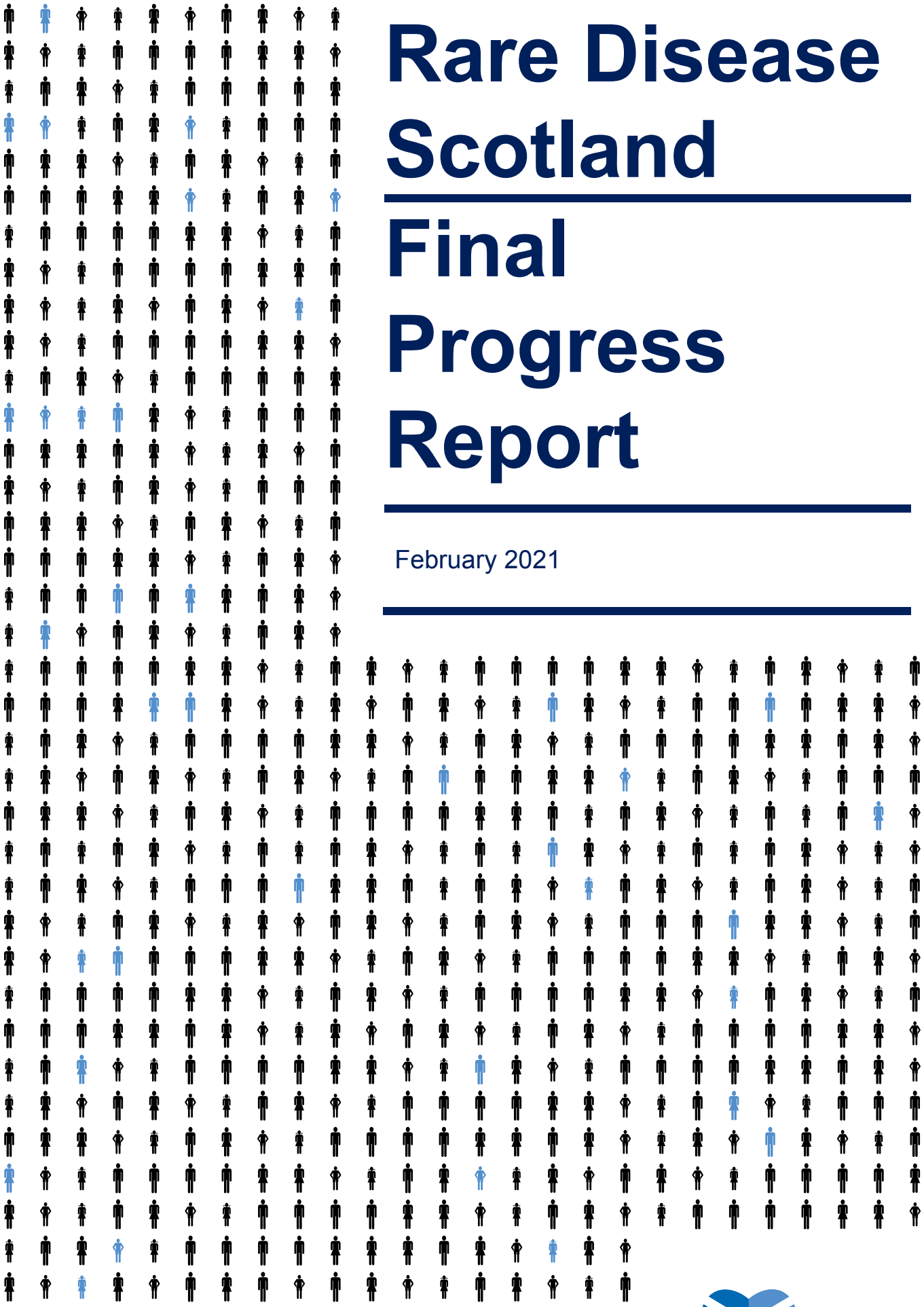
Rare Disease Scotland Final Progress Report

February 2021



Healthier Scotland

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Foreword

I am very pleased to present the final progress report in my new role as Minister responsible for Rare Disease. As we approach the conclusion of the UK Strategy for Rare Disease it's poignant that we look back over the entirety of the implementation of the 51 commitments and assess our progress.

We know from the rare disease community that they see most value in working together, expanding the pool of experience with rare disease and ensuring the patient voice is representative of the full breadth of the community. Scottish Ministers have been pleased to collaborate with UK counterparts to implement the UK Strategy for Rare Disease, an approach we know benefits those at the heart of our policies.

Since the adoption of the UK Strategy for Rare Disease in 2013, we've seen great advances in the diagnoses, treatment and care of rare disease but we know we must continue this momentum, ensuring we put the person at the centre of everything we do. So while the title refers to this being the 'Final Progress Report' please be assured our rare disease policy will continue to evolve alongside advancements in medicine and technology.

As we come to the end of the UK Strategy for Rare Diseases, we also see the end of Tracey Gillies' tenure as Chair of the Rare Disease Strategic Oversight Group. Tracey has been a driving force behind the group. I want to personally convey my gratitude and thanks to Tracey for her dedication to this agenda. I'd also like to thank those on the Group for their support and advice to Scottish Ministers.

In the final year of implementing this strategy, we have been faced with one of the biggest challenges experienced within a generation – COVID-19. The virus affected all of us and it would be remiss of me not to acknowledge the affects this pandemic has had on the rare disease community. Throughout our public response to COVID-19 we've heard from many rare disease patients about the concerns and challenges they have faced. Many rare disease patients will have been advised to follow shielding measures and we know the impact this can have on an individual's mental health and wellbeing. We have learned a lot from COVID-19 and we will continue to listen and learn from the rare disease community so those lessons inform our next steps.

To conclude, I welcome the progress made in Scotland against the 51 commitments set out in the UK Strategy for Rare Disease. You will find in this report that whilst not all of the 51 commitments will be completed, excellent progress has been made in all areas. Where more progress is needed, rest assured that these areas will feed into our next iteration of rare disease policy to ensure that the lives of people living with a rare disease continues to improve. With the publication of the new UK Rare Diseases Framework, I am committed to ensuring that the rare disease community continue to be at its heart. I look forward to engaging with you in shaping and delivering an Action Plan for our rare disease community in Scotland.

Mairi Gougeon MSP,
Minister for Public Health and Sport

We know challenges still remain for those living with a rare disease and COVID-19 has brought this to light even more so in the final year of implementing this strategy.

We have made a lot of good progress towards the implementation of the 51 commitments which all ultimately seek to improve the patient journey to a faster diagnosis through the advances in technology, or policies such as the introduction of genomics that seek to put the person at the centre of their own care.

As we near the end of the UK Strategy for Rare Disease this report will reflect on the fullness of the progress we have made in raising awareness of rare disease along with our efforts to nurture a more integrated approach to services, which aligns with our wider efforts and to embed seamless care and support.

As Chair of the Rare Disease Strategic Oversight Group (formerly the Rare Disease Implementation Oversight Group), I have seen first-hand the commitment by many to our rare disease agenda and I am grateful to you all on getting us this far. As the next iteration of rare disease policy is developed, it will be integral, now more than ever, to ensure the patient voice is not only part of the development but throughout the implementation.

I have enjoyed my time working on this agenda and would like to thank the members of the Rare Disease Strategic Oversight Group past and present for their support and hard work. Our efforts to support the rare disease community do not stop here and I look forward to seeing the developments of the future policy.

Tracey Gillies, Chair of the Rare Disease Strategic Oversight Group and Medical Director for NHS Lothian

Introduction

The Scottish Implementation Plan, It's Not Rare to Have a Rare Disease was first published in 2014. The title came from EU research statistics that showed whilst each rare disease only affects a small number of people (5 people or fewer in 10,000) there are actually between 6,000–8,000 rare diseases, and together these affect approximately 8% of the population. To put this in context, there are approximately 437,000 people out of a population of 5,463,300 in Scotland with a rare disease.

It's Not Rare to Have a Rare Disease which is Scotland's implementation plan was produced following the publication of the UK Strategy for Rare Diseases in November 2013. The Strategy included a list of 51 commitments that cover five specific themes:

- Empowering those affected by rare diseases
- Identifying and preventing rare diseases
- Diagnosis and early intervention
- Co-ordination of care
- The role of research.

The Strategy formed the blueprint for work across all the four UK nations to improve services, support patients and promote the role of research. Each nation developed their own implementation plan specific to the needs of their rare disease population.

The UK-wide Strategy included a commitment to publish a biennial report on progress against each of the commitments. The first report, 'Delivering for patients with rare diseases: Implementing a strategy' was published in 2016 and noted progress from the UK as a whole.

Scotland published its own progress report against the 51 commitments in February 2018 which highlighted a variety of areas requiring further progress to be taken forward in order to meet the commitments by the end of 2020.

This final progress report will evaluate the progress made against each of those 51 commitments originally set out in 2013. The report will bring our implementation plan to a natural conclusion. However, this does not mean our efforts to support the rare disease community stops.

This report will provide an opportunity to reflect on the societal, economic and technological changes that have taken place since the publication of the original strategy. It is important we use the information in this report to inform our future rare disease policy to ensure any future strategy encompasses the advancements we are seeing daily in our healthcare system in Scotland.

Each chapter of the report highlights key areas of progress against the relevant commitments and a more specific breakdown of progress against can be found in the annex at the end of the report.

It should be noted that much of the progress made towards the 51 commitments has only been made possible by working in partnership with a range of organisations out with the Scottish Government. Working with those who understand and support the rare disease community most is a priority for the Scottish Government, ensuring the rare disease community is put at the heart of any policies that affect them.

Recognising success

Since the introduction of the Strategy in 2013 there have been 3 key flagship deliverables. More detail on these can be found in the chapters in the report.

✓ **The Congenital Anomalies Register (CARDRISS)**

CARDRISS once fully established, will register babies affected by a major structural or chromosomal anomaly or recognised syndrome.

What does this mean for rare disease patients?

While the Congenital Anomalies Register is still being developed we have already seen a great benefit just by linking historical datasets to provide, for the first time in Scotland a record of congenital anomalies.

The dataset and the register are beginning to help inform the planning of services for individuals and families affected by congenital anomalies and rare diseases. Even more so once the Register is live, it will also allow NHS Scotland to support the prevention of anomalies where possible, understand the impact of antenatal screening and support research into these conditions.

✓ **The Bridge to a Scottish Strategy for Genomics**

Advancement of the strategy was driven by our partners in NHS Services Scotland National Services Division, the strategy supports the transition of genomic testing for inherited rare disease from the research setting into regular genetic testing services provided by the NHS in Scotland.

What does this mean for rare disease patients?

Scottish physicians and scientists have made world-leading contributions to research on rare disease genetics and genomics; and a well-established network of clinicians and clinical scientists have been delivering evidence-based genetic testing for NHS Scotland (NHSS) patients for over thirty years. Continuing advancements in genomics medicine improves a range of factors for rare disease patients included, diagnosis, access to treatment and co-ordination of care.

✓ **The Rare Disease Forum**

The UK Wide Rare Disease Forum was hosted by Scotland in November 2019. The Forum is made up of a wide range of rare disease stakeholders including patients themselves, third sector organisations and clinicians.

What does this mean for rare disease patients?

The Forum heard presentations from a range of healthcare professionals, patient organisations and those affected by rare disease. The outcomes from these discussions, and breakout sessions and evidence gathered, will feed into the development of the next iteration of the Rare Disease Strategy post 2020 and more specifically Scotland's own Action Plan. The Forum highlights the need for ongoing collaboration between patients and policy makers in order to ensure policies truly reflect the needs of rare disease patients.

1. Empowering those affected by Rare Diseases

Commitments 1-8

The Scottish Government is fully committed to empowering people in terms of their health and social care. We also remain committed to supporting person-centred care at all stages of the patient journey and public involvement in the development of healthcare services.

As information on rare diseases and their management is often more scarce and difficult to find than information on common diseases, it is of even greater importance that patients with rare diseases are supported by healthcare professionals with the information they need.

We know that patients and families actively seek information relating to managing their rare condition and anticipating how it may develop in the future. When equipped with up-to-date and reliable information people can become empowered to be experts in their condition and can make informed decisions regarding care and treatment.

Throughout the life span of the strategy there has been a great deal of progress made in empowering the rare disease community. Across a range of health conditions there are a variety of excellent models for patient involvement and information provision which could be extended across rare diseases. Some of those models have been highlighted below.

1.1 Person-centred Health Care

Healthcare Improvement Scotland (HIS) supports the healthcare priorities of the Scottish Government. HIS are currently leading a person-centred health and care programme which supports people to develop the knowledge, skills and confidence they need to more effectively make informed decisions and be involved in their own health and care which is very important for rare disease patients.

Person-centred care and support is everyone's business and the Person-Centred Health and Care Collaborative provides a framework for change and to build momentum for reliable testing and implementation, sharing and learning across the country.

The aims of the collaborative are ambitious and success will require a team approach in the broadest sense of the word. The lasting legacy of this work will be health, care and support services that are truly person-centred and take account of "what matters to you" for every person affected by rare diseases.

Here are some examples of the person-centred models which are benefiting rare disease patients in Scotland.

What Matters to You?

This model supports NHS Scotland staff to understand what's important to the people they are caring for and supporting and establishing a caring compassionate connection.

It is based on the principle that listening carefully to what matters to each person helps us to provide the care and support that people really need and want. It also recognises that listening is in itself is a powerful intervention.

In line with the principles of Realistic Medicine, our ambition is that conversations about what matters become a core part of how health and care services are delivered across Scotland, every day. This means rare disease patients have the opportunity to shape and influence the care and support they receive.

House of Care

The House of Care approach supports, empowers and enables people living with rare diseases to articulate their needs and decide on their own priorities through a process of joint decision-making, goal setting and action planning known as Care and Support Planning.

The House of Care approach in Scotland was originally spread across six primary care adopter sites working to make these Care and Support Planning conversations routine for those of us living with one or more long-term condition. However training is delivered on an ongoing basis to GP clusters throughout Scotland. The conversations produced through this approach are essential for self-management, shared decision-making and anticipatory care planning. The approach helps people be more involved in decisions about their care and identify what matters to them.

Health Literacy

Health Literacy is another important way to ensure that rare disease patients have sufficient knowledge, understanding, confidence and skills to cope with the complex demands of modern health care.

As an example of the importance of Health Literacy we have used the below information to demonstrate how information can be translated into more readable and understandable information for patients.

Before	After
Meeting people's health literacy needs and communicating in meaningful ways is key to delivering person-centred care. It also improves the safety and effectiveness of care, and helps address health inequalities and a cornerstone of Realistic Medicine's drive to better support people's needs through shared decision-making. In 2017, we published Making it Easier - Scotland's Healthy Literacy Action Plan. This builds on what we've learned so far about health literacy and sets out plans to: • share the learning from Making it Easy across Scotland; • embed ways to improve health literacy in policy and practice; • develop more health literacy responsive organisations and communities; and • design supports and services to better meet people's health literacy levels. Work on these objectives continues to contribute to our policies to support the rare disease community.	Health literacy is about you the patient, having enough knowledge, understanding and confidence to use the information you have been provided about your health to make informed decisions on treatment and all other parts of healthcare. By improving health literacy it helps with making sure decisions about your health are made together with your clinician or doctor. It helps ensure that your care is not affected by unfair or unavoidable differences because of where you were born, live, work or age, these are also known as health inequalities. The Scottish Government have developed actions on how to improve health literacy amongst people in Scotland. We've learned a lot already from talking with patients about their needs and we will design support and services to better meet those needs. The actions to improve health literacy will also have a positive impact on the rare disease community.

1.2 Raising Awareness of Rare Diseases amongst Healthcare Professionals

The Rare Disease Strategic Oversight Group (RDSOG), who oversee and monitor progress towards achieving the commitments in the implementation plan, commissioned a short life working group to look at raising awareness of rare disease amongst Healthcare Professionals, especially in terms of access to information. Membership of the group included members from the main oversight group together with co-opted members representing patients, patient organisations and healthcare professionals.

The group met on several occasions in addition to hosting workshops, focused on three areas of activity:

A. Rare disease toolkits for health professionals
B. Improving information on NHS Inform
C. Accessing rare disease information for individual care

Work on the rare disease toolkit and improving information on NHS Inform has been taken forward by Genetic Alliance UK in collaboration with NHS Inform and an update can be found on the Rare Resources: Scotland Toolkit at 1.6.

In welcoming the opportunity to delve further and better understand the needs of rare disease patients, the group developed four use case personas, to show some of the challenges faced by the rare disease community and health care professionals in receiving and providing the right support in health and social care. More information on the use case personas can be found at 4.1.

The use case personas were tested through workshops with groups, and at the UK Rare Diseases Forum hosted by the Scottish Government on 29 October 2019. More information on the Forum can be found at 1.7. The personas will inform the ongoing work in delivering a Scottish health and care 'national digital platform' so that rare disease patients, healthcare professionals and multidisciplinary teams treating them, can use technology to access relevant real-time data and information from their health and care records in a secure and safe way. This is essential to enabling high quality care, supporting staff, empowering citizens and enabling person-centred care. This ongoing work is at an early stage and has been impacted by the COVID-19 pandemic but will continue post 2020.

1.3 Rare Resources: Scotland Toolkit

The Rare Resources: Scotland Toolkit was developed in collaboration with parents, carers and health professionals, the Toolkit provides information for families in Scotland who have recently received a diagnosis of a genetic or rare condition, who are on the journey to a diagnosis or families who have been told their child's condition is so rare they might not get a diagnosis.

The Toolkit contains a wide range of general information on genetic, rare and undiagnosed conditions as well as information on how to access reliable information, care and support in Scotland. The Toolkit links to existing support services in Scotland and the wider Rare Resources: Scotland Project seeks to develop local knowledge networks across Scotland to raise awareness of rare conditions and reliable sources of information and support.

In 2020, in collaboration with the short life working group noted at 1.5, Genetic Alliance UK has also been working with NHS Inform to consider the way in which information for rare conditions, including the Toolkit can be made accessible through the NHS Inform website.

1.4 Capturing Patient's Views

Care Opinion continues to provide an online route for people to share their experiences of care directly with those providing NHS services, and to engage in constructive dialogue with them about how those services could be improved. This is exceptionally important for rare disease patients.

With over 20,000 stories now posted about people's experience of treatment and care in Scotland, Care Opinion has become a valuable source of information about what really matters to people about health and care services across Scotland, what they think works well and what could be better. By listening to the stories, staff at all levels can take action to provide the care and support people really want.

In 2019-20, 4,267 people shared their stories of health and care services in Scotland on Care Opinion. Of these stories, 71% reported positive experiences with the remaining 29% giving critical feedback of the service they received. For both types of stories, 97% received a reply to their story. The stories in 2019-20 have already been read over 800,000 times. Many of the stories have initiated changes in how health and social care services are being delivered across the NHS. These include:

- NHS Ayrshire and Arran have offered to create a care plan for a person who has an auto-immune condition https://www.careopinion.org.uk/647288
- NHS Greater Glasgow & Clyde have committed to improve communication around the rescheduling of appointments https://www.careopinion.org.uk/743216

Care Opinion continues to feed into rare disease policies and the stories and feedback provided on the site will be instrumental to shaping future rare disease policy in Scotland.

Hemochromatosis Patient Story from Care Opinion

I have suffered from Hemochromatosis for about 15 years and have been a regular patient at Forth Valley Hospital at Larbert. The nurses have been outstanding in Day Medicine but I have often had to wait for up to an hour for my turn because of the amount of patients and lack of staff. The parking at the hospital is not "fit for purpose" and there are never enough spaces especially at the peak times.

Cath and her team have changed everything around and I could not be more impressed. I was instructed to park at a special car park which had plenty of spaces and I walked through an automatic door directly into the Day Medicine area. I was shown to an area to wait and 1 minute later I was asked to go in and 30 minutes later I was leaving the hospital. I have to go once a quarter and it is always a day I dreaded as I never knew if I would be able to park and how long the procedure would take.

Well done all of you in Day Medicine for a really massive improvement. I cannot tell you much I appreciate what you have managed to achieve.

The Scottish Government is committed to supporting the development of a culture of openness and transparency in NHS Scotland that welcomes feedback – whether positive or negative – and uses it for improvement.

1.5 Our Voice

When launched in 2015, the Our Voice initiative was designed to support engagement in service improvement at an individual, local and national level and empower people to be equal partners in their care. This included:

- a Voices Scotland training programme which provides people with the knowledge, skills and confidence to have their voices heard in shaping local and national health and social care services.
- gathering Views on specific healthcare topics from public and third sector groups across Scotland.
- a Citizens' Panel broadly representative of the Scottish population which enabled the voices of a people to be heard on a range of important issues including what makes for a good consultation with a doctor, how to use our medicines better, and public opinion on organ tissue donation after death.
- Citizens' Jury, specifically engaging on shared decision making.

These tools and methods have been used to engage and involve people in a range of healthcare topics which influenced local and national healthcare policy.

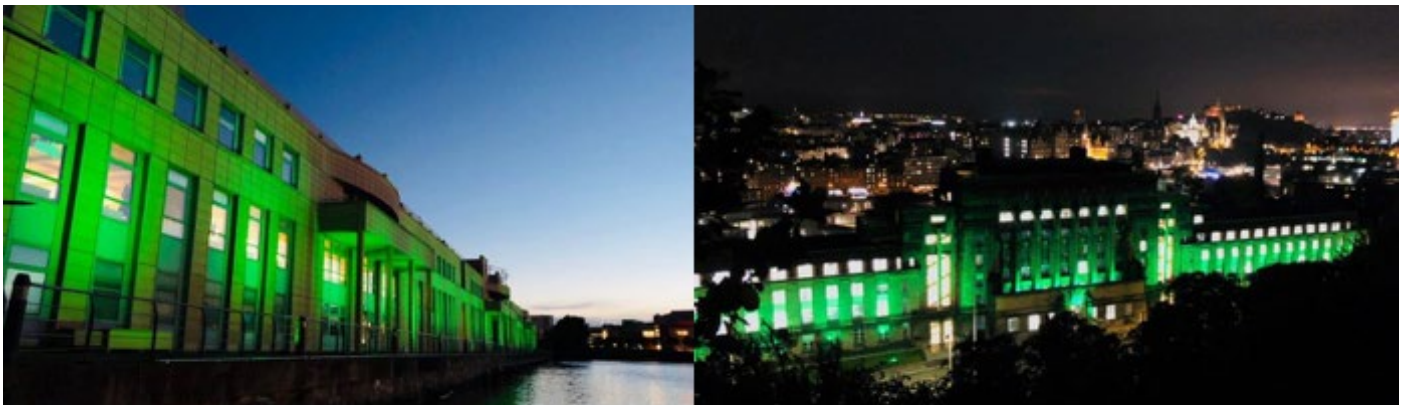
Since April 2020, the Scottish Health Council evolved into *Healthcare Improvement Scotland - Community Engagement* and the key components from the Our Voice have been mainstreamed into the work of the Scottish Government. We continue to work closely with the Our Voice key partners and its principles underpin all that we do to ensure that rare disease patients have opportunities and support to help make a difference in the design and improve the healthcare services that matter to them.

1.6 Rare Disease Day 2020

In recognition of Rare Disease Day, the Scottish Government lit up Victoria Quay and St Andrews House buildings green on 29 February 2020 to help highlight the impact of rare diseases on patient's lives.

Additionally, to mark the day in Scotland, Rare Disease UK hosted a parliamentary reception where a keynote speech was delivered by Joe FitzPatrick MSP, previous Minister for Public Health, Sport and Wellbeing, reaffirming the Scottish Government's commitment to improving the lives of people living with a rare disease.

This annual event is aimed at the general public but also seeks to raise awareness amongst policy makers, public authorities, industry representatives, researchers, health professionals and anyone with a genuine interest in rare diseases.



1.7 UK Rare Disease Forum 2019

Patient empowerment is crucial to improving healthcare for rare diseases and we have engaged with patients through the UK Rare Disease Forum to ensure the patient voice remains at the heart of our policy development thinking.

On 29 October 2019, Scotland hosted the third annual UK Rare Disease Forum Conference in Edinburgh which was jointly co-chaired by Tracey Gillies, Chair of the Rare Disease Strategic Oversight Group and Medical Director for NHS Lothian and Alastair Kent, Independent Consultant and Co-Chair of the UK Rare Disease Policy Board.

The event provided those living with a rare disease with an opportunity to share their lived experience with rare disease clinicians, health service commissioners and government policy makers.

Almost 70 people from all across the UK attended on the day and heard presentations from a range of healthcare professionals, patient organisations and those affected by rare disease, through their powerful and very personal experiences.

The agenda focused on three key themes:

- Scientific developments in rare disease including research.
- Genomics – An opportunity to reflect on the development of genomic medicine and its relevance for rare diseases and then consider next steps.
- Co-ordination of Care for Rare Disease Patients.

Feedback from the Forum survey was very positive with over 90% of people feeling that they were able to contribute their views through the various discussions and breakout sessions.

The outcomes from these discussions, breakout sessions and evidence gathered, will feed into the development of the next iteration of the Rare Disease Strategy post 2020.

Ongoing collaboration between patients and policy makers will be vital moving forward in order to build on these successes.

2. Identifying and Preventing Rare Diseases

Commitments 9-10

Challenges still remain in identifying rare diseases, however with the advances in genomics and screening we are seeing improvements which are benefiting not just the patients but families and NHS Scotland too.

The Scottish Government wants everyone to receive the best possible care and treatment from our health and care services and is committed to improving the lives of people in Scotland affected by a rare genetic disease to ensure they have access to the right treatment at the right time. Having an early diagnosis means action can be taken earlier and can prevent further complications and sickness for the patient.

2.1 The National Screening Oversight Function

The National Screening Oversight Function (NSOF) was established in 2020 to ensure end-to-end performance monitoring and risk management of the entire screening pathway. It is led by a Director of Screening and reports to the Scottish Screening Committee (SSC) who lead on policy and includes NHS Board Chief Executives. Its establishment has enabled the SSC to operate at a more strategic level, offering scrutiny and assurance for Board Chief Executives. While the National Services Division Screening Team focuses more on delivery as commissioners and coordinators of the screening programmes to ensure high quality, safe, efficient and sustainable services which meet the needs of individuals, address inequalities and optimise the wellbeing of the population.

2.2 Expansion to the Scottish Pregnancy Screening Programme

Pregnancy screening is offered at various stages of pregnancy to all women in Scotland during their routine antenatal appointments. Screening aims to find out the chance of the woman or unborn child having certain health conditions at the earliest opportunity to help protect their own and their baby's health and ensure that they receive the right support, advice and care.

In January 2016, the UK National Screening Committee (UK NSC) recommended earlier screening for Edwards' syndrome and Patau's syndrome, which would be delivered as part of the first trimester combined screen already offered for Down's syndrome. They also recommended that the screening options offered for twin pregnancies be expanded to match those offered for single pregnancies. Following the review of Non-invasive Prenatal Testing (NIPT) screening in pregnancy, an evaluative rollout of NIPT as part of the pregnancy screening programme was also recommended.

In June 2018, Scottish Ministers approved the UK NSC's three recommendations for the pregnancy and new born screening programmes, and NHS Scotland implemented them in September 2020. These changes to pregnancy screening include:

- the introduction of screening for Edwards' syndrome and Patau's syndrome as part of the first trimester combined screen already offered for Down's syndrome.
- a second line test: Non-Invasive Prenatal Testing (NIPT) for those receiving a higher chance result from a first line screening test.
- updated screening options for twin pregnancies.

NIPT increases the accuracy of the result of women already identified as being at a higher-chance of having a baby with either Down's syndrome, Edwards' syndrome or Patau's syndrome from the first line screening test. This should reduce the number of women subsequently undergoing diagnostic testing which carries a small risk of a test-related miscarriage.

Edwards' syndrome and Patau's syndrome are rare and serious genetic conditions which affect about 2 out of every 10,000 births in the UK each year. Like other pregnancy screening tests, NIPT is completely safe and will not cause harm. Women who receive a high-chance NIPT result will be offered a diagnostic test but can choose to have no further testing. Women who receive a low-chance result will not be offered diagnostic testing. NHS Scotland has rolled out NIPT for an evaluation period of at least three years.

More information on all pregnancy screening tests is available on NHS Inform. Support is available through various organisations for families whose baby has a chance of having or is diagnosed as having Down's syndrome, Edwards' syndrome, or Patau's syndrome more information can be found here.

2.3 Genetic Alliance UK Rare Resources Roadshow

In 2020, Genetic Alliance UK began work to deliver a Rare Resources Roadshow across Scotland to raise awareness of rare conditions with health and social care professionals, provide access to high quality and reliable information on rare conditions and the support available for both professionals and people living with a rare condition.

The Rare Resources Roadshow has three key aims:

- Build local rare networks of people living with a rare conditions and those who support them.
- Raise awareness of rare conditions amongst health and social care professionals.
- Provide a forum for knowledge and information sharing at a local level.

To achieve this, information and networking sessions have been held across Scotland. With the support of the Highland Children and Young People's Forum and CHIP+, a pilot session was held in Inverness with families, health and social care professionals. An online webinar was also held, providing information sessions for Highland-based paediatricians, health visitors and midwives. Feedback from the sessions has been extremely positive, with professionals reporting a better understanding of rare conditions and how to support people on their caseload who have a rare condition.

Parent quote from Rare Disease Roadshow:
Before I had my daughter we hadn't really had to use the NHS for anything other than a few GP appointments. I now feel like I know every person and every corner of our hospital.

Due to the COVID-19 pandemic, the Rare Resources Roadshow has been suspended but will return in 2021 with a programme of information events for those living with a rare disease including, their parents and carers. Furthermore, education events for health and social care professionals and a series of local events to build rare networks across Scotland will also be organised.

3. Diagnosis and Early Intervention

Commitments 11-22

Having a diagnosis is recognised as a key priority for those living with a rare disease. An early diagnosis provides more opportunity for early intervention. In addition, relatively common symptoms can hide underlying rare diseases, leading to misdiagnosis.

On average, rare disease patients wait four years to receive a diagnosis with some waiting over 20 years. The term 'diagnostic odyssey' refers to the time taken between a patient first developing symptoms and receiving a correct medical diagnosis. For people living with a rare condition this is often a long and eventful journey, frequently with several misdiagnoses until a final, correct diagnosis is reached. Without a diagnosis it can be impossible to access appropriate care and treatment, and without intervention a patient's health can significantly deteriorate.

A diagnosis can bring answers to long-standing questions, providing a better understanding of what the future may hold, such as how the condition may progress. A genetic diagnosis allows couples to exercise reproductive choices if they wish to. Receiving a diagnosis may also offer hope, as it can often be the first step towards a treatment or, in some cases, a cure. Areas of progress in this area are set out below.

3.1 CARDRISS Project

Through the work of the Rare Disease Strategic Oversight Group, in 2018, the Scottish Government commissioned NHS National Services Scotland, Information Services Division (ISD), to establish a congenital anomalies register in Scotland. This is one of the flagship programmes coming out of the rare disease implementation plan.

This would go on to be known as CARDRISS – the Congenital Anomalies and Rare Diseases Registration and Information Service for Scotland. On 1 April 2020, ISD became part of Scotland's new national public health agency, Public Health Scotland (PHS). The work to establish CARDRISS is therefore now being taken forward by PHS.

In the first instance, CARDRISS will register babies affected by a major structural or chromosomal anomaly or recognised syndrome in line with the standards recommended by the European Registry of Congenital Anomalies and Twins (EUROCAT), a European network of congenital anomalies registers. Live born babies diagnosed within the first year of life; spontaneous stillbirths occurring at ≥24 weeks gestation; spontaneous late fetal losses occurring at 20-23 weeks gestation; and pregnancies terminated at any gestation due to an included anomaly will all be registered. In due course, when registration of major anomalies is securely established, the plan will then be to widen the remit of CARDRISS to include registration of other rare diseases. This will help inform the planning of services for individuals and families affected by congenital anomalies and rare diseases. It will also allow NHS Scotland to support the prevention of anomalies where possible, understand the impact of antenatal screening and support research into these conditions.

Further details on establishing CARDRISS, the intended registration process and the benefits of the project are available in the 'Congenital anomalies in Scotland' report, published in November 2019.

To date, the following progress has been made towards establishing CARDRISS:

- Agreed the specific data items to be captured on cases registered through CARDRISS, following consultation.
- Work is continuing on specifying the new IT system that will be required for CARDRISS. This has involved running a data collection pilot and assessing the existing PHS cancer registration system to help inform the specification of detailed IT build requirements. Building the IT system has unfortunately been delayed due to the COVID-19 pandemic.
- The CARDRISS project team has visited all trisomy screening and genetic testing laboratories in Scotland, and developed a proposal for a new national data return from the labs to PHS. This new data would strengthen the ascertainment of babies affected by anomalies with a genetic basis, and would provide additional information on how affected babies had been diagnosed, for example as a result of antenatal screening or not.
- Creation of a new national dataset on babies affected by anomalies (now extended to cover pregnancies ending in 2000 to 2018) which led to the first annual publication of data for congenital anomalies in Scotland.
- Achieved affiliate membership of EUROCAT with a plan in place to upgrade this to associate and then – once CARDRISS is in place – full membership.
- An Expert Advisory Group has been established to provide advice, and constructive challenge, to the CARDRISS project team to support strategic planning, implementation, and ongoing development of the service.

Other areas of work that will be completed during the ongoing project include:

- Further development of the CARDRISS IT system.
- Development of information materials on CARDRISS for affected families, professionals, and the general public.
- Securing the information governance approvals required to begin registration.
- Testing a new national data return on trisomy screening and genetic testing from laboratories to PHS, then establishing a regular data return process.

At the beginning of the project the plan had been that CARDRISS would prospectively register affected pregnancies ending in 2021 onwards. However, work on the CARDRISS IT system has been delayed by COVID-19 which means that it is now more likely that registration will begin in 2022.

Establishing a congenital anomalies linked dataset

The establishment of CARDRISS will fill a key gap in national population health data by enabling the registration of babies in Scotland who are affected by congenital anomalies. However, as the development is a multi-year project, there was also consideration of what could be done to help to fill the gap until the register was in place.

While there had been previous work in this area it was quickly established that there were no available estimates of anomaly occurrence in Scotland for pregnancies ending in 2012 onwards. It was therefore decided to develop a national dataset on babies affected by anomalies by linking data from existing national records, use this dataset to produce the best possible estimates of anomaly occurrence in Scotland for pregnancies ending in Scotland from 2012 to 2017 inclusive and then publish this analysis.

In addition to addressing the data gap, the records included within the linked dataset would also demonstrate the minimum level of case ascertainment that would be achieved by CARDRISS (i.e. the number of cases that can be ascertained from existing national records alone, without additional input from local data sources or direct notification of cases by clinicians).

The linked dataset was therefore created using the same criteria that will initially be used to identify cases that will be registerable by CARDRISS, i.e. babies affected by a major structural or chromosomal anomaly or recognised syndrome.

The resulting publication of 'Congenital anomalies in Scotland, 2012 to 2017' was released on 26 November 2019. Full details of the methods used in the linked data analysis were also provided in a technical report which was released alongside the publication report.

Following on from this publication the linked dataset was then extended back to the year 2000 using the same criteria. The second annual publication in October 2020 presented estimates of anomaly occurrence in Scotland for pregnancies ending in Scotland from 2000 to 2018 inclusive.

3.2 Ultra Orphan Pathway

In response to the 2016 Montgomery Review findings, the Scottish Government developed the ultra-orphan pathway in 2019. This is designed to allow patients with very rare diseases faster access to new treatments following a revised decision making process.

To date, the Scottish Medical Council (SMC) has carried out initial assessment of four ultra-orphan medicines:

- **voretigene neparvovec (Luxturna)** for the treatment of adult and paediatric patients with vision loss due to inherited retinal dystrophy.
- **burosumab (Crysvita)** for the treatment of X-linked hypophosphataemia (XLH) with radiographic evidence of bone disease in children 1 year of age and older and adolescents with growing skeletons.
- **volanesorsen sodium (Waylivra)** as an adjunct to diet in adult patients with genetically confirmed familial chylomicronaemia syndrome (FCS).
- **nusinersen (Spinraza)** for the treatment of Spinal Muscular Atrophy (SMA) type 2 and 3.

Together with the scientific evidence provided by submitting companies, the views and experiences of patients, families and carers play an important role in the assessment of ultra-orphan medicines by the SMC. In addition, powerful statements and quotes provided by patient groups who participate in medicine assessments, provide committee members with a unique insight into living with rare conditions and the potential benefit of new medicines, not only on the quality of life for patients, but also for their families and carers.

Patients with XLH, for which the medicine burosumab (Crysvita) was assessed, describe the condition as having a profound effect on their daily living and quality of life.

Parent of child with XLH
"At 3 years old he (child) was walking with his feet inwards. He could only walk a short distance without pain. This was getting worse until he started this new treatment. Since then, he has improved month on month. The results are amazing so far. Virtually all of the bowing in his legs has reversed. His legs have straightened up and he has gone from having an obvious disability to looking like any other 4 year old."

To further support access for treatments for very rare diseases, in April 2020 the Scottish Board Chief Executives agreed to set up a new risk sharing scheme hosted by NHS Service Scotland National Services Division, to cover the cost of new drugs approved through the new ultra orphan pathway mechanism.

The risk share scheme pools funds from all Scotland's health boards for a small number of approved medicines for very rare diseases.

3.3 National Network Management Service – NNMS (National Managed Clinical and Diagnostic Networks)

All National Managed Clinical Networks (NMCNs) are designated through National Commissioning by NHS National Services Scotland on behalf of NHS Boards and the Scottish Government. They provide high quality management and operation support to enable them to focus on adding value to healthcare in Scotland through better access to specialist care.

They help ensure patients across Scotland have the best possible access to high quality specialist care. They bring together everyone involved in providing care when the full range of skills required isn't available within a single health board or region – this includes health professionals, carers, patient families and voluntary groups.

The diagnostic networks support early diagnosis and intervention by ensuring that patients have the right test at the right time.

List of networks: https://www.nss.nhs.scot/specialist-healthcare/national-networks

Launch of the Scottish Systemic Vasculitis Network in 2019

One of the key successes since the last progress report in 2018 includes the launch of the Scottish Systemic Vasculitis Network. Systemic Vasculitis is a collective term for a number of individually rare diseases that can affect many organ systems.

In the first year, focus has been through wide-ranging stakeholder engagement, establishment of a Steering Group and 3 sub-groups to look at:

- Information, education and communication.
- Research, data and audit.
- Clinical care.

Key priorities going forward include:

- Delivering a programme of education based on identified stakeholder needs.
- Development of pathways and guidelines including for Behcet's.
- Identifying service improvement projects based on emerging outcome data.
- Increase awareness and participation in research.

3.4 Services provided by NHS England and Cross Border Guidance for Clinicians

National Services Division (NSD) manages the process by which consultants in Scotland can access national funding to refer patients to specialist and highly specialist healthcare which is not available in Scotland. This is of particular importance to patients with very rare diseases, where there may be a limited number of expert clinicians in the UK able to offer diagnosis and advice.

NSD have updated the Cross Border Guidance for Clinicians in 2018 in order to improve knowledge of the process and the specialist and highly services to which referrals are funded through this national arrangement.

NSD is currently scoping the introduction of an electronic system to log and manage funding request for referrals to specialist and highly specialist services commissioned by NHS England.

4. Co-ordination of Care

Commitments 23-20

Some rare disease patients need expertise from a number of specialists and multidisciplinary teams. Well-co-ordinated care is essential when several specialists and hospital departments are involved in a patient's care.

It is not the best use of time or resources if patients have to visit different departments at the same hospital on different days, particularly if the hospital is not close to their home. Problems can also occur if possible interactions between different treatments are not properly managed. This section describes some of our work in this area.

4.1 Co-ordination of Care Working Group

The Rare Disease Strategic Oversight Group (RDSOG) commissioned a second working group to look at how care could be better co-ordinated for people with rare conditions.

The short life working group set up a Co-ordination of Care Workshop on 26 March 2020, to review and consider the results of the use cases exercise at the UK Rare Disease Forum as highlighted at 1.2 above. The aim of the workshop was to explore the particular challenges faced in receiving or providing co-ordinated care for rare disease patients. The group developed four use case personas to draw out what might matter most to people in certain situations and to show how this may influence and drive their behaviours in the following scenarios:

- A parent of a child with an undiagnosed rare disease.
- A patient with a rare disease diagnosis who has difficulty getting the support they need.
- A triage nurse in an Emergency Department (A&E) who has a patient with a diagnosed rare disease.
- A GP seeing a parent with an undiagnosed rare disease.

The evidence gathered to develop the use cases show why some patients, their families or carers and health professionals may experience challenges with services and sets out what steps might need to be considered and applied when designing system solutions to drive better person-centred care and support that takes account of what really matters to them.

To help illustrate this further, using the first use case persona, the group wanted to understand what a parent of a child with an undiagnosed rare disease might:

- ***hear or see;***
- ***what they might think;***
- ***how they might feel;*** *and*
- ***what they might say***

HEAR/SEE	**THINK**
From other parents – how their child is developing From health professionals – just wait, child develop at different paces; no that test would not be appropriate, yes we could try that. From other children – what about me?	Why is my child different from other children? I'm failing my child There is no one else who has the same experience as me. I need to see someone who will listen to me. I want to be taken seriously Will I ever know what's happening to my child? I'll google it! Will this affect my other children and any future child I might have? I need more time to take my child to appointments. Trying to lead a normal life not worth the effort. I can't cope.
FEEL	**SAY**
Worried – don't know what's happening, how long will this last, will it get worse? Frustrated – not being heard, not finding answers Helpless Isolated Overwhelmed/can't cope Failing my family – partner/children Guilty – my fault, what did I do wrong? Grief for the child you hoped would be ok.	Help! Panic - seek help from everywhere Assertive with health professional – this is what I need. Make excuses and not go out, actively avoid, I can't make it today… Check out with family and friends, do you think this too…? Avoid talking to children

Outcomes

Then thinking about the parent's goals from this scenario – what matters to them and what do they want to happen, the group came up with the following outcomes:

- To get a diagnosis which will enable me to manage the symptoms my child is experiencing and enable my child to reach their potential.
- Help me to understand the reason why my child is experiencing these symptom.
- Provide more certainty about what might lie ahead .
- Help my child access the support and treatment they need.
- Enable others to improve awareness, understanding and acceptance to my child's symptoms.

The Scottish Government policy team continue to use the evidence and feedback from the use case scenarios which will inform Scotland's response to the UK Government Rare Disease Framework.

4.2 National Demand Optimisation Group

It is essential that those affected by a rare disease have access to the right test at the right time and in the right way. Reducing or eliminating unnecessary testing can help deliver enhanced decision-making in patient care.

In 2015, the Scottish Government funded the establishment of the National Demand Optimisation Group (NDOG), in line with deliverable 3 of the Healthcare Science National Delivery Plan "Driving Improvement; Delivering Results". The group has since been active in highlighting a variety of quality improvement activities associated with the promotion of appropriate laboratory test use. During Phase I, the NDOG identified already existing demand optimisation work as well as undertaking a number of feasibility pilots to identify unwarranted variation, with a view to designing targeted interventions. It was recognised that there was a need to maintain the momentum from the initial successful phase of the programme and to implement improvement strategies locally and nationally, embedding the values and tools of demand optimisation into operational practice. To enable this, the following recommendations were made:

- pilot and promote the Atlas of Variation with referring clinicians.
- sustain ongoing Quality Improvement initiatives.
- develop and monitor new Quality Improvement projects.
- ensure alignment with the values of Realistic Medicine and contribute to the Scottish Government's vision for the future of primary care services.

The published report summarising Phase II work highlighted the programme's successes including the regular collection of data that captured diagnostic test requesting activity, presenting it in an easy accessible format, and coordinating with laboratory network clinical leads to initiate and progress quality improvement initiatives.

The NDOG has now concluded its third phase of operation and the Phase III Report is due to be finalised and published in the near future. Notable achievements of the third phase include:

- development and refinement of a Scottish Atlas of Variation for Laboratory tests that clearly demonstrates significant unwarranted variation in laboratory test use and availability.
- meaningful engagement with Primary Care to develop a GP Atlas view.
- creation of pilot dashboard summary views for both GP and Laboratory professional groups to interrogate.
- data collection to populate the Atlas has now stretched to cover three individual years (2017, 2018 and 2019).
- development of NHS Board flash reports that focus on requesting patterns for individual tests along with educational guidance on appropriate test use; continuation of a programme of quality improvement initiatives.

Funding for Phase IV has been approved and work has commenced on mapping priorities for the year ahead.

4.3 Co-ordinated Care of Rare Diseases Concord Study

The CONCORD (Co-ordinated Care Of Rare Diseases) study is looking at how care services for people with rare diseases are co-ordinated across the UK, and how people affected by rare diseases and health care professionals who treat rare diseases would like them to be co-ordinated. It is a collaboration between patients and carers affected by rare conditions, health care professionals with expertise in rare conditions, and health services researchers.

Genetic Alliance UK is part of the wider group involved in the study based at UCL, which began in June 2018 and is funded by the National Institute for Health Research (NIHR) Health Services and Delivery Research Programme. The work of the research team was completed in November 2020 and a final report on study findings is due to publish in January 2021. The findings of the report will be carefully considered in the development of the post 2020 Action Plan for Scotland, so that rare disease patients can experience better coordination of care throughout their patient journey.

Rare disease patient quote showing the impact that good co-ordinated care can make to patient's lives.

Going to many different clinics seeing lots of Doctors, many of whom have never seen your version of your condition, is really stressful. Driving two hours each way to a hospital on your own is tough. Not knowing how your appointment will go or what else you can try to bring your symptoms under control. Add to all of that remembering to go to the GP surgery to pick up a print out of all the results of the blood tests you had the week before, in advance of maybe starting a new drug. If you forget, no treatment decision can be made unless somebody at the clinic has time to phone the GP for the results. Nurses are all too busy, Receptionists too busy, Doctor running late, you're distraught that you forgot, but you had too many things to remember yesterday.

Not anymore. Nowadays, the results of tests done anywhere in Scotland are easy for Consultants to see. A quick e-mail or phone call to let the Consultant or their Secretary know when the tests are done so that they can check them online makes everything safer, more straightforward and a lot less stressful. Thank you!

4.4 European Reference Networks

We know that working with the other countries in the UK, Europe and internationally remains vitally important to support research and improve access to diagnosis, information and care for rare disease patients, particularly for ultra-rare diseases with low numbers of patients. In Scotland, we collaborate through UK participation in the European Reference Networks (ERNs). ERN's are virtual centres of knowledge, skills and expertise involving healthcare providers across Europe. They aim to facilitate discussion on complex or rare diseases and conditions that require highly specialised treatment, and concentrated knowledge and resources.

The uncertainty around the UK Exit from the EU remains a challenge. Especially the effect that this will have on the European Reference Networks (ERNs) and access to healthcare systems across Europe. We continue to work closely with colleagues in the rest of the UK on this matter. More detail on the work of ERNs to support the response to COVID-19 can be found at 6.2 below.

4.5 Nationally Designated Specialist Services

Specialist services provide support to patients living with a rare condition or who have highly specialist needs. National Services Division (NSD) commissions the following specialist and highly specialist services https://www.nss.nhs.scot/specialist-healthcare/specialist-services/commissioning-specialist-services.

NSD advises applicants who are considering submitting a proposal for a specialist service and supports the application process (stages 1-3). The National Specialist Services Committee (NSSC) and National Professional Patient and Public Reference Group (NPPPRG) provides a robust advisory and decision making structure to the application process.

NSD launched a new website in 2020, to improve access to information for staff from other NHS organisations and patients about the services, networks and other programmes that they commission. The website is currently in its Alpha Testing phase and will be further developed in 2021/22.

At the moment, due to the ongoing impact on COVID-19, applications for new specialist services are paused. However exceptions are being made for applications where there is evidence that these are likely to lead to direct patient safety improvements; are either cost-neutral or cost saving; and can be taken forward without additional resource.

Work has continued for services that were already progressing through the application process. Progress on those specifically relating to those with a rare disease includes:

- **Amyloidosis Service/Network -** The associated Network Lead Clinician has begun to draft an application for future consideration.
- **Inherited Metabolic Diseases -** This service was formally commissioned in at the end of 2018. NSD continues to work with the main host health board, NHS Greater Glasgow and Clyde, to develop this service and a number of key additional posts have been appointed since the service was designated. Work is ongoing to repatriate the care of patients who have previously had their care overseen by centres in England.
- **National Peri Hilar Cholangiocarcinoma Service -** This rare cancer has an incidence of approximately 1 in 100,000. Surgery represents the only chance of long term survival. It was proposed that there be one provider of the National Peri Hilar Cholangiocarcinoma Service, at the Royal Infirmary of Edinburgh. This is now progressing to a Stage 2 application.

5. The Role of Research

Commitments 31-51

Research plays a vital part in how our healthcare is delivered, it is at the centre of all we do. For rare disease patients research can fulfil unanswered questions that may support a diagnosis, cause, symptoms and treatment for many rare diseases.

Continued investment in research is paramount in order for rare disease patients to receive the benefits. Many research projects work across organisations and we see this in the collaboration between Scottish Genomics Partnership and Genomics England. With the prevalence of rare disease being significantly lower than other more common conditions, cross collaboration is even more pertinent.

Within the Scottish Government, the Chief Scientist Office (CSO) has responsibility for the funding of clinical research and we continue to work closely with them to ensure the availability of funding to rare disease researchers. Below we have outlined some key areas of progress.

5.1 A Bridge to a Scottish Genomics Strategy

In recent years we have seen great progress made in delivering genomics medicine in Scotland, particularly through the implementation of 'The Bridge to a Scottish Strategy for Genomics'.

The Scottish Government's Programme for Government in 2018/19 made a commitment to continue the development of genomic medicine through the enhancement of NHS Scotland genetic capabilities for the diagnosis of rare diseases. The work built on current practice and experience gained in genomic technologies; including the continued development of genomic tests, ongoing collaboration with Genomics England in the 100,000 Genomes Project as well as improved data analysis, sharing and storage.

Advancement of the strategy is driven by our partners in NHS Services Scotland National Services Division who have commissioning responsibility for the Scottish Genetic Laboratory Consortium (SGLC). Through this arrangement the four regional genetics centres in Aberdeen, Dundee, Edinburgh and Glasgow work together to provide genetic testing for a wide range of rare diseases, efficiently and equitably across the entire geography of Scotland.

The allocation of £4.2 million over a 2-year period by the Scottish Government supported the transition of genomic testing for inherited rare disease from the research setting into regular genetic testing services provided by the NHS in Scotland. The SGLC made significant progress in delivering the objectives set out for this funding which not only contribute to the overarching Role of Research commitments but deliver against the Diagnosis and Early Intervention commitments too.

Key achievements set out in the last report (Bridge Report 3, June 2020) include:

- The Clinical Exome Sequencing (CES) has been embedded across all four laboratory sites in Scotland. Demand for the service has exceeded expectations with 289 samples received and a diagnostic yield of 22% of reported cases at the time of writing.

- Whole Exome Sequencing (WES) Trio Analysis has been very well received by the clinical community with 158 Trios referred to the service. The service has continued to encounter challenges that have had a limiting effect in terms of sample numbers however this had not detracted from implementation of an effective diagnostic service with a diagnostic yield of 26%.
- The Scottish Genomes Partnership sequenced 999 genomes from 394 families and all results have now been returned. Current data indicates an average 17.4% diagnostic yield, varying from 26% in families with intellectual disability to around 5% in families with cardiovascular disorders. Diagnostic yields are in line with those currently reported from the 100,000 Genomes Project and may yet increase with further analysis.

Further information on the '*Genomics for Rare Disease in NHS Scotland: The bridge to a Scottish Strategy for Genomics*' and the '*Bridge Reports'* are available on the SGLC website.

A Scottish family share their experience of the benefits of a targeted analysis of a clinical exome test funded by the Scottish Government Bridge project:

"We found out from a scan that our daughter was to be born with clubfeet. She has needed multiple casts and operations to bring her feet into the position for walking and running. When she was two, we asked for further tests as we suspected her feet were a symptom of something more. Skeletal scans showed that bone growth in her arms, hips, thighs, knees and feet was abnormal, but could not pinpoint the underlying cause.

The team at Aberdeen Sick Children's hospital were brilliant and our surgeon referred us to clinical geneticist Dr Zosia Miedzybrodzka for blood tests. These showed that all three of us have a faulty SLC26A gene. This can cause a spectrum of physical problems, including failure to grow and joint pain. Through genetic counselling, we learned about our daughter's future, the possibility of our son being a carrier and the implications for his future, as well as the options for us for any future pregnancies.

Most important of all, identification of the faulty gene gives us the opportunity to investigate already available, or emerging, possible treatments. A researcher in Italy has shown that mice without SLC26A grow better on an over-the-counter supplement called NAC. It's cheap, readily available and is licensed to treat another childhood onset condition, so a trial of treatment has the potential to reverse the damage to our daughter's bones.

Now, because of the Scottish Genomic programme and in particular getting the right genetic test, we have the opportunity to enhance our daughter's growth, and maybe reduce the development of painful joints. We are so grateful for this opportunity to share our experience so that others may also benefit."

5.2 SHARE

The Scottish Health Research Register is a NHS Research Scotland initiative that has been established to allow people aged 11 and over and resident in Scotland to register their interest in participating in research. Participants agree to allow SHARE to use their anonymised NHS records to check whether they might be suitable for health research studies. By taking part in ongoing medical research rare disease patients can play a part in helping to develop new treatments and developing better healthcare in Scotland. As of 01/10/20 – 282,308 people have registered for SHARE: https://www.registerforshare.org/

5.3 Co-funding of Research

The Scottish Government, through the Chief Scientist Office (CSO), has established and maintained an active programme of co-funding research with third sector organisations, including research in rare diseases. Currently, CSO are working with medical research charity LifeArc to jointly fund early stage translational research in rare diseases. A joint fund of £300,000 is available to fund up to three Scottish-led research projects – applications submitted to the call are currently under review with funding decisions pending.

5.4 The Scottish Genetics Speciality Group

Established as part of the NHS Research Scotland network infrastructure
The Scottish Genetics Speciality Group supports the delivery and promotion of clinical research studies in a wide range of areas, including:

- Rare diseases.
- Common disorders such as familial cancer.
- Genetic approaches to their treatment and prevention.

This leads to more opportunities for people with rare genetic diseases to participate in research, which in turn leads to improved care and the development of new treatments.

NHS Research Scotland is committed to actively involving patients, those who care for them and the public in all aspects of the research process. This includes shaping future research activity and there are currently supporting more than 30 Genetics studies, about a third of which are led from Scotland.

NHS Research Scotland are also working closely with The Chief Scientist Office (CSO) of Scottish Government, and Health Board R&D Offices are working closely, and in collaboration with equivalents across the UK nations, to enable and deliver research into COVID-19.

5.5 Research and Rare Conditions Conference

In March 2020, NHS Research Scotland and Genetic Alliance UK held a collaborative 'Research and Rare Conditions Conference' in Edinburgh. The Conference brought together health professionals, researchers and patient organisations to showcase current developments and explore the challenges and opportunities faced when designing and delivering research for rare conditions.

A series of follow-up consultation workshops with patient groups was envisaged for summer 2020, however were postponed due to COVID-19.

One highly successful example of collaborative research funding directly impacting patients is evident in the field of motor neurone disease (MND).

MND is a debilitating condition that causes muscle weakness and paralysis, difficulty speaking, swallowing and breathing. It is life-shortening - affecting approximately 400 people in Scotland at any one time – with no effective treatment or cure. In 2015 joint funding from the CSO with MND Scotland and the MND Association enabled the recruitment of Dr Danielle Leighton, an early-career neurologist, as a clinical fellow at the University of Edinburgh. Dr Leighton was also at the heart of the Euan MacDonald Centre for MND Research, a philanthropically funded network that unites all MND researchers and health professionals across Scotland.

Dr Leighton's project was to investigate the clinical condition and genetic make-up of people living with MND in Scotland. During her three-year fellowship, she was able to make important insights on the genetics of MND in Scotland, which will have important implications for 'personalised medicine' drug treatments in the future, and the changing pattern of MND incidence in Scotland. This work empowers researchers, clinicians, people with MND and policy-makers to better understand the condition and future-proof optimal and equitable care provision.

Prof Siddharthan Chandran, Consultant Neurologist and MacDonald Professor of Neurology, University of Edinburgh noted that:

"This remarkable pooling of academic, clinical and monetary resources, and working closely with the patients themselves, has made a real impact on MND research and care in Scotland that is now seen as a shining example worldwide and will have lasting significance."

6. Recognising the Challenges

We know challenges remain for the rare disease community, some of which have been highlighted in the earlier chapters in this report. It's important for our rare disease policy going forward that we recognise those challenges, learn from them and use those learnings to inform what we do next.

One major challenge has dominated the final year of implementation for the rare disease strategy and will likely have an effect on the rare disease community for some time.

6.1 COVID-19

One of the biggest challenges faced recently by all is the COVID-19 pandemic. The pandemic has brought unprecedented challenges for everyone and we recognise the existing challenges for the rare disease community have been even more prevalent as a result.

The safety and continued provision of the care and treatment that the rare disease community need remains a priority for both the Scottish Government and NHS Scotland during the current pandemic. On 23 October 2020 we published Coronavirus (COVID-19): Scotland's Strategic Framework which sets out our strategic approach to suppress the virus to the lowest possible level and keep it there, while we strive to return to a more normal life for as many people as possible. The Framework is supported by a collection of documents which details Scotland's phased approach through and out of the COVID-19 crisis.

Additionally we seen the publication of the Re-mobilise, Recover, Re-design: The Framework for NHS Scotland on 31 May, which sets out how health boards will safely and incrementally prioritise the safe resumption of some paused services, while maintaining COVID-19 capacity and resilience. We know this is particularly important for rare disease patients.

Some rare disease patients in Scotland would have been advised to shield from March 2020 as they were identified as being at an extremely high clinical risk from severe illness from COVID-19. Although shielding was paused in July 2020, in January 2021 those on the shielding list were contacted by the Chief Medical Officer to advise that they follow additional precautions which included not attending work in person and working from home, during the phase 4 restrictions. We know that even more rare disease patients will have been identified as being at a higher risk from severe illness from COVID-19 than the general population. In Scotland, we averted taking a blanket approach to shielding. Some rare disease patients were added automatically on to the shielding list due to the nature of their condition. However, not all rare disease patients at the highest clinical risk from COVID-19 were identified through this exercise. Clinicians were able to make a clinical decision on individual patients and add them to the shielding list should they have deemed it clinically necessary, which may have benefited many rare disease patients.

For rare disease patients however, we understand that in many cases the patient or carer may have more knowledge about their own condition than their local clinician due to the rarity and understanding of the rare condition. This would have meant that the clinical decision on whether a rare disease patient should shield or not was more even more challenging than those with a more common disease.

We continue to learn from the COVID-19 pandemic, however the lessons learned from the identification of shielding patients has brought to the forefront the importance of our work on 'Empowering Those Affect By Rare Disease' in chapter 1 and we will ensure this is reflected in our future rare disease policies.

The Genetic Alliance UK published a report titled 'The Rare Reality of COVID-19' and describes the impact of the pandemic, and the UK's response to it, on the lives of people with a rare condition. The report, which comprises findings from the EURORDIS Rare Barometer Survey and Genetic Alliance UK's weekly community catch ups, highlights that the pandemic has served to amplify the levels of isolation and anxiety ordinarily felt by many people living with rare conditions.

The report explains the impact of shielding, disruption of services and interruption of access to ongoing health care for those with rare conditions. Findings from the EURORDIS Rare Barometer Survey show that around half of people with rare conditions have not attended their usual hospital appointments during the pandemic. The reasons given included fear of contracting COVID-19, and unit closure.

There has however, been a positive move to remote consultations, with more than 80% describing the experience as useful. Telemedicine was identified in the first UK Strategy for Rare Disease as a potential tool to improve care coordination for rare diseases and whilst the implementation of telemedicine during the pandemic has been welcome, it must be remembered that remote consultations do not work for everyone and we must continue to strive for equity of access for all.

'The Rare Reality of COVID-19' puts forward recommendations to address how best to improve matters during the pandemic for people living with rare conditions, successfully transitioning from the crisis state, and applying what has been learnt for the future. The Scottish Government will consider these recommendations for our future policies.

6.2 National and International Collaboration

The uncertainty around the UK Exit from the EU remains a challenge as highlighted in the Section on ERNs at 4.4.

Whilst we continue to work closely with colleagues in the rest of the UK on this matter, ERNs have also been facing an unprecedented challenge to help rare disease patients who are also affected by COVID-19 to receive care for their specific needs. Scotland is contributing to the efforts by the European Commission through the COVID-19 Clinical Management Support System (CMSS) which supports doctors, nurses, and other healthcare professionals in all over the EU, UK and the EEA countries. This system allows professionals to communicate easily with colleagues, exchange knowledge, discuss cases and improve training, namely via webinars. A full list of initiatives and information can be found here. We will continue to collaborate through these networks to share knowledge and best practice for the benefit of rare disease patients.

6.3 Communication

We acknowledge the need to improve our communication with the rare disease community regarding progress in our rare disease policy. Additionally we recognise that by having targeted communication channels for the rare disease community it provides an open dialogue which cannot only benefit and influence rare disease policy but allow other parts of government to tap into the network when needed. This would have been particularly useful throughout the COVID-19 pandemic.

We are grateful however for partners like Genetic Alliance UK who particularly during the COVID-19 pandemic were instrumental in communicating relevant support and guidance to the rare disease community through their Genetic Alliance UK's COVID-19 information hub. The hub was established to support the UK's genetic, rare and undiagnosed community during the COVID-19 pandemic. It provides quick and easy access to relevant information and will be updated regularly while COVID-19 remains a threat to health.

We will learn from the work of Genetic Alliance UK and others and use that collaboration to develop a communication plan and targeted communication channels going forward.

6.4 Genomics

We have seen great progress made genomics in Scotland particularly with the work on 'The Bridge to a Scottish Strategy for Genomics' as set out at 5.1 as led by our partners in NHS Services Scotland National Services Division, who have commissioning responsibility for Genetic Laboratories in Scotland.

The evaluation results from the bridge work will inform our next steps. It should be noted our work on genomics has been particularly affected by COVID-19. Both staff and equipment was deployed elsewhere in the system to support efforts on the response to the pandemic which meant progress came to a halt in some areas.

Advancements in genomics can greatly benefit the health care system however, long term planning needs to be in place to support its implementation. Much of the work up until now has very much been focused on research, a challenge for the Scottish Government will be to translate what we have learned through this research to embed it into routine healthcare.

In September 2020, the Scottish Government signalled support for the UK Governments Genome UK: the future of healthcare Strategy. The Strategy provides a useful statement of the current position of Genomics Medicine across the UK, along with potential benefits and a vision for further development over a 10 year period.

Work has begun on how the Strategy will be implemented, ensuring it accommodates the separate population needs, structures and NHS system we have here in Scotland.

7. Next Steps

As referenced throughout this report, the conclusion of the Rare Disease Strategy does not conclude our efforts for the rare disease community in Scotland.

On the 26 February 2020, the Minister for Public Health, Sport and Wellbeing penned an open letter to the rare disease community setting out the plans for the continuation of rare disease policy.

The letter confirmed the publication of this report to coincide with the conclusion of the existing strategy. The letter also set out our continued support to the UK Government's Rare Disease Framework which was published on 9 January 2021 to replace the existing strategy.

The Framework takes a 4 nation approach to supporting those living with a rare disease. The vision and objectives are based on stakeholder engagement and the results from the Rare Disease National Conversation survey. As we have done in previous years, Scotland will develop its own action plan setting out how we will implement the Framework taking into account the population needs and health system we have here in Scotland.

To do this we will establish a new Rare Disease Implementation Board to oversee the action plan. Further details will be in the Action Plan which will be published in 2021. Throughout the development of the Plan there will be many opportunities for the rare disease community to engage with us to help shape and inform the actions.

Throughout the course of 2021 we will see the publication of a range of healthcare strategies which will have a direct or in-direct effect on the rare disease community. We will ensure emerging health policies take into consideration the rare disease communities needs and ensure this is reflected in our action plan.

One emerging policy area which will have a considerable effect on the rare disease community will be Scotland's future Genomics policy. As referred to earlier in this report, the "Genome UK Healthcare Strategy" paves the way for Scotland's future in genomics healthcare.

The publication of Scotland's own Genomics Healthcare Implementation Plan is expected in 2021/2022. We will ensure the needs of the rare disease community are reflected in the future plan.

As we move forward developing the future rare disease Action Plan we will look to new and existing partners for help and support.

Annex A: Progress against UK Rare Disease Strategy 51 Commitments

Scotland's progress against each of the 51 commitments of the UK's Rare Disease Strategy has been highlighted in this report. Progress has been monitored using RAG status: Red for actions where no progress has been made; Amber for actions that have made progress, and Green for completed progress against the commitments.

Empowering those affected by Rare Diseases (commitments 1-8)

1. Strengthen the mechanisms and opportunities for meaningful and sustained patient involvement in rare disease service provision and research, recognising patient groups as key partners – including in the development of the four country plans to implement the Strategy.
✓ This has been achieved through our Rare Disease Strategic Oversight Group (RDSOG); the commitments in the Chief Medical Officer for Scotland's Realistic Medicine strategy; the House of Care Model for Scotland; the Our Voice website; the National Network Management Service; and the What Matters To You? initiative with Healthcare Improvement Scotland (HIS).

2. Improve awareness amongst service providers and others of the effects that rare diseases can have on a person's education, family, social relationships and ability to work.
✓ Achieved by RDSOG; the House of Care model; Care Opinion; and the What Matters To You? initiative.

3. Encourage effective and timely liaison between the NHS and other public service providers, and encourage providers to consider the effects of rare disease on people's lives when they are developing and managing services.
✓ Achieved by RDSOG; our Health and Social Care Delivery Plan; Making It Easy: A Health Literacy Plan for Scotland; the House of Care model; and the What Matters To You? initiative.

4. Make sure that patients and their families have a say in decisions about treatment and in the planning, evaluation and monitoring of services.
✓ Achieved as per Commitment 3 above and also the Realistic Medicine strategy.

5. Consider how to give all patients with rare disease clear and timely information about: their condition and its development; treatment and therapy options; practical support.
✓ Achieved through the National Clinical and Diagnostic Networks.

6. Improve access for patients (or where appropriate their parents or guardians) to their personal data.
● Work is ongoing and will be assisted by the publication of a refresh of Scotland's Digital Health & Care Strategy by the end of 2020.

7. Support patients to register on databases, where these exist.
✓ Achieved by the National Network Management Service; the Scottish Genetics Speciality Group, and SHARE, a new initiative by NHS Research Scotland.

8. Help patients to contribute to research and other activity related to rare disease.
✓ Achieved as per Commitment 7 above.

Identifying and Preventing Rare Disease (commitments 9-10)

9. Continue to work with the UK National Screening Committee to ensure that the potential role of screening in achieving earlier diagnosis is appropriately considered in the assessment of all potential new national screening programmes and proposed extensions to existing programmes.
✓ Achieved by the Scottish Screening Committee, established in 2016.

10. Initiate action to ensure carrier testing approved by the appropriate commissioning bodies, where the associated molecular tests are evaluated and recommended by UKGTN (UK Genetics Testing Network) is accessible for at risk relatives.
✓ Achieved by extending the Newborn Blood Spot Screening Programme for four additional rare conditions; by National Services Division establishing the Genetics Evaluation panel for Scotland; by making Somatic BR/CA1/2 testing for selected patients, and by Primary Immune Deficiency testing.

Diagnosis and Early Intervention (commitments 11-22)

11. Work to achieve reduced times for diagnosis of rare diseases, whilst acknowledging that more needs to be done to ensure that undiagnosed patients have appropriate access to co-ordinated care e.g. to help disabled children who are thought to have a genetic syndrome or condition that science has not yet identified.
● Partly addressed by the Health and Social Care Delivery Plan. Work is ongoing, and will be assisted by National Clinical and Diagnostic Networks.

12. Work with the NHS and clinicians to establish appropriate diagnostic pathways which are accessible to, and understood by, professionals and patients, by:

- *establishing clear, easily accessible and effective pathways between primary care, secondary care, regional centres and specialist clinical centres, as appropriate*
- *putting protocols in place to identify patients with no diagnosis, ensuring that a lack of diagnosis does not create a barrier to treatment*
- *drawing on patients' ability to help inform decisions about referral and diagnosis*
- *creating effective clinical networks to support this process*
- *making high quality diagnostic tests accessible through common, clinically agreed systems or pathways*
- *embedding appropriate information in national data systems including measuring equity of access to molecular tests to maintain UKGTN diagnostic studies.*

✓ Achieved by National Clinical and Diagnostic Networks, the Nationally Designated Specialist Services and The National Demand Optimisation Group (NDOG).

13. Ensure that there are appropriate procedures for evaluating the costs and benefits of treatments for patients.
✓ Achieved by the work taken forward from Dr. Brian Montgomery's Review of Access to New Medicines and the ultra-orphan pathway developed by the Scottish Government.

14. Where appropriate, support the availability of computerised prompts to help GPs diagnose a rare disease when a rare disease has not previously been considered.
✓ Achieved through eHealth decision support tools, and the EU-funded RARE-Bestpractices research project that Healthcare Improvement Scotland contributed to.

15. Improve education and awareness of rare diseases across the healthcare professions, including:

- *involving patients in the development of training programmes*
- *encouraging medical, nursing and associated health professionals to get hands-on experience in specialist clinics*
- *ensuring awareness of methods and clinical techniques used in differential diagnosis.*

🟡 Good progress has been made through RDSOG; the National Network Management Service work and will continue through the post 2020 Action Plan.

16. Monitor the development of ICD-11 in preparation for its adoption.
✅ Achieved by RDSOG and the work to establish a congenital anomalies register for Scotland.

17. Work with colleagues in Europe in the development of the European Orphanet coding system and consider the adoption of Orphanet coding and nomenclature.
✅ Achieved by RDSOG and the work to establish a congenital anomalies register for Scotland.

18. Standardise data collection, building on existing NHS data standards, and develop standards where they do not exist, increasing the reliability of information for use in providing or commissioning care.
✅ Achieved by the National Network Management Service.

19. Explore options to improve the link between existing patient data and electronic health records.
✅ Achieved by RDSOG and commissioning of National Patient Portal.

20. Assess the potential for rare disease databases where they do not exist.
✅ Achieved by the work to establish a congenital anomalies register for Scotland.

21. Agree international standards, building on existing UK standards.
✅ Achieved by the work to establish a congenital anomalies register for Scotland.

22. Support international links to UK databases and build on the work of current funded programmes that aim to link rare disease research internationally.
✅ Achieved by RDSOG, the EU-funded RARE-Bestpractices research project that Healthcare Improvement Scotland contributed to and the work to establish a congenital anomalies register for Scotland.

Co-ordination of Care (commitments 23-30)

23. Continue to develop service specifications for rare diseases. This will include country specific care pathways and a 'generic' care pathway that sets out best practice that can be applied to all patients with rare diseases in the UK (particularly where there are no disease specific pathways). The generic care pathway will include:

- *an appropriate care plan for all patients with rare disease*
- *clearly stated principles around the standards of care which patients with a rare disease can expect, including patients with no diagnosis*
- *the development of seamless pathways for transition, from childhood to adolescence, and on to adulthood and older age*

- *access to criteria and measures of quality and outcomes*

🟡 Good progress made through National Specialist Services Committee; National Network Management Services; National Managed Clinical Networks & Pathways; Access to specialist care in other parts of the UK; Specialist Centres, RDSOG and will continue through the post 2020 Action Plan.

24. Agree that specialist clinical centres should be a minimum standard:

- *have a sufficient caseload to build recognised expertise*
- *where possible, not depend on a single clinician*
- *coordinate care*
- *arrange for co-ordinated transition from children's to adults' services*
- *involve people with rare conditions, and their families and carers*
- *support research activity*
- *ensure their expertise is available to families and their healthcare teams.*

✅ All specialist centres in Scotland have a detailed specification and are regularly reviewed by NSD.

25. Ensure that the relationship between the specialist clinical centres and science and research is explained to and understood and put into practice by: practitioners delivering local health and social care; the research community; industry; academia.
🟡 Good progress made through access to specialist care in other parts of the UK; Specialist Centres and work will continue through the post 2020 Action Plan.

26. Set out clearly the connections to and communications with Specialist Clinical Centres in molecular diagnostics and other forms of diagnostic support.
✅ The National Demand Optimisation Group (NDOG) contributes to this commitment.

27. Ensure that specialist clinical centres are as concerned with research as with health and social care support, and that they develop networks that provide professional-to-professional dialogue and collaboration across a wide range of experts, including internationally (especially for those conditions that are ultra-rare).
✅ All specialist centres in Scotland have a detailed specification and are regularly reviewed by NSD.

28. Work with international partners wherever possible and develop UK-wide criteria for centres to become part of an expert reference network to increase flow of information between patients and professionals in a range of disciplines.
✅ European Reference Networks (ERNs) contribute to this commitment.

29. Improve systems to record genetic and other relevant information accurately to detail the incidence and prevalence of disease and to support service planning and international planning.
✅ Achieved by the work of the Scottish Genomes Partnership.

30. Identify how they can change systems to hold information about rare diseases, including information about the uptake of treatments.
✅ Achieved by SHARE, a new initiative by NHS Research Scotland.

The Role of Research (commitments 31-51)

31. Look at how the four UK countries develop, change or expand information systems to capture, connect and analyse data about clinical and social care pathways.
✓ Achieved by RDSOG and the work to establish a congenital anomalies register for Scotland.

32. Work together to identify a selection of the rare diseases most suited to the development of best-care pathways and propose other rare diseases for possible pathway development, taking on board the needs of patients and carers and the challenges faced during delivery of the first set of pathways.
✓ Achieved by the National Network Management Service.

33. Examine how they can encourage service providers to involve patients in research and to ensure appropriate funding for excess treatment costs for research in rare diseases.
✓ Achieved through the work of Scottish Government's Chief Scientist Office of centrally managing excess treatment costs to facilitate prompt approval of rare disease studies and activity-based funding of NHS Boards.

34. Make better use of online applications to give patients information about their condition so that they can develop a personalised care path plan with their clinical and social care team.
✓ Achieved by SHARE, a new initiative by NHS Research Scotland.

35. Use portals to connect patients and relatives to enhance research participation and, where appropriate, promote self-enrolment to approved research studies with online consenting, self-reporting and use of social media.
✓ Achieved by SHARE, a new initiative by NHS Research Scotland.

36. Encourage patient groups to get involved with regulatory bodies.
✓ Achieved through CSO and its continued policy of centrally managing excess treatment costs to facilitate prompt approval of rare disease studies and activity-based funding of NHS Boards.

37. Help patient organisations and community engagement events develop more formal partnerships with the NHS research-active organisations.
✓ Achieved by SHARE, a new initiative by NHS Research Scotland.

38. Explore the feasibility of the UK Clinical Trials Gateway including experimental medicine trials for rare diseases to provide information for patients and their families about research trials.
✓ Achieved by the Scottish Genetics Specialty Group.

39. Work with the research community, regulators, providers of NHS Services and research funders to develop risk-proportional permission systems.
✓ Achieved through the Research Active Scottish NHS Boards signing up to the Musketeer's memorandum to facilitate approval of multi-centre rare disease clinical studies.

40. Encourage researchers to use current guidance to produce generic participant information leaflets and consent forms and participate in future guidance reviews.
● Work is ongoing and will continue to be monitored in the next phase of implementation.

41. Promote good practice and the use of systems which facilitate a consistent and streamlined process to local NHS permissions of publicly, charitably and commercially funded research with an aim to reduce timescales.
✓ Achieved by the Scottish Genetics Laboratory Consortium.

42. Begin and complete next generation sequencing (NGS) demonstration projects to: evaluate their usefulness, acceptability and cost-effectiveness; develop effective health economic assessments (for example through Health Technology Assessments) and similar initiatives.
✓ Achieved by the work of the Scottish Genomes Partnership.

43. Evaluate the different NGS platform configurations, for example:

- *NGS for clinical condition-specific sets of genes (such as 100-200 of the 22,000 genes)*
- *whole exome sequencing (2% of the entire genome)*
- *whole genome sequencing*

✓ Achieved through the work of the Scottish Genomes Partnership.

44. Support the introduction of NGS into mainstream NHS diagnostic pathways, underpinned by appropriate clinical bioinformatics, including clinical bioinformatics hubs supported by high performance computing centres, where appropriate.
✓ Achieved through the work of the Scottish Genomes Partnership.

45. Ensure that training and education are available to the NHS workforce, highlighting the importance of NGS to all aspects of rare disease care, including the support for evidence-based local counselling for patients and their relatives who receive NGS results.
✓ Achieved through the work of the Scottish Genomes Partnership.

46. Work with industry to set priorities and determine how best to support research into rare diseases and promote research collaboration.
✓ Achieved through the work of the Scottish Government's Chief Scientist Office.

47. Support initiatives to facilitate engagement between patients, clinical care teams, researchers and industry wherever practical.
✓ Achieved through the work of the Scottish Genomes Partnership, the work of the Scottish Government's Chief Scientist Office and the Scholarship work in the name of Gordon Aikman towards Motor Neurone Disease.

48. Set out the benefits of collaboration (besides producing specific treatment) for all stakeholders.
✓ Achieved through the work of the Scottish Genomes Partnership, the SHARE initiative, and the work of the Scottish Government's Chief Scientist Office.

49. Continue to build a cohesive infrastructure for implementation and coordination of rare disease research in the NHS.
✓ Achieved through the work of the Scottish Genomes Partnership and the SHARE initiative.

50. Encourage major research funders to use current structures to coordinate strategic funding initiatives in rare diseases.
✓ Achieved through the work of the Scottish Genomes Partnership and the SHARE initiative.

51. Improve engagement between key stakeholders, including:

- *Patients and relatives*
- *Main funding providers*
- *Healthcare commissioners*
- *NHS hospitals and specialist care units*
- *Industry (pharmaceutical, biotechnology, IT, diagnostics).*

● Work is ongoing and will continue to be monitored in the next phase of implementation.

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