Birmingham Women's and Children's NHS Foundation Trust

WEST MIDLANDS REGIONAL CLINICAL GENETICS SERVICE

# Review of the impact of consanguinity locally and current clinical genetics service provision

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By your side

# Infant mortality (IMR)

- IMR: proxy for the overall health of a population and can also reflect the quality of maternity services (Royal College of Paediatrics and Child Health National Children's Bureau, 2014).
- Birmingham consistently high IMR, almost double the national average in England and Wales
- Public Health England, 2016
  - West Midlands IMR was 5.5
  - Regional variation from 3.3 per 1,000 births in Shropshire to 7.2 per 1,000 births in Birmingham
- Almost 400 infant deaths annually in West Midlands
  - 80% occurring in the neonatal period in comparison
  - 70% nationally

## Birth outcomes for consanguinity-related recessive disorders: Preliminary modelled estimates for Birmingham Local Authority population, 2021 (numbers of cases)

| | Stillbirths | Live births | Couples needing expert genetic counselling (and family cascading) | Neonatal deaths | Infant deaths | Under-5 deaths | Surviving @ 5 yr |
|---|---|---|---|---|---|---|---|
| All | 19 | 90 | 109 | 10 | 13 | 31 | 59 |
| Pakistani | 16 | 75 | 91 | 8 | 11 | 26 | 50 |
| Bangladeshi | 1 | 6 | 7 | 1 | 1 | 2 | 4 |

Source: Bernadette Modell, UCL Emeritus Professor of Community Genetics

- Over half of maternity population from ethnic minorities (Tonks et al., 2013)
- Public Health England 2016, Asian or Asian British
  - second largest ethnic group in the West Midlands
  - 13% of the population in the West Midlands
  - 25% of the population of Birmingham
- Socioeconomic factors and prematurity are major factors
- Genetic contribution
  - Congenital abnormalities occur in 2-3% of pregnancies however this risk is doubled in consanguineous couples to around 6% (Sheridan et al., 2013).

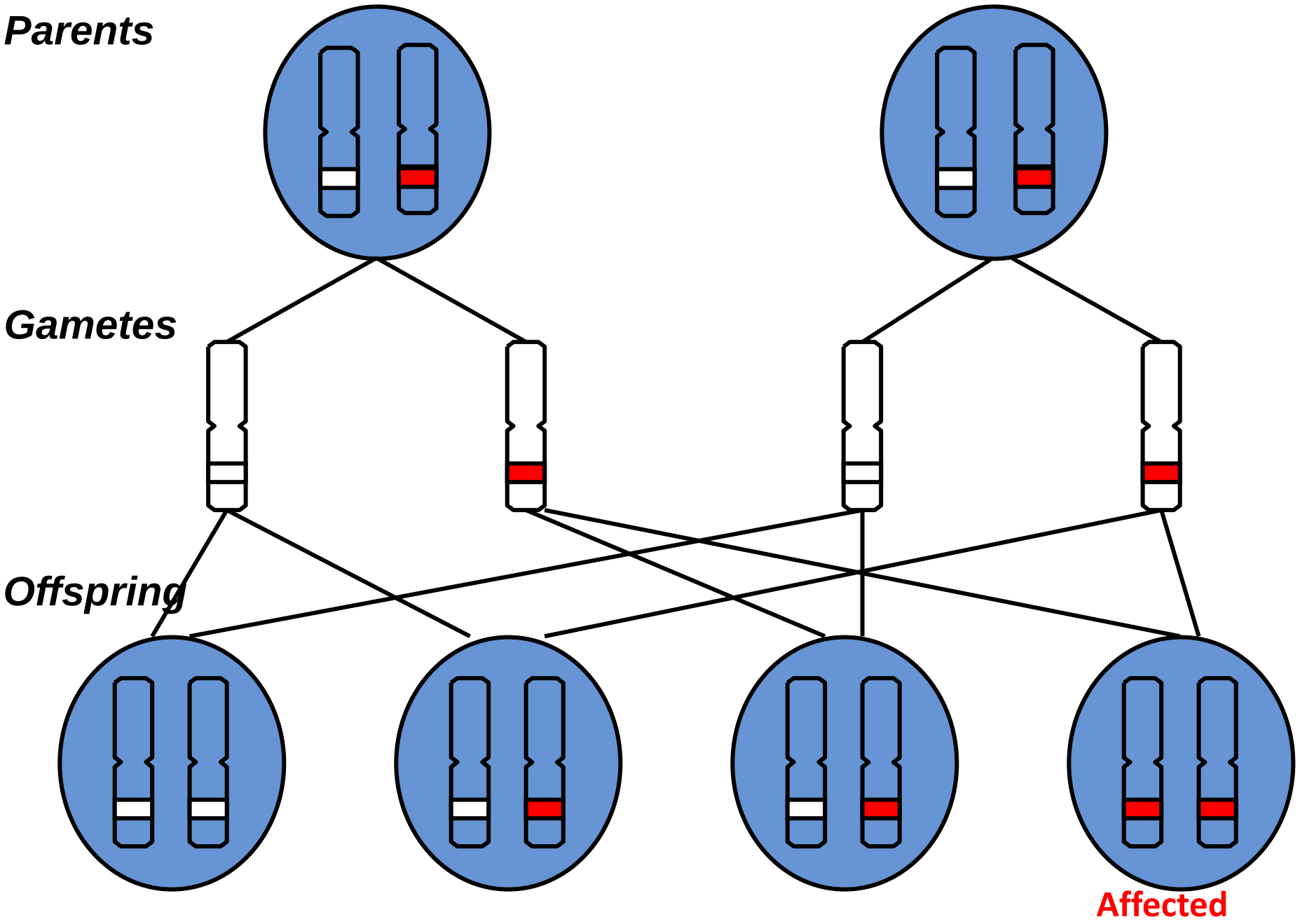
# West Midlands Regional Genetics Service - Longstanding interest in the impact of genetic diseases in the British Pakistani community

Birmingham deaths/anomaly 2006-2010 Perinatal Episode Electronic Record (PEER), data , Tonks et al., 2013, 2014

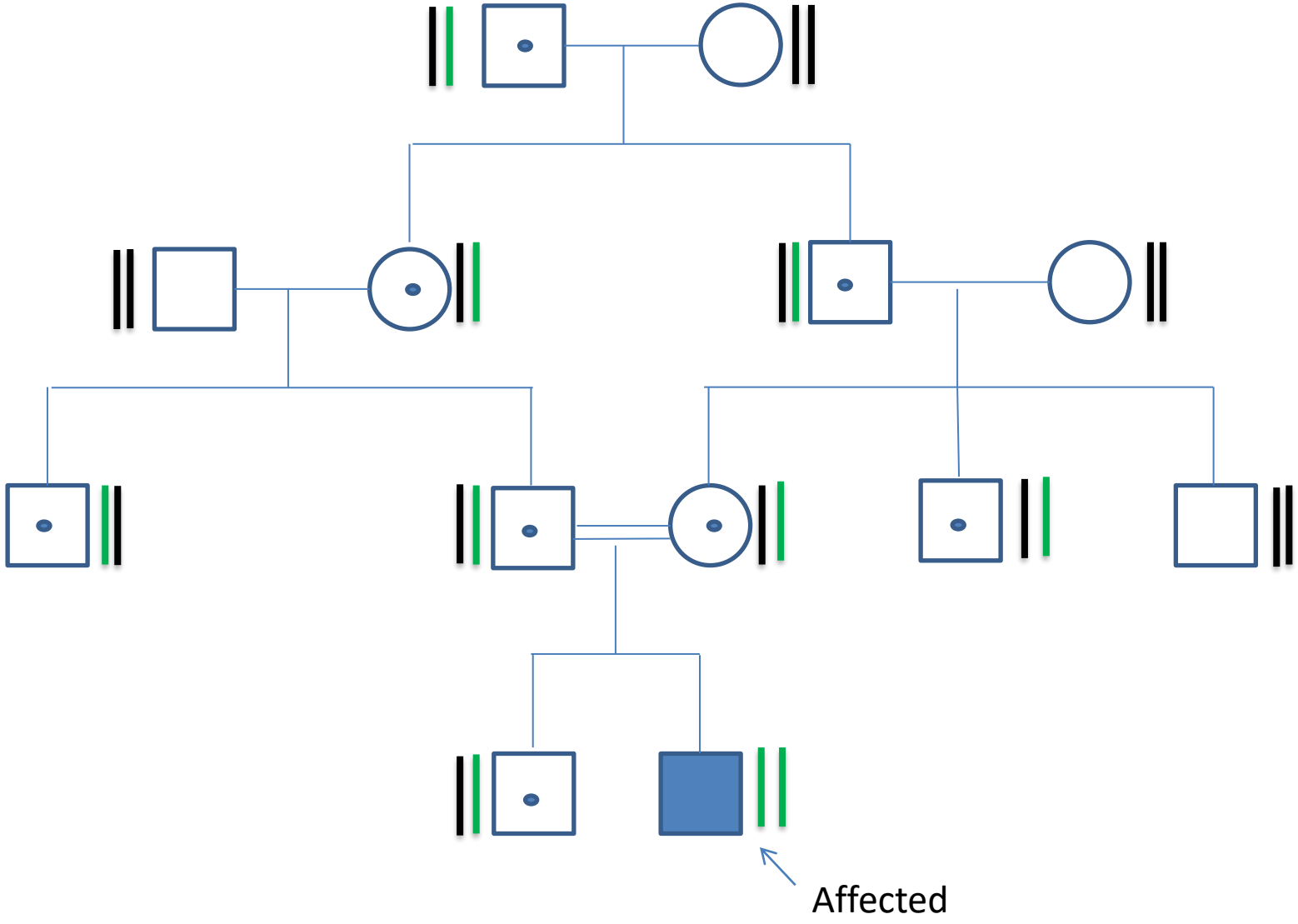
2 years period (2009-2010)

- congenital anomaly-related deaths in 1/3 of stillbirth and infant deaths
- significantly higher mortality rates in Pakistani and Bangladeshi mothers
- metabolic, renal and neural tube defects significantly higher in Pakistani babies
- consanguineous unions 16% but 50% in Pakistani mothers
- Autosomal recessive (AR) conditions 10% of stillbirths and infant deaths and over a third of deaths from congenital anomalies
- Pakistani births, AR conditions in ¼ of deaths and almost 2/3 of deaths from congenital anomaly. Mortality from AR disorders was significantly higher in the Pakistani group
- AR conditions contribute to the excess of stillbirth and infant mortality in Pakistani and Bangladeshi births in Birmingham

# AUTOSOMAL RECESSIVE INHERITANCE



# Autosomal recessive inheritance



# Strategies to improve access to Genetic Services in the West Midlands

Specialist Asian Genetic Counsellors (2) with expertise and knowledge of the cultural and religious issue (1WTE)

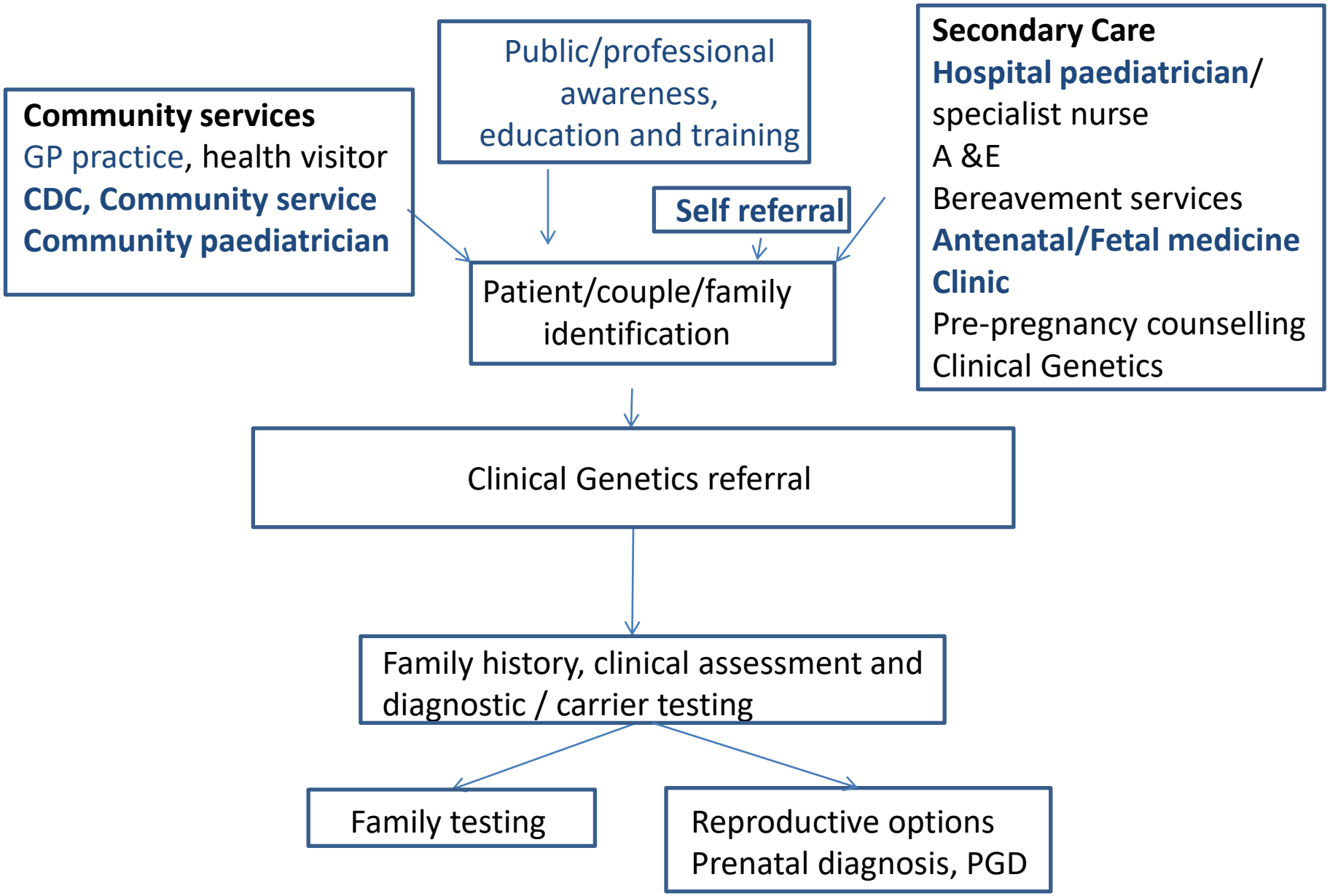
Enhanced Genetics Services Project (December 2008 - December 2011)

- developing genetic laboratory testing
- identifying and offering relatives carrier testing
- increase specialist Genetic Counsellor support for Pakistani ethnic minority families
- community and primary care involvement to enhance awareness of who may benefit from clinical genetics input
- tailored educational resources for professionals and families

Integration of genetics into mainstream services e.g. neurometabolic service

- 10x risk; usually severe, often life limiting conditions with a high morbidity and mortality in childhood, requiring frequent and prolonged medical, social and educational resources
  - Support around family history interpretation, diagnosis and prenatal testing as well as carrier testing of the wider family
  - Extended educational opportunities with our paediatric colleagues

# Referral pathways into Clinical Genetics

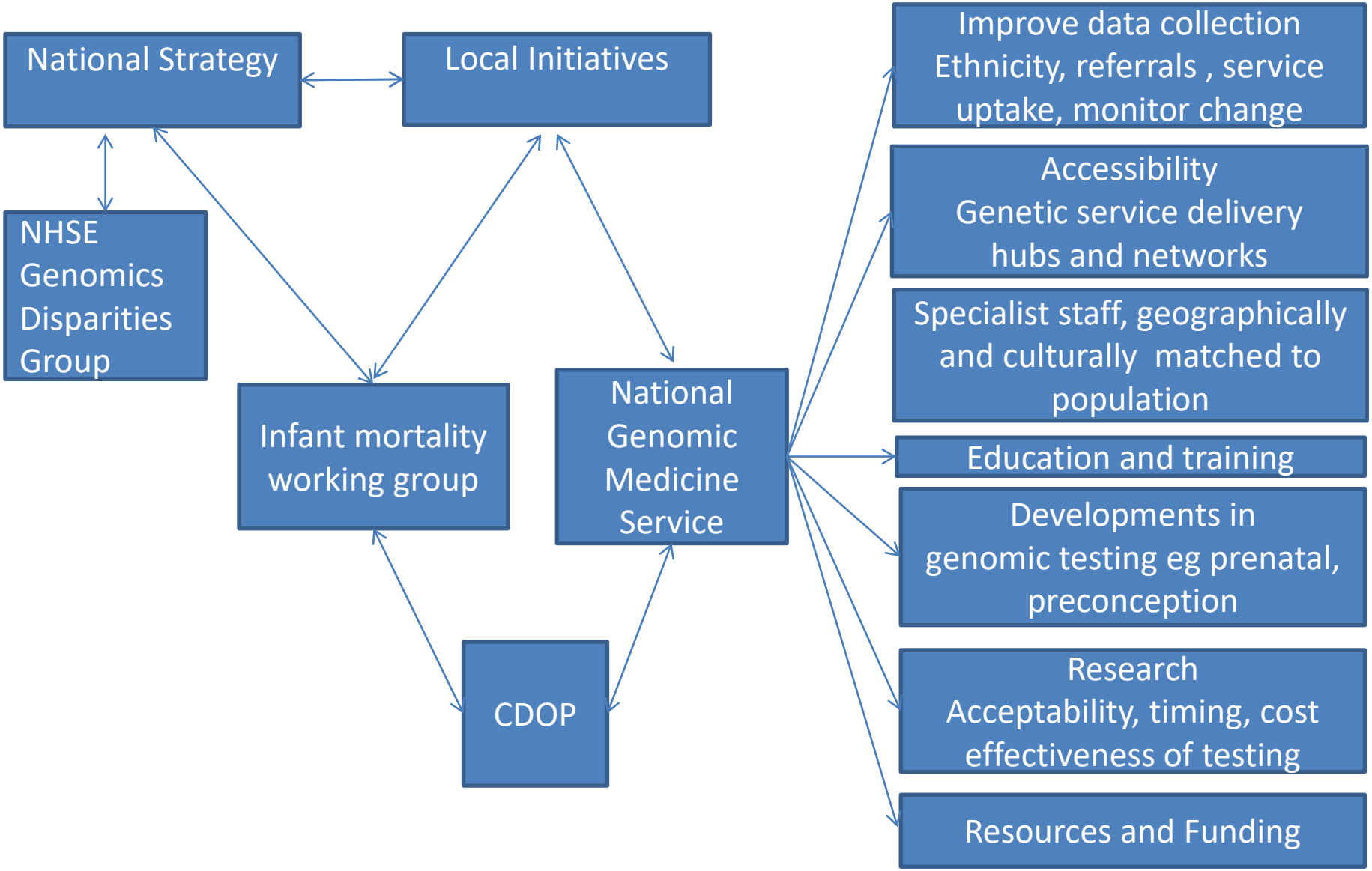


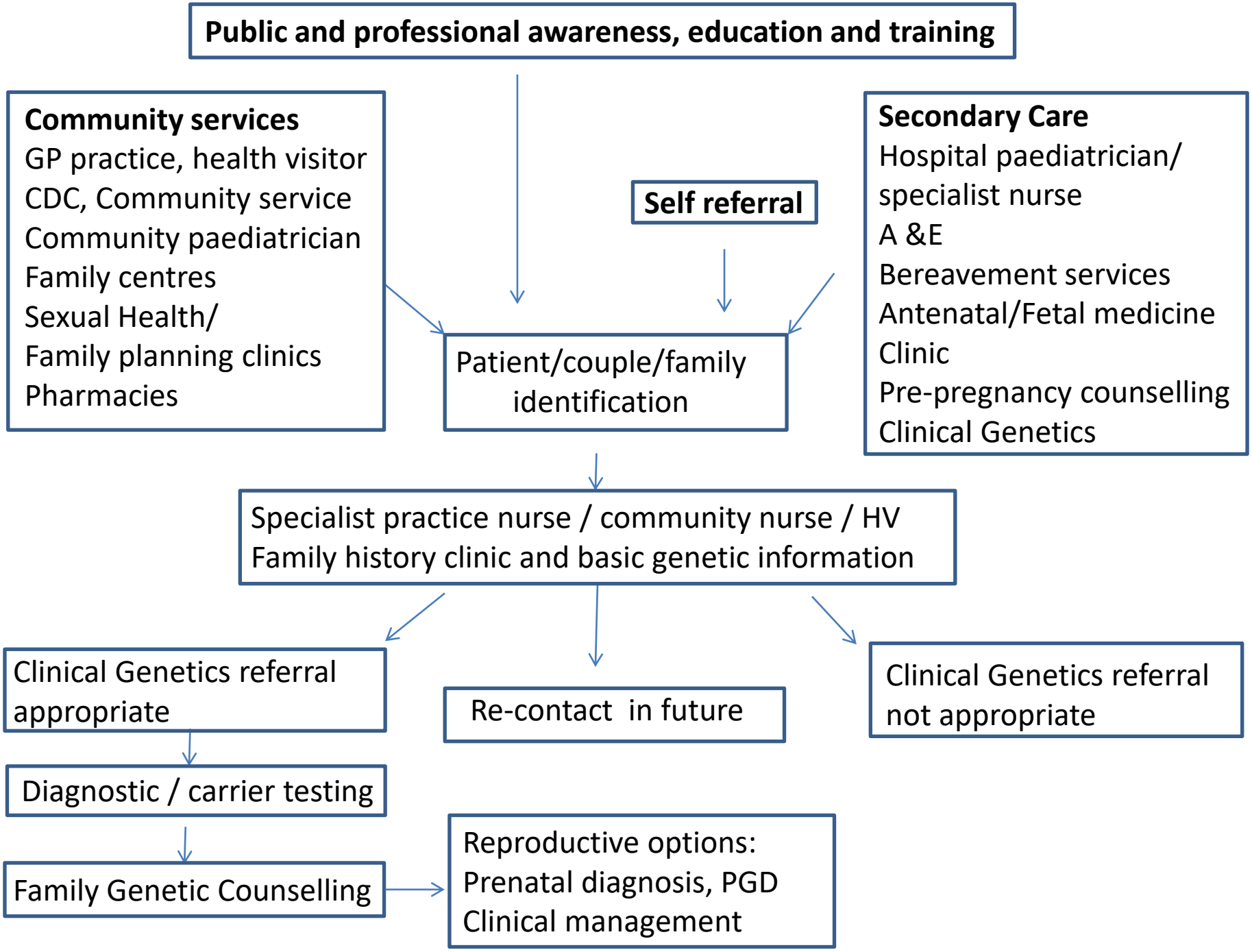
# Barriers to service uptake

- Lower uptake of prenatal testing and services and an increased risk of perinatal death and fetal recurrence has recently been observed in consanguineous pregnancies in Birmingham (Mone et al., 2020)

- Practical experience of offering genetic investigations and extended family testing to consanguineous families in the West Midlands has highlighted important issues
  - language
  - trust and confidentiality
  - timing of the referral for example in an acutely unwell child
  - misconceptions or perceived lack of utility by patients and professionals
  - practicalities and limitations for genetic counselling and testing
  - accessibility affected by automated referral and booking processes

# Future direction- shift emphasis to rare AR diseases




Public and professional awareness, education and training
Community services
GP practice, health visitor
CDC, Community service
Community paediatrician
Family centres
Sexual Health/
Family planning clinics
Pharmacies
Self referral
Secondary Care
Hospital paediatrician/
specialist nurse
A &E
Bereavement services
Antenatal/Fetal medicine
Clinic
Pre-pregnancy counselling
Clinical Genetics
Patient/couple/family
identification
Specialist practice nurse / community nurse / HV
Family history clinic and basic genetic information
Clinical Genetics referral
appropriate
Re-contact in future
Clinical Genetics referral
not appropriate
Diagnostic / carrier testing
Family Genetic Counselling
Reproductive options:
Prenatal diagnosis, PGD
Clinical management

# Conclusion

- Complex issues
- Rare, severe, multisystem conditions and may be multiple genetic conditions(s)
- Benefits of genomic testing, family planning options, management implications
- Consistent and continue to build robust networks and embed good practice
- Implementation of national and local initiatives, clinical staff with the appropriate skills, community support and resources, to ensure that the service can be provided equitably

- Acknowledgements to my colleagues at the West Midlands Regional Genetics Service

- Please save questions until after the following presentation