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This submission was co-authored by Prof Andrew Green, National Centre for Medical Genetics, and Ms Mairéad Heffron, Royal College of Physicians of Ireland, with contributions from the following:

Prof John Crowe President, RCPI
Mr Barry Dempsey Irish Heart Foundation (IHF)
Dr Peter Doran UCD School of Medicine and Medical Science
Dr Joe Galvin Sudden Cardiac Death (SCD) Council of Irish Heart Foundation
Prof Denis Gill National Immunisation Advisory Committee
Prof Hilary Hoey Faculty of Paediatrics, RCPI
Prof Jonathan Hourihane Prof of Paediatrics and Child Health, UCC
Prof Frank Keane Forum of Irish Postgraduate Medical Training Bodies
Prof Cecily Kelleher UCD School of Public Health, Physiotherapy and Population Science
Dr Peter Kelly Faculty of Pathology, RCPI
Prof Mary King Consultant Paediatric Neurologist, Children’s University Hospital, Temple Street and UCD School of Medicine and Medical Science
Prof Mark Lawler Chair of Translational Cancer Genomics, Queens University Belfast
Prof David McConnell Professor of Genetics, TCD
Prof Hannah McGee Dean, Faculty of Medicine & Health Sciences, RCSI
Ms Margaret Mullett Irish Haemochromatosis Society
Prof Suzanne Norris RCPI Vice Dean of Postgraduate Specialist Training and Ethics
Prof Owen Smith Professor of Haematology, TCD
Prof Declan Sugrue President, Irish Heart Foundation
Dr Mary Codd UCD School of Public Health, Physiotherapy and Population Science
Mr Rob Corbett Arthur Cox
Dr. Graham Love CEO, Molecular Medicine Ireland.
John McCormack CEO, Irish Cancer Society
1. Executive Summary

In February 1966, less than 4 years after the first newborn screening programme for Phenylketonuria (PKU) was launched in the State of Massachusetts, Ireland became one of the first countries in the world to set up a National New Born Bloodspot Screening Programme (NNBSP). Quite apart from the public health benefit that this national programme has delivered to Irish citizens (where PKU is over twice as common as in the UK), the resulting scientific resource from the heel prick test has helped to underpin our increasing knowledge of human disease with a genetic component.

Clinical Diagnosis

In addition to the screening of newborns, the Newborn Screening Cards (NSCs), also known as ‘Guthrie Cards’, are currently used in clinical diagnosis for older children and even adults. These applications are new, and could not have been envisaged when the NNBSP commenced.

- The NSCs of children presenting with deafness and developmental problems have been used to determine whether the cause is an infection acquired in pregnancy (congenital viral infection). This diagnosis has implications for treatment and also has health economics ramifications as it saves on the expense of other unnecessary investigations.
- As new genetic mutations for disease conditions are identified, NSCs are often used to inform parents and siblings of a previously deceased child (where the death was undiagnosed at the time) of a genetic diagnosis as the cause of the condition. This is particularly useful as in many cases, no other genetic material will be available for analysis.
- NSCs have also been used to confirm genetic mutations associated with deaths from Sudden Arrhythmic Death Syndrome (SADS), where no autopsy was carried out at death. This provides valuable information to siblings, who may decide to be screened for the same genetic mutation.
- In the case of a twin who develops leukaemia, NSCs have been valuable in proving information to parents as to the likelihood of the second twin subsequently developing leukaemia.
Research

Given the research that has already been possible through the availability of NSCs, it is envisaged that enhanced research possibilities will develop in the future as genetic science, molecular technologies and their application evolve at an exponential rate.

The NSC archive affords an opportunity to determine frequencies of rare genetic diseases in the Irish population, thereby giving accurate data for related health service planning. This is particularly relevant in the context of the EU 2009 Council Recommendation on an action in the field of rare diseases which calls for member states to elaborate and adopt a plan or strategy for rare disease. It will also have implications for funding for Irish scientists under the European Commission’s Horizon 2020, given that one focus of the draft programme is in the area of rare diseases.

- Research already carried out using a selection of anonymised NSCs from the Irish archive has revealed a high prevalence in Ireland of the iron storage disorder, haemochromatosis.
- Other research using NSCs determined the frequency in Irish newborns of a genetic variant which predisposes to neural tube defects.
- Internationally, NSCs have been used to study gene variants associated with autism and research using NSCs has also allowed researchers to study the markers of leukaemia development, showing that some of these markers are present at birth, before the onset of clinical leukaemia.
- The genetic basis of many rarer and some more common conditions (e.g. diabetes, multiple sclerosis, hypertension) is now becoming more clearly understood, and research using the archive can provide information on the genetic variants associated with these conditions, in the Irish context.

Ethics, consent and privacy in medical research

Medical research in Ireland is carried out to the highest ethical standards in relation to consent and privacy. The retention and storage of the archive would similarly, be done in line with current ethical standards. Individuals and organisations involved in medical research in Ireland rely on ethics approval processes of research ethics committees, and guidelines from bodies such as the Health Service Executive (HSE) and the Office of the Data Protection Commissioner. Current guidelines from these bodies indicate that anonymised or
pseudonymised data may be used for research without consent, subject to ethics committee approval. These guidelines have their legal basis in the Irish Data Protection Acts (DPAs).

At the time when the samples were originally taken, the extent of future research possibilities could not have been envisaged. The practice around obtaining consent was also different to current practice, and as a result, when the samples were taken, written informed consent was not obtained for retention or future studies. The NNBSP has subsequently updated its consent process to obtain explicit written informed consent for screening in line with the European Protection Directive (Directive 95/46/EC)\(^2\).

It is worth noting that a recent study carried out by the clinical investigations unit of Cork University Hospital showed that although few parents attending the paediatric and neonatal services were aware of the NSC storage, when asked their view on retention, the majority accepted anonymised research use, and were in favour of legislation to protect the archive rather than destroy it.\(^3\)

While there are privacy and consent considerations, the desired endpoint should be a considered and transparent framework, taking into account the European Charter on Patient Rights, balancing the right to preventative measures and the right to innovation with the right to consent and right to privacy.

In order to achieve this and to ensure that the highest ethical standards are followed in maintenance of the archive and use of the NSCs for research, we propose that the governance system for the archive would come under the new National Paediatric Hospital with a joint research structure between the three Dublin University Medical schools.

Governance for the primary purpose of the screening programme would remain under Temple St Children’s hospital until it merges into the new National Paediatric Hospital. The use of the NSCs in additional clinical diagnosis of infectious or genetic diseases would also come under the same governance.

In the interim, for research use of the NSCs, Molecular Medicine Ireland (MMI) is ideally placed to ensure governance in accordance with ethical standards. MMI\(^a\), previously known as the Dublin Molecular Medicine Centre was established in 2002 by the National University of Ireland Galway, the Royal College of Surgeons in

\(^a\) See http://www.molecularmedicineireland.ie/home
Ireland, University College Cork, University College Dublin and Trinity College Dublin and their associated academic hospitals, as a research partnership to accelerate the translation of biomedical research into improved diagnostics and therapies for patients.

2. Introduction

This submission seeks to highlight the importance of Newborn Screening Blood Spot cards (NSCs), also known as ‘Guthrie Cards’ in current clinical diagnosis and existing and future medical research. RCPI and the other contributors to this report favour the retention of the NSC archive in support of these uses. We also acknowledge the immense value of the National Newborn Bloodspot Screening Programme (NNBSP) and agree that every effort should be made to preserve the integrity and public confidence in the programme that has benefitted thousands of children since its introduction.

While the primary purpose of the NNBSP is to provide early treatment for prevention of severe disability or death by screening for particular metabolic and genetic conditions, the cards have a value in clinical diagnosis far beyond the newborn period. With advances in medical genetics, the applications and value of the cards to individuals and families increases continuously. This value would be lost forever if the archive were to be destroyed.

Similarly, as the science of genetics continues to grow exponentially, the research potential relating to the archive is immense, and valuable opportunities would be lost of the archive were to be destroyed.

Both individuals and institutions engaged in medical research and provision of patient care in Ireland are bound by the highest ethical standards when it comes to consent and processing of personal data. All research projects must apply for ethical approval to ethics boards comprised of both healthcare professionals and lay members. National and European law governing medical research must be adhered to, and national guidelines such as the HSE policy on consent are followed.

Consent, privacy and protection of personal data are valid concerns in a world where massive amounts of personal data are digitised and held by various state and private organisations. Safeguarding of personal data is paramount, and national legislation on data protection seeks to strike a balance between ensuring that the
right to privacy of the individual is protected, while allowing provision of information for specific societal good, such as public health concerns, the need to investigate offences and collection of taxes.

Standards and practice in relation to data protection have changed substantially in recent years. Implied consent was used when the NNBSP commenced because this was common clinical practice at that time. The decision to use implied consent was thus not due to error, or omission on the part of the NNBSP at that time. As practice changed, the procedure for consent also evolved accordingly, and currently, explicit, written consent is required for the screening programme.

A recent study carried out by the clinical investigations unit of Cork University Hospital showed that although few parents attending the paediatric and neonatal services were aware of the NSC storage, when asked their view on retention, the majority accepted anonymised research use, and were in favour of legislation to protect the archive rather than destroy it.

We agree that retention of the archive should be done only in accordance with ethical standards and directives, and the system for storage and use of the NSC archive should fully comply with data and regulatory requirements.

The current use in clinical diagnosis is outlined in the first part of this submission, while the second part highlights current and future research uses, specific to the NSCs. The third part of the submission highlights the legal arguments around retention and use of the cards, referring to guidelines from the Office of the Data Protection Commissioner (OPDC) and the HSE. The final part outlines a proposed governance system that would satisfy the legal and regulatory requirements.

3. Use of Newborn Screening Cards in Current Clinical Diagnosis

National Newborn Blood Spot Screening Programme

In Ireland, all babies are offered screening for:

- Phenylketonuria (PKU)
- Homocystinuria
- Maple Syrup Urine Disease
Newborn Screening Blood Spot Cards

- Classical Galactosaemia
- Cystic Fibrosis
- Congenital Hypothyroidism

Ireland was one of the first countries in the world to have a national screening programme starting with screening for Phenylketonuria (PKU) in Ireland in February 1966. Screening for all these conditions is strongly recommended, but it is not mandatory. If a baby has one of the conditions, the long-term benefit of screening with early treatment is much greater than the small discomfort they feel when the blood sample is taken. It is likely that more conditions will be added in the future.

The sample is taken by means of the Heel Prick Test. It involves taking a few drops of blood from the baby's heel onto a screening card for testing. The screening programme was updated in June 2011 and screening cards are now stored with parental consent for 10 years after the test is completed. The National Newborn Bloodspot Screening Programme has older screening cards from all heel prick tests carried out since 1984 in storage.

The stored NSCs have a significant current role in the clinical diagnosis of medical conditions other than the 6 currently screened for at birth. Destruction of the stored cards would seriously impede current methods of diagnosis of children and adults with a wide range of conditions.

Diagnosis of Congenital Infection

Congenital viral infection, particularly Cytomegalus Virus (CMV) is an important cause of deafness and neurological disability in children. In older children with deafness or developmental issues, NSCs are currently used to make a retrospective diagnosis of congenital viral infection. The mother acquires the infection in pregnancy and is usually asymptomatic. The infected baby may not have symptoms at birth but may present later in life with deafness/developmental problems. Testing the child’s blood after the newborn period for viral DNA is not helpful in making a diagnosis of congenital infection (as the infection may have been acquired post-natally when it would not be expected to cause neurological problems), but testing of that child’s NSC for the presence of viral RNA or DNA in their blood at birth confirms that the infection was acquired in pregnancy. Such testing provides the family with a clear explanation for the child’s problems, and
also has health economics implications, removing the need for other unnecessary investigations.

The technology to detect viral DNA would not have been available 10 years ago to make this diagnosis, and thus, this is a use of the cards that could not have been foreseen in the past. The newborn screening laboratory has been very helpful to paediatricians in providing the child’s screening card for additional virology analysis, subject to consent of the parents. However, destruction of NSCs over 10 years old would mean that making such late diagnoses, which have been achieved in the recent past, would not be possible.

Retrospective Diagnosis

Some families in Ireland have had a child die in the past from a progressive but unexplained neurological, endocrine or metabolic condition, where the limits of medicine and technology at that time were not able to identify an underlying cause. Subsequently, years later, the genetic basis of that condition has been identified. The parents or siblings of the child are often interested in the implications of the child’s condition long after the child’s death, as they may be concerned over the likelihood of another child in the family being affected by the same condition. Retrospective genetic testing of the affected child’s NSC can potentially identify the cause of the child’s condition, even years after the child’s death. Information gained from that test is vital in giving accurate reproductive advice and counselling to the rest of the family. If the child’s NSC were to be destroyed, this retrospective testing would not be possible.

Such retrospective genetic diagnosis using NSCs has been achieved for families with numerous different conditions, including Cystic Fibrosis, immunodeficiency and Congenital Adrenal Hyperplasia. As new genetic diagnoses are identified, there may be additional conditions added to this list.

Diagnosis in Sudden Unexplained Death

A study analysing Sudden Cardiac Death (SCD) in young people in Ireland between 2005 and 2007 revealed that about 116 people under the age of 35 died as a result of SCD confirmed by an adequate autopsy, during that time period. To put this in context, this accounts for approximately 5% of all deaths in that age group in a
Newborn Screening Blood Spot Cards

The actual figure is likely to be higher, however, as a significant number of potential SCD cases were excluded from this analysis because they had incomplete or unavailable autopsy reports. In addition SIDS (Sudden Infant Death Syndrome) cases and SCDs under 15 year of age were excluded and a proportion of SCDs will have been categorised elsewhere as drownings, road traffic accidents, acute asthma and drug overdoses and so will have been missed. It is estimated that the TOTAL number of deaths from SCD annually is closer to 80.

The study also showed that the commonest cause of SCD was Sudden Arrhythmic Death Syndrome (SADS). Numerous research studies internationally and in Ireland, have show that at least 25% of such deaths are due to previously unrecognised hereditary disorders of heart rhythm including Long QT Syndrome, Catecholaminergic Polymorphic Ventricular Tachycardia (CPVT) or Brugada Syndrome all of which have been diagnosed in Irish cardiac arrest survivors 5,6. A diagnosis of one of these conditions has major implications for the health of the relatives of the deceased individual.

Unfortunately, for a significant number of people who died from SCD/SADS, either there was no suitable tissue taken at autopsy, or no autopsy was carried out. In such cases, the NSCs are the only sample suitable for genetic testing for that deceased person. c

A New Zealand study, published in 2010 has indicated that NSCs from deceased relatives is a reliable DNA source for detection of Long QT Syndrome and can allow detection in at least 15% of cases, providing the opportunity to diagnose and provide lifestyle and/or medical interventions for at-risk individuals7,8. The results of this study prompted the introduction of legislation governing the indefinite storage of neonatal blood spot cards in New Zealand9,10.

In addition to New Zealand, NSCs of those who died of SADS have also been used in Denmark to search for mutations in genes associated with long QT syndrome11. Where mutations have been found, the results have been used to counsel and manage families where before they had never been aware of a genetic reason for their relative’s death. Family members may be advised to have themselves

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b Based on a figure of approx 770 deaths per year in the age group 14-35 according to CSO statistics.

cNote: It is the understanding of this group that the cards of a deceased person are not covered by data protection and thus the ruling of the ODPC does apply to these cards.
screened for the same gene mutation, and if present they would be advised on how to minimise the risk of sudden cardiac death associated with long QT syndrome, including avoidance of certain medication. Such testing is not yet available in Ireland, but is likely to be in the near future.

Destruction of NSCs over 10 years old could mean that no sample would remain from those who may go on to have SADS, and their family may lose the opportunity to find out what happened to their relative.

**Family Counselling in Leukaemia**

Retrospective analysis of neonatal blood spots has also informed our understanding of the development of infant leukaemia. 12

In cases where one of identical twins develops childhood leukaemia, parents understandably want to know the likelihood of the other twin developing leukaemia. New evidence shows that the origins of leukaemia can be traced back to a somatic gene mutation arising in the womb. In a recent case in Ireland, the NSCs of twins, where one twin was diagnosed with leukaemia, were used for diagnostic genetic testing to determine the timing of the development of leukaemia in the affected twin and helped to predict the likelihood of development of leukaemia in the unaffected twin. Again, this technology was not available 5 years ago.

**Improvements in Genetic Technology**

New developments in molecular genetics technology have now made it possible to obtain reliable amounts of good quality DNA from NSCs 13. This technology has been in use since 2011 as part of the NNBSP for Cystic Fibrosis, where the top 1% of newborns with a high level of immunoreactive trypsin by biochemical testing in the National Newborn Screening Laboratory, are subsequently DNA tested for 38 cystic fibrosis gene mutations in the National Centre for Medical Genetics.

The technology also allows for amplification of large amounts of DNA from a single blood spot, without recourse to repeated sampling of the original card, ensuring the integrity of the original card. The DNA extracted can also be used for other diagnostic genetic tests, when indicated. This also means that part of the sample can be anonymised and used for research, without compromising the original sample for diagnostic use.
4. Research Use of Newborn Screening Cards

Existing Research using Irish Newborn Screening Cards

**Haemochromatosis**

The current archive of NSCs has been successfully used, after anonymisation, in valuable research into the frequency of the hereditary condition haemochromatosis. The genetic mutations causing the iron overload disorder Hereditary Haemochromatosis were identified in 1996. Work shortly afterwards in Ireland suggested that the mutation frequency in Ireland was very high. The NSC archive was identified as the most appropriate source material to determine the frequencies in the Irish population and after a lengthy ethics approval process the study was completed in 1999. Utilising 800 blood spot cards from this national resource, researchers established that the allele frequency for the common C282Y mutation in the HFE gene implicated in haemochromatosis was amongst the highest in the world strongly suggesting a Celtic founder origin for this mutation. One in five of the Irish population carry the main mutation C282Y and 1 in 86 are homozygotes. Overall 1 in 17 of the Irish population are at some risk of developing iron overload.

As a result of this knowledge, much work has been done to alert the public and the medical profession to this very common but under-diagnosed disorder.

An education process delivered by lectures, newspaper articles, pamphlets, radio and television interviews by gastroenterologists and the Irish Haemochromatosis Society significantly increased awareness of Haemochromatosis not only in the general population but also amongst doctors and nurses. As a result, affected individuals are identified early and it is now unusual for a patient to present in the later stages of haemochromatosis when irreversible changes such as cirrhosis have already developed. Venesection services have been developed in hospitals and in GP practices throughout the country and the Irish Blood Transfusion Service modified its rules to allow haemochromatosis patients become regular donors thus significantly increasing the overall blood supply. The technology developed in the initial study has been refined and individuals requiring a genetic test may use a convenient self testing kit where they place a blood spot on a paper strip similar to the NSC and send it to the laboratory by post where their DNA is extracted from the blood spot and analyzed. This facilitates family screening where family members may not have easy access to a genetic screening service where they live.
Other Research

Similar research using Irish NSCs has shown the frequency of a common genetic predisposition to Venous Thromboembolism, Factor V Leiden\(^\text{15}\), and also the frequency in Irish newborns of a gene variant, MTHFR C677T, which predisposes to neural tube defects\(^\text{16,17}\). This research, impossible without the NSC archive, has given important epidemiological information about these conditions within the Irish Population. The research into the gene variant, MTHFR C677T, for example provided new data underscoring the importance of public health intervention programmes of folic acid supplementation and food fortification targeted at all women of childbearing age to prevent neural tube defects.

International Research using Newborn Screening Cards

Archives of anonymised NSCs have been successfully used for research in many other countries. In Denmark, the archive has been used to study the frequency of gene variants associated with the development of autism\(^\text{18}\). In the USA and in the UK, several studies have analysed NSCs of children with specific genetic markers of leukaemia, allowing researchers to track the onset of the early events\(^\text{19,20}\). This research has shown that in a number of those children, the markers of leukaemia development can be present at birth, before any onset of clinical leukaemia.

Genetic technology has improved significantly, using whole genome pre-amplification steps, which allow the use of a single blood spot as a source of DNA, without compromising the original sample. DNA of sufficient quality for whole exome sequencing, and whole genome association studies is now obtainable from NSCs.

Future Research with Newborn Screening Cards

The recognition of the genetic basis of many rare diseases and the development of gene testing has changed the management of these conditions.

Ireland is obliged in 2013, under an EU Council Recommendation (2009/C 151/02)\(^1\) to put in place a plan for treating rare diseases. The EU Directive on Cross-Border Health Care (Directive 2011/24/EU)\(^\text{21}\), on the application of patients’ rights to cross-border care, due to be transposed in 2013, also makes particular provision for patients with rare disorders. To plan accurately requires data on the frequency of these diseases, specifically in an Irish population. The NSC archive allows for anonymised testing of the population to determine the specific frequencies of a
range of rare genetic diseases, and thereby give accurate data for service planning. To allow meaningful research to be done into rare diseases the large sample size that the archive could provide, built up over years is an extremely valuable resource. The resource would also be of value to Irish scientists wishing to take part in EC Horizon 2020 funded pan-European research for a range of rare disease indicators.

Gene regulation studies for markers of how genes are controlled (epigenetics) can now be done using newborn screening bloodspot cards and could be used in the future to predict epigenetic effects on common diseases.

Recent studies have highlighted how this resource can provide an epigenetic snapshot in utero which may have implications for the future development of many diseases including cardiovascular disease, cancer and neurological disorders, diabetes and the childhood basis of adult disease. Increased understanding of these conditions would impact on a large number of people in this country; approximately 10,000 people die every year from cardio-vascular disease; approx 8,500 people die annually from cancer; and 700,000 people in Ireland live with neurological disorders.

The genetic basis of many common conditions, such as multiple sclerosis, diabetes, and hypertension is now becoming more clearly understood, with numerous gene variants contributing to the development of these conditions. The below graph illustrates the rapid growth in understanding of genetic disease. It shows the number of new disease genes identified every year, based on data published by the US National Institutes of Health, indicating an exponential increase in the last 5 years.
Research analysis of the NSC archive for genetic variants in the Irish population will give a much greater understanding of the impact of these variants on the condition, specifically in an Irish context. Some conditions have a higher frequency of occurrence in Ireland, such as coeliac disease. Research use of Irish NSCs would therefore be important for Irish people with this disease.

In regard to the development of personalised medicine, understanding genetic variants can ensure that a patient is prescribed appropriate drugs for treatment. A good example in current practice is the use of a medicine azathioprine, which is used to suppress the immune system in auto immune conditions. A small number of people treated with this medicine get very severe bone marrow toxicity, which can be life threatening. The basis of this toxicity is due to a rare enzyme deficiency TPMT. People in whom this medicine is being considered are now tested before treatment to see if they have the common TMPT gene alteration, and if not, they can safely start the drug.

Knowledge has no limitation or boundaries and technology continually evolves. It is impossible to adequately envisage the potential for future beneficial use of the cards and the information that they contain. Destruction of the cards is an absolute and irrevocable limitation on any future use.

5. Data Protection

We acknowledge that this group is comprised of medical experts and researchers, and as such are not legal experts in the area of data protection. The group however, has sought to understand the legal principles and legislation relevant to this discussion and has heard from legal experts on this. With this in mind, we aim to summarise the legal arguments and present our opinion on this discussion. As medical practitioners and researchers, we both respect and uphold the principles of privacy, consent and any solution to the retention of the cards would be grounded in those principles.

The review of policy regarding retention and disposal of the NSCs was prompted by a complaint received by the Data Protection Commissioner from a member of the public in late 2009. The basis of the complaint, which was upheld by the Data Protection Commissioner, was that the NSCs should not be retained indefinitely without consent as this was breaching the Data Protection Acts 1988 and 2003.
A new policy was adopted providing that explicit, informed, written consent for screening should be obtained from the parent/guardian at the time the sample is taken. It was also proposed that the NSCs would be retained for 10 years and then disposed of. The revised consent process has been in place since 2011. The review also recommended that the archive of NSCs be destroyed.

The 10 year retention period was, according to the review, in part based on the fact that there is no agreed practice internationally with regard to retaining NSCs. Some countries retain the cards for less than 10 years, but the policy in a number of EU countries is to retain the cards for a much longer period. Denmark and Sweden, for example, store the cards for 1000 years, and allow the cards to be used for research and quality control of screening programmes, subject to ethical approval for research.

**Personal Data and the Data Protection laws**

Under the Data Protection Acts of 1988 and 2003 (DPAs), and the underlying EU Directive (95/46/EC), personal data means data relating to a living individual from which that living individual may be identified. Under the DPAs, processing of personal data relating to health usually requires explicit consent from the data subject; with a number of exceptions. The DPAs however have no application in the case of data which are not capable of identifying living individuals. Therefore, even if it is accepted that express parental consent is a pre-requisite to the use of the cards, if the cards are anonymised prior to research, then the DPAs no longer apply as the DPAs apply to the personal data only, not the actual card.

**Consent and Data Protection Law**

Under the DPAs and the EU Data Protection Directive, explicit and informed consent is normally required for the processing of sensitive personal data, and this is generally taken as the appropriate standard in biomedical research. However, it should be noted that many of these legal requirements post-date the time when some of the existing NSC archive was created and therefore the fact that consent was not obtained for the retention or research use of the cards was not due to omission or error at that time. For example, the requirement to explicitly give consent to the processing of sensitive personal data was only introduced in the Data Protection (Amendment) Act 2003. The consent requirement for the NSCs has now been changed to reflect current practice, which is to have explicit informed consent of the parent/guardian.
Exceptions to the consent requirement

There are various statutory alternatives which allow for processing of personal data without consent under certain circumstances:

- Section 2B(1)(b)(iii) of the DPAs permits the processing of health data without consent where it ‘is necessary to prevent injury or other damage to the health of the data subject or another person’ or ‘to protect the vital interests of the data subject or of another person in a case where (i) consent to the processing cannot be given by or on behalf of the data subject … or (ii) the data controller cannot reasonably be expected to obtain such consent’. This opens up the potential use of the database in cases, such as SADS, where the risk of immediate clinical harm might be identified.

- Similarly, Section 2B(1)(b)(viii) of the DPAs enables the processing of health data where it is necessary for medical purposes and is undertaken by (I) a health professional, or (II) a person who in the circumstances owes a duty of confidentiality to the data subject that is equivalent to that which would exist if that person were a health professional. “Medical purposes” is defined to include “the purpose of preventive medicine, medical diagnosis, medical research, the provision of care and treatment and the management of healthcare services”.

- Additionally, Section 8(e) of the DPAs permits the processing and disclosure of personal data without consent where it is “required by or under any enactment or by a rule of law or order of a court”. National legislation can and has been enacted in the past to allow for processing and disclosure of personal data without consent, for example, in the context of the introduction of the Local Government (Household Charge) Act 2011 and in various Criminal Justice and Finance Acts.

- Cancer research and screening is also an exception. Under the Health (Provision of Information) Act, 1997, any person may provide any personal information to the National Cancer Registry Board for the purpose of any of its functions; or to the Minister for Health or any body or agency for the purpose of compiling a list of people who may be invited to participate in a cancer screening programme which is authorised by the Minister.
Data Protection Guidelines on Research in the Health Sector

The ODPC has indicated that there are situations in which patients do not need to be informed in advance of use of their data for research purposes. Guidance for researchers on the ODPC website states the following (which reflects the provisions of Section 2(5) (b) of the DPAs):

“Ideally you should make patients aware in advance if you intend to use their data for your own research purposes. However, the Acts provide that such uses of personal data are permitted, even where the patient was not informed in advance, provided that no damage or distress is likely to be caused to the individual”.

The ODPC 2007 data protection guidelines for research in the health sector states that anonymised and pseudonymised use of data does not need consent. The guidelines also advise on a best practice approach to capture patient consent for access to data where no consent was initially sought, stressing that every effort should be made to contact the patient, while acknowledging that this may not always be possible. Notices in the media are suggested, where it is not possible or feasible to contact the patient.

Using the media to communicate to the general public regarding retention of the archive would be appropriate, as communication on an individual level may not be practicable. There has been extensive media coverage of the issue earlier in 2013, and, in addition to the HSE and the NNBSP itself, organisations such as RCPI and the Irish Heart Foundation can use their influence to ensure the message is communicated widely.

HSE Policy on Consent

A new HSE policy on consent was published in May 2013. Section 6.6 of this policy refers specifically to research using archived material, stating that data may be used for research purposes without consent:

- where the material or data is not individually identifiable (i.e. anonymous), and
- where there are no potential harms to the person from whom the material or data was obtained.
Also, it states that where the material is individually identifiable, a research ethics committee may waive the consent requirement if:

- The use of the material/data without the participants’ consent is unlikely to adversely affect the welfare of individuals involved
- The researchers will take appropriate measures to protect the privacy of individuals, and to safeguard the material/data
- The researchers will comply with any known preferences previously expressed by individuals about any use of their material/data
- It is impossible or impracticable to seek consent from individuals to whom the material/data relates.

Future Legal Considerations

It is our suggestion that the proposed Human Tissue Bill could make specific reference to the case of the NSC archive and its retention, as could the proposed Health Information Bill. Either Bill could address any outstanding concerns in relation to consent and could prescribe the governance framework for storage and use of the cards.

6. Governance of the Newborn Screening Archive

As geneticists and translational scientists, we are constantly aware of the importance of ethical principles including consent, and we need a measured, sensible and transparent approach to address this current problem.

While there are privacy and consent considerations over potential misuse of Guthrie cards which need to be addressed\textsuperscript{29,30} the desired endpoint from should be a considered and transparent framework, which balances:

- the rights of parents and their children
- the attitudes of citizens to the storage and use of biological material for research
- the rights of a nation to optimal quality preventative and interventional care.
The debate should take into account the European Charter on Patient Rights especially balancing the right to preventative measures and the right to innovation with the right to consent and right to privacy.

The debate would include proper consultation with relevant health and research professionals, disease foundations and patient advocates, an open dialogue with research funding agencies, and most importantly, presentation to the public of the full facts including both the risks and the benefits of the use of these blood spot cards in research and in clinical care.

Providing a coherent legal and ethical framework (which for example is what occurred in New Zealand and in Denmark) where they can be preserved and where only research of the highest ethical standards can be considered, should be the goal, to preserve this irreplaceable resource that can potentially guide future healthcare. Storage of residual neonatal blood spots and their use in research could be governed by a code of practice as in the UK’s Code of Practice for the Retention and Storage of Residual Spots. The UK code stipulates that research must meet high ethical standards, as determined by the NHS Central Office for Research Ethics Committees.

Currently the NSC archive is under the governance of the Children’s University Hospital Temple Street. However, the hospital is coming under a single governance structure for the three existing paediatric hospitals, even in advance of the completion of the structure of the new National Paediatric Hospital (NPH). Governance for the primary purpose of the screening programme would remain under Temple St Children’s hospital until it merges into the new National Paediatric Hospital. The use of the NSCs in additional clinical diagnosis of infectious or genetic diseases would also come under the same governance.

Ultimately, the retention and research use of the NSCs would come under the new NPH, with a single administrative structure, and a joint research structure between the three Dublin University Medical Schools which would be part of the NPH. Such governance would be to the highest ethical standard, with a single research ethics committee for the NPH, without whose approval, no research with NSC archive could be carried out. The committee may also include representative from all six universities in Ireland in addition to the three Dublin University Medical Schools. The committee may also include patient organisation representation. The NSC archive would be accessible, with appropriate approval, to any of the Irish universities.
The governance system would follow the ODPC and HSE guidance referred to in the previous section. In addition, the criteria for research ethical approval would include the following principles:

- The research should not compromise the original sample
- The research must be valid and important in an Irish context
- The samples would either be pseudonymised or irreversibly anonymised. For pseudonymised samples, the code to connect a sample would not be held by the researcher, but separately by the NNBSP.
- The researcher would not be allowed to pass on any of the de-identified samples to third parties without specific approval from the research ethics committee.

One public concern around retention of the cards is that the DNA from the cards may be used for forensic purposes in criminal investigations. To reassure the public, and protect patient confidentiality, requests for the provision of identified NSCs for forensic purposes would not be approved, unless the newborn screening laboratory was compelled to do so by a High Court order.

As in the case with the NNBSP currently, there would be an opt-out mechanism for anyone who did not want their bloodspot card to be retained. Under an opt-out system, a public information campaign could indicate that the bloodspot cards in the archive would be retained, and used for research, unless the parents/person whose card it is objects, in which case the card would be destroyed. The parents/person could choose to

- Opt out for retention of the card for either diagnostic and research use, in which case, the card would be destroyed.
- Opt out for research use, but request the card be retained for future diagnostic use.

With this model of research governance, no additional governance structure would need to be set up, there would be no specific preference to any academic institution, and the costs of DNA extraction from samples could be borne by the researchers, not the newborn screening laboratory.
7. Interim Measures

In the interim, governance for the primary purpose of the screening programme should remain under Temple St Children’s hospital which will be merging with the two other paediatric hospitals well in advance of the completion of the new hospital build. The use of the cards in additional clinical diagnosis of infectious or genetic diseases would also come under the same governance.

Until the NPH is established an interim governance system for research use of the cards would be provided by Molecular Medicine Ireland (MMI). MMI, previously known as the Dublin Molecular Medicine Centre was established in 2002 by the National University of Ireland Galway, the Royal College of Surgeons in Ireland, University College Cork, University College Dublin and Trinity College Dublin and their associated academic hospitals, as a research partnership to accelerate the translation of biomedical research into improved diagnostics and therapies for patients.

MMI’s partners already include many of the relevant stakeholders, i.e. the university medical schools and teaching hospitals. Ethics approval for research would be done via the constituent partner university/hospital and MMI has a Biobanking Committee which would be the natural structure to house this process. This committee has overseen the publication of peer reviewed guidelines for standardized Biobanking and is broadly constituted across the universities/hospitals.

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\(^d\) Some funding support will be required to operate the MMI structures for interim research governance.
8. References


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