≤5	0	≤5	≤5	≤5	≤5	≤5	**11**
1a2 (3-5mm deep and <7mm wide)	14	14	24	19	26	21	10	15	16	**12**	**171**
1b (confined to cervix)	39	33	38	30	29	33	26	27	20	**41**	**361**
2 or Greater (spread outwith cervix)	≤5	≤5	≤5	0	0	0	0	0	0	≤5	**11**
Total	**80**	**61**	**86**	**70**	**69**	**66**	**58**	**56**	**55**	**81**	**682**

Source: NHSGGC Invasive Cancer Audit (November 2020)
Numbers ≤5 redacted as per ISD Statistical Disclosure Control Protocol

Table 8.14 shows that in 2019, none of the cases were screen detected. The majority of the cases presented to the service were incidental findings (50) and 31 were symptomatic.

Table 8.14: Number of women with invasive cancers split by modality of presentation by year of diagnosis

	Year (Diagnosis)										
Presentation	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**Total**
Not Known	24	20	0	0	≤5	0	≤5	0	0	0	**48**
Smear detected	29	20	39	31	33	28	27	20	22	0	**249**
Symptomatic	27	21	46	38	34	36	26	35	33	31	**327**
Incidental Finding	0	0	≤5	≤5	≤5	≤5	≤5	≤5	0	50	**58**
Total	**80**	**61**	**86**	**70**	**69**	**66**	**58**	**56**	**55**	**81**	**682**

Source: NHSGGC Invasive Cancer Audit (November 2020)
Numbers ≤5 redacted as per ISD Statistical Disclosure Control Protocol

In 2019, 25 of 81 (30.8%) women diagnosed with invasive cervical cancer had a complete smear history compared to 50 (61.7%) women who had incomplete smear histories **(Table 8.15)**. Over the ten years audited, 71 (10.4%) women out of the 682 that developed cancer had never had a smear; 235 (34.4%) had complete smear histories and 368 (53.9%) of women had incomplete smear histories.

Table 8.15: Smear histories of women with invasive cervical cancer 2010-2019

	Year (Diagnosis)										
Smear History	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**Total**
Adequate	25	25	34	24	28	21	23	17	13	25	**235**
Incomplete	42	22	40	36	36	39	30	34	39	50	**368**
Not Applicable	12	14	11	10	≤5	≤5	≤5	≤5	≤5	6	**71**
Not Known	≤5	0	≤5	0	0	≤5	≤5	≤5	≤5	0	**8**
Total	**80**	**61**	**86**	**70**	**69**	**66**	**58**	**56**	**55**	81	**682**

Source: NHSGGC Invasive Cancer Audit (November 2020)
Numbers ≤5 redacted as per ISD Statistical Disclosure Control Protocol

Table 8.16 shows the follow up status of the women included in the audit of invasive cancer at the time when the audit was carried out.

Table 8.16: Follow up status of women with invasive cervical cancer

	Year (Diagnosis)										
Current Status	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**Total**
Lost to colposcopy service	≤5	0	≤5	≤5	≤5	≤5	0	0	0	0	**6**
On follow up at colposcopy	21	8	24	18	13	11	15	10	9	23	**152**
On follow up at oncology/Beatson	47	38	46	46	52	48	31	16	11	47	**382**
Early recall	0	0	≤5	0	0	0	≤5	0	0	0	**4**
Death	7	9	11	≤5	0	≤5	0	≤5	≤5	4	**46**
No further recall	0	≤5	0	0	0	≤5	8	24	28	7	**70**
Unknown	≤5	≤5	≤5	≤5	≤5	0	≤5	≤5	≤5	0	**22**
Total	**80**	**61**	**86**	**70**	**69**	**66**	**58**	**56**	**55**	**81**	**682**

Source: NHSGGC Invasive Cancer Audit (November 2020)
Numbers ≤5 redacted as per ISD Statistical Disclosure Control Protocol

8.12 Challenges and Future Priorities

- To counter the decreasing uptake of cervical screening by implementing a planned programme of promotional activities as outlined in inequalities plan
- To deliver implementation of Hr-HPV primary screening in 2020
- To undertake trial of SMS reminder texts to 25 year old women eligible for cervical screening
- To continue monitoring of impact of changes to GMS contract on uptake of cervical screening
- To continue to work in partnership with CRUK and Jo's Cervical Cancer Trust to support GP practices to sustain good practice to support eligible women to participate in cervical screening programme

Appendix 8.1

Management and follow-up advice for cytology results

SMEAR REPORT	MANAGEMENT
Negative	36 month recall
Negative, after borderline	Further repeat at 6 months Return to routine recall after 2nd negative
Negative, after mild	Further repeat at 6 & 18 months. Return to routine recall after 3rd negative
Unsatisfactory	3 month recall. Refer after third in succession
Low grade abnormalities	
Borderline Squamous Changes +/- HPV	6 month recall. Refer after third. ? High grade – Flag as such and Refer to Colposcopy on 1st
Borderline Glandular Changes	6 month recall. Refer after second
Low grade dyskaryosis	Repeat in 6 months Refer after second
High grade abnormalities	
Glandular abnormality	Urgent (within 2 weeks) refer to Colposcopy
Moderate Dyskaryosis	Refer to Colposcopy
Severe Dyskaryosis	Refer to Colposcopy
Severe Dyskaryosis / invasive	Urgent (within 2 weeks) refer to Colposcopy
Adenocarcinoma – Endocervical	Urgent (within 2 weeks) refer to Colposcopy
Endometrial Adenocarcinoma	Refer to Gynaecology (Early recall will not be triggered for such cases as the detected abnormality is not relevant to cervical screening)

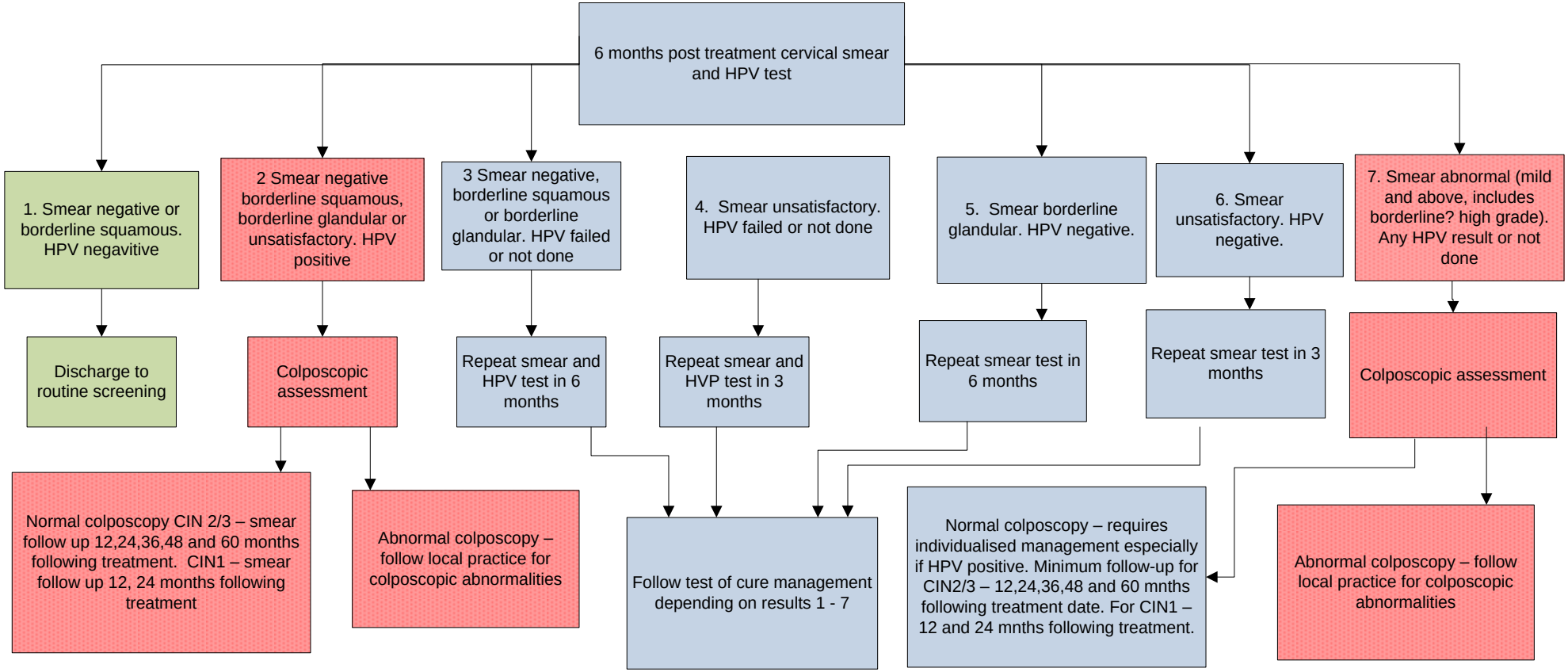
Management and follow up for cytology results: Post Total Hysterectomy

On routine recall No CIN/CGIN in hysterectomy	No further recall
On non-routine recall No CIN/CGIN in hysterectomy	No further recall
CIN in hysterectomy (any grade, completely or incompletely excised)	Vault smear and HPV Test at 6 months (Test of Cure). If both negative, no further recall. If abnormal refer back and manage outcome accordingly.
Hysterectomy as treatment for CGIN (any grade)	Vault smears at 6 and 18 months. If negative, no further recall. If abnormal refer back and manage outcome accordingly.

CIN = cervical intraepithelial neoplasia
CGIN = cervical glandular intraepithelial neoplasia

Appendix 8.1

Management and follow up for cytology post treatment cervical smear and HPV test (Test of Cure)



Appendix 8.2

National Performance Standards 2019-20

Source: Scottish Cervical Screening Programme Statistics. Public Health Scotland

Uptake for Cervical Screening; Scotland & NHSGGC 1 April 2019 to 31 March 2020

Percentage uptake of females aged 25-64. Uptake based on being screened within the specified period (within last 3.5 or 5.5 years).

Screening uptake	Standard %	Scotland %	Greater Glasgow & Clyde %
The percentage of eligible women (aged 25 to 64) who were recorded as screened adequately	80	**71.2**	67.7
Percentage uptake by deprivation quintile			
SIMD 1 (most deprived)	80	**75.5**	70.8
SIMD 2		**75.3**	71.6
SIMD 3		**71.6**	66.3
SIMD 4		**69.1**	68.1
SIMD 5 (least deprived)		**65.3**	64.9
Uptake by Age Group			
25-49 years		**60.8**	64.2
50-64 years		**75.8**	74.5
25-64 years		**71.2**	67.7

Uptake for Cervical Screening by HPV vaccinated: Scotland & NHSGGC 1 April 2019 to 31 March 2020

Percentage uptake of females who had a record of a previous screening test taken within last 3.5 years by age

HPV vaccination status	Age						
	23	**24**	**25**	**26**	**27**	**28**	**23-28**
HPV Immunisation status (Full[1])							
Scotland	59.2	61.0	65.9	71.5	74.2	75.7	68.7
Greater Glasgow & Clyde	54.4	58.9	64.3	70.3	72.9	75.0	67.2
HPV Immunisation status (Incomplete[1])							
Scotland	49.6	45.6	54.5	67.3	68.1	71.7	65.9
Greater Glasgow & Clyde	34.6	36.9	53.8	62.7	70.3	70.3	66.4
No HPV Immunisation status							
Scotland	30.3	21.4	18.8	33.4	38.7	45.0	33.3
Greater Glasgow & Clyde	25.9	17.3	15.0	28.3	33.7	40.0	28.2

1. The Immunisation Status of FULL is where the individual has been Fully Immunised, i.e. had all HPV doses. Incomplete is where the individual has had at least one of the Immunisations but not all of them.

2. Based on SCCRS population denominator (excluding medically ineligible women) ages 23-28.

Cervical screening tests processed[1]: Scotland & NHSGGC laboratories, 1 April 2019 to 31 March 2020

Year/ quarter	Scotland	Greater Glasgow & Clyde
Q4	63,631	16,363
Q3	70,878	18,638
Q2	82,922	21,318
Q1	101,296	25,397
Total	**318,727**	**81,505**

[1.] Data includes unsatisfactory screening tests.

Laboratory Turnaround times[1] for 95% of all cervical screening tests processed at NHS laboratories: Scotland & NHSGGC laboratories, 1 April 2019 to 31 March 2020

Year/ quarter	Scotland	Greater Glasgow & Clyde
Q4	16	17
Q3	17	21
Q2	19	26
Q1	27	27

[1.] The turnaround time is defined as the number of days from the date the sample was received by the laboratory to the date the report was issued by the laboratory.

Average reporting times[1] for cervical screening tests: Scotland & NHSGGC laboratories, 1 April 2019 to 31 March 2020 (Mean number of days by quarter)

Year/ quarter	Scotland	Greater Glasgow & Clyde
Q4	19	19
Q3	18	21
Q2	20	23
Q1	38	44

Appendix 8.3

Assessment of Risk to the implementation of HPV into the Cervical Screening Programme should this be delayed:

HPV Primary Testing is scheduled to be implemented into the Cervical Screening Programme on 30 March 2020.

The reasons why implementation may be delayed:
• Staff shortages - availability of staff to implement the change (NHS and external suppliers) • The decision is made to pause the Cervical Screening Programme (although it may be able to continue with implementation if there was the staff to do so)
Considerations:
• New implementation date would be required to be agreed • What test do we resume with? • Resuming the Cervical Screening Programme using hr-HPV would see less pressure on the laboratories (in which there will only be 2 come 30 March 2020) • Would not meet the Ministerial commitment for implementation in 2019/2020 • Communication to the public and NHS Boards / Heath Care Professionals
Risks:
• Delay in implementing the new test
Recommendation:
• Implementation to go ahead, if possible, regardless of whether the Cervical Screening Programme is paused

Appendix 8.4

Assessment of risk to Cervical Screening Programme should screening programme be paused:

Cervical screening is a 3 yearly screening programme for women aged 25 – 49 and 5 yearly for women aged 50 – 64. Women on non-routine screening will be invited up to age 70. This is a programme for well women and as such would not be deemed an essential service.

The reasons why a screening programme may need to be paused:
• Staff shortages - availability of service staff to run programme should there be outbreak • Re-allocation of screening programme staff for essential services within Boards (laboratory and sample takers in particular – sample takers are more often than not practice nurses) • Colposcopy service not available – if NHS Boards decide to reduce / pause elective work • Women may not wish to attend at this time • GPs may not wish for women to come to the Practices
Considerations:
• Continuation/triage of cases referred to colposcopy (if NHS Boards have not decided to reduce / pause elective work) • Continuation of resulting samples already taken • Cancellation of appointments already issued at GP practices and colposcopy (these could be weeks in advance and not centrally known) • Suspension of further prompts / reminders • Raise awareness of symptomatic referral pathways • Delay in testing samples in the laboratory / may need to retest (vials can be stored at room temp for 30 days and in a fridge for 105 days. If in a HPV tube another 60 days can be added) • Delays will entail need for action plans when service fully resumes • Additional staff / appointments / clinics may be needed when the programme resumes • Prompts / reminders sent to women – new safeguarding to ensure none are missed when resuming the programme • Phased commencement to ensure GP practices can cope with demand • Communication to the public and NHS Boards / Heath Care Professionals • Any technical issues for SCCRS
Risks:
Risks for continuing • Onward transition of Covid-19 to staff and otherwise well screening population by continuing to screen Risks for pausing • Delay to screening with possible delayed diagnosis of pre-cancerous cells / cervical cancer

• Potentially significant IT risks in pausing and resuming SCCRS processes (yet to be assessed)
Recommendation:
Within 48 hours of decision to pause, the issue of new prompts and reminders and request that GP Practices offer no further appointments for samples to be taken. However laboratories will result samples already taken (for as long as feasibly possible). Any existing cervical screening appointments to be managed locally by GP Practices. Colposcopy referrals to be managed as appropriate within NHS Boards.

Clinical Lead and Scientific Manager (NHS Lanarkshire Lab Lead) within the cervical screening programme have been consulted and provided input to the recommendations.

Appendix 8.5

Members of Cervical Screening Steering Group (At March 2019)

Dr Emilia Crighton	Deputy Director of Public Health (Chair)
Ms Christine Black	Consultant in Sexual and Reproductive Health
Ms Lisa Buck	Public Health Programme Manager
Mr Paul Burton	Information Manager
Ms Sandra Cairney	Associate Director of Public Health, Argyll and Bute HSCP
Mrs Lin Calderwood	HI&T Service Delivery Manager
Mrs Pam Campbell	Records Manager
Ms Claire Denning	General Practice Nursing Transformation Lead, Primary Care Support
Dr Victoria Flanagan	Consultant Obstetrician & Gynaecologist, RAH
Dr Morton Hair	Clinical Lead, RAH
Dr Robert Henderson	Consultant in Public Health Medicine, Highland
Ms Heather Jarvie	Public Health Programme Manager
Mrs Kathy Kenmuir	Practice Nurse Support and Development Team Manager
Dr Margaret Laing	Staff Grade in Cytology/Colposcopy
Dr Graeme Marshall	Clinical Director, North East Glasgow
Mrs Michelle McLachlan	General Manager, Obstetrics
Dr Abigail Oakley	Consultant Pathologist
Mr Graham Reid	Specialty Manager, Cytology
Mrs Elizabeth Rennie	Programme Manager, Screening Dept
Mrs Fiona Scott	Practice Manager, Clarkston Medical Centre
Ms Alana Struthers	CRUK Facilitator, West of Scotland
Ms Heather Woods	PHEC, Jo’s Cervical Cancer Trust

Chapter 9 - Diabetic Retinopathy Screening (DRS)

Summary

Diabetes mellitus is a long-term condition in which the level of glucose in the blood is raised leading to abnormal fat metabolism and other complications. There are two main types of diabetes: type 1 and type 2.

The Scottish Diabetes Survey 2019 reports that in Scotland, there were 312,390 people with known diabetes recorded on local diabetes registers in 2019, representing 5.7% of the population. In the same year in Greater Glasgow and Clyde, there were 66,332 people with known diabetes (5.6% of the population), compared to 48,602 people in 2007 (4.1% of the population). The crude incidence rate for all ages (cases per 100,000 per year) has risen from 311 in 2011 to 336 in 2019.

In 2019-20 screening period there were 71,984 people with known diabetes residing in NHS Greater Glasgow and Clyde. Of these, 60,897 (84.5%) were eligible for DRS screening. A total of 11,087 (15.4%) people were not eligible for screening because they were either permanently or temporarily suspended from the programme. Of those eligible for DRS screening, 44,733 (73.5%) attended screening.

Uptake is poorest in younger adults, aged 25-34 at 55.8% and among the most socio-economically deprived residents (SIMD 1 was 70.2%).

DRS Screening and COVID Pandemic

The Scottish Government, on the advice of the Scottish Screening Committee, decided to temporarily pause the DRS screening programme as a result of the COVID pandemic. An assessment (**Appendix 9.2**) was undertaken and the recommendation was to:

- Pause all screening and agree that the secondary care pathway for patients in ophthalmology should be decided by the local ophthalmology departments.
- Cancel all the scheduled clinics and stop the issuing of any new invitations.

Chapter Contents

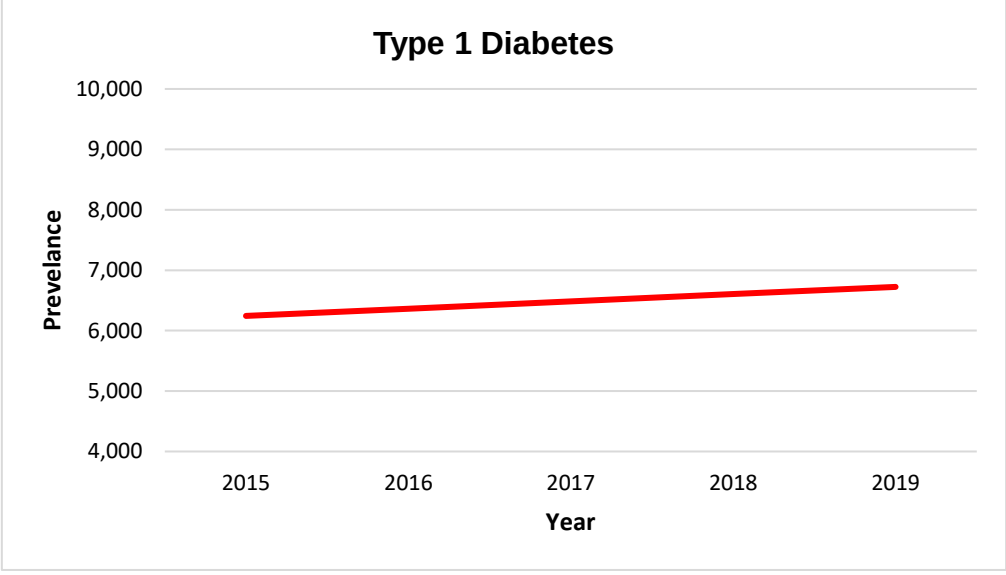
9.1. Background

Diabetes mellitus is a long-term condition in which the level of glucose in the blood is raised, leading to abnormal fat metabolism and other complications. There are two main types of diabetes: type 1 and type 2. Type 1 often develops before the age of 40 and usually during the teenage years. Type 2 is far more common than type 1 and typically affects people over the age of 40, although increasingly younger people are affected as well. It is often associated with being overweight or obese and people of South Asian, African-Caribbean or Middle Eastern origins are more frequently affected.

The latest Scottish Diabetes Survey 2019[21] reports that in Scotland, there were 312,390 people with known diabetes recorded on local diabetes registers in 2018, representing 5.7% of the population of all ages. 89.1% (274,346) of all people registered in Scotland with diabetes were recorded as having type 2 diabetes and 10.9% (33,427) of all registered people were recorded as having type 1 diabetes. In the same year in Greater Glasgow and Clyde, there were 66,332 people with known diabetes in 2019, (5.6% of the population) compared to 48,602 people in 2007 (4.1% of the population).

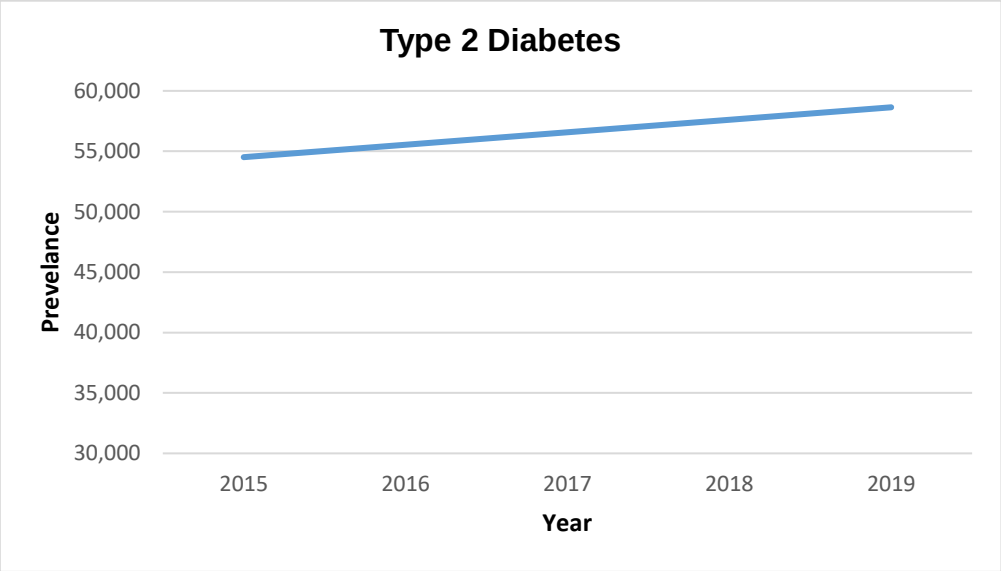
Figures 9.1 and 9.2 illustrate the increase in the number of NHSGGC residents with type 1 and type 2 diabetes in the previous four year period. In 2015 there were 6,244 people with type 1 diabetes compared to 6,724 in 2019, an increase of 7.6%. Similarly for type 2 diabetes, there 54,515 people in 2015 when compared to 58,641 in 2019, representing an increase of 7.6%.

Figure 9.1: Number of people with Type 1 Diabetes in NHSGGC 2015- 2019



[21] **https://www.diabetesinscotland.org.uk/wp-content/uploads/2020/10/Diabetes-Scottish-Diabetes-Survey-2019.pdf**

Figure 9.2: Number of people with Type 2 Diabetes in NHSGGC 2015- 2019



Source: Diabetes in Scotland reports 2015-2019

Diabetic Retinopathy is a complication of diabetes affecting blood vessels of the retina and is the biggest single cause of blindness and visual impairment amongst working age people in Scotland. Retinopathy is symptom-free until its late stages, and programmes of retinal screening can reduce the risk of blindness in the population by detecting retinopathy at a stage at which it may be effectively treated. If it is detected early enough, treatment can prevent the progression of the disease and save sight for many years in most patients.

9.2. Aim of the Screening Programme and Eligible Population

The national Diabetic Retinopathy Screening (DRS) Programme was implemented across NHSGGC in 2004-2005 and is an integral part of patients' diabetes care. The primary aim of the programme is the detection of referable (sight-threatening) retinopathy. A secondary aim is the detection of lesser degrees of diabetic retinopathy. This can have implications for the medical management of people with diabetes.

All people with diabetes aged 12 and over who are resident in the NHSGGC area are eligible for annual Diabetic Retinopathy Screening.

The programme performance and quality of national DRS screening is monitored via defined National DRS Screening Standards[22] and Key Performance Indicators[23].

[22] http://www.healthcareimprovementscotland.org/our_work/long_term_conditions/programme_resources/diabetic_retinopathy_screening.aspx (Accessed November 2019)
[23] http://www.ndrs-wp.scot.nhs.uk/?page_id=122 (Accessed November 2019)

9.3. The Screening Test

In the first instance, a digital photograph is taken of the individual's retina. If the photograph cannot be graded then a further slit lamp examination will be performed.

There are two main information systems used in the provision of Diabetic Retinopathy Screening.

1. VECTOR provides the call/recall, image capture, grading, quality assurance and result delivery.
2. SCI-Diabetes is an essential component for effective Diabetic Retinopathy Screening. It provides the diabetes population register for diabetic retinopathy screening call/recall and the screening results can be viewed here by clinical staff involved in the care of patients with diabetes.

9.4. Screening Setting

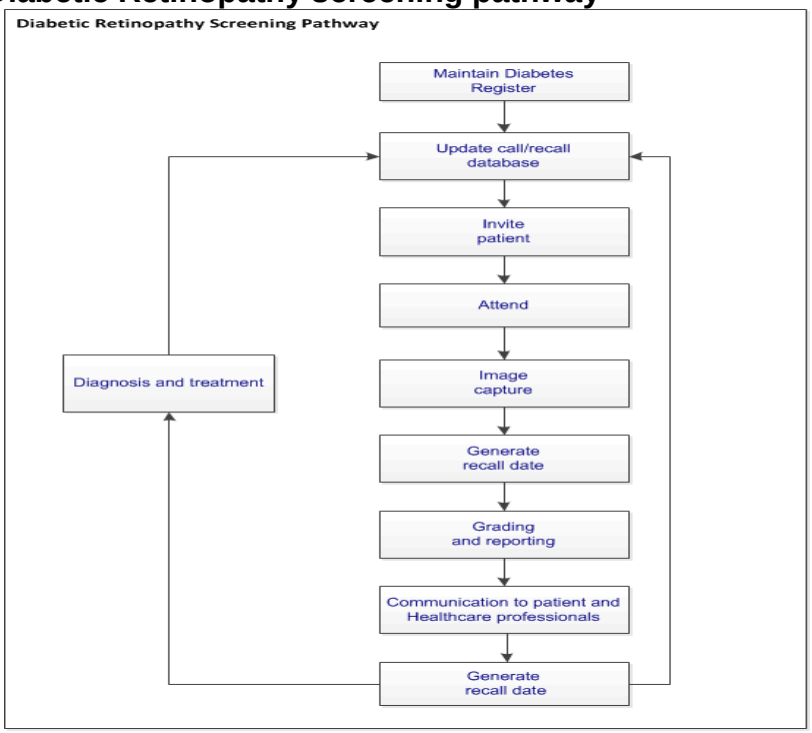
Across Greater Glasgow and Clyde, screening takes place at five hospital locations and 14 health centres or clinics.

The screening service also carries out slit lamp examinations from the five hospitals and two of the health centres/clinics for patients who are not suitable for retinal photography.

9.5. Screening Pathway

Figure 9.3 illustrates the pathway to reduce diabetes related blindness in the general population by identifying and treating sight threatening diabetic retinopathy.

Figure 9.3: Diabetic Retinopathy screening pathway



9.6. Delivery of NHSGGC Diabetic Retinopathy Screening Programme

The VECTOR system, introduced in March 2017, has been used to produce the National KPI data used in this report for the period of 1st April 2019 to 31st March 2020.

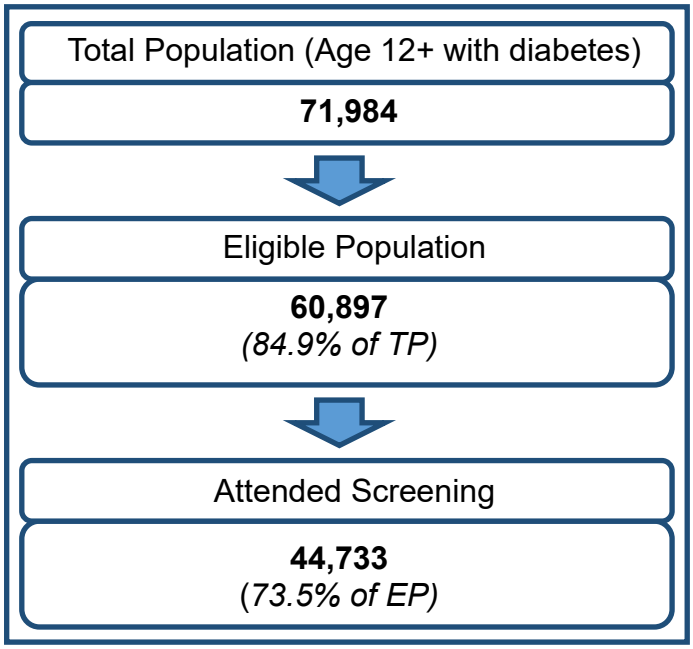
The DRS screening programme KPI's cover information on uptake of screening, screening performance, outcomes of screening and Ophthalmology performance. (**Appendix 9.1**) National KPIs are reported by Board of Treatment.

Analysis of the data by Board of residence provides a localised picture of the demographic breakdown of the eligible resident population who were eligible and screened during time period 1st April 2019 to 31st March 2020.

During 2019/20 there were 71,984 people with known diabetes in NHS Greater Glasgow and Clyde. Of these, 60,897 (84.5%) were eligible for DRS screening**.** Of those eligible for DRS screening, 44,733 (73.5%) attended screening, below the national target of 80% **(Figure 9.4).**

A total of 11,087 (15.4%) people were not eligible for screening because they were either permanently or temporarily suspended from the programme. The main reason for suspension from screening was ongoing ophthalmology care following attendance in diabetic retinopathy screening; deemed clinically unfit by the general practitioner or no longer diabetic.

Figure 9.4: NHSGGC DRS Screening Programme 2019-2020 by Board of Residence



Source: VECTOR 2019-20

Table 9.1 shows that more than half (55.5%) of the eligible resident population were male. Within NHSGGC the overall uptake was 73.5%. Males were also slightly

more likely to attend screening than females (74.2% vs. 72.5%). The 80% uptake target was not met by either sex.

Table 9.1: Uptake of DRS screening by sex in NHSGGC, by Board of Residence 2019-2020

Sex	Not Screened	Screened	Total	% Screened
Female	7,454	19,629	27,083	*72.5*
Male	8,710	25,104	33,814	*74.2*
TOTAL	**16,164**	**44,733**	**60,897**	***73.5***

Source: VECTOR OnoMap. September 2020

Table 9.2 shows that approximately half of the eligible resident population (51%) are aged between 55 to 74 years of age. Eligible individuals aged 65 to 74 years were most likely to attend DRS screening (80%) compared to other age groups. The uptake target of 80% was only met in the 65 to 74 years age group.

Table 9.2: Uptake of DRS screening by age in NHSGGC, by Board of Residence 2019-2020

Age	Eligible Population	% of eligible population	Attended Screening (full year)	% Attended Screening (full year)
0 to 14	167	*0.3*	128	*76.6*
15 to 24	979	*1.6*	607	*62.0*
25 to 34	1,748	*2.9*	976	*55.8*
35 to 44	3,918	*6.4*	2,370	*60.5*
45 to 54	8,624	*14.1*	5,839	*67.7*
55 to 64	15,633	*25.4*	11,542	*73.8*
65 to 74	15,700	*25.6*	12,567	*80.0*
75 to 84	10,575	*17.3*	8,214	*77.7*
85+	3,553	*5.8*	2,490	*70.1*
TOTAL	**60,897**	***100.0***	**44,733**	***73.5***

Source: VECTOR OnoMap. September 2020

42.7% of the eligible population resided in the most deprived Board areas. There was a consistent pattern that DRS screening uptake increased with decreasing levels of deprivation **(Table 9.3).** Uptake was lowest among people residing in the most deprived areas (70.2%) and highest among those residing in the least deprived areas (78.1%). The uptake target of 80% was not met in any deprivation quintile.

Table 9.3: Uptake of DRS screening by deprivation in NHSGGC, by Board of Residence 2018-2019

SIMD	Eligible Population	% of eligible population	Attended Screening (full year)	% Attended Screening (full year)
1 (most deprived)	26,027	*42.7*	18,277	*70.2*
2	11,197	*18.3*	8,292	*74.1*
3	7,909	*12.9*	5,950	*75.2*
4	7,110	*11.6*	5,451	*76.7*
5 (least deprived)	8,654	*14.2*	6,763	*78.1*
TOTAL	**60,897**	***100.0***	**44,733**	***73.5***

Source: VECTOR OnoMap, September 2020

Table 9.4 shows that the majority of the eligible population are White British (78.2%). DRS screening uptake among this group was 73.7%. Uptake among Asian / Asian British ethnic group was similar at 75.2%. The 80% target uptake was not met by any ethnic group.

Table 9.4: Uptake of DRS screening by ethnicity in NHSGGC, by Board of Residence 2019/2020

2001 Census Ethnic Group	Not Screened	Screened	Total	% Screened
White – British	12,456	34,886	47,342	*73.7*
White - Irish	1,348	3,904	5,252	*74.3*
White – Any Other White Background	504	951	1,455	*65.4*
Asian or Asian British	288	871	1,159	*75.2*
Asian or Asian British - Pakistani	772	2,257	3,029	*74.5*
Asian or Asian British - Bangladeshi	45	104	149	*69.8*
Asian or Asian British – Any Other Asian Background	25	57	82	*69.5*
Black or Black British – Caribbean	3	2	5	*40.0*
Black or Black British – African	117	216	333	*64.9*
Other Ethnic Groups – Chinese	105	328	433	*75.8*
Other Ethnic Groups – Any Other Ethnic Group	383	953	1,336	*71.3*
Unclassified	118	204	322	*63.4*
Total	16,164	44,733	60,897	*73.5*

Source: VECTOR, OnoMap, September 2020

There are variations in screening uptake across HSCPs **(Table 9.5).** They range from 70.8% in Glasgow City North West Sector to 77.6% in East Renfrewshire HSCP. No HSCP met the 80% target for screening.

Table 9.5: Uptake of diabetic retinopathy screening by HSCP in NHGGC, 2019-2020 (NHSGGC residents only)

HSCP	Not Screened	Screened	Total	% *Screened*
East Dunbartonshire	1,193	3,835	5,028	*76.3*
East Renfrewshire	962	3,341	4,303	*77.6*
Glasgow North East	2,753	7,163	9,916	*72.2*
Glasgow North West	2,744	6,650	9,394	*70.8*
Glasgow South	3,478	9,697	13,175	*73.6*
Glasgow City	8,975	23,510	32,485	*72.4*
Inverclyde	1,193	3,254	4,447	*73.2*
Renfrewshire	2,423	7,018	9,441	*74.3*
West Dunbartonshire	1,418	3,775	5,193	*72.7*
Total	16,164	44,733	60,897	*73.5*

Source: VECTOR, OnoMap, September 2020

9.7. Challenges and Future Developments

The national DRS database Vector implemented in 2017, will become unsupported after April 2020. Work is ongoing to migrate to a new screening database called Optomize system in April 2020.

It is anticipated that the number of people with diabetes will continue to increase, requiring additional screening capacity and resources in the coming and future years.

In July 2020 the service will implement the UK NSC recommendation that, for patients with no retinopathy or maculopathy in 2 successive years, the screening interval will increase from one year to two years. The service will also implement DRS Optical Coherence Tomography (OCT) clinics, which will increase the specificity of referrals from DRS to ophthalmology.

By changing the screening interval for patients at low risk of sight loss from one year to two years it is predicted that there will be a reduction in DRS screening appointments. However this will be offset by an increase in new DRS OCT appointments.

NHSGGC Screening department is in process of scoping a new telephone system to improve the efficiency and capacity of call handling. In addition, following the implementation of Optimize, screening department will progress virtual printing via Royal Mail for patient screening invites which will release staff capacity.

Appendix 9.1

Diabetic Retinopathy Screening Service reports for Quarter 4 2019/2020
By Board of Treatment
Report start date 01/04/2019 report end date 31/3/2020
Report Interval = 365 days. All data taken from Vector.
Source: DRS National statistics 2020

KPI	HIS Target June 2016 (where applicable)	Description	Board of Treatment	
			Greater Glasgow & Clyde	Scotland
KPI 0: Summary Statistics		Total Population (TP)	71,984	**343,802**
		Temporarily suspended (TS)	6,788 *(9.4%)*	**25,352** *(7.4%)*
		Permanently suspended (PS)	4,532 (6.3%)	**28,239** *(8.2%)*
		Temporarily unavailable (TU)	874 *(0.2%)*	**3,067** *(0.9%)*
		Eligible Population (EP = TP-TS-PS+TU)	61,538 *(85.5%)*	**293,278** *(85.3%)*
Screening Uptake				
Call/Recall (HIS Standards 2)	Within 30 calendar days for newly diagnosed appointment offer. (HIS Standard 2.3)	2.3 The invitation to attend diabetic retinopathy screening is offered to all newly diagnosed patients within 30 calendar days of the DRS Collaborative4 receiving notification.	96.6%	97.3%
	Within 90 calendar days for newly diagnosed appointment date. (HIS Standard 2.4)	2.4 The date of the appointment offered to all newly diagnosed patients is within 90 calendar days of the DRS Collaborative4 receiving notification.	99.9%	99%
KPI 1: Screening invitation rate (HIS Standard 3)	100% for Q4 of eligible people, regardless of personal circumstances or characteristics are offered an opportunity to	People attending screening without invitation (API)	2,571	**20,329**
		People invited at least once (INV)	53,996	**245,586**
		% (100 * INV / (EP - API))	91.6%	**90%**

	attend. (HIS Standard 3.3)			
KPI 2: Screening uptake rate (HIS Standard 3)	NHS boards achieve an attendance of 80% for Q4. (HIS Standard 3.1)	People attending at least once (ATT)	45,223	**212,464**
		% (100 * ATT / EP)	73.5%	**74.2%**
DNA rate	Indicative DNA rate by %	**% (100 * INV - ATT)**	18.1%	**17.5%**
KPI 3: Annual successful screening rate (HIS Standard 3)	NHS boards achieve an uptake of 80% pa. (HIS Standard 3.2)	People successfully screened in the previous year (ANN)	44,823	**210,456**
		% (100 * SUC1 /EP)	72.8%	**71.8%**
KPI 4: Successful screening rate (HIS Standard 3)	NHS boards achieve an uptake of 80% for Q4 (HIS Standard 3.2)	People successfully screened in reporting period (SUC)	44,823	**210,456**
		% (100 * SUC2 /EP)	72.8%	**71.8%**
KPI 5: Biennial successful screening rate (HIS Standard 3)	NHS boards achieve an uptake of 80% pa. (HIS Standard 3.2)	People successfully screened (biennial) (BIE)	53,445	**252,703**
		% (100 * BIE / EP)	86.8%	**86.2%**
KPI 6: Annual patient technical recall rate	As low as possible	People unsuccessfully screened (UNSUC)	694	**5,136**
		% (100 * UNSUC / EP)	1.1%	**1.8%**
KPI 7A: Annual photographic technical failure rate (HIS Standard 4)	NHS boards achieve a maximum rate of ungradable images of 2.5% for digital imaging. (HIS Standard 4.3)	Photographic screenings (PS)	43,648	**210,020**
		Unsuccessful photographic screening episodes (UPS)	717	**5,372**
		% (100 * UPS/ PS)	1.6%	**2.6%**
KPI 7B: Annual slit lamp technical failure rate	NHS boards achieve a maximum rate of ungradable images of 2.0% for slit lamp examinations. (HIS Standard 4.3)	Slit lamp screenings (SL)	4,068	**18,270**
		Unsuccessful slit lamp screening episodes (USL)	27	**481**
		% (100 * USL / SL)	0.7%	**2.6%**

KPI 7: Annual overall technical failure rate	**As low as possible**	**Slit lamp screenings + photographic screenings (SLPS)**	**47,716**	**228,290**
		Unsuccessful slit lamp screenings & photographic screenings (USLUPS)	**744**	**5,853**
		% (100 * USLUPS / SLPS)	**1.6%**	**2.6%**
KPI 8: Duration to written report	A minimum of 95% of people screened are sent the result within 20 working days of being screened.	Longest recorded number of days to written report (LRD)	105	**207**
		Average of the number of days to written report (AD)	12	**6**
		Median of the number of days to written report (MD)	3	**5**
KPI 9: Written report success rate		Episodes with <= 20 working days to written report (E20D)	34,580	**206,091**
		% (100 * E20D / NE)	72.47%	**90.3%**
Screening outcomes				
KPI 10: Twelve Month Recall result rate		Successful screening episodes (excl. ophthalmology examinations) (SSE)	*46,981*	***222,473***
		% (100* SSE/EP)	*76.3%*	***75.9%***
		Screening episodes (excl. ophthalmology examinations) with negative result (SEN)	*567*	***2,908***
		% (100 * SEN / SSE)	*1.2%*	***1.3%***
KPI 11: Six Month Recall result rate		Screening episodes (excl. ophthalmology examinations) with observable result (SEO)	*697*	***3,509***
		% (100 * SEO / SSE)	*1.5%*	***1.6%***

KPI 12: Six Month recall rescreen rate		People with last result 'observable' in the first 6 month of the interval (POR)	*305*	***1,599***
		People within POR who commenced an examination within 6 month (PC6M)	*51*	***354***
		% (100 * PC6M / POR)	*16.7%*	***22.1%***
KPI 13: Referable Result rate		Screening episodes (excl. ophthalmology examinations) with referable result (SER)	*1,760*	***8,972***
		% (100 * SER / SSE)	*3.7%*	***4.0%***
Ophthalmology performance				
KPI 14: Ophthalmology Report Interval		Patients with an outcome of 'Refer to Ophthalmology ' in the first 6 month of the interval (RO)	963	**4,441**
		% (100 * RO/EP)	1.6%	**1.5%**
		Patients within RO with a subsequent Ophthalmology examination (SOE)	653	**2,135**
		% (100 * SOE/RO)	67.8%	**48.1%**
		Longest recorded days to ophthalmology examination for the first qualifying episode (LRDOE)	211	**250**
		Longest recorded to Ophthalmology examination for the first qualifying episode (based on 30 days/month – months & days)	30 weeks 1 days	**35 weeks 5 days**
		Average of the number of days to Ophthalmology examination (ADOE)	44	**63**

KPI 15: Ophthalmology review target		Patients with an outcome of 'Refer to Ophthalmology ' in the first 6 months of the interval (RO)	963	**4,441**
		Number of these patients for whom the days to Ophthalmology examination is less than or equal to referral target (90 days) (REFT)	326	**1,326**
		% (100 * REFT / RO)	33.9%	**29.9%**
KPI 16: Ophthalmology attendance rate		People who attended at least 1 Ophthalmology examination with a screening outcome of 'Re-screen in 12 months', 'Re-screen in 6 months' or 'Retain under Ophthalmology review' (OPHTH)	5,546	13,957
		Screening population (SP)	67,177	**313,990**
		% (100 * OPHTH / SP)	8.3%	**4.4%**
KPI 17: Ophthalmology suspensions rate		People temporarily suspended from screening for reason of "under the care of Ophthalmologist" (UCO)	5,639	**20,712**
		Screening population (SP)	67,177	**313,990**
		% (100 * UCO / SP)	8.4%	**6.6%**

Appendix 9.2

Assessment of Risk to Diabetic Retinopathy Screening (DRS) Programme should screening programme be dialled down /temporarily paused:

DRS screening is a screening programme for all patients over the age of 12 who have been identified with Diabetes – it is an annual and 6 monthly screening programme with less than 4% of patients sent on for further investigations/treatment.

Summary for DRS business as usual screening

Reasons why screening programme may need to be paused:
• Risk for either participants or staff picking up the virus • Re-allocation of screening programme staff to support other essential services within Boards • Minimising the impact on essential NHS services by cutting down on referrals • Availability of service staff to screen /operate the programme should there be outbreak • Participants may not travel/wish to attend routine screening appointments at this time
Considerations: • A 18/24 hour notice period to cancel clinics - Invitations are issued for routine screening 3 weeks in advance of appointment dates • Communications with population /key stakeholders as to halt to service • Timing and lead in time for re-instatement of programme and action plans given delay to service
Risks:
Risks of continuing screening: • Participants picking up coronavirus - due to this screening group all have diabetes they more at risk having complications from the virus compared to the general population • Screening staff picking up coronavirus • **Not being able to clean the screening equipment sufficiently between episodes and thus the potential to be exposed the coronavirus** • Ophthalmology departments not being able to take on any new referrals from the DRS programme. • Risk of cancelation of clinics being cancelled on GP/independent premises – as GP practices/independent venues may not agree to screening clinics going ahead • Resultant increased anxiety of men diagnosed with an aneurysm that don't get appropriate follow up care timeously. • Inefficient usage of resources – there could be a spike in DNAs (as men invited to screening might deem it a greater risk attending than not) and that would mean clinical staff not being used to the full capacity • Limited staffing available to operate screening service Risks of pausing screening:

• Possible delay to diagnosis of retinopathy or sight loss. The likelihood of sight loss happening is statistically very small. In contrast, this is set against the risk of an individual picking up the coronavirus by attending a screening clinic.] • Reputation of the screening programme(s)/health service • Not meeting the programmes KPIs
Recommendation:
Pause all screening and agree that the secondary care pathway for patients in ophthalmology should be decided by the local ophthalmology departments. This would involve cancelling all the scheduled clinics and stop the issuing of any new invitations.
This assessment and recommendation agreed in consultation with key stakeholders from the DRS programme including some Clinical Leads of the local programmes

Summary for DRS Development work: DRS Optimze/RIS&OCT project

Reasons to continue DRS Optimze/RIS&OCT project:
• Minimal risks of clinical risk for staff picking up the virus as they work could be done remotely • Identified staff for the project already agreed and disruption would be minimal • Supplier has not reported any issues to-date
Considerations: • If DRS is suspended the project plan might need to be revaluated. • The project could be monitored on a weekly basis and contingency arrangements made as and when issues arise • There are contractual (milestone) issue that would need to be reconsidered in any suspension of the project
Risks:
Risks of continuing the project: none identified Risks of suspending the project: • Projects targets/deadlines not met • There are contractual (milestone) issue that would need to be reconsidered in any suspension of the project • Delay to moving to a new platform and introducing revised interval screening and OCT surveillance • Reputation of the screening programme(s)/health service • Not meeting the programmes KPIs. The project is deemed necessary in order to reduce the workload for the DRS programme and ensure the risk of clinical risks in not meeting the KPIs are reduced
Recommendation:
Ask the DRS Optimize Project Board to revaluate the timescales for the project and ensure it is continued as per the current objectives agreed for the project.

Appendix 9.3

Members of Diabetic Retinopathy Screening Steering Group (At March 2019)

Dr Emilia Crighton	Deputy Director of Public Health (chair)
Mr Jim Bretherton	Clinical Service Manager
Miss Lisa Buck	Public Health Programme Manager
Mr Paul Burton	Information Manager
Mrs Lin Calderwood	HI&T Screening Service Delivery Manager
Miss Beth Culshaw	Chief Officer, HSCP Headquarters
Miss Mary Fingland	Glasgow LMC
Dr Mike Gavin	Consultant Ophthalmologist
Mrs Elaine Hagen	Programme Support Officer, Screening Department
Mrs Fiona Heggie	Clinical Nurse Co-ordinator, Retinal Screening
Ms Heather Jarvie	Public Health Programme Manager
Mr Stuart Laird	Area Optometric Committee
Ms Gillian Kinstrie	Co-ordinator for MCN for Diabetes
Mrs Elizabeth Rennie	Programme Manager, Screening Dept
Mr David Sawers	DRS Service Manager
Mrs Sandra Simpson	Assistant Programme Manager, Screening Department
Dr Sonia Zachariah	Specialty Doctor, Diabetic Retinal Screening