A stocktake of rare disease activities in Australia

Key activities, initiatives and programs occurring in Australia in the area of rare diseases, to inform the development of the National Strategic Action Plan for Rare Diseases.

A companion document to the National Strategic Action Plan for Rare Diseases

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rare voices AUSTRALIA

We acknowledge Traditional Owners of Country throughout Australia and recognise the continuing connection to lands, waters and communities. We pay our respect to Aboriginal and Torres Strait Islander people; and to Elders both past and present.

Contents

Introduction . . . 5

The international context . . . 6
Strategies and plans for rare diseases . . . 6
Other important initiatives . . . 6
Orphanet . . . 6
International Rare Diseases Research Consortium (IRDiRC) . . . 6
EURORDIS . . . 6
Asia Pacific Alliance of Rare Disease Organisations (APARDO) . . . 6

The Australian context: rare disease policy . . . 7
Call for a National Rare Disease Framework . . . 7
WA Rare Diseases Strategic Framework 2015–2018 . . . 7

The Australian context: rare disease organisations . . . 8
National organisations . . . 8
State-based organisations . . . 8
Rare disease-specific organisations . . . 8

The Australian context: critical enablers for long-term success . . . 9
Multi-stakeholder involvement and engagement . . . 9
Collaborative governance and leadership . . . 9
State, national and international partnerships . . . 9
High quality, comprehensive collection, and effective use, of rare disease data . . . 9

Rare disease awareness and education . . . 10
Rare Disease Day . . . 10
National organisations . . . 10
State-based organisations . . . 10
Rare disease-specific organisations . . . 10
Rare cancers awareness and education . . . 10
Awareness of prevention measures . . . 11
Awareness of care and support services available for people living with a rare disease . . . 11
Rare cancers awareness and education about care and support services . . . 12
Consultation between policy-makers and the rare disease community . . . 12
Workforce . . . 13
Rare disease diagnosis . . . 13

Rare disease care and support . . . 14
Care and support that is integrated . . . 14
Responsive care and support services . . . 14
Life-stage transitions . . . 15
Capacity of rare disease organisations . . . 16
Embedding people's voices into existing systems . . . 17
Equitable access to diagnostic tools and tests . . . 18
Policy to support implementation of diagnostic tools and tests . . . 19
Support throughout the diagnostic journey . . . 20
Equitable access to peri-conception testing and counselling . . . 21
Pre-conception and peri-natal care . . . 22
New and emerging technologies . . . 23
Reimbursement pathways . . . 24

Equitable access to medicines . . . 24
Mental health supports and services . . . 25
Rare disease organisations and mental health and wellbeing support . . . 26

Rare disease research and data . . . 28
Health information systems . . . 28
Epidemiological surveillance . . . 28
Data collection and use . . . 30
Rare disease registries . . . 31
Driving all types of research for rare diseases . . . 31
Collaborative and person-centred research . . . 32
Clinical trials and research activity . . . 32
Collaborative and person-centred research . . . 33
Partnerships . . . 34
Existing capability and infrastructure . . . 34

Conclusion . . . 35

Appendix 1: Acronyms . . . 36

Appendix 2: Snapshot of activities undertaken by rare disease-specific organisations . . . 37

Reference list . . . 38

Introduction

The aim of this document is to identify key existing activities, initiatives and programs occurring in Australia for rare diseases to assist in identifying gaps and potential programs that could be implemented nationally. The document draws on international best practice to map a way forward in Australia, while providing an understanding of the current environment.

This document cannot address every single activity in relation to the more than 7,000 different rare diseases[1]. Instead, it seeks to identify those of particular importance to the *National Strategic Action Plan for Rare Diseases* (the Action Plan).

A number of rare disease-related activities are currently taking place at a national, state and territory level in Australia. The rare disease sector is largely fragmented and there are instances of gaps, inequities and duplication.

This document relates to the Priorities, Actions and Implementation steps outlined in the Action Plan.

Data collection to inform this document comprised the following activities:

Stakeholder consultations

From February to April 2019, Rare Voices Australia (RVA) conducted face-to-face stakeholder consultations, and in May 2019, RVA released an online stakeholder consultation survey. Throughout this process, RVA took note of any activities, initiatives or programs that stakeholders referred to during consultations. This input was collated and validated.

In May 2019, RVA sought input from its Scientific & Medical Advisory Committee (SMAC) on key activities, initiatives and programs via email survey and videoconference. In June 2019, the information submitted by SMAC members was collated and validated by RVA.

RVA would like to extend a sincere thank you to all stakeholders for the time and effort they dedicated to assisting RVA with the gathering of information required for this document.

Desktop research

RVA actively searched for activities that were suitable to include in the stocktake via general web searches (Google). This included a review of awareness, education, care, support, research and data activities undertaken by RVA and its Partner organisations, including genetic, undiagnosed and rare disease peak bodies and rare disease-specific organisations via their websites. It is understood that websites may not reflect all activities undertaken by organisations, and that websites may not incorporate recent activities. This risk was mitigated by reviewing each organisation's most recently published newsletter and/or Annual Report. Some activities or initiatives were also identified in published literature, through the literature review undertaken to prepare the Companion Document titled, *The evidence base of the National Strategic Action Plan for Rare Diseases.*

Input from the Department of Health

The Department of Health reviewed draft versions of the Action Plan in the second half of 2019. A number of Australian Government initiatives were raised and further investigated via desktop research using general web searches (Google).

The international context

Internationally, there are notable examples of activities, initiatives and programs. Due to small numbers in rare diseases, international collaboration is critical to building economies of scale.

Strategies and plans for rare diseases

- The *UK Strategy for Rare Diseases* (2013) lays out a vision for action to 2020 and is supported by the regular publication of implementation plans.
- The *French National Plan for Rare Diseases 2018–2022* is the third French plan.
- The Canadian Organization for Rare Disorders (CORD) published *Canada's Rare Disease Strategy in 2015*. Programs are in place at a national level, notably around orphan drug development and access.
- The United States (US) *Orphan Drug Act (1983)* legislates orphan drug development incentives, while the *Rare Disease Act (2002)* established an Office of Rare Diseases.
- The *Asia-Pacific Economic Cooperation (APEC) Action Plan* on Rare Diseases was released in 2018 and is of particular relevance to Australia as an APEC member economy. RVA Partner Organisations and RVA's SMAC provided input into the APEC Action Plan during the consultation phase[2].

Common to these international strategies and plans are objectives relating to: prevention; early detection and screening; accurate and timely diagnosis; access to care and clear care pathways; supporting people living with a rare disease beyond the health domain; increasing development of and access to therapies (including orphan drugs); and the crucial role of research and innovation.

Other important initiatives

Orphanet

Orphanet is the global portal for rare diseases and orphan drugs. It is supported by grants from the European Commission and is recognised as a leading authority on rare disease classification and codification[3]. The Orphanet rare disease code – Orpha code – provides a unique code for 6,172 diseases and matches, where possible, to other commonly used classification systems[4]. Orphanet also provides links to summary information for both the general public and health professionals.

International Rare Diseases Research Consortium (IRDiRC)

The IRDiRC seeks to unite national and international governmental and non-profit funding bodies, companies (including pharmaceutical and biotech enterprises), umbrella rare disease advocacy organisations, and scientific researchers to promote international collaboration and advance rare disease research worldwide[5].

EURORDIS

Also known as Rare Diseases Europe, EURORDIS positions itself as 'The Voices of Rare Disease Patients in Europe', a non-government, patient-driven alliance of rare disease organisations representing 862 rare disease organisations in 70 countries[6]. EURORDIS coordinates Rare Disease Day annually.

Asia Pacific Alliance of Rare Disease Organisations (APARDO)

APARDO seeks to help its member organisations to improve treatment outcomes for those affected by rare diseases (including rare cancers) in the Asia Pacific region[7].

The Australian context: rare disease policy

Call for a National Rare Disease Framework

In 2014, RVA undertook a roadshow to progress a national plan for rare diseases. Key findings on the principles and objectives to progress a national plan were presented at the National Rare Disease Summit in 2015. The collaborative outcome of the Summit was a *Communiqué* to progress *A National Rare Disease Plan* that listed key principles and objectives. The *Communiqué* was subsequently endorsed by more than 170 organisations and individuals in the rare disease community and was key to RVA's advocacy for a coordinated national response to rare diseases.

In June 2017, the themes of the *Communiqué* were further developed into the key advocacy and policy document, *Call for a National Rare Disease Framework: 6 Strategic Priorities* in which RVA called for a National Rare Disease Framework with six strategic priorities: Diagnosis, Access to Treatments, Data Collection, Coordinated Care, Access to Services and Coordinated Research.

The document highlighted the need for a nationally coordinated approach to effective rare disease policy and stated that a phased implementation approach would ensure greater sustainability, while enabling much-needed policy reform in critical areas[8]. The document was presented to the Minister for Health, the Hon Greg Hunt MP and was critical in creating momentum in rare disease policy reform, particularly around:

- the Life Saving Drugs Program (LSDP);
- Medical Research Future Fund (MRFF) grant opportunities targeting rare disease (Rare Cancers and Rare Diseases and Unmet Needs (RCRDUN) competitive grant program); and
- fee exemptions in relation to the Therapeutic Goods Administration (TGA) reforms to Orphan Drug Designation.

WA Rare Diseases Strategic Framework 2015–2018

The *WA Rare Diseases Strategic Framework 2015–2018* was the first strategy for rare diseases in Australia and a significant landmark for WA Health and Western Australians affected by rare disease[9].

The Australian context: rare disease organisations

Australians living with a rare disease are supported by both national and state-based peak organisations; and disease-specific organisations.

National organisations

- RVA is Australia's peak organisation for rare disease, advocating for Australians living with a rare disease. It advocates for health and social policy and systems that work for people living with a rare disease[10].
- Syndromes Without A Name (SWAN) Australia provides information and support to families who have a child with an undiagnosed or rare genetic condition[11].

State-based organisations

There are support services available specific to genetic and rare diseases that are funded by state Governments in Western Australia (WA), Victoria and New South Wales (NSW). These organisations also respond to requests from other jurisdictions if needed.

- Genetic and Rare Disease Network (GaRDN) 'acts as a peak body for genetic and rare disease support groups in WA, working to empower individuals and their families to reach positive health outcomes'[12].
- Genetic Support Network of Victoria (GSNV) is a state-wide service for all people with genetic, undiagnosed and rare conditions, and those who support them[13].
- Genetic Alliance Australia (GAA) is a NSW-based peak organisation for individuals and families affected by a rare genetic disease[14].

SWAN Australia, GaRDN, GSNV and GAA are RVA Partner Organisations[15]. All five organisations are not-for-profit and are registered charities that accept donations.

Rare disease-specific organisations

There are many rare disease-specific organisations in Australia. For the purposes of this document, only the activities, initiatives and programs of rare disease-specific organisations that are RVA Partner organisations and other key rare disease organisations such as Rare Cancers Australia and the Steve Waugh Foundation were considered.

Various types of activities are undertaken by rare disease-specific organisations in Australia (see Appendix 2); this is explored in further detail throughout this document.

The Australian context: critical enablers for long-term success

Certain enablers were identified throughout the stakeholder consultation process as being critical to the long-term success of the Action Plan for the rare disease sector. Below is a summary of current relevant activity.

Multi-stakeholder involvement and engagement

RVA interacts with all key rare disease stakeholders, including both federal and state governments, rare disease organisation leaders and advocates, peak bodies, industry, rare disease health professionals, clinicians and researchers and the media[16]. State-based peak genetic and rare disease organisations and other rare disease organisations also engage with multiple stakeholders but have a greater focus on supporting individuals living with a rare disease. RVA and SWAN Australia conduct national conferences[17,18], while a number of rare disease-specific organisations conduct disease-specific conferences. Peak genetic and rare disease organisations conduct state-based conferences, meetings and workshops in WA[19], NSW[20] and Victoria[21].

In Queensland, South Australia (SA), Tasmania, the Australian Capital Territory (ACT) and the Northern Territory (NT), there is no local peak genetic or rare disease organisation to support individuals, families and carers.

Collaborative governance and leadership

RVA, SWAN Australia, and state-based and rare disease-specific organisations currently collaborate on a largely ad-hoc basis regarding issues of common interest. Recently, there has been increased activity in this area, including RVA leading the collaborative development of the Action Plan with the guidance of a Steering Committee with cross-sector representation[22].

State, national and international partnerships

RVA has led the development of the Action Plan with a Steering Committee consisting of representatives from key stakeholders across the sector[23]. RVA works alongside state-based organisations, SWAN Australia and rare disease-specific organisations as needed regarding areas of common interest. RVA builds and maintains partnerships at both a federal and state level[24], while individual rare disease-specific organisations also maintain relationships with governments, often with the support of RVA. State-based organisations primarily focus on maintaining partnerships at a state level, including with state governments[25]. They may also be member associations of international alliances, such as EURORDIS[26].

At an international level, RVA maintains partnerships with EURORDIS, Asia-Pacific Economic Cooperation (APEC), Asia Pacific Alliance for Rare Disease Organisations (APARDO) and the International Rare Diseases Research Consortium (IRDiRC)[27]. RVA also regularly facilitates communication and collaboration between key stakeholders for important initiatives such as APEC's Rare Disease Action Plan[28], and engages in the development of resources such as the International Joint Recommendations to Address Specific Needs of Undiagnosed Rare Disease Patients[29].

High quality, comprehensive collection, and effective use, of rare disease data

A number of rare disease registries have been created around the country, with many being developed and organised independently of one another. GaRDN's website contains a page dedicated to genetic and rare disease registries open to Australians[30]. In 2018, RVA established a National Alliance of Rare Disease Registries with the aim to promote person-centred best practice, encourage uniformity around key principles and commit to further developing a growing understanding of the national rare disease picture[31]. Meanwhile, the involvement of rare disease organisations in consultation and communication between policy-makers and the rare disease community, results in the sharing of qualitative data. This often takes place with the support of RVA-led initiatives including the commissioning of reports such as *Disability & Rare Disease: Towards Person Centred Care for Australians with Rare Diseases*[32]. Likewise, a number of state-based and rare disease-specific organisations commission reports and regularly undertake surveys, contributing to the body of anecdotal and qualitative rare disease data[33].

Rare disease awareness and education

Rare Disease Day

Rare Disease Day takes place on the last day of February each year. The main objective is to raise awareness among the general public and decision-makers about rare diseases and their impact on peoples' lives. Rare Disease Day is an international event coordinated by EURORDIS[34]. RVA is Australia's official Rare Disease Day Partner[35]. Australia first participated in Rare Disease Day in 2009[36]. A number of Australian events are published on the EURORDIS website.

National organisations

RVA hosts regular Parliamentary Events and a biennial national conference[37]. RVA leads, participates in and promotes Rare Disease Day events annually. RVA's website hosts information about rare diseases, including information about the experience of living with a rare disease, and orphan drugs[38]. RVA launched the Fair for Rare campaign in 2017 to enable people living with a rare disease to share their story and ask for a 'fair go' from policy-makers[39].

SWAN Australia hosts Undiagnosed Children's Awareness Day, which aims to increase awareness and understanding of the impact and prevalence of undiagnosed genetic conditions[40]. SWAN's website contains information on the perspective of parents of SWAN children, understanding SWAN families, grief, the National Disability Insurance Scheme (NDIS), disability education advocacy, and whole genome sequencing for rare diseases[41].

State-based organisations

GaRDN participates in Rare Disease Day, typically hosting and supporting events. In 2018, it hosted the inaugural GaRDN Rare Disease Day Awards[42]. Its website contains both resources and information categorised for Individuals and Families, Support Groups and Health Professionals[43].

GSNV also participates in Rare Disease Day, and hosts workshops and events targeted at educating the support sector, health professionals and people living with a rare disease, while hosting a range of web resources. As part of their awareness and education activities aimed at stakeholders, GSNV has developed Genetic Link, an online database accessible via their website, with information categorised for Family and Individuals, Support groups and Health professionals[44].

GAA participates in an annual Genetic Awareness Week, and hosts information seminars, including seminars with a focus on genetics. Its website hosts a list of genetic conditions, including links to support services available[45].

Rare disease-specific organisations

RVA Partner Organisations conduct a wide range of awareness and education activities using platforms such as websites, social media accounts, podcasts and webinars. Example activities include awareness raising days, fundraising events and conferences.

Rare cancers awareness and education

Rare Cancers Australia (RCA) is a charity whose purpose is to improve the lives and health outcomes of Australians living with rare and less common (RLC) cancers. One of its key focus areas is raising awareness[46]. As part of their awareness and education activities, RCA has developed KnowledgeBase, an online database accessible via their website. There are five collections[47]:

- Cancer Types: a database of over 200 RLC cancers and subtypes with information and links related to that cancer;
- Cancer Services: listings of the hospitals, treatment centres and hospices specialising in cancer care;
- Health Professionals: a wide range of cancer specialists with an interest in RLC cancers;
- Support Services: a database of not-for-profit organisations, support groups and financial services that offer support services for people impacted by RLC cancers; and

- Clinical Trials: a list of clinical trials currently recruiting in Australia for RLC cancers.

Awareness of prevention measures

Prevention refers to both actions aimed at avoiding the manifestation of a disease and early detection when this improves the chances for positive health outcomes[48]. Examples include:

- Pre-conception vaccination against chicken pox (varicella) to avoid development of the rare disease congenital varicella syndrome in infants[49,50]. Information and vaccination recommendations are found on the Australian Government Department of Health website, *Immunisation for pregnancy* webpage;
- Awareness and education targeted at pregnant women, and parents and caregivers of newborns, on risks of passing whooping cough, a rare disease[51], onto newborns, and measures to reduce those risks (i.e. pertussis vaccine is recommended by the Australian Government as a single dose for women between 20 and 32 weeks in each pregnancy)[52]. There is also a broader awareness and education program surrounding whooping cough;
- Folic acid fortification and supplementation to lower the incidence of rare neural tube defects, such as spina bifida. A number of resources were developed in the late 1990s to raise awareness among women, pharmacists and pharmacy assistants on the role of folate in preventing neural tube defects[53]. GPs are heavily relied upon to provide women with the advice to begin folic acid supplementation[54]; and
- Prenatal and newborn screening programs to enable early detection of rare diseases.

The Australian Government also promotes certain health initiatives for women planning a pregnancy or already pregnant. These initiatives can have preventive effects against certain rare conditions.

- *Alcohol consumption in pregnancy*: Further to the *National Fetal Alcohol Spectrum Disorder (FASD) Strategic Action Plan 2018–2028*, the Australian Government has funded the Pregnant Pause initiative[55] and the Women Want To Know initiative[56].
- *Smoking prior to and in pregnancy*: Active smoking is a known risk factor for congenital anomalies[57]. The Australian Government has developed the *Quit for You – Quit for Two* app.

Meanwhile, the Royal Australian and New Zealand College of Obstetricians and Gynaecologists (RANZCOG) publishes patient information pamphlets, accessible by both members of the public and health professionals, to raise awareness of and educate people about a range of issues related to obstetrics and gynaecology. The pamphlets are a guide, containing general information only, and are intended to be used in conjunction with conversations between health professionals and individuals[58]. Two of these pamphlets are related to rare disease screening opportunities, and can be accessed from the Patient Information Pamphlets webpage:

- *Prenatal Screening for Chromosomal and Genetic Conditions*; and
- *Reproductive Carrier Screening*.

Awareness of care and support services available for people living with a rare disease

National organisations

RVA's website contains an A–Z list of rare disease support organisations[59], as well as a page containing information on both state-based genetic and rare disease organisations in Australia, and international rare disease organisations[60].

SWAN Australia dedicates a section of their website to support, and includes an article entitled 'What SWAN parents suggest'[61].

State-based organisations

GaRDN connects key stakeholders and service providers with people affected by genetic and rare diseases. It dedicates a section of its website to Resources for Parents and Families, including a document that lists available support services, sorted by common needs or commonly asked questions, such as *How can I contact parents in similar situations*[62]. The web page also links to a Directory of Genetic and Rare Disease Support Groups and WA Community Support Organisations[63].

GSNV seeks to connect people and their families with support through its networks. The GSNV website contains a Community & Professionals section, that includes an A-Z list of Support Groups[64]. GSNV has also created a web resource called the Genetic Link, which is targeted at Family and Individuals, Support Groups, and Health Professionals. Within the Family and Individuals section of the site, adolescents, children, individuals and parents can access information on support, ranging from mental health information and services, to rare disease-specific packs[65].

GAA's website contains a section titled Genetic Conditions & Support, in which there are A-Z lists of both Genetic Conditions and Chromosomal Conditions. The conditions listed on the website represent people who have a child with the condition, or who have the condition themselves, and have contacted GAA seeking contact with others in shared circumstances.[66,67]. The GAA website also contains a dedicated list of contact details of Australian and international support services[68].

Rare disease-specific organisations

Many rare disease organisations collate information on care and support services available to the people they represent. For example, their websites may contain information on relevant specialist health professionals, available medications and appropriate diets.

Rare cancers awareness and education about care and support services

RCA have developed KnowledgeBase, an online database, as part of their awareness and education activities aimed at patients. Among the collections, two focus on raising awareness among people living with rare cancers and their families and carers about the care and support services available to them[69]:

- Cancer Services: listings of the hospitals, treatment centres and hospices specialising in cancer care, searchable by state / territory, public / private, and service type. Where known, there is a link to relevant Health Professionals associated with each service; and
- Support Services: a database of not-for-profit organisations, support groups and financial services that offer support services for people living with RLC cancers and / or their families / carers, searchable by state / territory, and support type.

Consultation between policy-makers and the rare disease community

National organisations

RVA advocates for Australians living with a rare disease. The organisation works collaboratively with key stakeholders, including people living with a rare disease, key peak bodies, governments, researchers, clinicians and industry to promote rare disease, diagnosis, access to treatments, data collection, coordinated care, access to services and coordinated research[70].

RVA has undertaken notable stakeholder consultation processes in recent years, including the 2019 consultations as part of the development of the Action Plan. Findings of consultations conducted by RVA directly inform communications with policy-makers[71].

One of the means through which this occurs is RVA's regular Parliamentary Events[72]; by making submissions to government on rare disease policy issues, and through the publication of documents such as the *Call for a National Rare Disease Framework: 6 Strategic Priorities* (2017)[73].

SWAN Australia lobbies both the private and public sectors for systemic change to make the system fairer and easier to negotiate for everyone. Through their awareness, education and support activities, SWAN identifies issues of significant concern to SWAN families, and communicates these concerns to decision-makers through various avenues, including formal submissions[74].

State-based organisations

GaRDN aims to develop an understanding of views of members by consultation, research and surveys. They further represent these views across all sectors and levels of government. GaRDN advocates to influence outcomes in public policy and resource allocation within Government, and to influence policies and practices of government agencies. Their systemic advocacy work includes media, participation in committees, submissions to government policy review processes and direct representation to politicians and other key decision-makers[75].

GSNV has developed advocacy principles in collaboration with the Victorian support sector. Following these principles, it seeks to identify community views and then act on these views. GSNV has a particular focus on building support outside the health system[76].

GAA has produced a reported entitled *Australian Patients' and Families' Perspectives on Genome Sequencing*, which seeks to clarify perceptions on genome sequencing and understand the impact on families. Development of the report involved a national survey and focus group, and ultimately provides guidance on what should be deliberated when patients, carers, the general public and policy makers are considering genome sequencing[77].

Workforce

National Health Genomics Policy Framework and Implementation Plan

The *National Health Genomics Policy Framework* was endorsed by the Council of Australian Governments (COAG) Health Council in November 2017[78]. There are a number of national actions underway in the priority areas, as articulated in the Framework Implementation Plan[79]. They include actions to map the current genomic workforce; identify the workforce's long-term challenges; enhance the genomic literacy for the broader health workforce; engage with relevant professional bodies and colleges to identify and promote best practice; and build collaborative relationships between governments, professional bodies, clinical leaders (as champions or gatekeepers) and tertiary education providers to streamline and improve the integration of health genomics into curricula, including the feasibility of genomics[80].

Rare disease diagnosis

International Joint Recommendations to Address Specific Needs of Undiagnosed Rare Disease Patients (the Recommendations)

SWAN UK, the Wilhelm Foundation, EURORDIS, RVA, CORD, the Advocacy Service for Rare and Intractable Diseases' stakeholders in Japan (ASrid) and NORD, developed *the Recommendations* on behalf of people living with an undiagnosed and rare disease across Europe, North America, Australia and Japan in 2016. One of the five recommendations made is that '[n]ational sustainable programmes dedicated specifically for undiagnosed diseases should be developed and supported by appropriate authorities in each country to enable rapid and equitable access to diagnosis and social support.' The document recognises that care and support professionals need to be supported by national, coordinated systems in order to equip frontline health professionals to consider, investigate and refer for potential rare disease diagnoses[81].

State-based organisations: GaRDN

The GaRDN website has a section for health professionals containing a range of materials to support them to consider, investigate and refer for potential rare disease diagnoses, including a Genetic and Rare Disease Health Professional Register, Clinical Resources, Diagnostic Decision Support Tools[82]; and Undiagnosed Disease Resources for health professionals regarding a typical Undiagnosed Patient Pathway[83].

Rare disease-specific organisations

Some rare disease organisations also provide information for health professionals, in recognition that with thousands of different rare diseases, it's impossible for any individual to be aware of them all.

Rare disease care and support

Care and support that is integrated

Queensland Lifespan Metabolic Medicine Service

The Queensland Lifespan Metabolic Medicine Service provides diagnosis, care and treatment for children and adults with inborn errors of metabolism[84]. It is a joint service that works across Lady Cilento Children's Hospital and Mater Health and manages patients throughout their life. The multi-disciplinary team operates out of a clinic in Brisbane and through outreach clinics across Queensland[85]. It also provides leadership and education on a state-wide and interstate basis across the lifespan to all health professionals in all aspects of the management of metabolic disorders[86].

Special Needs Unlimited Group (SNUG)

The Steve Waugh Foundation supports children and young adults between birth and 25 years of age living with a rare disease. It provides grants for individuals, and facilitates opportunities for peer support and connection by hosting respite camps and raising awareness[87]. The respite camps are called SNUG and support the families of children with person-centred respite, support networks and information. They provide an example of care and support that is integrated by combining a family holiday with coordinated medical support[88].

My Health Record

My Health Record is an online summary of Australians' key health information and is controlled by the individual whose record it is[89]. The intended benefits of the My Health Record System are to avoid adverse drug events; enhance patient self-management, improve patient outcomes; reduce time gathering information; and avoid duplication of services[90].

Responsive care and support services

National Disability Insurance Scheme (NDIS)

The NDIS supports participants by providing reasonable and necessary supports to meet their needs, which includes supports to ensure their families and informal supports maintain their caring role. These supports include:

- in-home supports Assistance with overnight care;
- community access;
- short-term accommodation; and
- capacity building supports including, but not limited to:
  - supported employment opportunities;
  - individual and group therapy to build independent living skills;
  - therapy assessments; and
  - individual and group skills development programs etc.

Participants may use their Core support budget flexibly. This provides participants with maximum choice and control to use their funding to match their support needs, such as during times of increased support needs, or to address changes to the participant's capacity[91].

Fast tracking access to the NDIS

On 14 November 2019, the Hon Stuart Robert MP announced the NDIS Participant Service Guarantee, which will set new service timeframes for National Disability Insurance Agency (NDIA) service delivery[92]. This involved a review of the *NDIS Act* (known as the Tune Review), which investigated mechanisms to streamline and simplify NDIS processes[93].

NDIS Priority Access Requests

The NDIA recognises that urgent circumstances may indicate that a prospective participant requires an access decision to be processed sooner than the timeframes set out in the *NDIS Act*. In such circumstances, an access request may be considered for priority and a decision made (or evidence requested) within a legislated 21-day timeframe. The NDIA has implemented further priority timeframes, based on the level of vulnerability or risk of the person's circumstances[94].

Steve Waugh Foundation Grants

The Steve Waugh Foundation's grant program is intended to support those who are ineligible to get support from other sources. The grants can go towards government approved medicine; treatment; equipment, and; at times, minor house renovations or items that improve people's quality of life. The request for funding must have already been rejected by another organisation[95].

Life-stage transitions

Paediatric to adult transition services

Transition is the term used to refer to the transition of one's care from one health service to another. This may be due to a change in age, level of needs, providers, geography or other factors. The transition from paediatric to adult health services is commonly cited as a challenge for people living with a rare disease[96].

Examples of Australian paediatric to adult transition services, for people with rare diseases, include:

- the Transition Support Service, which operates at the Royal Children's Hospital Melbourne in Victoria[97]; and
- two transition clinics in WA at Perth Children's and Sir Charles Gairdner Hospitals[98].

Perinatal palliative care

The WA Government Perinatal Palliative Care Model of Care states that '[p]erinatal palliative care is a holistic approach to supportive end-of-life care', going on to say that the aim of the Model of Care is 'to ensure provision of best care during pregnancy, childbirth and the newborn period when a fetus has an identified fetal anomaly or a newborn has an identified life-limiting condition'[99]. The approach aims to improve quality of life, addressing people's overall health and wellbeing needs.

Nationally, perinatal palliative care resources include:

- Palliative Care Australia provides information to support families caring for children with a life-limiting illness. The Paediatric Palliative Care webpage contains an interactive map of Australia titled 'Paediatric Palliative Care Planning – Find a service' that enables families to find care near their home; and
- families caring for a child with a life-limiting illness can access palliative care in every state and territory, with dedicated paediatric palliative care services in every jurisdiction except the NT and Tasmania. Families in these latter jurisdictions can access specialist services in SA and Victoria[100].

In Victoria, for example, there are a number of separate generalist perinatal palliative care services that are developing targeted resources for rare diseases, including:

- Very Special Kids is one of many hospices that provide an alternative venue for end of life care, where loved ones can stay with an infant in a supported environment. Nurses and doctors are on call 24 hours a day, as well as family support workers who provide emotional support. This support is available for parents and siblings;
- Victorian Paediatric Palliative Care Program;
- Heartfelt, a volunteer organisation of professional photographers who provide high quality photographs of babies;
- Domiciliary care for the mother, including advice on suppressing lactation, for example the Australian Breastfeeding Association information on *Lactation suppression*; and
- The Red Nose grief and loss support material, including the brochure, *Choices on arranging a child's funeral*.

Palliative Care Australia

Palliative Care Australia aligns with the World Health Organization (WHO) definition of palliative care, stating that, in the contemporary Australian context[101]:

- Palliative care is person and family-centred care provided for a person with an active, progressive, advanced disease, who has little or no prospect of cure and who is expected to die, and for whom the primary treatment goal is to optimise the quality of life.

Palliative Care Australia has developed the *National Palliative Care Standards* in order to articulate and promote a vision for compassionate and appropriate specialist palliative care[102]. The organisation has also developed the Palliative Care Service Development Guidelines to communicate the organisation's expectations for the range of palliative care services, and the workforce and system capabilities required to deliver effective palliative care services[103]. While palliative care has great potential to respond to rare diseases, neither document references rare nor genetic disease.

National Palliative Care Strategy 2018

The *National Palliative Care Strategy* 'represents the commitment of the Commonwealth, state and territory governments to ensuring the highest possible level of palliative care is available to all people'. The Strategy aligns to the two documents described above, and is intended to be used to guide the improvement of palliative care in Australia. The Strategy outlines a number of Goals and Priorities, before articulating what the discussion means for the various stakeholder groups[104]. The document does not specifically reference rare nor genetic disease.

Capacity of rare disease organisations

National organisations

RVA advocates for Australians living with a rare disease. The organisation works with key stakeholders, including people living with a rare disease, key peak bodies, governments, researchers, clinicians and industry to promote rare disease, diagnosis, access to treatments, data collection, coordinated care, access to services and coordinated research[105]. Examples of representative and advocacy activities undertaken by RVA include[106]:

- developing the Action Plan, incorporating a national stakeholder consultation process; and
- advocating for key reforms to the LSDP, which include greater opportunities for the consumer voice to be heard, and drawing on key stakeholders of the rare disease community to engage and contribute their perspectives.

RVA also provides advocacy mentorship and education to its Partner Organisations to increase their advocacy capacity[107].

SWAN Australia lobbies the private and public sectors for systemic change to make the system fairer and easier to negotiate for everyone. Through their awareness, education and support activities, SWAN identifies issues that are of significant concern to SWAN families, and communicates these concerns to decision-makers through various avenues, including formal submissions[108].

State-based organisations

GaRDN advocates to influence outcomes in public policy and resource allocation within government, as well as to influence policies and practices of government agencies. Their systemic advocacy work includes media, participation in committees, submissions to government policy review processes and direct representation to politicians and other key decision-makers. Areas of focus include health and disability policy, programs and services. GaRDN also provides one-on-one advocacy and assistance to families, with the aim to assist families and / or carers to resolve issues of specific relevance to their family[109].

GSNV has developed advocacy principles in collaboration with the Victorian support sector. Following these principles, it seeks to identify community views and then act on these views. GSNV has a focus on building support outside the health system. It aims to help individual support groups to increase their capacity to deliver services, including individual or systemic advocacy[110].

GAA is developing a focus on representation and advocacy. It is doing so by participating in the Clinical Genetics Executive Committee and Newborn Screening Program Advisory Committee for the NSW Ministry of Health, and in various meetings, summits and workshops at national and state levels[111]. It also makes submissions to relevant inquiries.

Rare disease-specific organisations

Some rare disease organisations undertake representation and advocacy activities. These are often undertaken in partnership, for example with RVA, genetic and rare disease peak bodies or health professionals. In many cases, advocacy activities are directed towards enabling or increasing access to health technologies. Examples include advocating for the introduction of screening programs, listing of treatments on the Pharmaceutical Benefits Scheme (PBS) or LSDP to enable reimbursement and therefore affordable access, or re-scheduling of therapeutic goods to enable access.

Patient Voice Initiative (PVI)

PVI is a collaboration between patients, researchers and industry with the common objective of improving the patient voice in the Australian health system. One of the key functions of PVI is to undertake activities that build the capacity of patient and healthcare consumer organisations[112]. PVI conducts workshops and publishes resources targeted at individual health consumers, carers and health consumer advocacy groups providing tips and guides as to how to ensure the consumer voice is heard in health systems and processes. Examples of resources include *Dos and don'ts when making a PBAC consumer comment* and *Ethical issues for patient groups to consider when collecting and reporting information for HTA submissions*[113].

Health Technology Assessment (HTA) Consumer Training Workshops

The HTA Consumer Consultative Committee was established in 2017 to provide strategic advice and support to the principal HTA Committees and the Department of Health, in relation to consumer engagement and participation in HTA processes[114]. As a part of their work plan, the Consumer Consultative Committee has held regular Consumer Training Workshops, the purpose of which is 'to explain how consumer/patient groups and individuals currently make input into the HTA process.' The workshop also provided opportunities for consumer/patient groups to make suggestions as to how to improve the process and engage effectively with HTA assessments by the Pharmaceutical Benefits Advisory Committee (PBAC), Medical Services Advisory Committee (MSAC) and Prostheses List Advisory Committee (PLAC)[115]. The Agenda from the 12 December 2017 Workshop states the objectives to include '[supporting] the capacity building for patient organisations to participate meaningfully in all phases of HTA processes'[116].

Embedding people's voices into existing systems

The PACER Network

The PACER Network is a joint initiative of The University of Sydney, and the Kids Research at The Children's Hospital at Westmead. The Network was established in 2018 and its aim is to facilitate knowledge exchange, cross-disciplinary collaboration, and innovation in conducting and implementing patient-centred outcomes research and patient involvement in research. It provides an opportunity for researchers and health professionals to exchange learnings, collaborate, access relevant resources, and receive training in patient-centred research and patient involvement. Activities include monthly webinars and training workshops on a range of topics including qualitative research, patient involvement, and so on[117]. This model could be adapted for use in the rare disease context.

The Kaleidoscope Project

The Kaleidoscope Project is a research priority setting partnership for childhood chronic disease. It brings together children with a chronic disease, their families or carers, health professionals and policy-makers to identify important research questions. It is supported by the NSW Ministry of Health. The project involves focus group discussions with children and their families or carers, a national survey, and a one-day consensus workshop. The Project flips the traditional model of research priority setting, looking to the people impacted for the questions to answer, rather than the people who will be conducting the research[118]. The model could be adapted for use in rare disease.

Consumer voice in PBAC

The primary role of the PBAC is to recommend new medicines for listing on the PBS. Among its members are two consumer nominees[119]. Associated with the PBAC are Guidelines for the Initiation of Stakeholder Meetings, which are relied upon when the PBAC is considering an application for a drug that 'treats a serious, disabling or life-threatening condition, where there are no other realistic treatment options for that condition, but where insufficient cost-effectiveness prevents the PBAC from recommending listing'. Among the stakeholders that may be met with are patient groups, and the aim of the meetings is to inform, seek stakeholder views and, if possible, determine a listing outcome agreeable by both parties[120].

Consumer voice in the LSDP

In response to a Review of the LSDP, a number of improvements are being implemented[121]. The Department of Health states in the LSDP Guidance document that '[p]atients, their carers, and their treating physicians are central to the assessment of new medicines, particularly when considering medicines for rare diseases as clinical trial data is often sparse and understanding stakeholder perspectives is integral to the consideration'[122]. There are increased opportunities for the consumer voice to be heard in revised application and review processes. These mechanisms include:

- the inclusion of a consumer nominee as a member of the LSDP Expert Panel, embedding the consumer perspective into the decision-making process; and
- opportunities for consumers to contribute written submissions and presentations to the LSDP Expert Panel[123].

Office of HTA Consumer Evidence and Engagement Unit

The HTA Consumer Evidence and Engagement Unit was established in 2019 to assist the work of the HTA Consumer Consultative Committee. The Committee is responsible for providing strategic advice and support to the principal HTA Committees and the Department of Health, principally related to the involvement of consumers and communities in HTA decision making. The function of the Consumer Evidence and Engagement Unit is to develop 'structured projects of engagement with consumer and patient groups… [with a] focus on expanding opportunities for consumers and patients to be central to ensuring that robust decision making can also support better transparency and understanding of HTA decision making processes'[124].

Equitable access to diagnostic tools and tests

Newborn bloodspot screening (NBS)

NBS is offered to all newborns in Australia. It is a blood test that is used to detect certain rare, genetic conditions and disorders of the metabolism. NBS programs are funded by state and territory governments, and there are variations in the conditions screened for in each jurisdiction[125].

New South Wales Newborn Screening of Spinal Muscular Atrophy (SMA) (Pilot Study)

NSW is conducting a pilot study screening for SMA. Babies that have been screened and have SMA have gone on to receive treatment[126]. Babies being born in NSW have the opportunity to undertake screening and, where SMA is detected, commence treatment.

Medicare Benefits Schedule (MBS) rebates

The Australian Government provides rebates for a broad range of services, including diagnostic procedures, therapeutic procedures, diagnostic imaging services and pathology services[127].

Applications for new listings on the MBS

Applications for listings are first assessed by MSAC, which is an independent, expert committee that advises the government on the evidence relating to the safety, efficacy and cost-effectiveness of new medical technologies and procedures[128].

MSAC currently has multiple applications for pathology testing of uncommon or rare diseases in progress for conditions such as SMA, fragile X syndrome, childhood syndromes and rare cancers. With many new and emerging tests and technologies becoming available, MSAC is considering a range of applications that are seeking to address conditions and diseases that are presently harder to diagnose and treat. For example, *Medical Services Advisory Committee (MSAC) Application 1476 – Genetic testing for childhood syndromes (Application 1476)* seeks a new MBS item for next generation sequencing of coding regions in clinically affected individuals. While next generation sequencing has the ability to investigate all genes in the one test, only genes known to cause these syndromes will be analysed. A phenotype-driven list of candidate genes should be prioritised for analysis, followed by a broader scan of all other known genes with clinical evidence indicating possible involvement in the affected individual's condition[129].

National Centre for Indigenous Genomics (NCIG)

Under Indigenous Governance, NCIG conducts research and other activities to build and maintain a genome resource for the research community. The resource is being developed from an older collection of biological material (mostly blood) collected from Aboriginal and Torres Strait Islander people and held by the Australian National University since the 1960s, supplemented by the ongoing addition of new material (mostly saliva). NCIG is using the newest technologies to read the DNA sequences in the old and new material. The sequence data that emerges is being carefully assembled to make it useable to scientists. The NCIG Collection, which also includes historical documents as well as the biological material and data, is under the custodianship of an Indigenous-majority board. Biomedical scientists and researchers from other fields are invited to apply to the Board for access to the resource for projects that offer potential benefit to Aboriginal and Torres Strait Islander people[130].

Mackenzie's Mission

Mackenzie's Mission is a research project in which couples will be offered screening to identify those with an increased chance of having children with debilitating or fatal genetic conditions, or conditions where early treatment can improve a child's health. Ten thousand couples will be screened before the couples conceive (pre-conception) or in early pregnancy (antenatally).

Researchers will evaluate the outcomes of screening, the psychosocial impacts reported by couples, the ethical issues raised by reproductive carrier screening, and the health economic impacts of this test. They will also investigate how reproductive carrier screening should be provided as a national program, with the long-term aim of making screening free for every Australian couple who wants it. Mackenzie's Mission is the first project to be funded from the $500 million Australian Genomics Health Futures Mission – part of the Australian Government's MRFF[131].

Policy to support implementation of diagnostic tools and tests

NBS National Policy Framework (the Framework)

Published in 2017, *the Framework* provides guidance and mechanisms to enable the individual state and territory programs to grow and adapt into the future. While the Framework provides the policy basis for national alignment of NBS programs, it was published without funding[132]. Further funding is required for sustained implementation.

Reproductive carrier screening

RANZCOG developed a statement on genetic carrier screening in March 2019. Aimed at health professionals that provide pre-conception and antenatal care, the statement is intended to provide advice on the counselling of women and couples prior to and in the early stages of pregnancy in relation to genetic carrier screening.

Genetic carrier screening, also known as reproductive carrier screening, involves testing an individual or a couple prior to conception or birth, to see if they have an increased chance of having a child with a genetic condition. If they do, options available to them include:

- Conceiving naturally and testing the child after birth;
- Having a child naturally and conducting diagnostic testing during pregnancy to determine if the child is impacted;

- Undergoing in vitro fertilisation (IVF) and using pre-implantation genetic diagnosis (PGD) to test embryos. Any unaffected embryos would then be used for pregnancy;
- Using donor sperm, egg or embryo from individuals who are unaffected;
- Adopting a child; and
- Choosing not to have children[133].

The RANZCOG statement provides recommendations and good practice points for the counselling of women and couples prior to and in the early stages of pregnancy.

Priority access to expert diagnostic responses

International Joint Recommendations to Address Specific Needs of Undiagnosed Rare Disease Patients (the Recommendations)

In 2016, the Recommendations were developed by peak rare disease organisations representing people living with undiagnosed and rare diseases across Europe, North America, Australia and Japan. The Recommendations included the development of national specialised programs for undiagnosed rare diseases, known as Undiagnosed Disease Programs (UDPs). The Recommendations emphasise the importance of access to specialised expertise and diagnostic technologies in increasing the ease and speed of diagnosis for these individuals, and accompanying social support. Additionally, the Recommendations call for strong involvement in the UDP by patient advocates and rare disease organisations[134].

UDPs in Australia

Australia's first UDP is underway in WA. The UDP-WA aims to provide a definitive diagnosis for people with complex and long-standing medical conditions. The program, adapted for the WA public health system from the highly successful US National Institutes of Health UDP, was announced in late 2015. The UDP-WA incorporates a team of doctors from a broad range of specialties working together in partnership with researchers. The UDP-WA officially commenced in March 2016, when a cross-disciplinary expert panel met to consider its first case. This expert panel is made up of doctors from a range of medical specialties, depending on the individual case requirements. The program focuses on children with undiagnosed conditions and has specific entry criteria[135].

The momentum created by the establishment of the UDP-WA led to the formation of an Australia-New Zealand Undiagnosed Diseases Program Executive Committee and several jurisdictions commencing planning or implementation of UDPs. For example, a workshop was hosted in NSW in 2016 to discuss establishment of a local UDP[136]. In Victoria, the Murdoch Children's Research Institute's Rare Disease Flagship works to improve the detection, diagnosis and treatment of rare diseases[137]. The Institute hosts the UDP – Victoria, whose approach differs from that of the UDP-WA in that a combination of genomic technology and stem cell medicine is used[138].

Support throughout the diagnostic journey

National organisations

SWAN Australia plays an active role in national representation and advocacy[139]. A selection of the support activities of SWAN is presented below:

- SWAN Australia dedicates a section of its website to Support, and includes an article titled 'What SWAN parents suggest'. It raises awareness of available support services, such as counsellors, and suggests that families and carers can seek assistance from their GPs, a genetic counsellor, home care and respite services[140];
- Undiagnosed Children's Awareness Day, which aims to increase awareness and understanding in the wider community of the impact and prevalence of undiagnosed genetic conditions so as to support the ongoing operations of SWAN Australia[141];
- it hosts a SWAN Conference and facilitates a closed Facebook Group, as well as a number of peer support events, including Parent Dinners, Dad's Group, Mum's Group, Family Days, SWAN Playgroup, SWAN Grandparents Group and Siblings Group; and

- the organisation prepares packs for SWAN families in ICU or in hospital for long periods, has a buddy system, offers a parent telephone support line and provides Messenger support[142].

State-based organisations

GaRDN's website contains Undiagnosed Disease Resources to support individuals and their families and carers, including[143]:

- links to the UDP-WA, the Undiagnosed Diseases Network International, and to a range of patient support options for people without a diagnosis; and
- genetic Services: Information on available genetic services in WA, as well as some general information.

Equitable access to peri-conception testing and counselling

Pre-conception care

The current edition of the Royal Australian College of General Practitioners' (RACGP) *Guidelines for preventive activities in general practice* includes a chapter titled 'Genetic counselling and testing', which promotes an approach to genetic testing and counselling based on increased risk, including family history. The Guidelines support GPs to discuss a woman's (and potentially her partner's) genetic / family history in order to ascertain the possibility of requiring further genetic investigation, and suggests that GPs should consider referral to, or consultation with, a genetic service for testing due to the complex and sensitive nature of such a process. The Guidelines suggest that GPs '[p]rovide opportunity for carrier screening for genetic conditions (eg cystic fibrosis, haemoglobinopathies) and referral for genetic counselling based upon risk factors.' The Guidelines also provide a table of prominent rare and/or genetic diseases, such as cystic fibrosis, Down syndrome and Fragile X syndrome, which includes factors that increase probability; screening, testing, or other actions that should be undertaken, and how often; and references[144].

Clinical Practice Guidelines: Pregnancy Care

The *Clinical Practice Guidelines: Pregnancy Care* (the Guidelines) were developed by the Australian Government Department of Health. They aim to provide high quality, evidence-based guidance to maternity service providers and care recipients.

In a section on Fetal Chromosomal Anomalies, the Guidelines have chapters dedicated to:

- chromosomal anomalies;
- tests for probability of chromosomal anomalies;
- diagnostic testing; and
- other considerations in testing for fetal chromosomal anomalies.

All recommendations and practice points in the Guidelines relating to this section expired in December 2016. No guidance is provided as to pre-conception screening or testing[145].

Access to reproductive carrier screening

RANZCOG writes that reproductive carrier screening generally incurs out of pocket expenses in Australia, unless there is a family history of the condition for which the woman or couple is being tested. Where there is a family history of the condition, the woman or couple may be referred to a genetic counsellor or clinical geneticist, and the screening may be funded by the Government. For the limited number of rare and/or genetic diseases listed in the table in the RACGP's 'Guidelines for preventive activities in general practice' chapter titled, 'Genetic counselling and testing', there is some discussion of whether or not MBS rebates apply to the suggested tests. For example, MBS rebates apply for certain tests for hereditary haemochromatosis, for first-degree relatives of an affected individual[146].

Education materials available for individuals and families

In Australia, education materials available for individuals and families are not standardised across the nation. However, there are some resources and projects in train to increase the consistency of information available.

The RANZCOG publishes patient information pamphlets to raise awareness of and educate about a range of issues related to obstetrics and gynaecology. The pamphlets are a guide, containing general information, and are intended to be used alongside conversations between health professionals and individuals[147].

Two of these pamphlets are related to rare disease screening opportunities:

- *Prenatal Screening for Chromosomal and Genetic Conditions*; and
- *Reproductive Carrier Screening.*

In October 2019, Australian Genomics published a *National Clinical Genomic Consent Form*, with the intent of determining a national approach to administering patient consent in a genomic context. The consent form is accompanied by supporting material that explains a range of complex and sensitive matters related to genomic testing, including[148]:

- the testing process and different types of testing;
- potential outcomes from the results;
- the implications of results for the patient and their family;
- data storage; and
- options for sharing test data for research.

Work is also progressing under the National Health Genomics Policy Framework to 'build on existing work to develop and promote nationally consistent templates and guidance for consent' (Action 4A of the *Implementation Plan: National Health Genomics Policy Framework 2018–2021*). This work is being led by the NSW Ministry of Health[149].

Pre-conception and peri-natal care

Pre-conception care

Women who have, or are at risk of developing, certain chronic conditions, such as diabetes, epilepsy or thyroid disorders, have an increased chance of having babies with rare congenital anomalies. Access to evidence-based, high-quality pre-conception and peri-natal care can minimise this chance[150,151], and this has been called for in the Australian Journal of General Practitioners[152].

There are no Commonwealth Government-endorsed national guidelines for pre-conception care[153]. Instead, Australian GPs may refer to the following guidelines, which include advice on pre-conception care:

- WHO's 2012 publication of meeting outcomes, entitled *Meeting to Develop a Global Consensus on Preconception Care to Reduce Maternal and Childhood Mortality and Morbidity*[154]; and
- the SA Government's *Preconception Advice Clinical Guideline*, available from the Practice Guidelines webpage[155].

This situation is similar in Europe where despite there being reasonable evidence surrounding pre-conception interventions that optimise maternal and foetal health, pre-conception care has received little policy development support in many European countries[156].

The current edition of RACGP's *Guidelines for preventive activities in general practice* contains a chapter titled 'Preventive activities prior to pregnancy', stating that '[e]very woman of reproductive age should be considered for preconception care' and providing a reproductive age range of women with whom to provide this type of care. It describes preconception care as comprising a number of interventions that aim to identify and modify risks to a woman's health or pregnancy through prevention and management[157].

Australian GPs have identified a major barrier to their ability to provide evidence-based, high-quality preconception care: a lack of women presenting in the preconception stage specifically for the purpose of preconception care. There is evidence that suggests that women may not be aware of the benefits of preconception care, or of the risks of suboptimal health in the preconception period. In summary, often, women attend GPs when they are not pregnant but have other reasons for their presentation, they are already pregnant, or they are experiencing difficulty conceiving. Barriers to GPs proactively investigating the need for preconception care are predominantly related to insufficient time and resources[158].

Clinical Practice Guidelines: Pregnancy Care

The Australian Government Department of Health has developed *Clinical Practice Guidelines: Pregnancy Care* (the Guidelines).

Diabetes: While the Guidelines contain a chapter dedicated to hyperglycaemia (raised blood glucose level), the section specifically 'does not address the care of women diagnosed with Type 1 or type 2 diabetes before pregnancy as the Guidelines cover the antenatal care of healthy pregnant women (i.e. those who do not have identified pre-existing conditions).' The Guidelines do discuss the risks associated with diabetes in pregnancy; guide clinicians to identify women at risk of diabetes during pregnancy, including testing for hyperglycaemia, and; provide a conversation guide to aid health professional discussions with women regarding diabetes in pregnancy.

Epilepsy: The Guidelines do not contain a section dedicated to care for women with, or at risk of developing, epilepsy. However, they do identify women with epilepsy as potentially requiring additional care during pregnancy, and encourage health professionals to discuss the use of medicines during pregnancy with women, including epilepsy medications.

Thyroid disorders: The Guidelines contain a chapter dedicated to thyroid dysfunction. This section discusses the risks associated with thyroid dysfunction in pregnancy; discuss the benefits and harms of testing for thyroid dysfunction; guide clinicians to identify women at high risk of thyroid dysfunction, including testing thyroid function, and; provide a conversation guide to aid health professional discussions with women regarding thyroid dysfunction in pregnancy[159].

New and emerging technologies

Recent policy changes

In June 2017, RVA developed a key advocacy and policy document, *Call for a National Rare Disease Framework: 6 Strategic Priorities*[160]. This document made the case for a nationally coordinated approach to effective rare disease policy and was presented to the Minister for Health, the Hon Greg Hunt MP. This was critical in creating momentum in rare disease policy reform, particularly around:

- reforms to the LSDP, resulting in increased transparency and a clearer pathway[161];
- MRFF grant opportunities targeting rare disease (RCRDUN competitive grant program)[162]; and
- fee exemptions relating to the TGA reforms to Orphan Drug Designation[163].

LSDP

The LSDP provides fully subsidised access for eligible patients with rare and life-threatening disease to essential medicines[164]. All currently subsidised drugs on the LSDP are undergoing review by the LSDP Expert Panel to ensure that they are performing as expected at the time of listing and that their funding arrangements remain appropriate. As of December 2019, the LSDP lists 16 drugs for 10 rare diseases[165].

In 2014, the Minister for Health announced a Review of the LSDP. The main objectives were to review the access, equity, value for money and future administration of the program with a view to facilitating continued subsidy to important and necessary medicines for patients[166]. On 28 January 2018, the Minister for Health, the Hon Greg Hunt MP, announced the outcomes of the Review of the LSDP and provided the Government response. The reforms were developed in consultation with industry and with consumer representatives. Changes have been designed to provide opportunities for people living with a rare disease and their families to be heard throughout the decision-making process[167]. In response to this review, a number of improvements are being implemented to ensure those eligible retain access to medicines through the LSDP and that the program remains sustainable. Improvements commenced 1 July 2018, and include[168]:

- the adoption of a LSDP definition of 1:50,000 people or less in the Australian population;
- the implementation of transparent and rigorous assessment processes and guidance, including:
  - the establishment of an Expert Panel to advise the Commonwealth Chief Medical Officer, which provides the expertise required to assess and advise upon medicines for the LSDP;
  - guidance and details on the HTA involved in including a medicine on the program, including all steps, timeframes, program criteria and evidence requirements for consideration; and
  - publication of Expert Panel activity online;

- the introduction of a review of medicines 24 months after listing to ensure use and performance of the medicine is in line with the expectations at listing;
- a similar review of existing medicines to be completed within two years from the commencement of the new program;
- the negotiated application of pricing policies to new and existing medicines, similar to those applied to PBS medicines; and
- streamlining administration processes to deliver certainty to people living with a rare disease and stakeholders, including implementing cost recovery arrangements from sponsors for listing considerations and management of their agreements.

International approaches to mitochondrial replacement therapies

Mitochondrial replacement therapies, involving mitochondrial donation, aim to prevent the transmission of mitochondrial disease from a mother to her genetically related offspring. While there are various techniques to achieve this outcome, in simple terms, they involve diluting or replacing defective maternal cytoplasm containing the faulty mitochondrial DNA with the healthy, donor cytoplasm containing healthy mitochondrial DNA[169]. Mitochondrial donation is not yet legal in Australia. Following the Inquiry into the Science of Mitochondrial Donation and Related Matters, it was requested that the NHMRC Chief Executive Officer (CEO) facilitate a public consultation on the possible introduction of mitochondrial donation into Australian clinical practice. The NHMRC CEO was asked to advise the Government on key scientific questions that were identified by the Senate Inquiry. The NHMRC has established the Mitochondrial Donation Expert Working Committee to provide advice to the CEO on the legal, regulatory, scientific and ethical issues relating to mitochondrial donation. Additionally, a sub-committee was established to provide advice on the citizens' panel. Meanwhile, the UK passed regulations on mitochondrial donation in late 2015. Under the amendments made to the Human Fertilisation and Embryology Act in the UK, mitochondrial donation techniques are allowed as part of IVF treatments[170].

Reimbursement pathways

HTA Access Point (HTAAP)

The HTAAP is a 'single entry point' to receive applications for subsidy under the MBS, the PBS and the Prostheses List. As a part of the HTAAP, the HTA Team can assist potential applicants with co-dependent or hybrid technology to determine which Committee is best-placed to assess their application; MSAC, PBAC, and/or PLAC, respectively[171].

Equitable access to medicines

New registration pathways

The Department of Health, through the TGA, has implemented new registration pathways that provide earlier access to new therapies. These pathways include provisional (approval based on early clinical data), priority (faster approval), usage of comparable overseas regulator evaluation reports and a number of international collaboration initiatives to increase options and/or reduce perceived regulatory burden.

Orphan drug designation

Orphan drugs are so called because they are 'intended to treat diseases so rare that sponsors are reluctant to develop them under usual marketing conditions.' Hence, the drug's development is in response to a public health need rather than for economic reasons. The indications of a drug may also be considered as 'orphan' since a substance may be used in the treatment of a common disease but not for a more rare indication[172].

The *Therapeutic Goods Regulations 1990* state that, in order for a medicine to be designated as an orphan drug it must be intended to treat a condition that affects less than five in 10,000 Australians at the time of application, or to prevent or diagnose a condition that would not be likely to be supplied to more than five in 10,000 Australians each year. Orphan designation means the sponsor receives a waiver of application and evaluation fees for registration on the Australian Register of Therapeutic Goods[173].

HTA Consumer Evidence and Engagement Unit

The HTA Consumer Evidence and Engagement Unit was established in 2019 to assist the work of the HTA Consumer Consultative Committee. The Committee is responsible for providing strategic advice and support to the principal HTA Committees and the Department of Health, related to the involvement of consumers and communities in HTA decision making.

The function of the Consumer Evidence and Engagement Unit is to develop 'structured projects of engagement with consumer and patient groups… [with a] focus on expanding opportunities for consumers and patients to be central to ensuring that robust decision making can also support better transparency and understanding of HTA decision making processes'[174].

Mental health supports and services

The Fifth National Mental Health and Suicide Prevention Plan (the Fifth Plan)

The Fifth Plan and its Implementation Plan were endorsed by the COAG Health Council on 4 August 2017. It seeks to establish a national approach for collaborative government effort from 2017 to 2022 across eight targeted priority areas. It aims to provide guidance for governments, stakeholders and the health sector to understand the implementation approach, and is supported by an Implementation Plan[175].

In articulating the reasons for which improving Aboriginal and Torres Strait Islander mental health and suicide prevention is a priority, the Plan provides the following overview (p.30) [176]:

- ATSI adults are almost three times more likely to experience high or very high levels of psychological distress than other Australians, are hospitalised for mental and behavioural disorders at almost twice the rate of non-Indigenous people, and have twice the rate of suicide than that of other Australians. … The high rates of chronic disease in Aboriginal and Torres Strait Islander peoples mean that many people are likely to experience coexisting physical and emotional health problems. Governments have recognised that achieving the COAG Closing the Gap targets will require simultaneous action to address chronic disease and mental illness in Aboriginal and Torres Strait Islander peoples, families and communities.

The Plan also discusses challenges to Aboriginal and Torres Strait Islander people receiving culturally safe and appropriate mental health care (p.27), as below, and concludes that cultural competence should be a core clinical competence capability of mental health service providers [177]:

- The general workforce does not always have the knowledge, experience or tools to effectively treat severe mental illness in an Aboriginal and/or Torres Strait Islander cultural context. Language barriers can hinder communication and accurate assessment, and gaps in cultural knowledge and understanding can lead to misdiagnosis or mental disorders remaining undiagnosed.

Chronic Disease Management Services

Chronic Disease Management (formerly Enhanced Primary Care or EPC) — GP services on the MBS enable GPs to plan and coordinate the health care of patients with chronic or terminal medical conditions, including patients with these conditions who require multidisciplinary, team-based care from a GP and at least two other health or care providers[178].

Mental Health Treatment Plans

Mental Health Treatment Plans, often referred to simply as Mental Health Plans, are part of the Australian Government's *Better Access to Psychiatrists, Psychologists and General Practitioners through the MBS (Better Access)* initiative. This initiative enables people with a clinically diagnosed mental disorder to receive Medicare rebates for up to ten individual and ten group allied mental health services per calendar year. The services may be provided by GPs, psychiatrists, psychologists (clinical and registered) and eligible social workers and occupational therapists. In some circumstances, individuals with a Mental Health Treatment Plan living in an eligible rural, remote or very remote location are able to claim rebates for online video consultations for up to seven (of their ten) consultations[179].

Rare disease organisations and mental health and wellbeing support

Digital mental health services

Digital mental health services and products can be delivered online via desktops, mobile devices and apps. The term also extends to telephone and online crisis and counselling services. Digital mental health services are delivered in real time through multiple settings, including the home, the workplace, schools and through clinicians' workplaces. Some services offer fully automated self-help programs, while others involve guidance from clinicians, volunteer crisis supporters, teachers, administrators or peers. The broad range of digital mental health service options span health promotion, education, prevention, treatment and recovery[180].

The Fifth Plan identified digital mental health services as valuable resources for people with or at risk of developing, mild to moderate mental illness. It recognises these types of services as emerging and, to this point, developing in an ad-hoc manner. It highlights opportunities for greater integration of these services, and commits Australian Governments to developing a *National Digital Mental Health Framework* in collaboration with the Digital Health Agency (Action 32)[181]. As at February 2020, the Framework is yet to be published.

Head to Health

Head to Health is the Australian Government's digital mental health gateway, which aims to better connect people to information, advice, and free or low-cost phone and online mental health services, supports and treatment options. Head to Health also aims to support improved mental health literacy, and provides resources designed to support early intervention and prevention, especially around wellbeing and overall general mental health. It lists quality digital mental health resources delivered by trusted Australian service providers[182].

Peer support activities

The predominant way in which genetic and rare disease peak organisations and RVA Partner organisations provide wellbeing and mental health support is through the facilitation and development of peer support activities.

National organisations

SWAN Australia facilitates many peer support activities and events, including a closed Facebook Group, Parent Dinners, Dad's Group, Mum's Group, Family Days, SWAN Playgroup, SWAN Grandparents Group and Siblings Group, and a buddy system[183].

State-based organisations

GaRDN operates the Link Line, which connects individuals and families for whom no known support group exists[184], as well as facilitating peer support activities between individuals and families seeking support about genetic and rare disease. GaRDN also provides peer support training, thus helping build the capacity of the sector to facilitate these activities[185].

GSNV funded a small number of support group leaders to undertake the mental health first aid program in 2018 and 2019, in order to upskill the genetic and rare disease sector to recognise mental health issues presenting in themselves and the people they support[186]. Mental health first aid training is funded by the Commonwealth Department of Health for frontline community workers in four sectors: the healthcare, financial, legal and relationship counselling sectors. The primary focus of mental health first aid is suicide prevention[187]. GSNV also provides peer support training[188].

GAA offers face-to-face seminars, sibling workshops, condition-specific meetings, remote options for connecting people (technology-enabled), a Peer Support and Information Officer responsible for facilitating ongoing support, and the Contact Corner (a register for people who have a condition themselves, or a child with the condition and would like to get in touch with others who share a similar situation)[189].

Rare disease-specific organisations

A number of rare disease-specific organisations offer or facilitate peer support groups or activities, which directly contribute to supporting the social and emotional wellbeing of their members. Examples include:

- phone lines that people can ring and speak with someone with shared experiences;
- exchanging contact details of members (with appropriate consent);
- face-to-face meetings for people living with or caring for someone with a rare disease, sometimes with a special focus, such as young people; and
- family-focused activities, such as support network sessions or retreats.

Rare disease research and data

Health information systems

Australian Institute of Health and Welfare (AIHW) review of International Classification of Diseases 11th Revision (ICD-11)

The ICD, developed by WHO, is known as 'the global standard for diagnostic health information'. It enables diseases and health conditions to be recorded using a standardised coding system, so that mortality and morbidity data can be tracked, analysed, and compared. The 11th Revision was released on 18 June 2018 for implementation from 1 January 2022.

Genetic syndromes without structural developmental anomalies—previously grouped as 'congenital anomalies'—are now recategorised according to the affected body systems. Accordingly, the number of rare diseases has increased by ten-fold compared with ICD-10, and 5,400 such diseases listed in the Orphanet database now have unique codes in ICD-11[190].

Australia currently uses ICD-10 for coding mortality (cause of death) and ICD-10-AM for coding of morbidity (diseases and related health problems) in hospitals. ICD-11 brings mortality and morbidity coding into one classification. The AIHW has conducted a review of ICD-11 to inform and assist decision-makers about ICD-11 and its potential for adoption in Australia[191].

Australian definition of rare disease

The WA Office of Population Health Genomics is in the process of developing a definition of 'rare disease', in collaboration with key stakeholders[192].

Currently, the Australian 'definition' of a disease being considered rare if it affects less than five in 10,000 people is only implied in the TGA Orphan Drug designation eligibility criteria, and not formally defined[193]. In many other areas of the world, including all of the European Union, rare diseases are defined as those affecting fewer than 5 per 10,000 people. In the US, a rare disease is one affecting fewer than 200,000 individuals at a given time[194].

International definition of undiagnosed rare disease

'Undiagnosed rare disease' is defined in the International Joint Recommendations to Address Specific Needs of Undiagnosed Rare Disease Patients[195] as comprising two groups of undiagnosed diseases, which are classified amongst rare diseases and comprised of:

- 'not yet diagnosed' refers to a person who lives with an undiagnosed condition that should be diagnosed but hasn't been because the person has not been referred to the appropriate clinician due to common, misleading symptoms, or an unusual clinical presentation of a known rare condition'; and
- 'undiagnosed (Syndromes Without A Name or SWAN) refers to a patient for whom a diagnostic test is not yet available since the disease has not been characterised and the cause is not yet identified. This person can also be misdiagnosed as his/her condition can be mistaken for others.'

Epidemiological surveillance

National Congenital Anomalies Data Collection

The AIHW is committed to congenital anomalies (also called congenital abnormalities, congenital malformations, birth anomalies, birth defects and development anomalies) as a core data collection, in recognition of congenital anomalies remaining a significant public health problem in Australia. However, we do not have quality national data on birth anomalies in Australia[196].

Congenital anomalies are a large class of mainly rare diseases. Despite being the leading cause of perinatal deaths[197], the most recent national publication was released in 2008 using 2002–03 data[198]. A report published in 2004 entitled *Recommendations for development of a new Australian Birth Anomalies System* set out initial parameters for a new Australian Birth Anomalies System[199]. However, to date, the collection remains elusive.

England's approach to a comparable data collection represents an international best-practice approach. The National Congenital Anomaly and Rare Disease Registration Service records those people with congenital abnormalities and rare diseases across the whole nation[200].

The AIHW is establishing a National Congenital Anomalies Data Collection, which will provide national data regarding the incidence of congenital anomalies to evaluate the public health impact. This will be the first time data on congenital anomalies has been compiled by the AIHW since the cessation of the Australian Congenital Anomalies Monitoring System in 2008.

The AIHW is working collaboratively with jurisdictions and monitoring the progress of work in WA around improving visibility of rare congenital anomalies through the use of Orphacodes, as well as WHO's incorporation of rare disease coding into the new ICD-11 classification. In the long-term, AIHW seeks to incorporate rare disease coding into the National Congenital Anomaly Data Collection, once jurisdictional capability to provide data with greater visibility of rare diseases is developed.

WA Register of Developmental Anomalies (WARDA)

WARDA is Australia's leading congenital anomalies data collection, with respect to rare disease coding. It is a statutory and state-wide combined congenital anomaly and cerebral palsy register, and is a world affiliate member of EUROCAT (the European network of population-based registries for the epidemiological surveillance of congenital anomalies) and member of the International Clearing House of Birth Defects Surveillance Registers[201].

WARDA has implemented rare disease coding prospectively and is currently undergoing a matching exercise (between the British Paediatric Association extension of ICD-9, ICD-10 and Orphanet rare disease classification) together with the WA Clinical Coding Authority that also incorporates historical data and uses case specific congenital anomaly coding. This is the basis for the introduction of Orpha coding into other health data sets[202].

Other congenital anomalies data collections

Congenital anomalies registers exist in NSW, Victoria, WA and SA. Data is collected on congenital anomalies in Queensland, Tasmania and the ACT. The NT is currently unable to provide data in a format enabling it to be compiled with data from the other states and territories, although some summary data has been provided by the NT for inclusion in national collections. Congenital anomalies are mainly notified from data collected as part of perinatal collections. Other sources of data include perinatal death certificates, cytogenetic or pathology reports, admitted patient data, maternal and child health nurses and medical officers[203].

- SA Birth Defects Register
- NSW Register of Congenital Conditions
- Victorian Congenital Anomalies Register

Australian Paediatric Surveillance Unit (APSU)

The APSU is a national resource established in 1993 to facilitate active surveillance of uncommon rare childhood diseases; complications of common diseases; and adverse effects of treatment.

Diseases are selected based on their public health significance and impact on health resources. Data collected by the APSU has contributed to 52 surveillance studies[204]. Current studies are underway on the rare diseases congenital varicella, congenital rubella and Rett syndrome[205].

The data collection method of the APSU is to send clinicians on a contact database a reply-paid report card or an email 'card' that lists the conditions currently being studied by the APSU, a list which is also accessible from the website. Clinicians are asked to report children newly diagnosed with any of the conditions listed. The APSU informs investigators of any new cases reported, who can then follow up with the clinicians as needed, and then report back to the APSU annually. Due to the nature of the data collection method, reported rates for conditions ascertained through the APSU represent a minimum estimate of these conditions in the relevant populations[206].

National Notifiable Diseases Surveillance System (NNDSS)

A select number of communicable diseases are notified nationally to the NNDSS. The information contributes to the development of public health policy, and identification and response to communicable disease outbreaks of national significance.

Some rare diseases are included on the NNDSS list, for example: congenital rubella syndrome, Creutzfeldt-Jakob disease, pertussis (whooping cough) and Q fever[207].

There is a legislated protocol in place to add or remove diseases from the National Notifiable Disease List, which supports collection of data into the NNDSS. In addition to the nationally notifiable diseases, some states may collect data on other diseases within their jurisdictions. For example, in Victoria, medical practitioners and pathology services must notify authorities in writing within five days of a diagnosis of *Mycobacterium ulcerans* infection[208].

Data collection and use

National Health Genomics Policy Framework and Implementation Plan

The National Health Genomics Policy Framework (the Framework) was endorsed by the COAG Health Council in November 2017. The Framework 'aims to harness the health benefits of genomic knowledge and technology into the Australian health system in an efficient, effective, ethical and equitable way to improve individual and population health'[209].

The Framework consists of five Strategic Priorities, the fifth of which is Data. The aim of this Priority is to ensure the responsible collection, storage, use and management of genomic data. It consists of five priority areas for action, and seven intended outcomes[210].

There are a number of national actions underway in these priority areas, as articulated in the Framework Implementation Plan[211], many of which have close alignment to the Action Plan.

LSDP

Under reforms to the LSDP, from 1 July 2018, all existing and new medicines listed on the LSDP have been subject to reviews of usage and financial costs after 24 months of this date (for existing medicines) or the date of initial subsidy (for new medicines). The purpose of these reviews is specifically related to ongoing determination of eligibility and suitability of the treatment.

These reviews may collect a wide range of information, including and not limited to the following:

- the real-world use of a medicine, including safety, utilisation, dosage and program treatment guidelines;
- the clinical benefits achieved through medicine use, including comparative effectiveness between medicines where there is more than one medicine to treat the same condition, and extent of life extension;
- understanding preventable wastage;
- understanding testing and access requirements and the price paid for the medicine; and
- annually-collected patient-level data for all patients on the LSDP.

Due to the small number of patients accessing medicines on the LSDP, privacy and confidentiality are of paramount importance when considering the publication of any data[212].

It is currently unclear what data, if any, may be made available, to support health system planning or research. Some data may be able to be released once properly assessed for confidentiality purposes.

Rare disease registries

National Alliance of Rare Disease Registries

Led and facilitated by RVA, the National Alliance of Rare Disease Registries (the Alliance) aims to promote person-centred best practice, encourage uniformity around key principles and commit to further developing a growing understanding of the national rare disease picture. The Alliance has been initiated by an experienced group of rare disease researchers and clinicians, as a Sub-Committee for RVA. It supports the use of recommendations for improving rare disease registries, from the global platform RD-Connect[213].

Genetic and Rare Disease Registries

GaRDN's website contains a page on Genetic and Rare Disease Registries. The page contains a list of patient and clinical registries open to Australians that may be relevant to both health professionals and individuals with an interest in genetic and rare diseases. The page also contains a link to further information on international registries[214].

Rare Disease Registry Framework

The *Rare Disease Registry Framework* is an internet tool developed by WA researchers. Importantly, this registry architecture is open source and allows customised data input by patients or their family members[215]. The Framework contains data entry forms and questionnaires based on reusable data element definitions ('Common Data Elements'), and thus the registries can be created and modified without changes to the source code[216]. The proposal is that the RDRF could provide a secure, potentially low-cost alternative to individual rare disease organisation-managed registries, as well as a basis for collaborative data collection by researchers and patient organisations[217].

MRFF

As part of the MRFF ten-year investment plan, the Government announced the MRFF Data Infrastructure Initiative, which will inject $80 million over eight years from 2020–21 with a focus on registries, biobanks, and linkage platforms[218].

Driving all types of research for rare diseases

Genomics Health Futures Mission

Established under the MRFF, $500m has been allocated over 10 years. It is recently established, so it is unclear exactly how the funding will be allocated. The first project will be Mackenzie's Mission, and $20m is allocated to this project. Calls under the Project Grants and Ethical, Legal and Social Issues Research stream are currently in progress[219].

There may be opportunities to align with consultation processes that may be undertaken as a part of the Genomics Health Futures Mission, and other initiatives under the MRFF, both to develop the research strategy for rare diseases and undertake regular reviews.

National Health and Medical Research Council (NHMRC) Reporting

The NHMRC publishes a range of research funding and statistics data. It reports on funding for National Health Priority Areas, as well as major diseases, conditions or health areas by burden of disease. Congenital anomalies are included in the latter category[220].

While data classifications, including burden of disease allocations, fields of research, keywords, grant titles and media summaries, are provided by investigators[221], the NHMRC provides selected fields to collect consistent data. Investigators can nominate their project as fitting into a certain *Broad Research Area*, with options such as Basic Science, Public Health, Clinical Medicine and Science and Health Services Research; and *Field of Research*, with options such as Community Child Health, Developmental Genetics (incl. Sex Determination), Epidemiology, Foetal Development and Medicine and Genomics[222].

Collaborative and person-centred research

IRDiRC

IRDiRC seeks to unite national and international governmental and non-profit funding bodies, companies (including pharmaceutical and biotech enterprises), umbrella patient advocacy organisations, and scientific researchers to promote international collaboration and advance rare diseases research worldwide[223]. The Australian Member Organisations are the WA Department of Health and RVA[224].

MRFF International Clinical Trial Collaborations Program

The International Clinical Trial Collaborations Grant Opportunity will provide support for Australian research teams to conduct clinical trial research in collaboration with international counterparts.

Applications to this grant opportunity must propose a single clinical trial that will achieve the following outcomes:

- promote Australian involvement in international collaborative investigator-initiated clinical trials research through the establishment and coordination of clinical trial site/s in Australia; and
- provide high-quality evidence of the effectiveness of novel health treatments, drugs or devices in 'usual care' settings, which will support a decision on whether to deliver the intervention in an Australian setting.

Novel health treatments include new and innovative applications of existing interventions[225].

Clinical trials and research activity

Clinical Trial Activity: Rare Cancers and Rare Diseases and Unmet Needs (RCRDUN)

Under the MRFF 10 Year Plan announced in the 2019–20 Budget, $614 million is committed under the Clinical Trials Activity – RCRDUN Initiative, to support new clinical trial activity focussing on rare cancers, rare diseases and unmet medical need, through contestable grant opportunities for which Australian researchers can apply. International collaboration is encouraged to bring the most cutting-edge technology and treatments to Australia to benefit Australian patients.

As at 5 April 2019, an investment of around $35 million had been made in 19 projects under the RCRDUN Clinical Trials Funding Program[226], with desired outcomes being to:

- increase clinical trial activity in Australia and develop new drugs, devices and treatments;
- increase opportunities for patients involved in clinical trials and benefiting from the latest research; and
- reaffirm Australia's position as a preferred destination for clinical trials[227].

A further $40 million has been invested in projects under the Lifting Clinical Trials and Registry Capacity, and Low Survival Cancers and Diseases Funding Programs[228].

On 15 November 2019, the Morrison Government announced its investment of $55 million to research rare cancers and diseases. Of the $55 million[229]:

- $15 million is for research into reproductive cancers, including those located in the cervix, uterus, fallopian tubes, endometrium or ovaries in women, and testicular cancer in men;
- $5 million is for Childhood Brain Cancer clinical trials, with an aim to double the 10-year survival rate of childhood brain cancer, improve the quality of life of children living with brain cancer, and ultimately find a cure to defeat childhood brain cancer;
- $20 million will address an increasingly significant burden of neurological disorders including Duchenne Muscular Dystrophy, spinal cord injuries and Autism Spectrum Disorders; and
- $15 million will address other significant gaps in current research and/or knowledge in rare cancers, rare diseases and areas of unmet medical need.

Encouraging more clinical trials in Australia initiative

The COAG Health Council agreed in March 2017 to further strengthen Australia's clinical trials sector using stimulus from the Commonwealth's $7 million *Encouraging more clinical trials in Australia* initiative to support jurisdictions in redesigning clinical trial operations around coordination hubs. Activities will improve trial sponsor, participant and investigator navigation and trial start-up times and outcomes based around coordination. The Commonwealth is continuing to lead clinical trials sector improvements consistent with the COAG Health Council's revitalised clinical trials agenda via the Clinical Trials Project Reference Group[230].

Australian Clinical Trials

AustralianClinicalTrials.gov.au is a joint initiative between the NHMRC and the Department of Industry, Innovation and Science to provide information and resources to consumers, health care providers, researchers and industry about clinical trials. It allows the user to search for a specific clinical trial, and also browse by trial categories[231]. Under the latter function, there are a number of Broad Conditions that the user can search, including a category for 'Human Genetics and Inherited Disorders'.

Trials Enabling Program (TEP)

Announced in May 2015[232], the charity, Leukaemia Foundation, partnered with Australia's leading blood cancer clinical trial group, the Australasian Leukaemia & Lymphoma Group (ALLG) to establish the TEP[233].

The TEP allows Australians living with blood cancer to participate in clinical trials based internationally, without needing to leave Australia. The Program was established in recognition that many Australians do not get access to potentially life-saving treatments being offered through overseas clinical trials, as the costs of extending the trials to Australia can be prohibitive. Without a program like the TEP, Australians wishing to participate in an international trial need to finance both the travel and associated medical expenses. Furthermore, there is no guarantee that the international trials are conducted in as strict a regulatory environment as they would be if they were carried out in Australia, and hence they may not be as safe as Australian trials.

The TEP overcomes these challenges by:

- finding consistent funding, which on average is approximately $5000 per person, with community support (donations);
- identifying suitable international trials;
- facilitating delivery of trials in Australia, including administration and data collection; and
- vetting the international trials through a medical advisory board; an independent safety board; the relevant regulatory authority in Australia, the TGA; and hospital ethics committees.

At the time of announcement, it was anticipated that approximately 125 Australians with blood cancer would be able to participate in clinical trials over the following two years, fully funded by the Leukaemia Foundation at an anticipated total cost of $600,000, or $4,800 per person. Another benefit of the Program is that people living with blood cancer outside of major cities are able to take part in the program[234].

Collaborative and person-centred research

Statement on consumer and community involvement in health and medical research

The NHMRC has developed a 'Statement on consumer and community involvement in health and medical research'. The NHMRC states that[235]:

> The active involvement of consumers and community members in health and medical research benefits the quality and direction of research. Consumer and community involvement is about research being carried out with or by consumers and community members rather than to, about or for them.

Rare disease-specific organisations

Rare disease organisations play a widely acknowledged role in promoting rare disease research. One of the key functions they can play is in linking people living with rare disease with the opportunity and support to participate in research. Some examples of this include:

- hosting registries / data collections;
- connecting people living with a rare disease to research projects, (i.e. through collating information on relevant clinical trials);
- sharing progress and / or outcomes of research projects through web resources, including podcasts and webinars;
- funding research, either through dedicated fundraising activities or by investing all funds received into research related to a particular disease; and
- undertaking / publishing research, including conducting surveys that can form pilot observational studies, or through formally publishing research.

Australian Clinical Trials Alliance

The Australian Clinical Trials Alliance has established a reference group called the Strengthening Consumer Engagement reference group. The objective of doing so was to explore how to strengthen consumer involvement and engagement in developing, conducting and reporting on clinical trials. They have released a report entitled *Consumer Involvement in Clinical Trials: Consultation Report*, which shares their findings that both consumer and clinician researchers felt more positively about consumer involvement in clinical trials[236].

Partnerships

Rare Diseases Clinical Research Network

The Rare Diseases Clinical Research Network is a US Government initiative, funded by the Office of Rare Diseases Research, the National Center for Advancing Translational Sciences and collaborating institutes and centers. It was established in 2003, with the mission to 'advance medical research on rare diseases by providing support for clinical studies and facilitating collaboration, study enrolment and data sharing.'

Through the Network, rare disease research groups, researchers and their teams work together with patient organisations to study nearly 200 rare diseases at clinical centers across the US and worldwide. The Network's operations are facilitated by a Data Management and Coordinating Center that operates out of a children's hospital and university.

In FY19, the National Institutes of Health granted approximately US$31 million to 20 teams of scientists, clinicians, patients, families and patient advocates to study a wide range of rare diseases. A further US$7 million has been awarded to a separate data coordinating center to support these research efforts[237].

Existing capability and infrastructure

Children's and Adolescent/Young Adult Cancer Clinical Trials Unit

In 2017, Professor John Heath helped to establish the Children's and Adolescent/Young Adult Cancer Clinical Trials Unit at Royal Hobart Hospital. The Unit receives funding of more than $300,000 over five years from The Kids' Cancer Project, and ensures that Tasmanian children and young people can access clinical trials, and therefore, potentially life-saving treatments, without travelling interstate. The benefits of having the Unit locally extend beyond giving Tasmanians greater access to clinical trial participation, and therefore potentially to treatments, to increasing the exposure of local health professionals to leading national and international research.

One participant has been granted compassionate access to a number of therapies that have not previously been listed. Professor Heath attributes this to the embedding of research capability and infrastructure within clinical teams: 'This is possible because we've been able to show the drug company that we will monitor her as though she's on a clinical trial,' he said. 'We can do this because we now have the infrastructure, and particularly an experienced clinical trials coordinator, to collect the data and interact with the company with regards to side effects, etc'[238].

Conclusion

The stocktake identified rare disease-related activities occurring in Australia and this information informed the Action Plan. A number of activities are taking place at the national, state/territory and local levels. In some instances, international exemplars provide relevant examples for priority areas included in the Action Plan. Due to the low numbers in rare disease, international collaboration is critical to building economies of scale.

The activities identified include awareness campaigns, prevention programs, education programs, guidelines, support groups, screening programs and registries. Rare disease organisations are responsible for many activities that are of direct relevance to Australians living with a rare disease. The Australian Government, the RACGP and the RANZCOG take carriage of many initiatives that are of most relevance to health practitioners.The activities, initiatives, and programs included in this stocktake provide examples of opportunities to build on existing models, and demonstrate areas in which further resources and services are needed in order to achieve the Vision articulated in the Action Plan.

Appendix 1: Acronyms

AIHW – Australian Institute of Health and Welfare
APARDO – Asia Pacific Alliance for Rare Disease Organisations
APEC – Asia-Pacific Economic Cooperation
APSU – Australian Paediatric Surveillance Unit
COAG – Council of Australian Governments
CORD – Canadian Organization for Rare Disorders
EURORDIS – Rare Diseases Europe
GAA – Genetic Alliance Australia
GaRDN – Genetic and Rare Disease Network
GSNV – Genetic Support Network of Victoria
HTA – Health Technology Assessment
ICD – International Classification of Diseases
IRDiRC – International Rare Diseases Research Consortium
LSDP – Life Saving Drugs Program
MBS – Medicare Benefits Schedule
MRFF – Medical Research Futures Fund
MSAC – Medical Services Advisory Committee
NHMRC – National Health and Medical Research Council
NNDSS – National Notifiable Diseases Surveillance System
NBS – Newborn Bloodspot Screening
NCIG – National Centre for Indigenous Genomics
NDIA – National Disability Insurance Agency
NDIS – National Disability Insurance Scheme
PBAC – Pharmaceutical Benefits Advisory Committee
PBS – Pharmaceutical Benefits Scheme
PLAC – Prostheses List Advisory Committee
PVI – Patient Voice Initiative
RACGP – Royal Australian College of General Practitioners
RANZCOG – Royal Australian and New Zealand College of Obstetricians and Gynaecologists
RCRDUN – Rare Cancers and Rare Diseases and Unmet Needs
RLC – rare and less common (cancers)
RVA – Rare Voices Australia
SMA – Spinal Muscular Atrophy
SMAC – Scientific & Medical Advisory Committee
SNUG – Special Needs Unlimited Group
SWAN – Syndromes Without A Name
TEP – Trials Enabling Program
TGA – Therapeutic Goods Administration
UDP – Undiagnosed Disease Program
UDP-WA – Undiagnosed Disease Program Western Australia
WARDA – Western Australian Register of Developmental Anomalies
WHO – World Health Organization

Appendix 2: Snapshot of activities undertaken by rare disease-specific organisations

Awareness and Education

- Website
- Social media
  - Facebook
  - Twitter
  - LinkedIn
  - Instagram
  - YouTube
  - Pinterest
  - Webinars
  - Podcasts
- Awareness raising days
- Fundraising capacity (website link or activities)
- Conference/s
- Education
- Communications
  - Newsletters/E-Newsletters
- Systemic Advocacy
  - Direct representation to politicians and other key decision-makers
  - Policy submissions
  - Participating in committees
  - Contributing to stakeholder consultations
  - Media appearances/releases
- Individual advocacy
  - Working with individuals/families to resolve issues of specific relevance to them

Care and Support

- Peer Support Events
- Closed Facebook groups
- Clinics
- Information on Support
- Information on Care
- Resources for Health Professionals

Research and Data

- Registries/Data collections
- Connecting people living with rare disease to research projects
- Connecting people living with rare disease to registries
- Promoting/Facilitating person-centred research
- Sharing research
- Funding research
- Contributing to literature

Reference list

1 United States Department of Health & Human Services 2019. FAQs About Rare Diseases. Accessed from rarediseases.info.nih.gov/diseases/pages/31/faqs-about-rare-diseases on 28 October 2019.

2 Rare Voices Australia n.d. Policy. Accessed from www.rarevoices.org.au/page/115/policy-development- on 25 November 2019.

3 Orphanet n.d. About Orphanet. Accessed from www.orpha.net/consor/cgi-bin/Education_AboutOrphanet.php?lng=EN on 12 February 2020.

4 Orphanet 2020. Home Page. Accessed from www.orpha.net/consor/cgi-bin/index.php on 12 February 2020.

5 International Rare Diseases Research Consortium 2019. About. Accessed from www.irdirc.org/about-us/ on 26 June 2019.

6 EURORDIS Rare Diseases Europe n.d. About EURORDIS. Accessed from www.eurordis.org/about-eurordis on 26 June 2019.

7 Asia Pacific Alliance of Rare Disease Organisations 25 November 2019. About. Accessed from www.apardo.org/about on 25 November 2019.

8 Rare Voices Australia 2017. Call for a National Rare Disease Framework: 6 Strategic Priorities. Melbourne: RVA. Accessed from rva.blob.core.windows.net/assets/uploads/files/National%20Rare%20Disease%20Framework.pdf on 2 October 2019.

9 Government of Western Australia Department of Health 2015. WA Rare Diseases Strategic Framework 2015–2018. Perth: Government of Western Australia. Accessed from ww2.health.wa.gov.au/~/media/Files/Corporate/Reports%20and%20publications/PDF/Rare-diseases-strategic-framework.pdf on 2 October 2019.

10 Rare Voices Australia n.d. Uniting Australians Living with Rare Disease. Accessed from www.rarevoices.org.au/ on 9 December 2019.

11 Syndromes Without A Name (SWAN) Australia n.d. Home Page. Accessed from swanaus.org.au/ on 9 December 2019.

12 Genetic and Rare Disease Network n.d. About GaRDN. Accessed from gardn.org.au/about/ on 9 December 2019.

13 Genetic Support Network of Victoria n.d. About the GSNV. Accessed from www.gsnv.org.au/ on 9 December 2019.

14 Genetic Alliance Australia n.d. About Genetic Alliance Australia. Accessed from www.geneticalliance.org.au/aboutnew.php?1 on 9 December 2019.

15 Rare Voices Australia n.d. RVA Partner Organisations. Accessed from www.rarevoices.org.au/page/130/rva-partner-organisations on 9 December 2019.

16 Rare Voices Australia n.d. RVA's Focus. Accessed from www.rarevoices.org.au/page/7/our-purpose on 13 December 2019.

17 Rare Voices Australia n.d. National Rare Disease Summit. Accessed from www.rarevoices.org.au/page/148/national-rare-disease-summit on 13 December 2019.

18 Syndromes Without A Name (SWAN) Australia n.d. SWAN events. Accessed from swanaus.org.au/event/swan-conference-and-agm/ on 13 December 2019.

19 Genetic and Rare Disease Network 2018. Annual Report 2017–18. Accessed from gardn.org.au/wp-content/uploads/2018/12/2017-18-GaRDN-Annual-Report.pdf on 4 December 2019.

20 Genetic Alliance Australia n.d. What we do. Accessed from www.geneticalliance.org.au/aboutnew.php?2 on 13 December 2019.

21 Genetic Support Network Victoria n.d. How we can help you. Accessed from www.gsnv.org.au/about/how-we-can-help-you/ on 13 December 2019.

22 Rare Voices Australia n.d. Uniting Australians Living with Rare Disease. Accessed from www.rarevoices.org.au/page/44/home on 13 December 2019.

23 Rare Voices Australia n.d. Uniting Australians Living with Rare Disease. Accessed from www.rarevoices.org.au/page/44/home on 13 December 2019.

24 Rare Voices Australia n.d. Policy & Advocacy. Accessed from www.rarevoices.org.au/page/114/policy on 13 December 2019.

25 See, for example: Genetic and Rare Disease Network n.d. About. Accessed from gardn.org.au/about/ on 13 December 2019.

26 See, for example: Genetic Alliance Australia n.d. Home Page. Accessed from www.geneticalliance.org.au/ on 13 December 2019.

27 See, for example: Rare Voices Australia n.d. Policy. Accessed from www.rarevoices.org.au/page/115/policy-development on 13 December 2019.

28 Rare Voices Australia n.d. Policy. Accessed from www.rarevoices.org.au/page/115/policy-development on 13 December 2019.

29 Rare Voices Australia 2016. International Joint Recommendations for Undiagnosed Rare Disease Patients Dissemination Paper. Accessed from www.rarevoices.org.au/news/3140/international-joint-recommendations-for-undiagnosed-rare-disease-patients-dissemination-paper on 13 December 2019.

30 Genetic and Rare Disease Network n.d. Patient and Clinical registries open to Australians. Accessed from gardn.org.au/registries/ on 15 November 2019.

31 Rare Voices Australia n.d. National Alliance of Rare Disease Registries. Accessed from www.rarevoices.org.au/page/132/national-alliance-of-rare-disease-registries on 13 December 2019.

32 Rare Voices Australia n.d. Policy. Accessed from www.rarevoices.org.au/page/115/policy-development- on 13 December 2019.

33 See, for example: Genetic Alliance Australia n.d. Genome Sequencing Report and Patient Charter. Accessed from www.geneticalliance.org.au/genome.php?1 on 13 December 2019.

34 EURORDIS Rare Diseases Europe 2019. What is rare disease day? Accessed from www.rarediseaseday.org/article/what-is-rare-disease-day on 26 June 2019.

35 EURORDIS Rare Diseases Europe 2019. Home Page. Accessed from www.rarediseaseday.org/ on 9 December 2019.

36 EURORDIS Rare Diseases Europe 2019. Rare Disease Day in Australia, Accessed from www.rarediseaseday.org/country/au/australia on 10 September 2019.

37 Rare Voices Australia n.d. National Rare Disease Summit. Accessed from www.rarevoices.org.au/page/148/national-rare-disease-summit on 9 December 2019.

38 Rare Voices Australia n.d. Uniting Australians Living with Rare Disease. Accessed from www.rarevoices.org.au/ on 9 December 2019.

39 Rare Voices Australia n.d. Fair for Rare. Accessed from www.rarevoices.org.au/page/166/fair-for-rare- on 12 February 2020.

40 Syndromes Without A Name (SWAN) Australia 2016. Undiagnosed Children's Awareness Day. Accessed from swanaus.org.au/undiagnosed_childerens_awareness_day/ on 22 August 2019.

41 Syndromes Without A Name (SWAN) Australia n.d. SWAN Presentations. Accessed from swanaus.org.au/presentations/ on 9 December 2019.

42 Genetic and Rare Disease Network 2018. Annual Report 2017–18. Accessed from gardn.org.au/wp-content/uploads/2018/12/2017-18-GaRDN-Annual-Report.pdf on 4 December 2019.

43 Genetic and Rare Disease Network n.d. Home Page. Accessed from gardn.org.au/ on 9 December 2019.

44 Genetic Support Network Victoria 2019. Genetic Link. Accessed from www.thegeneticlink.org.au/ on 26 November 2019.

45 Genetic Alliance Australia n.d. About Genetic Alliance Australia. Accessed from www.geneticalliance.org.au/aboutnew.php?1 on 9 December 2019.

46 Rare Cancers Australia 2019. Our Mission. Accessed from on www.rarecancers.org.au/page/15/our-mission 7 October 2019.

47 Rare Cancers Australia 2019. KnowledgeBase. Accessed from knowledge.rarecancers.org.au/ on 7 October 2019.

48 World Health Organization 2019. About us. Accessed from www.emro.who.int/about-who/public-health-functions/health-promotion-disease-prevention.html on 12 February 2020.

49 Australian Government Department of Health 2019. Immunisation for pregnancy. Accessed from www.health.gov.au/health-topics/immunisation/immunisation-throughout-life/immunisation-for-pregnancy on 10 September 2019.

50 Orphanet 2019. Congenital varicella syndrome. Accessed from www.orpha.net/consor/cgi-bin/Disease_Search.php?lng=EN&data_id=602&Disease_Disease_Search_diseaseGroup=varicella&Disease_Disease_Search_diseaseType=Pat&Disease(s)/group%20of%20diseases=Congenital-varicella-syndrome&title=Congenital%20varicella%20syndrome&search=Disease_Search_Simple on 10 September 2019.

51 Orphanet 2019. Whooping cough. Accessed from www.orpha.net/consor/cgi-bin/Disease_Search.php?lng=EN&data_id=859&Disease_Disease_Search_diseaseGroup=whooping-cough&Disease_Disease_Search_diseaseType=Pat&Disease(s)/group%20of%20diseases=Whooping-cough&title=Whooping%20cough&search=Disease_Search_Simple on 10 September 2019.

52 Australian Government Department of Health 2019. Immunisation for pregnancy. Accessed from www.health.gov.au/health-topics/immunisation/immunisation-throughout-life/immunisation-for-pregnancy on 10 September 2019.

53 Australian Government Department of Health 2010. Folate. Accessed from www1.health.gov.au/internet/main/publishing.nsf/Content/health-pubhlth-strateg-folate-index.htm on 10 September 2019.

54 Royal Australian College of General Practitioners 2018. Preventive activities prior to pregnancy. Chapter 1 in: Guidelines for preventive activities in general practice. 9th edn, updated. East Melbourne: RACGP. Accessed from www.racgp.org.au/FSDEDEV/media/documents/Clinical%20Resources/Guidelines/Red%20Book/Guidelines-for-preventive-activities-in-general-practice.pdf on 19 November 2019.

55 Australian Government Department of Health 2019. Pregnant Pause initiative. Accessed from www.health.gov.au/initiatives-and-programs/pregnant-pause-initiative on 10 September 2019.

56 Australian Government Department of Health 2019. Women Want To Know initiative. Accessed from www.health.gov.au/initiatives-and-programs/women-want-to-know-initiative on 10 September 2019.

57 Hackshaw, A., Rodeck, C. and Boniface, S. 2011. Maternal smoking in pregnancy and birth defects: a systematic review based on 173 687 malformed cases and 11.7 million controls. Human Reproduction Update, 17 (5), 589–604. Accessed from academic.oup.com/humupd/article/17/5/589/760093?searchresult=1 on 10 September 2019.

58 Royal Australian and New Zealand College of Obstetricians and Gynaecologists n.d. Patient Information Pamphlets. Accessed from ranzcog.edu.au/womens-health/patient-information-guides/patient-information-pamphlets on 14 November 2019.

59 Rare Voices Australia n.d. A-Z list of rare disease patient organisations. Accessed from www.rarevoices.org.au/page/26/a-z-of-support-organisations on 25 November 2019.

60 Rare Voices Australia n.d. Helpful information. Accessed from www.rarevoices.org.au/page/43/patient-information on 25 November 2019.

61 Syndromes Without A Name Australia n.d. Support. Accessed from swanaus.org.au/information/diagnosis/support-for-parentscarers/ on 15 November 2019.

62 Genetic and Rare Disease Network 2017. Resource Guide for Families. Accessed from gardn.org.au/wp-content/uploads/2017/11/Resource-Guide-for-Families-2017.pdf on 15 November 2019.

63 Genetic and Rare Disease Network 2017. Resources for Parents and Families. Accessed from gardn.org.au/individuals-and-families/resources-families/ on 15 November 2019.

64 Genetic Support Network Victoria n.d. Support Groups. Accessed from www.gsnv.org.au/community-professionals/support-groups/ on 15 November 2019.

65 Genetic Link 2019. Parents. Accessed from www.thegeneticlink.org.au/family-and-individuals/parents/ on 15 November 2019.

66 Genetic Alliance Australia n.d. Genetic Conditions. Accessed from www.geneticalliance.org.au/conditions.php on 15 November 2019.

67 Genetic Alliance Australia n.d. Chromosome Conditions Intro. Accessed from www.geneticalliance.org.au/chromosome_conditions.php on 15 November 2019.

68 Genetic Alliance Australia n.d. Useful Support Services. Accessed from www.geneticalliance.org.au/support_groups.php on 15 November 2019.

69 Rare Cancers Australia 2019. KnowledgeBase. Accessed from knowledge.rarecancers.org.au/ on 7 October 2019.

70 Rare Voices Australia n.d. Policy & Advocacy. Accessed from www.rarevoices.org.au/page/114/policy on 9 December 2019.

71 Rare Voices Australia n.d. Policy. Accessed from www.rarevoices.org.au/page/115/policy-development- on 9 December 2019.

72 Rare Voices Australia n.d. News. Accessed from www.rarevoices.org.au/news/category/13/e-newsletter on 9 December 2019.

73 Rare Voices Australia n.d. Policy. Accessed from www.rarevoices.org.au/page/115/policy-development- on 9 December 2019.

74 Syndromes Without A Name (SWAN) Australia n.d. Advocacy. Accessed from swanaus.org.au/make-a-difference/advocacy/ on 9 December 2019.

75 Genetic and Rare Disease Network n.d. About GaRDN. Accessed from gardn.org.au/about/ on 9 December 2019.

76 Genetic Support Network Victoria n.d. Our Advocacy Principles. Accessed from www.gsnv.org.au/about/our-advocacy-principles/ on 9 December 2019.

77 Genetic Alliance Australia n.d. Genome Sequencing Accessed from www.geneticalliance.org.au/genome_sequencing.php?1 on 9 December 2019.

78 Australian Government Department of Health 2019. National Health Genomics Policy Framework and Implementation Plan 2018–2021. Accessed from www1.health.gov.au/internet/main/publishing.nsf/Content/national-health-genomics-policy-framework-2018-2021 on 7 October 2019.

79 Australian Government Department of Health 2018. Implementation Plan—National Health Genomics Policy Framework. Accessed from www1.health.gov.au/internet/main/publishing.nsf/Content/FD973B58DE82BCFFCA2581CC007D4682/$File/Implementation-Plan-to-the-Framework.pdf on 2 October 2019.

80 Australian Government Department of Health 2018. Implementation Plan—National Health Genomics Policy Framework. Accessed from www1.health.gov.au/internet/main/publishing.nsf/Content/FD973B58DE82BCFFCA2581CC007D4682/$File/Implementation-Plan-to-the-Framework.pdf on 2 October 2019.

81 SWAN UK, Wilhelm Foundation, RVA, Canadian Organization for Rare Disorders, Advocacy Service for Rare and Intractable Diseases' stakeholders in Japan, National Organization for Rare Disorders 2016. International joint recommendations to address the specific needs of undiagnosed rare diseases patients. EURORDIS Rare Diseases Europe. Accessed from download2.eurordis.org.s3.amazonaws.com/documents/pdf/Undiagnosed-International-Joint-Recommendations.pdf on 12 September 2019.

82 Genetic and Rare Disease Network n.d. Health Professionals. Accessed from gardn.org.au/health-professionals/ on 15 November 2019.

83 Genetic and Rare Disease Network n.d. Undiagnosed Patient Pathway. Accessed from gardn.org.au/health-professionals/diagnosis-decision-support-tools/undiagnosed-patient-journey/ on 15 November 2019.

84 Queensland Government Children's Health Queensland Hospital and Health Service n.d. Queensland Lifespan Metabolic Medicine Service. Accessed from www.childrens.health.qld.gov.au/service-queensland-lifespan-metabolic-medicine/ on 4 December 2019.

85 Mater 2018. Mercy Day Mission Awards recognise those who embody Mater Values. Accessed from www.mater.org.au/group/news/mater-news/october-2018/mercy-day-mission-awards-recognise-those-who-embod on 4 December 2019.

86 Queensland Government Children's Health Queensland Hospital and Health Service n.d. Queensland Lifespan Metabolic Medicine Service. Accessed from www.childrens.health.qld.gov.au/service-queensland-lifespan-metabolic-medicine/ on 4 December 2019.

87 Steve Waugh Foundation n.d. About. Accessed from www.stevewaughfoundation.com.au/about/ on 4 December 2019.

88 Steve Waugh Foundation n.d. Respite Retreats. Accessed from www.stevewaughfoundation.com.au/how-we-help/programs/respite-retreats/ on 4 December 2019.

89 Australian Government Australian Digital Health Agency n.d. What is My Health Record? Accessed from www.myhealthrecord.gov.au/for-you-your-family/what-is-my-health-record on 25 September 2019.

90 Australian Government Australian Digital Health Agency n.d. Benefits of My Health Record for healthcare professionals. Accessed from www.myhealthrecord.gov.au/for-healthcare-professionals/what-is-my-health-record/benefits-my-health-record-for-healthcare on 25 September 2019.

91 Information provided via email by the National Disability Insurance Agency, to Rare Voices Australia via the Australian Government Department of Health, in October 2019.

92 Robert, S (Minister for the National Disability Insurance Scheme) 2019. The NDIS Plan (Speech. 14 November 2019. Canberra). Accessed from ministers.dss.gov.au/speeches/5266 on 28 November 2019.

93 David Tune AO PSM December 2019. Review of the National Disability Insurance Scheme Act 2013: Removing red tape and implementing the NDIS Participant Service Guarantee. Accessed from www.dss.gov.au/sites/default/files/documents/01_2020/ndis-act-review-final-accessibility-and-prepared-publishing1.pdf on 10 February 2020.

94 Information provided via email by the National Disability Insurance Agency, to Rare Voices Australia via the Australian Government Department of Health, in October 2019.

95 Steve Waugh Foundation n.d. Grant Guidelines. Accessed from www.stevewaughfoundation.com.au/grants/grant-guidelines/ on 4 December 2019.

96 Molster CM, Urwin D, Di Pietro L, Fookes M, Petrie D, van der Laan S, Dawkins HJ 2016. Survey of healthcare experiences of Australian adults living with rare diseases. Orphanet Journal of Rare Diseases Volume 11 No.1. Accessed from ojrd.biomedcentral.com/articles/10.1186/s13023-016-0409-z on 8 October 2019.

97 The Royal Children's Hospital Melbourne n.d. Transition Support Service: What is adolescent transition? Accessed from www.rch.org.au/transition/ on 2 October 2019.

98 Government of Western Australia Child and Adolescent Health Service 2019. New transition clinics for rare and complex diseases. Accessed from pch.health.wa.gov.au/About-us/News/New-transition-clinics-for-rare-and-complex-diseases on 2 October 2019.

99 Government of Western Australia Department of Health 2015. Perinatal Palliative Care Model of Care. Perth: Government of Western Australia. Accessed from ww2.health.wa.gov.au/~/media/Files/Corporate/general%20documents/Health%20Networks/Palliative%20care/Perinatal-Palliative-Care-Model-of-Care.pdf on 9 November 2019.

100 Palliative Care Australia n.d. Paediatric Palliative Care. Accessed from palliativecare.org.au/children on 19 November 2019.

101 Palliative Care Australia n.d. National Palliative Care Standards. Accessed from palliativecare.org.au/standards on 19 November 2019.

102 Palliative Care Australia n.d. National Palliative Care Standards. Accessed from palliativecare.org.au/standards on 19 November 2019.

103 Palliative Care Australia n.d. Palliative Care Service Development Guidelines. Accessed from palliativecare.org.au/quality on 19 November 2019.

104 Australian Government Department of Health 2018. National Palliative Care Strategy 2018. Accessed from www.health.gov.au/sites/default/files/national-palliative-care-strategy-2018.pdf on 19 November 2019.

105 Rare Voices Australia n.d. Policy & Advocacy. Accessed from www.rarevoices.org.au/page/114/policy on 9 December 2019.

106 Rare Voices Australia n.d. Policy. Accessed from www.rarevoices.org.au/page/115/policy-development- on 9 December 2019.

107 Rare Voices Australia n.d. Policy & Advocacy. Accessed from www.rarevoices.org.au/page/114/policy on 9 December 2019.

108 Syndromes Without A Name (SWAN) Australia n.d. Advocacy. Accessed from swanaus.org.au/make-a-difference/advocacy/ on 9 December 2019.

109 Genetic and Rare Disease Network n.d. Advocacy. Accessed from gardn.org.au/about/advocacy/ on 9 December 2019.

110 Genetic Support Network Victoria n.d. Our Advocacy Principles. Accessed from www.gsnv.org.au/about/our-advocacy-principles/ on 9 December 2019.

111 Genetic Alliance Australia n.d. About Genetic Alliance Australia. Accessed from www.geneticalliance.org.au/aboutnew.php?1 on 9 December 2019.

112 Patient Voice Initiative n.d. About Us. Accessed from www.patient-voiceinitiative.org/about-pvi/ on 28 November 2019.

113 Patient Voice Initiative n.d. Resource Library. Accessed from www.patientvoiceinitiative.org/category/patient-groups/ on 28 November 2019.

114 Australian Government Department of Health 2019. Why is health technology assessment (HTA) important? Accessed from www1.health.gov.au/internet/hta/publishing.nsf/Content/hta-1 on 28 November 2019.

115 Australian Government Department of Health 2018. Health Technology Assessment (HTA) Consumer Consultative Committee Communiqué (14 May 2018). Accessed from www1.health.gov.au/internet/hta/publishing.nsf/Content/hta-1 on 28 November 2019.

116 Australian Government Department of Health 2017. Health Technology Assessment (HTA) Consumer Training Workshop – Tuesday 12 December 2017. Agenda. Received in personal correspondence (email) from the HTA Consumer Consultative Committee on 8 December 2017.

117 PACER Network n.d. Welcome to the PACER Network. Accessed from pacernetwork.org.au/about/ on 4 December 2019.

118 The Kaleidoscope Project n.d. Welcome to the Kaleidoscope Project. Accessed from www.thekaleidoscopeproject.com.au/about-us/ on 4 December 2019.

119 Australian Government Department of Health 2019. Pharmaceutical Benefits Advisory Committee (PBAC) Membership. Accessed from www.pbs.gov.au/pbs/industry/listing/participants/pbac on 28 November 2019.

120 Australian Government Department of Health n.d. Guidelines for Initiation of Stakeholder Meetings. Accessed from www.pbs.gov.au/pbs/industry/listing/elements/initiation-of-stakeholder-meetings on 28 November 2019.

121 Australian Government Department of Health 2019. Other supply arrangements outside the Pharmaceutical Benefits Scheme (PBS) – the Life Saving Drugs Program. Accessed from www1.health.gov.au/internet/main/publishing.nsf/Content/lsdp-info on 9 November 2019.

122 Australian Government Department of Health 2018. Procedure guidance for medicines funded through the Life Saving Drugs Program (LSDP) – Version 1.0 July 2018. Accessed from www1.health.gov.au/internet/main/publishing.nsf/content/FD13E-541FA14735CCA257BF0001B0AC0/$File/Procedure-guidance-for-medicines-funded-through-the-LSDP.pdf on 14 November 2019.

123 Australian Government Department of Health 2019. Other supply arrangements outside the Pharmaceutical Benefits Scheme (PBS) – the Life Saving Drugs Program. Accessed from www1.health.gov.au/internet/main/publishing.nsf/Content/lsdp-info on 9 November 2019.

124 Australian Government Department of Health 2019. Health Technology Assessment, Consumers and Communities. Accessed from www1.health.gov.au/internet/hta/publishing.nsf/Content/hta-1 on 14 November 2019.

125 Australian Government Department of Health 2019. Newborn bloodspot screening. Accessed from www.cancerscreening.gov.au/internet/screening/publishing.nsf/Content/newborn-blood-spot-screening on 7 October 2019.

126 The Sydney Children's Hospitals Network n.d. Disorders we test for. Accessed from www.schn.health.nsw.gov.au/find-a-service/laboratory-services/nsw-newborn-screening/disorders on 8 February 2020 .

127 Australian Government Department of Health 2019. The 1 November 2019 Medicare Benefits Schedule. Accessed from www.mbsonline.gov.au/internet/mbsonline/publishing.nsf/Content/Downloads-201911 on 19 November 2019.

128 Australian Government Department of Health 2016. About MSAC. Accessed from msac.gov.au/internet/msac/publishing.nsf/Content/about-msac on 28 June 2019.

129 Medical Services Advisory Committee 2019. 1476 – Genetic testing for childhood syndromes, Accessed from www.msac.gov.au/internet/msac/publishing.nsf/Content/1476-public on 10 September 2019.

130 National Centre for Indigenous Genomics, 2019. Australian National University College of Health & Medicine, About, Accessed from ncig.anu.edu.au/about on 10 September 2019.

131 Australian Genomics Health Alliance 2019. Mackenzie. Accessed from www.australiangenomics.org.au/our-research/disease-flagships/mackenzie-mission/ on 10 September 2019.

132 Australian Government Department of Health 2017. Newborn Bloodspot Screening National Policy Framework, Accessed from www.cancerscreening.gov.au/internet/screening/publishing.nsf/Content/newborn-bloodspot-screening on 10 September 2019.

133 Royal Australian and New Zealand College of Obstetricians and Gynaecologists 2019. Genetic Carrier Screening. Accessed from ranzcog.edu.au/RANZCOG_SITE/media/RANZCOG-MEDIA/Women%27s%20Health/Statement%20and%20guidelines/Clinical-Obstetrics/Genetic-carrier-screening(C-Obs-63)New-March-2019_1.pdf?ext=.pdf on 10 November 2019.

134 SWAN UK, Wilhelm Foundation, RVA, Canadian Organization for Rare Disorders, Advocacy Service for Rare and Intractable Diseases' stakeholders in Japan, National Organization for Rare Disorders 2016. International joint recommendations to address the specific needs of undiagnosed rare diseases patients. EURORDIS Rare Diseases Europe. Accessed from download2.eurordis.org.s3.amazonaws.com/documents/pdf/Undiagnosed-International-Joint-Recommendations.pdf on 12 September 2019.

135 Government of Western Australia Department of Health n.d., Undiagnosed Disease Program (UDP), Accessed from www.kemh.health.wa.gov.au/Our-services/Statewide-Services/Genetic-Services-of-Western-Australia/Undiagnosed-Disease-Program on 10 September 2019.

136 Baynam G et al. 2017. Initiating an undiagnosed diseases program in the Western Australian public health system. Orphanet Journal of Rare Diseases Vol.12 No.83. Accessed from ojrd.biomedcentral.com/articles/10.1186/s13023-017-0619-z on 27 November 2019.

137 Murdoch Children's Research Institute n.d. Rare Disease. Accessed from www.mcri.edu.au/content/rare-disease on 11 February 2020.

138 Murdoch Children's Research Institute n.d. Rare Disease. Accessed from www.mcri.edu.au/stem-cells/brain-disorders on 12 February 2020.

139 Syndromes Without A Name (SWAN) Australia n.d. Advocacy. Accessed from swanaus.org.au/make-a-difference/advocacy/ on 9 December 2019.

140 Syndromes Without A Name Australia n.d. Support. Accessed from swanaus.org.au/information/diagnosis/support-for-parentscarers/ on 15 November 2019.

141 Syndromes Without A Name Australia 2016. Undiagnosed Children's Awareness Day. Accessed from swanaus.org.au/undiagnosed_childerens_awareness_day/ on 22 August 2019.

142 Syndromes Without A Name Australia n.d. Support. Accessed from swanaus.org.au/information/diagnosis/support-for-parentscarers/ on 15 November 2019.

143 Genetic and Rare Disease Network n.d. Health Professionals. Accessed from gardn.org.au/health-professionals/ on 15 November 2019.

144 Royal Australian College of General Practitioners 2018. Genetic counselling and testing. Chapter 2 in: Guidelines for preventive activities in general practice. 9th edn, updated. East Melbourne: RACGP. Accessed from www.racgp.org.au/FSDEDEV/media/documents/Clinical%20Resources/Guidelines/Red%20Book/Guidelines-for-preventive-activities-in-general-practice.pdf on 19 November 2019.

145 Australian Government Department of Health 2019. Clinical Practice Guidelines: Pregnancy Care. Canberra: Australian Government Department of Health. Accessed from www.health.gov.au/sites/default/files/pregnancy-care-guidelines_0.pdf on 19 November 2019.

146 Royal Australian College of General Practitioners 2018. Genetic counselling and testing. Chapter 2 in: Guidelines for preventive activities in general practice. 9th edn, updated. East Melbourne: RACGP. Accessed from www.racgp.org.au/FSDEDEV/media/documents/Clinical%20Resources/Guidelines/Red%20Book/Guidelines-for-preventive-activities-in-general-practice.pdf on 19 November 2019.

147 Royal Australian and New Zealand College of Obstetricians and Gynaecologists n.d. Patient Information Pamphlets. Accessed from ranzcog.edu.au/womens-health/patient-information-guides/patient-information-pamphlets on 14 November 2019.

148 Australian Genomics Health Alliance 2019. A National Approach to Clinical Consent. Accessed from www.australiangenomics.org.au/just-released-national-clinical-consent-form-for-genomic-testing/ on 19 November 2019.

149 Australian Genomics Health Alliance 2019. National Clinical Consent. Accessed from www.australiangenomics.org.au/resources/for-professionals/national-clinical-consent/ on 19 November 2019.

150 EUROCAT European Surveillance of Congenital Anomalies 2012. Primary Prevention of Congenital Anomalies: Recommendations on policies to be considered for the primary prevention of congenital anomalies in National Plans and Strategies on Rare Diseases. EUROCAT. Accessed from eu-rd-platform.jrc.ec.europa.eu/sites/default/files/EUROCAT-EUROPLAN-Primary-Preventions-Recomendations.pdf on 4 October 2019.

151 EUROCAT European Surveillance of Congenital Anomalies 2013. *Special Report: Primary Prevention of Congenital Anomalies in European Countries*. Newtownabbey: EUROCAT. Accessed from eu-rd-platform.jrc.ec.europa.eu/sites/default/files/EUROCAT-Special-Report-Primary-Preventions-of-CA.pdf on 2 October 2019.

152 Dorney E, Black KI 2018. Preconception care. Australian Journal of General Practice Vol.47 No.7. Accessed from www1.racgp.org.au/ajgp/2018/july/preconception-care/ on 19 November 2019.

153 Dorney E, Black KI 2018. Preconception care. Australian Journal of General Practice Vol.47 No.7. Accessed from www1.racgp.org.au/ajgp/2018/july/preconception-care/ on 19 November 2019.

154 World Health Organization 2012. Meeting to Develop a Global Consensus on Preconception Care to Reduce Maternal and Childhood Mortality and Morbidity. Geneva: WHO. Accessed from apps.who.int/iris/bitstream/handle/10665/78067/9789241505000_eng.f;jsessionid=CB2BA6F596B1849A513BC3C9001B5010?sequence=1 on 19 November 2019.

155 Government of South Australia Department of Health and Ageing 2015. Preconception Advice Clinical Guideline. Accessed from extapps2.sahealth.sa.gov.au/PracticeGuidelines/Home/DownloadPDF?Filename=Preconception%20Advice_Sept2015.pdf&target=_blank on 19 November 2019.

156 EUROCAT European Surveillance of Congenital Anomalies 2013. Special Report: Primary Prevention of Congenital Anomalies in European Countries. Newtownabbey: EUROCAT. Accessed from eu-rd-platform.jrc.ec.europa.eu/sites/default/files/EUROCAT-Special-Report-Primary-Preventions-of-CA.pdf on 2 October 2019.

157 Royal Australian College of General Practitioners 2018. Preventive activities prior to pregnancy. Chapter 1 in: Guidelines for preventive activities in general practice. 9th edn, updated. East Melbourne: RACGP. Accessed from www.racgp.org.au/FSDEDEV/media/documents/Clinical%20Resources/Guidelines/Red%20Book/Guidelines-for-preventive-activities-in-general-practice.pdf on 19 November 2019.

158 Dorney E, Black KI 2018. Preconception care. Australian Journal of General Practice Vol.47 No.7. Accessed from www1.racgp.org.au/ajgp/2018/july/preconception-care/ on 19 November 2019.

159 Australian Government Department of Health 2018. Clinical Practice Guidelines: Pregnancy Care. Canberra: Australian Government Department of Health. Accessed from www.health.gov.au/sites/default/files/pregnancy-care-guidelines_0.pdf on 19 November 2019.

160 Rare Voices Australia 2017. Call for a National Rare Disease Framework: 6 Strategic Priorities. Melbourne: RVA. Accessed from rva.blob.core.windows.net/assets/uploads/files/National%20Rare%20Disease%20Framework.pdf on 2 October 2019.

161 Australian Government Department of Health 2019. Life Saving Drugs Program – Information for patients, prescribers and pharmacists. Accessed from www.health.gov.au/internet/main/publishing.nsf/Content/lsdp-criteria on 28 June 2019.

162 Australian Government Department of Health 2019. Clinical Trial Activity: Rare Cancers and Rare Diseases and Unmet Needs. Accessed from www.health.gov.au/initiatives-and-programs/clinical-trial-activity-rare-cancers-and-rare-diseases-and-unmet-needs on 10 September 2019.

163 Therapeutic Goods Administration 2018. Orphan drug designation. Accessed from www.tga.gov.au/publication/orphan-drug-designation on 26 June 2019.

164 Australian Government Department of Health 2019. Life Saving Drugs Program – Information for patients, prescribers and pharmacists. Accessed from www.health.gov.au/internet/main/publishing.nsf/Content/lsdp-criteria on 28 June 2019.

165 Australian Government Department of Health 2019. Life Saving Drugs Program – Information for patients, prescribers and pharmacists. Accessed from www.health.gov.au/internet/main/publishing.nsf/Content/lsdp-criteria on 12 February 2020.

166 Australian Government Department of Health 2019. Other supply arrangements outside the Pharmaceutical Benefits Scheme (PBS) – the Life Saving Drugs Program. Accessed from www1.health.gov.au/internet/main/publishing.nsf/Content/lsdp-info on 9 November 2019.

167 Australian Government Department of Health 2019. Other supply arrangements outside the Pharmaceutical Benefits Scheme (PBS) – the Life Saving Drugs Program. Accessed from www1.health.gov.au/internet/main/publishing.nsf/Content/lsdp-info on 9 November 2019.

168 Australian Government Department of Health 2019. Other supply arrangements outside the Pharmaceutical Benefits Scheme (PBS) – the Life Saving Drugs Program. Accessed from www1.health.gov.au/internet/main/publishing.nsf/Content/lsdp-info on 9 November 2019.

169 Tachibana M, Kuno T, Yaegashi N 2018. Mitochondrial replacement therapy and assisted reproductive technology: A paradigm shift toward treatment of genetic diseases in gametes or in early embryos. Reproductive Medicine and Biology. Vol.17 No.4. Accessed from www.ncbi.nlm.nih.gov/pmc/articles/PMC6194288/ on 19 November 2019.

170 Castro R, 2016. Mitochondrial replacement therapy: the UK and US regulatory landscapes. Journal of the Law and the Biosciences. Vol.3 No.3. Accessed from academic.oup.com/jlb/article/3/3/726/2566730 on 19 November 2019.

171 Australian Government Department of Health 2011. Applying through the HTA Access Point: A guide for potential applicants. Accessed from www1.health.gov.au/internet/hta/publishing.nsf/Content/guide-1 on 14 November 2019.

172 Orphanet 2019. About Orphan Drugs. Accessed from www.orpha.net/consor/cgi-bin/Education_AboutOrphanDrugs.php?lng=EN on 15 August 2019.

173 Therapeutic Goods Administration 2018. Orphan Drug designation eligibility criteria. Accessed from www.tga.gov.au/publication/orphan-drug-designation-eligibility-criteria on 12 February 2020.

174 Australian Government Department of Health 2019. Health Technology Assessment, Consumers and Communities. Accessed from www1.health.gov.au/internet/hta/publishing.nsf/Content/hta-1 on 14 November 2019.

175 Council of Australian Governments Health Council 2017. The Fifth National Mental Health and Suicide Prevention Plan. Accessed from www.coaghealthcouncil.gov.au/Portals/0/Fifth%20National%20Mental%20Health%20and%20Suicide%20Prevention%20Plan.pdf on 15 November.

176 Council of Australian Governments Health Council 2017. The Fifth National Mental Health and Suicide Prevention Plan. Accessed from www.coaghealthcouncil.gov.au/Portals/0/Fifth%20National%20Mental%20Health%20and%20Suicide%20Prevention%20Plan.pdf on 15 November.

177 Council of Australian Governments Health Council 2017. The Fifth National Mental Health and Suicide Prevention Plan. Accessed from www.coaghealthcouncil.gov.au/Portals/0/Fifth%20National%20Mental%20Health%20and%20Suicide%20Prevention%20Plan.pdf on 15 November.

178 Australian Government Department of Health 2014. Chronic Disease Management (formerly Enhanced Primary Care or EPC) — GP services. Accessed from www1.health.gov.au/internet/main/publishing.nsf/Content/mbsprimarycare-chronicdiseasemanagement 14 November 2019.

179 Australian Government Department of Health 2017. Better access to mental health care: fact sheet for patients. Accessed from www1.health.gov.au/internet/main/publishing.nsf/content/mental-ba-fact-pat on 15 November 2019.

180 Australian Government Department of Health 2017. Low Intensity Mental Health Services for Early Intervention: PHN Primary Mental Health Care Flexible Funding Pool Implementation Guidance. Accessed from www1.health.gov.au/internet/main/publishing.nsf/content/2126B045A8DA90FDCA257F6500018260/$File/2PHN%20Guidance%20-%20Low%20Intensity%20services.docx on 15 November 2019.

181 Council of Australian Governments Health Council 2017. The Fifth National Mental Health and Suicide Prevention Plan. Accessed from www.coaghealthcouncil.gov.au/Portals/0/Fifth%20National%20Mental%20Health%20and%20Suicide%20Prevention%20Plan.pdf on 15 November.

182 Australian Government Department of Health n.d. What is Head to Health. Accessed from headtohealth.gov.au/about-us on 15 November 2019.

183 Syndromes Without A Name Australia n.d. Support. Accessed from swanaus.org.au/information/diagnosis/support-for-parentscarers/ on 15 November 2019.

184 Genetic and Rare Disease Network n.d. Support Groups. Accessed from gardn.org.au/support-groups/ on 26 November 2019.

185 Genetic and Rare Disease Network 2018. Annual Report 2017–18. Accessed from gardn.org.au/wp-content/uploads/2018/12/2017-18-GaRDN-Annual-Report.pdf on 4 December 2019.

186 Genetic Support Network of Victoria Inc. 2019. 2019 Submission – Royal Commission into Victoria's Mental Health System. Accessed from s3.ap-southeast-2.amazonaws.com/hdp.au.prod.app.vic-rcvmhs.files/9215/6651/6852/Genetic_Support_Network_of_Victoria_Inc.pdf on 14 November 2019.

187 Australian Government Department of Health 2014. Mental health first aid training for front line community workers. Accessed from www1.health.gov.au/internet/main/publishing.nsf/Content/mental-firstaid on 14 November 2019.

188 Genetic Support Network Victoria n.d. Peer Support Training. Accessed from www.thegeneticlink.org.au/resource/peer-support-training/ on 15 November 2019.

189 Genetic Alliance Australia n.d. Projects. Accessed from www.geneticalliance.org.au/projects.php on 19 November 2019.

190 The Lancent Child & Adolescent Health 2018. What does ICD-11 mean for health professionals? Accessed from www.thelancet.com/journals/lanchi/article/PIIS2352-4642(18)30211-6/fulltext#articleInformation on 10 September 2019.

191 Australian Institute of Health and Welfare n.d. Australia and ICD-11. Accessed from www.aihw.gov.au/getmedia/048dfef8-44f7-42f1-a27a-03c6b61e7376/ICD-11-review-flyer.pdf.aspx on 10 September 2019.

192 Genetic and Rare Disease Network 2018. Annual Report 2017–18. Accessed from gardn.org.au/wp-content/uploads/2018/12/2017-18-GaRDN-Annual-Report.pdf on 4 December 2019.

193 Therapeutic Goods Administration 2018. Orphan Drug designation eligibility criteria. Accessed from www.tga.gov.au/publication/orphan-drug-designation-eligibility-criteria on 19 August 2019.

194 Khosla N, Valdez R 2018. A compilation of national plans, policies and government actions for rare diseases in 23 countries. Intractable & Rare Disease Research Vol. 7 No. 4 pp.213–222. Accessed from www.ncbi.nlm.nih.gov/pubmed/30560012 on 12 September 2019.

195 SWAN UK, Wilhelm Foundation, RVA, Canadian Organization for Rare Disorders, Advocacy Service for Rare and Intractable Diseases' stakeholders in Japan, National Organization for Rare Disorders 2016. International joint recommendations to address the specific needs of undiagnosed rare diseases patients. EURORDIS Rare Diseases Europe. Accessed from download2.eurordis.org.s3.amazonaws.com/documents/pdf/Undiagnosed-International-Joint-Recommendations.pdf on 12 September 2019.

196 Australian Institute of Health and Welfare 2017. Recommendations for development of a new Australian Birth Anomalies System. Accessed from www.aihw.gov.au/reports/mothers-babies/development-new-australia-birth-anomalies-system/contents/table-of-contents on 10 September 2019.

197 Australian Institute of Health and Welfare 2018. Mothers & babies. Accessed from www.aihw.gov.au/reports-data/population-groups/mothers-babies/overview on 10 September 2019.

198 Australian Institute of Health and Welfare 2008. Congenital anomalies in Australia 2002–2003. Accessed from www.aihw.gov.au/reports/mothers-babies/congenital-anomalies-australia-2002-2003/contents/table-of-contents on 10 September 2019.

199 Australian Institute of Health and Welfare 2017. Recommendations for development of a new Australian Birth Anomalies System. Accessed from www.aihw.gov.au/reports/mothers-babies/development-new-australia-birth-anomalies-system/contents/table-of-contents on 10 September 2019.

200 Gov.UK 2018. National Congenital Anomaly and Rare Disease Registration Service, Accessed from www.gov.uk/guidance/the-national-congenital-anomaly-and-rare-disease-registration-service-ncardrs on 10 September 2019.

201 Government of Western Australia Department of Health n.d. WARDA – Diagnostic codes for birth defects, Accessed from ww2.health.wa.gov.au/Articles/U_Z/WARDA-Diagnostic-codes-for-birth-defects on 10 September 2019.

202 Information supplied by Dr. Gareth Baynam, Head, Western Australian Register of Developmental Anomalies, in writing (email) on 28 May 2019.

203 National Perinatal Epidemiology and Statistics Unit n.d. Australian Congenital Anomalies Monitoring System (ACAMS). Accessed from npesu.unsw.edu.au/data-collection/australian-congenital-anomalies-monitoring-system-acams on 10 September 2019.

204 Australian Paediatric Surveillance Unit n.d. About the APSU. Accessed from www.apsu.org.au/about on 10 September 2019.

205 Australian Paediatric Surveillance Unit 2019. Studies. Accessed from www.apsu.org.au/studies/ on 15 November 2019.

206 Australian Paediatric Surveillance Unit n.d. About the APSU. Accessed from www.apsu.org.au/about on 10 September 2019.

207 Australian Government Department of Health 2019. Australian national notifiable diseases and case definitions. Accessed from www1.health.gov.au/internet/main/publishing.nsf/Content/cd-na-casedefinitions.htm?Open=&utm_source=health.gov.au&utm_medium=redirect&utm_campaign=digital_transformation&utm_content=casedefinitions on 10 November 2019.

208 Government of Victoria Department of Health 2019. Mycobacterium ulcerans infection. Accessed from www2.health.vic.gov.au/public-health/infectious-diseases/disease-information-advice/mycobacterium-ulcerans on 10 November 2019.

209 Australian Government Department of Health 2019. National Health Genomics Policy Framework and Implementation Plan 2018–2021. Accessed from www1.health.gov.au/internet/main/publishing.nsf/Content/national-health-genomics-policy-framework-2018-2021 on 7 October 2019.

210 Australian Government Department of Health 2017. National Health Genomics Policy Framework 2018–2021. Accessed from www.health.gov.au/internet/main/publishing.nsf/Content/national-health-genomics-policy-framework-2018-2021 on 27 June 2019.

211 Australian Government Department of Health 2018. Implementation Plan—National Health Genomics Policy Framework. Accessed from www1.health.gov.au/internet/main/publishing.nsf/Content/FD973B58DE82BCFFCA2581CC007D4682/$File/Implementation-Plan-to-the-Framework.pdf on 2 October 2019.

212 Australian Government Department of Health 2018. Procedure guidance for medicines funded through the Life Saving Drugs Program (LSDP) – Version 1.0 July 2018. Accessed from www1.health.gov.au/internet/main/publishing.nsf/content/FD13E-541FA14735CCA257BF0001B0AC0/$File/Procedure-guidance-for-medicines-funded-through-the-LSDP.pdf on 14 November 2019.

213 Rare Voices Australia 2019. National Alliance of Rare Disease Registries. Accessed from www.rarevoices.org.au/page/132/national-alliance-of-rare-disease-registries on 10 September 2019.

214 Genetic and Rare Disease Network n.d. Patient and Clinical registries open to Australians. Accessed from gardn.org.au/registries/ on 15 November 2019.

215 Pinto D, Martin D, Chenhall R 2016. The involvement of patient organisations in rare disease research: a mixed methods study in Australia. Orphanet Journal of Rare Diseases Vol. 11. Accessed from ojrd.biomedcentral.com/articles/10.1186/s13023-016-0382-6 on 15 October 2019.

216 Murdoch University Centre for Comparative Genomics 2019. Rare Disease Registry Framework. Accessed from muccg.github.io/rdrf/ on 19 November 2019.

217 Pinto D, Martin D, Chenhall R 2016. The involvement of patient organisations in rare disease research: a mixed methods study in Australia. Orphanet Journal of Rare Diseases Vol. 11. Accessed from ojrd.biomedcentral.com/articles/10.1186/s13023-016-0382-6 on 15 October 2019.

218 Association of Australian Medical Research Institutes 2019. 2019–20 Federal Budget – what's in it for medical research? Accessed from aamri.org.au/news-events/2019-20-federal-budget-whats-in-it-for-medical-research/ on 19 November 2019.

219 Australian Government Department of Industry, Innovation and Science 2019. Genomics Health Futures Mission – Projects Grant Opportunity. Accessed from www.business.gov.au/assistance/genomics-health-futures-mission-projects on 10 September 2019.

220 National Health and Medical Research Council 2019. Research funding statistics and data. Accessed from www.nhmrc.gov.au/funding/data-research/research-funding-statistics-and-data on 15 November 2019.

221 National Health and Medical Research Council 2019. Research funding statistics and data. Accessed from www.nhmrc.gov.au/funding/data-research/research-funding-statistics-and-data on 15 November 2019.

222 National Health and Medical Research Council 2019. Summary of the results of the NHMRC 2019 Grant Application Round – Updated 29/09/19. XLSX File – GRANTS DATA Tab. Accessed from www.nhmrc.gov.au/funding/data-research/outcomes-funding-rounds on 15 November 2019.

223 International Rare Diseases Research Consortium 2019. About. Accessed from www.irdirc.org/about-us/ on 26 June 2019.

224 International Rare Diseases Research Consortium n.d. Member Organizations. Accessed from www.irdirc.org/about-us/people-organisation/members-organizations/ on 15 November 2019.

225 National Health and Medical Research Council 2019. MRFF International Clinical Trial Collaborations (ICTC) Program. Accessed from www.nhmrc.gov.au/funding/find-funding/mrff-international-clinical-trial-collaborations-ictc-program on 15 November 2019.

226 Australian Government Department of Health 2019. Medical Research Future Fund (MRFF) grant recipients announced and under contract since 2016–17 (as at 5 April 2019). Last updated 15 October 2019. Accessed from www.health.gov.au/resources/publications/medical-research-future-fund-mrff-grant-recipients-current-as-at-5-april-2019 on 15 November 2019.

227 Australian Government Department of Health 2019. Clinical Trial Activity: Rare Cancers and Rare Diseases and Unmet Needs. Accessed from www.health.gov.au/initiatives-and-programs/clinical-trial-activity-rare-cancers-and-rare-diseases-and-unmet-needs on 10 September 2019.

228 Australian Government Department of Health 2019. Medical Research Future Fund (MRFF) grant recipients announced and under contract since 2016–17 (as at 5 April 2019). Last updated 15 October 2019. Accessed from www.health.gov.au/resources/publications/medical-research-future-fund-mrff-grant-recipients-current-as-at-5-april-2019 on 8 November 2019.

229 Hunt, G (Minister for Health) 2019. $55 million investment to give new hope to Australians living with rare cancer. Media release. Australian Government Department of Health, 18 November 2019. Accessed from www.health.gov.au/ministers/the-hon-greg-hunt-mp/media/55-million-investment-to-give-new-hope-to-australians-living-with-rare-cancer on 25 November 2019.

230 Australian Government Department of Health 2019. Clinical Trials. Accessed from www1.health.gov.au/internet/main/publishing.nsf/Content/Clinical-Trials on 19 November 2019.

231 Australian Government National Health and Medical Research Council and Department of Industry, Innovation and Science 2018. About. Accessed from www.australianclinicaltrials.gov.au/about on 19 November 2019.

232 Dunlevy, S 23 May 2015. Australian cancer patients to access life extending overseas clinical trials in major breakthrough. news.com.au. News Corp Australia Network. Accessed from www.news.com.au/lifestyle/health/australian-cancer-patients-to-access-life-extending-overseas-clinical-trials-in-major-breakthrough/news-story/e80470895f4d2d616e4167cc1761d106 on 8 November 2019.

233 Leukaemia Foundation 2019. Trials Enabling Program FAQs. Accessed from www.leukaemia.org.au/research/trials/tepfaqs/ on 8 November 2019.

234 Leukaemia Foundation 2019. Trials Enabling Program FAQs. Accessed from www.leukaemia.org.au/research/trials/tepfaqs/ on 8 November 2019.

235 National Health and Medical Research Council 2016. Statement on consumer and community involvement in health and medical research. Accessed from www.nhmrc.gov.au/about-us/publications/statement-consumer-and-community-involvement-health-and-medical-research on 19 November 2019.

236 Australian Clinical Trials Alliance 2019. Consumers Leading the Way in Clinical Trials in Inspire 013. Online: Research Australia. Accessed from issuu.com/researchaustralia/docs/inspire_issue_13_final on 19 November 2019.

237 Rare Diseases Clinical Research Network, National Institutes of Health n.d. About Us. Accessed from www.rarediseasesnetwork.org/about on 14 November 2019.

238 The Kids Cancer Project 2019. The Kids Cancer Project: Clinician Profile – Prof John Heath in Inspire 013. Online: Research Australia. Accessed from issuu.com/researchaustralia/docs/inspire_issue_13_final on 19 November 2019.