EL(88)P/195



# DEPARTMENT OF HEALTH

To: Regional General Managers )
General Managers of the Special )
Health Authorities for the London ) for action
Post-Graduate Teaching Hospitals )

District General Managers - for information

30 November 1988

Dear General Manager

## GENETICS SERVICES

I am writing to ask for your help in taking forward the formulation of guidance on future development of genetics services. This letter explains the background to centrally funded (Special Medical Development) projects in this field and invites your help in the next phase by providing us with information on which to base future guidance.

### BACKGROUND

1. In recent years there have been remarkable advances in medical genetics. These advances have been due largely to the application of recombinant-DNA technology often complemented by improved cytogenetic techniques and better methods of fetal examination. They offer much greater precision than hitherto in the diagnosis of single-gene disorders and major chromosome and malformation syndromes as well as assessment of the risks of transmitting or of developing such conditions. This letter refers to the single-gene disorders in which the impact of the new genetics has been greatest.

   The single-gene disorders include Huntington's chorea, cystic fibrosis, Duchenne muscular dystrophy, and many causes of severe mental retardation; thalassaemia and sickle-cell disease which are common in particular ethnic minorities; and many others.

   However we recognise that the provision and organisation of services must also reflect characteristics of the other heritable and congenital disorders such as Down's syndrome, Fragile X syndrome and other congenital anomalies.

2. Genetics services have developed in response to the new opportunities mostly as a result of individual enterprise, often without clear policy or priority within strategic planning. Not surprisingly provision is uneven and its funding, from a variety of sources, often insecure. We are concerned to ensure that these services are considered and planned as part of health services as a whole within each region.

3. Anticipating the changes in services that the new advances would bring and to encourage orderly progress, the Department in 1984 set up a Special Medical Development (SMD) in three genetics centres, (Cardiff, London and Manchester.) Its purpose has been to determine the effect upon clinical and other activities, of bringing the new DNA techniques into service use and to evaluate those activities and their outcomes. The first phase of the SMD is complete and it is expected that responsibility for the services introduced will be taken over by health authorities. A detailed evaluation of the first phase is now available on request and a summary is attached at Annex C for your information. Although not part of the SMD a service for diagnosis of haemoglobinopathies has been developed since 1982 at the National Haemolobinopathy Reference Library in Oxford. The service has demonstrated the effective application of recombinant - DNA techniques to these disorders, most notably thalassemia and sickle-cell disease.

4. Building on the experience already gained the Department is to mount a further SMD. This will explore the newer techniques for detecting gene mutations, together with the use of automated processes to facilitate the application of these techniques to services. Meanwhile work will continue towards defining the requirements for effective delivery of these services to identified populations.

**POLICY AND PLANNING**

5. Rapid medical advance in this area will continue. In order to assist effective and efficient introduction of services we see a need to draw up policy guidelines. In order that guidance can take account both of existing services and of plans now being made it is important to know in outline their nature, content and range. Guidance will emphasise the need for coordinated planning and organisation of these services and their component parts.

**MONITORING SERVICES**

6. It is intended that the planning, development and outcome of these services should be monitored in the context of the planning and review process. The guidance to be prepared will draw attention to this aspect.

7. A number of health authorities have drawn up planning documents which contain some of the information sought, but none contains all. May I therefore ask you to forward a report on genetics services in your region which covers the following aspects:

    a. Policy for genetics services
    b. Advisory machinery
    c. Current provision
    d. Planned provision

8. At Annex A are details of the information requested and at Annex B are Notes for Guidance to assist preparation of the report.

9. Please send the report to this division, at the address given below, with a copy to the Regional Principal, Regional Liaison Division, by 31 March 1989. It would also be very helpful if you could identify an officer to whom we may direct any subsequent questions.

J C Middleton.

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LONDON SE1 6BY

This letter will be cancelled and deleted from the Communications Index on 30 June 1989.

ANNEX A

REPORT ON GENETICS SERVICES

CONTENT OF THE REPORT

1. It is likely that much of the information requested on current provision is readily available. A professional enquiry of clinical geneticists conducted in 1984 gave an outline of service provision, staffing and organisation. We now seek up-to-date information in greater detail on the various components of these services. You may find the Notes for Guidance (Annex B) helpful in preparing the report.

Policy for genetics services

2. We wish to know the authority's policy for these services, with reference to their purposes and the functions they encompass, the components of genetics services and their organisation, and arrangements for delivery in relation to the population served. Account should also be taken of predictable developments (such as the introduction of automated techniques, more discriminating genetic markers and means of carrier detection).

Advisory machinery

3. Please describe the arrangements that have been made for obtaining professional advice on the requirements for planning and development of effective and efficient services, and on the criteria that might be used for determining priorities.

Current provision

4. Please supply details of services currently provided, in the form given in Tables 1-3. Please outline the arrangements for notifying General Medical Practitioners and potential 'at risk' groups of the genetic facilities available in the Region. How is the effectiveness of these arrangements monitored?

Planned provision

5. Please supply details of services planned for the period 1988-93, in the form given in Tables 4-6. We recognise that in many instances the details requested will not yet be available although they will need to be considered in the planning process.

Future Guidance

6. Please draw attention to additional aspects of planning and organisation of these services which might be considered in future guidance. We shall bear in mind the implications of inter-regional arrangements, for which mechanisms have yet to be established.

# REGIONAL REPORT ON GENETICS SERVICES

## NOTES FOR GUIDANCE

1. Genetics services have evolved in response to the wishes of individuals and prospective parents to know of the risks of their developing or transmitting genetic disorders and chromosome and malformation syndromes, and their wish to understand possible consequences and ways in which these might be prevented or eased. They especially wish to know whether or not

   i. they or their children bear a disorder for which prompt recognition is necessary to ensure effective treatment

   ii. they risk developing a disorder, so that their life planning may be better informed

   iii. they risk transmitting a disorder to their children, in order that informed decisions may be made on reproduction

   iv. a genetic disorder for which they are carriers, or are at risk of being carriers, has been transmitted to an unborn child, so that decisions may be made about the pregnancy.

2. The first requirement is that individuals and couples and their health advisers in many specialties should be sufficiently aware of these disorders, their nature and the risks associated with them, and of the need to anticipate interventions that might be necessary. Then through counselling, supported by accurate diagnosis and risk assessment, those affected may arrive at informed decisions on the steps to be taken. Achievement of this end will depend particularly on the knowledge and vigilance of general practitioners, obstetricians and paediatricians, supported by genetics colleagues, together with close coordination of their respective activities.

3. These functions define the components of an effective genetics service. There must also be scrupulous recording of genetic data, and means of linking that data through family registers used with proper regard to confidentiality. A commitment to surveillance of those identified as being at significant risk in the population served will help ensure timely opportunities for effective interventions.

4. The view is emerging that services are best organised on a regional basis and that their components should be brought together in regional genetics centres. This arrangement facilitates the close coordination that is necessary between clinical genetics and other clinical specialties and laboratory diagnostic services. We also see considerable advantages in placing the centre on which the regional genetics service is based close to the referral centre for procedures such as detailed ultrasound scanning for fetal abnormalities and the less common prenatal diagnostic techniques. Besides the convenience of patients and the identification of a regional locus for the anticipatory care of those at risk in extended families, such arrangements should also assist the development of coherent operational stategies in an advancing field.

5. There are specialised elements of laboratory diagnostic services where consideration of the number, incidence and variety of disorders together with the rapidity of technical development and accompanying expertise, will require multi-regional provision. In the case of rare disorders, pan-regional arrangements may be necessary, ie, arrangements that are made by and between regions (in distinction from those clinical services which meet the criteria of, and are designated under the Supra Regional Services Advisory Group arrangements (HN(83)36)). Factors to be taken into account include the quality, clinical effectiveness and efficiency of these services, and the need to avoid unnecessary duplication. Much will depend on achieving close liaison with referring genetics centres. This is necessary to provide adequate clinical guidance of laboratories' activities and to ensure the correct interpretation of their findings. Such activities will need to be considered as part of extended but integrated genetics services.

6. The advances described bring closer the prospect of screening for the detection of presymptomatic and carrier states of many genetic disorders. This will include the most common single-gene disorders whose detection offers putative benefits. However the success of any screening programme depends on careful preparation beforehand, with full account being taken of both the ethical and the practical issues that are raised.

7. Increasingly genetics will influence clinical medicine in almost all specialties, initially for relatively uncommon disorders but in time for disorders which are very common. It is evident that sound planning for these complex and rapidly changing services will call for continuing well-informed professional advice representing many specialties.

REGIONAL GENETICS SERVICES: Current Provision (1988) RHA

TABLE 1 SERVICES: Please indicate (+) under services as follows:

(a) self sufficient
(b) obtained from another region (please name)
(c) provided for another region (please name)
(d) no provision

| GENETIC DISORDER | Diagnosis and risk assessment | | | | Genetic counselling | | | | Genetic register | | | | Prenatal diagnosis | | | | DNA laboratory | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | a | b | c | d | a | b | c | d | a | b | c | d | a | b | c | d | a | b | c | d |
| **AUTOSOMAL DOMINANT** | | | | | | | | | | | | | | | | | | | | |
| Adult polycystic kidney disease | | | | | | | | | | | | | | | | | | | | |
| Huntington's chorea | | | | | | | | | | | | | | | | | | | | |
| Neurofibromatosis | | | | | | | | | | | | | | | | | | | | |
| Retinoblastoma | | | | | | | | | | | | | | | | | | | | |
| Myotonic dystrophy | | | | | | | | | | | | | | | | | | | | |
| Tuberous sclerosis | | | | | | | | | | | | | | | | | | | | |
| Familial adenomatous polyposis | | | | | | | | | | | | | | | | | | | | |
| **AUTOSOMAL RECESSIVE** | | | | | | | | | | | | | | | | | | | | |
| Cystic fibrosis | | | | | | | | | | | | | | | | | | | | |
| Phenylketonuria | | | | | | | | | | | | | | | | | | | | |
| Sickle cell disease | | | | | | | | | | | | | | | | | | | | |
| Thalassaemia | | | | | | | | | | | | | | | | | | | | |
| Tay Sachs disease | | | | | | | | | | | | | | | | | | | | |
| **X-LINKED** | | | | | | | | | | | | | | | | | | | | |
| Duchenne muscular dystrophy | | | | | | | | | | | | | | | | | | | | |
| Haemophilia A, B | | | | | | | | | | | | | | | | | | | | |
| X-linked mental retardation (including fra(x)) | | | | | | | | | | | | | | | | | | | | |
| Other disorders (please name) | | | | | | | | | | | | | | | | | | | | |

REGIONAL GENETICS SERVICES: Current Provision (1988)

RHA

TABLE 2 MANPOWER, FUNDING, SERVICE DISTRIBUTION

Please enter current staffing levels as whole time equivalents (WTE) under source of funding and their approximate service distribution

| | WTE | | | Approximate service distribution of manpower (WTE) | | | | |
|---|---|---|---|---|---|---|---|---|
| STAFF | NHS | Univ | Other | Diagnosis and risk assessment | Genetic counselling | Genetic register | Prenatal diagnosis | DNA laboratory |
| Consultant Clin Genet | | | | | | | | |
| Senior Registrar | | | | | | | | |
| Registrar/SHO | | | | | | | | |
| Research Fellow | | | | | | | | |
| SCMO/CMO | | | | | | | | |
| Clin Assistant | | | | | | | | |
| Scientist | | | | | | | | |
| MLSO | | | | | | | | |
| Other | | | | | | | | |
| Health Visitor | | | | | | | | |
| Nurse | | | | | | | | |
| Other | | | | | | | | |

REGIONAL GENETICS SERVICES: Current Provision (1988) RHA

TABLE 3 CASELOAD: Please enter for each service the number of patients per annum for whom a report is made:

Column (a) number from within region
(b) number referred from other regions
(c) number referred to other regions

| GENETIC DISORDER | Diagnosis and risk assessment | | | Genetic counselling | | | Genetic register | | | Prenatal diagnosis | | | DNA laboratory | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | a | b | c | a | b | c | a | b | c | a | b | c | a | b | c |
| **AUTOSOMAL DOMINANT** | | | | | | | | | | | | | | | |
| Adult polycystic kidney disease | | | | | | | | | | | | | | | |
| Huntington's chorea | | | | | | | | | | | | | | | |
| Neurofibromatosis | | | | | | | | | | | | | | | |
| Retinoblastoma | | | | | | | | | | | | | | | |
| Myotonic dystrophy | | | | | | | | | | | | | | | |
| Tuberous sclerosis | | | | | | | | | | | | | | | |
| Familial adenomatous polyposis | | | | | | | | | | | | | | | |
| **AUTOSOMAL RECESSIVE** | | | | | | | | | | | | | | | |
| Cystic fibrosis | | | | | | | | | | | | | | | |
| Phenylketonuria | | | | | | | | | | | | | | | |
| Sickle cell disease | | | | | | | | | | | | | | | |
| Thalassaemia | | | | | | | | | | | | | | | |
| Tay Sachs disease | | | | | | | | | | | | | | | |
| **X-LINKED** | | | | | | | | | | | | | | | |
| Duchenne muscular dystrophy | | | | | | | | | | | | | | | |
| Haemophilia A, B | | | | | | | | | | | | | | | |
| X-linked mental retardation (including fra(x)) | | | | | | | | | | | | | | | |
| Other disorders (please name) | | | | | | | | | | | | | | | |

REGIONAL GENETICS SERVICES: Planned Provision (1988-93)

RHA

TABLE 4 SERVICES: Please indicate (+) under services as follows:

(a) to be self sufficient
(b) to be obtained from another region (please name)
(c) to be provided for another region (please name)
(d) No provision planned

| GENETIC DISORDER | Diagnosis and risk assessment | | | | Genetic counselling | | | | Genetic register | | | | Prenatal diagnosis | | | | DNA laboratory | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | a | b | c | d | a | b | c | d | a | b | c | d | a | b | c | d | a | b | c | d |
| **AUTOSOMAL DOMINANT** | | | | | | | | | | | | | | | | | | | | |
| Adult polycystic kidney disease | | | | | | | | | | | | | | | | | | | | |
| Huntington's chorea | | | | | | | | | | | | | | | | | | | | |
| Neurofibromatosis | | | | | | | | | | | | | | | | | | | | |
| Retinoblastoma | | | | | | | | | | | | | | | | | | | | |
| Myotonic dystrophy | | | | | | | | | | | | | | | | | | | | |
| Tuberous sclerosis | | | | | | | | | | | | | | | | | | | | |
| Familial adenomatous polyposis | | | | | | | | | | | | | | | | | | | | |
| **AUTOSOMAL RECESSIVE** | | | | | | | | | | | | | | | | | | | | |
| Cystic fibrosis | | | | | | | | | | | | | | | | | | | | |
| Phenylketonuria | | | | | | | | | | | | | | | | | | | | |
| Sickle cell disease | | | | | | | | | | | | | | | | | | | | |
| Thalassaemia | | | | | | | | | | | | | | | | | | | | |
| Tay Sachs disease | | | | | | | | | | | | | | | | | | | | |
| **X-LINKED** | | | | | | | | | | | | | | | | | | | | |
| Duchenne muscular dystrophy | | | | | | | | | | | | | | | | | | | | |
| Haemophilia A, B | | | | | | | | | | | | | | | | | | | | |
| X-linked mental retardation (including fra(x)) | | | | | | | | | | | | | | | | | | | | |
| Other disorders (please name) | | | | | | | | | | | | | | | | | | | | |

REGIONAL GENETICS SERVICES: Planned Provision (1988-93) RHA

TABLE 5 MANPOWER, FUNDING, SERVICE DISTRIBUTION

Please enter planned staffing levels as whole time equivalents (WTE) under source of funding and their approximate service distribution

| | WTE | | | Approximate service distribution of manpower (WTE) | | | | |
|---|---|---|---|---|---|---|---|---|
| STAFF | NHS | Univ | Other | Diagnosis and risk assessment | Genetic Counselling | Genetic register | Prenatal diagnosis | DNA laboratory |
| Consultant Clin Genet | | | | | | | | |
| Senior Registrar | | | | | | | | |
| Registrar/SHO | | | | | | | | |
| Research Fellow | | | | | | | | |
| SCMO/CMO | | | | | | | | |
| Clin Assistant | | | | | | | | |
| Scientist | | | | | | | | |
| MLSO | | | | | | | | |
| Other | | | | | | | | |
| Health Visitor | | | | | | | | |
| Nurse | | | | | | | | |
| Other | | | | | | | | |

REGIONAL GENETICS SERVICES: Planned Provision (1988-93)

RHA

TABLE 6 CASELOAD: Please enter for each service an estimate of the number of patients per annum for whom a report will be made.

Column (a) number from within region
(b) number referred from other regions
(c) number referred to other regions

| GENETIC DISORDER | Diagnosis and risk assessment | | | Genetic counselling | | | Genetic register | | | Prenatal diagnosis | | | DNA laboratory | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | a | b | c | a | b | c | a | b | c | a | b | c | a | b | c |
| **AUTOSOMAL DOMINANT** | | | | | | | | | | | | | | | |
| Adult polycystic kidney disease | | | | | | | | | | | | | | | |
| Huntington's chorea | | | | | | | | | | | | | | | |
| Neurofibromatosis | | | | | | | | | | | | | | | |
| Retinoblastoma | | | | | | | | | | | | | | | |
| Myotonic dystrophy | | | | | | | | | | | | | | | |
| Tuberous sclerosis | | | | | | | | | | | | | | | |
| Familial adenomatous polyposis | | | | | | | | | | | | | | | |
| **AUTOSOMAL RECESSIVE** | | | | | | | | | | | | | | | |
| Cystic fibrosis | | | | | | | | | | | | | | | |
| Phenylketonuria | | | | | | | | | | | | | | | |
| Sickle cell disease | | | | | | | | | | | | | | | |
| Thalassaemia | | | | | | | | | | | | | | | |
| Tay Sachs disease | | | | | | | | | | | | | | | |
| **X-LINKED** | | | | | | | | | | | | | | | |
| Duchenne muscular dystrophy | | | | | | | | | | | | | | | |
| Haemophilia A, B | | | | | | | | | | | | | | | |
| X-linked mental retardation (including fra(x)) | | | | | | | | | | | | | | | |
| Other disorders (please name) | | | | | | | | | | | | | | | |

ANNEX C

## SUMMARY

This report is based on the data collected during the first year of the evaluation of clinical genetics in the context of DNA probes in three genetic centres at Manchester, Cardiff and the Institute of Child Health in London. The aim of this report is to assess the demand for genetic services in the three centres and the characteristics of such a demand.

Information on 10185 individuals from 2852 families are included in the analysis. The results are presented according to mode of inheritance and according to the most common disorders for which DNA probes have been used in the centres.

The results indicate that the use of DNA probes is now a major element of activity in genetic departments and as long as indirect DNA probe testing is the predominant manner of using recombinant technology the clinical input will be an important element of expenditure, probably greater than DNA laboratories.

From our experience in data collection in the three centres we would strongly recommend them to organise a common system to summarise information on process measures to monitor changes in demand and utililsation over time.

So far centres have concentrated on DNA testing of diseases for which there has been a long standing interest. In many cases this has coincided with services for high frequency and severe disorders. However there are some common disorders which seem to have been excluded from an established pattern of services. Conversely a relatively high number of famililes were studied in some disorders of very low incidence. We would recommend that the distribution of service responsibility should be organised supra-regionally in relation to DNA laboratories and regionally for clinical genetics. For rare or treatable disorders one DNA laboratory can deal with national demand for each specified disease. For common disorders of poor prognosis with a complex gene structure few DNA laboratories can deal with the national demand. It would be a mistake to allow 10 or more DNA laboratories to service a disease such as DMD. Sooner or later differences in quality will be detected and demand will be insufficient to justify such a large number of laboratories. Supra-regional DNA laboratories must provide similar standard of service and speed of reporting results to colleagues from other regions as to colleagues in the same region. The departments sending samples should be informed of the time needed to report results.

The efficacy of the recombinant technology and the fact that for many disorders this is the only preventive action available make it clear that DNA laboratory services are useful and necessary. It is early days for a full appraisal of the effectiveness of the recombinant technology and we expect to contribute to this issue in our second report. However, at present and excluding hemoglobinopathies which are looked after elsewhere, DNA probes will only be able to prevent a fraction of new cases of the main diseases for a variety of reasons depending on the disorder eg high mutation rates, ethical issues, perceived mildness of the diseases or availability of treatment and the requirement that an affected child be born before an assessment can be made.

We have detected very large differences in utilisation of services within and between regions. Although many factors may contribute to these differences, undeniably access and lay and professional awareness are potential explanatory factors as more patients are from the same or neighbouring DHAs to the genetic centre than from DHAs further away.

It is worth comparing GP collaboration and home visiting to obtain a sample for DNA testing. Use of GP may result in some savings and at the same time increase professional awareness in the subject.

Information for other clinicians about the use of recombinant technology, the type of families that could benefit and the genetic centres where referral should be sent may be an important step forward to maximise the effectiveness of the technology. Since this may increase demand, this educative tool should be coordinated and agreed by DHSS with the genetic departments in the country.