



#### Health Educations England's Genomics Education Programme

Transforming Healthcare: the impact of genomics on the NHS Wednesday 12<sup>th</sup> April 2017

Developing people for health and

healthcare

www.hee.nhs.uk





### HEE's Commitment to Genomics Professor Ian Cumming Chief Executive, Health Education England





## **Objectives for the day**

- Raise awareness of the key drivers and strategies in genomics and personalised medicine, and how these will impact on patient care.
- Raise the profile of the HEE Genomics Education Programme (GEP) and its work in this critical area of healthcare.
- Mobilise local HEE teams and key partners to champion the agenda and provide advice and guidance on solutions and any follow-up actions needed including any local investment decisions.
- Plan for the **sustainability and legacy** of the GEP moving forward



## Setting the context

#### The NHS England 2016 'Improving Outcomes through Personalised Medicine' strategy document states that:

"Britain has the opportunity to be at the forefront of this new era of medicine, delivering 21st century healthcare. As the single biggest integrated healthcare system, combined with our world leading science base and global reputation for innovation, we have the opportunity and capability to transform the way we deliver healthcare to secure benefits for our patients, our society and our economy."



### Mandate Deliverables 2017-18

#### **Objective 4: Prevent ill health and support people to live healthier lives**

HEE will contribute to realising the potential of research and innovation in healthcare and demonstrate commitment to the UK Life Sciences growth agenda, for example by continued education and training developments for the scientific workforce and more broadly in genomics, bioinformatics and the use of data across all levels of the workforce.

#### Overall 2020 goals:

• Embed genomics education at all levels of the current and future workforce.

#### 2017-18 deliverables:

- As a key partner of the 100,000 Genomes Project, deliver the final year of the £20m Genomics Education Programme and plan for the transition to business as usual;
- Lead workforce transformation resulting from genomic medicine ensuring alignment to Genetic Laboratory re-procurement, STPs and Local Workforce Advisory Boards and the new Life Sciences Strategy;
- Secure sustainable funding for the HEE Master's in Genomic Medicine beyond Apr '18



### When genomics provides answers



https://youtu.be/agE5SgzWXOs

@Genomicsedu

#genomes100k

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**NHS** Health Education England

#### Genomics in action: sequencing the TB bacterium



#### British scientists claim major advance in TB treatment

24 March 2017 Last updated at 05:31 GMT

A team of British scientists have made a major breakthrough in the treatment and diagnosis of tuberculosis.

Researchers in Birmingham and Oxford have been able to use genome sequencing to isolate different strains of the disease, which means patients who might have waited months to get the right drugs can now be diagnosed in little more than a week.

Public Health England says it's the first time the technique has on been used on this scale anywhere in the world.

- From March 2017, whole genome sequencing is being used in England to identify different strains of the TB bacterium. This is the first time that WGS has been used as a diagnostic solution for managing a disease on this scale anywhere in the world.
- Previously it took up to 1 month to diagnose and confirm treatment choices.
   This can now be done in just over a week, slowing the spread of disease.

#### @Genomicsedu

#### #genomes100k

www.genomicseducation.hee.nhs.uk



### The role of HEE

"Health Education England (HEE) exists for one reason only: to support the delivery of excellent healthcare and health improvement to the patients and public of England by ensuring that the workforce of today and tomorrow has the right numbers, skills, values and behaviours, at the right time and in the right place."





## **GEP key achievements to date**

All 550 Master's commissions achieved ahead of time

50,373 CPD sessions\* to date, on track to exceed 2018 target of 52,000 \*formal, online or face-to-face education or training; informal self-directed learning / professional activity



**First HSST cohort of bioinformaticians** in training and first round of registration achieved with HCPC through equivalence, professionalising the role

d by

STP in Genomic Counselling approved by HCPC with full recruitment to first cohort



Launched first MOOC on whole genome sequencing on the FutureLearn platform, achieving more than 12,000 learner registrations

NHS GMC education and training leads activity and collaboration across England

ng gn)

Shortlisted for awards by Nursing Times (funded training programme) and comms2point0 (social media campaign)

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## How does this relate to genomics?

#### Build a workforce that is:

- Better educated and more competent both specialist and wider.
- Has the skills to deliver a genomics service across the NHS e.g. bioinformatics, genomic counselling.
- Can deliver the vision to be world leaders.

#### **Call to action:**

- Define what the current specialist workforce looks like and what it needs to look like in the future.
- Attract and recruit the right people to key training programmes.
- Ensure enough training posts exist in the right areas.
- Utilise alternative roles to deliver genomic services.
- Have conversations with the STPs and LWABs to encourage genomics workforce development.





## How is genomic medicine changing service models?

**Professor Sue Hill, Chief Scientific Officer for England, SRO for Genomics, NHS England** 





# How is genomic medicine changing service models?

Professor Sue Hill@CSOSueChief Scientific Officer for EnglandApr 2017





*"Genomics is probably the biggest breakthrough in the last 50 years.* 

"For many years, it's been talked about that medicine is going to be personalized. We're finally starting to get there."



Dr Eric Topol Leading researcher in US Precision Medicine Institute

### Importance of technological advance England in improving outcomes & sustainability





The Five Year Forward View – the strategic framework for the future of the NHS – recognises the **importance of disruptive technologies** such as genomics, in meeting the 3 gaps and prevention challenge required **for future NHS sustainability** 

"The NHS needs to adapt to take advantage of the opportunities that science& technology offer patients, carers & those who serve them"

The 'Next Steps' document on the delivery of the 5YFV recognises the importance of genomics to the future of the NHS, building from the current base to establish a national Genomic Medicine Service for England with supporting infrastructure.



'Next Steps' identifies that this will support the **delivery** of significant NHS initiatives such as the Cancer Implementation Plan, the Rare Disease Strategy and earlier diagnosis across clinical priority areas.





Profound scientific & technological innovation influencing NHS transformation and effectiveness; a major step change in the pathway to personalised care





with 231 sub-panels; 4800 genes can now be tested from clinical exome

techniques can monitor

metabolites, proteins & other biomarkers across FG pathway

for maximum impact POCT developments providing real-time clinical opportunity

## Genomics: cornerstone of future science & model for transformation



- Participants consent to additional findings, sharing of genomic data for research and of longitudinal record
- Moving from proof of concept to implementation in 3 years and aligned to two major system priorities (UK Rare Disease strategy and Cancer TF
- A model for transformational change in the NHS as well as delivering science and partnerships with industry
- Will be key part of UK life sciences industry strategy



#### A new infrastructure setting out genomic *England* medicine service models for the future GENOMIC MEDICINE

Nationwide network of **13 NHS Genomic Medicine Centres (GMCs)** for populations of ~3- 5million with multiple local hospital trusts (~80-100)

Operating models driven by **focus on innovation** to establish and develop genomic medicine service model.:

- New models for consent
- Standardisation & transformation of care models
- Involvement of multiple clinical specialities
- New sample handling & processing in cancer for FF tissue
- Data collation & handling (new data hubs)
- Genomic MDTs for RD and Cancer
- Partnership and network working
- Clinical Leadership for change
- Patient and public involvement
- Aligned with HEE Genomics education and training initiatives



- CORE PATHWAY



#### Pathology for sequencing: a complex Engla transformation of surgical pathways & practice

#### The most important change in established practice for genomic medicine Is in the handling of solid tissue samples for DNA sequencing

Tumour samples are traditionally preserved in formalin then fixed in paraffin (FFPE) to preserve cellular architecture for diagnosis under the microscope



DNA extracted from samples treated like this is damaged and broken



Use part of the sample for FFPE and histology

- Freeze part of the sample for genetic tests
  - Need to make sure the sample contains mainly tumour cells

#### **KEY CHANGES**

- Move away from formalin fixation to obtain the best possible tissue for genomic analysis
- Formalin free theatres
- Use of refrigeration to preserve tissue rather than formalin
- Use of vacuum packing
- Use "DNA friendly" fixatives (e.g. *PAXgene tissue*)

This new pathway requires very significant changes in sample handling and cellularity assessments, affecting surgeons, interventional radiologists, pathologists and oncologists

## Opening up a new range of biomarkers and diagnostics

- DNA information alone does not provide the full picture – the translation of genes into the proteins & metabolites of the body shapes outcomes
- These translation steps are the functional genomic pathway – the Project is collecting multiomic samples with the possibility of simpler biomarker tests to identify particular genetic changes
- The new technology of ctDNA (circulating tumour DNA) opens up the possibility of using blood samples for the genetic analysis of cancer, rather than invasive biopsies

#### **Functional Genomic Pathway**







## **Genomics England: building future research into current care**







## The scale of the 100,000 Genomes Project

100,000 genomes



70,000 patients and family members

21 Petabytes of data. 1 Petabyte of music would take 2,000 years to play on an MP3 player.

13 Genomic Medicine Centres, and85 NHS Trusts within them are involved in recruiting participants

1,500 NHS staff (doctors, nurses, pathologists, laboratory staff, genetic counse



laboratory staff, genetic counsellors)

2,500 researchers and trainees from around the world

### Already changing lives: Rare Disease

#### **GEORGIA**



Multiple problems; >5 hospital spec services 2 Genetic Centres No cause identified despite extensive testing Now aged 4

**JESSICA** 



Difficult to treat epilepsy Developmental Delay No cause identified by standard tests Now aged 4 Newly recognised disease gene found (KDM5B) End of 'diagnostic odyssey' Informs parent's reproductive choice (*low future risk*)

NHS

England

Defect identified in GLUT1 gene

End of 'diagnostic odyssey' Epilepsy improved through special diet reproductive choice (*low future risk*)

**INFANT P** 



'Failure to thrive' Unclassified immune deficiency Recruited with consaguinous parents **Died** age 5 months Mother pregnant

Defect identified in TCN2 gene – transcobalamin deficiency

Sibling also affected – condition can be treated with Vit B12 Sibling responding well

### **Cancer: a new world of opportunity**



- Cancer is an important disease to the NHS with >350,000 new cases a year & >160,000 deaths. Expected to rise >1.6x by 2030
- All cancer is a lesion of the genome.
- Detailed analysis of WGS can inform personalisation across each of the four arms of cancer care: surgery, radiotherapy, drugs & interventional radiology



## Establishing a World Leading Infrastructure for genomic medicine

England



#### Laying the foundations for the future of care





## Where is this taking healthcare?

The future direction for healthcare systems is clear – with, at one end, a focus on improvements to population health and, at the other, increasing personalisation of care and management approaches

- A step change in prevention
- Earlier diagnosis of disease
- Enhanced screening and prediction
- Influencing lifestyle choices

#### FUTURE FOCUS



- Tackling the limits of 'one size fits all' medicine & blockbuster drugs
- Medicines optimisation
- Managing adverse drug reactions
- Identification of new targets and treatment approaches
- Improving outcomes

### Personalised medicine – moving England from volume to value-driven healthcare





## Altering the focus of intervention across the care continuum



Prompt and precise diagnosis delivers the '*Holy Grail*' of health systems – a shift towards maintaining health and preventing disease

#### The NHS framework for personalisation



## Delivering patient, population & England system benefits



#### underpinned by an evolving infrastructure



## Early opportunities for personalised medicine underpinned by genomics



**Development of personalised medicine** is a multi-dimensional activity:

- Evidence base for utility/cost effectiveness
- Responsiveness & turnaround time for results
- Evolution of Informatics and analytical platforms
- Integrated genomic testing and other functional diagnostics
- Whole pathway approach
- NHS England has established working groups to establish genomic testing strategy for rare/inherited diseases, some common diseases and cancer



Specialist Care

## Surgical personalisation in practice: colorectal cancer



Genomics has the potential to play a substantial role in the surgical decision-making process through precise diagnosis and careful stratification of cases



Dienstmann R et al. ASCO Meeting Abstracts. 2014

Careful stratification could justify a conservative 'organpreserving' approach (rather than radical surgery) with much less morbidity & comparable oncological outcomes

## Data and its analysis becomes crucial England

- The combination, management and analysis of information is a key part of the genomic revolution
- Informatics is becoming a crucial new clinical profession – v limited existing roles & posts in the workforce
- An increasing range of analysis and clinical decision support can be made by a variety of artificial intelligence techniques

   but will require appropriatelytrained staff to ensure safety, consistency and innovation in these services



#### IDENTIFICATION OF SKIN CANCER THROUGH INFORMATIC ANALYSIS

- Deep convolutional neural networks (CNNs)
- System trained with 129,450 skin images on two key tests:
  - keratinocyte cancers vs benign keratosis *(common cancer)*
  - Malignant melanomas versus benign nevi *(deadly cancer)*
- Out–performed 21 Certified Grade
   Dermatologists

Esteva et al Nature, Feb 2017

## Rethinking the care pathway for early-onset diabetes





Combination of phenotypical characterisation (including established diagnostics) with genomic testing identifies precise diagnosis and treatment options for conditions that **could be mistaken** for being type I diabetes

#### New pathways & service models: WM Familial Hyperchoesterolemia Service





- Previous service lacks co-ordination;
- Care fragmented, no agreed pathway, standards or protocols or systematic cascade testing

England

 22 West Midlands CCGs have committed to commissioning the regional service including funding of nursing posts and genetic testing

• Embedded in WM GMC

- If mutation –we treat in accordance with NICE guidelines (CVD Risk Assessment and Reduction)
- MECC, lifestyle advice and refer to relevant lifestyle services
- Offer referral to 100,000 genome project


## A new weapon in the battle against infection & resistance

- Genome sequencing & analysis is opening up a new front in the battle against infectious disease
- Tools such as *Mykrobe Predictor* take sequence data from samples of MRSA or MDR-TB

AMINOGLYCOSIDES	BL BETA LACTAMS	MACROLIDES / LINCOSAMIDES
Gentamicin ▲	Penicillin ▲ Methicillin ▲	Clindamycin Erythromycin
G GLYCOPEPTIDES	TETRACYCLINES	QUINOLONE
∛ancomycin ●	Tetracycline ●	Ciprofloxacin •

• This provide a fast, accurate and precise diagnosis of the resistance profile of an organism allowing effective personalisation of antimicrobial approach.

### Genomics and Medicines optimisation





### Personalisation for patients: England transforming Warfarin management

- 600,000 Warfarin users in UK
- Massive variability in individual response 40x variability in dose
- Major cause of adverse reactions
- Established methodology 'trial and error' via INR clinics
- Have identified the genetics that accounts for significant element of variation in response
- Research has established genotype guiding protocols – allowing clinicians to get to the right dose sooner, with fewer adverse effects
- Improves patient outcomes and patient experience







## A (near) future personalisation pathway: improving cardiovascular care



Blood analysed (WGS) to determine if patient at risk of CVD events



Biomarker and remote telemonitoring determines when to intervene (reducing hospital readmission)



Genomic and biomarker data used to select most effective medication



Drug platform enables designer drugs for personalised treatment

> Urine/Biomarker monitoring is used to check treatment efficacy, modifying as required

#### Improves patient outcomes & experience, while reducing pressure on acute services

**Approach** developed by Cardiovascular Precision Medicine Initiative – a multi-partner US project

**Aim:** emphasize predictive analytic methodology to provide quality care, reduce cost and provide cutting edge cardiovascular technology to community of 3 million







- Precise diagnosis precise treatment selection
- Greater multi-professional involvement in MDT
- Fewer non-responders/ADRs
- Role for community-based diagnostics/screening

#### **Developing the NHS Genomic Medicine Service**

NHS

England



## Alignment with research supporting future care & innovation





## Importance of cross-workforce engagement & development



Establishing widespread use of genomic medicine is a 'hearts & minds' activity requiring a step-change in genomic knowledge needed across clinical professions - *far beyond the highly specialised workforce*.



- The HEE Genomics Education Programme is transforming knowledge and understanding at all levels of the NHS workforce – with a wide range of resources developed
- Still more work to be done on embedding within prospective education and training
- The Masters in Genomic Medicine delivered by 10 HEIs provides a multiprofessional approach to developing genomic knowledge – supporting CPPD & revalidation
- New research fellowships will develop capacity and capability to work on genomic data from 100,000 Genomes Project



## Integration and collaboration is everything...



Area of maximum advance

> **Partnerships** – across services, specialisms, sectors and across the world – maximise the opportunities from discovery & innovation through the mainstreaming of genomic medicine

Eg **GeCIP** – brings 2400 researchers from 300 institutions in 24 countries into 39 domains across cancer, rare disease and cross-cutting issues to maximise learning from clinical interpretation of WGS

DIFFUSION

**INVENTION** 

**EVALUATION** 

**ADOPTION** 

## The personalisation journey over the next decade



#### Today:

'One-size-fits-all' treatment based on symptoms

Services and professions organised according to organ/speciality

Limited use of genomic and molecular markers

Diagnostic and clinical data not linked

#### By 2020:

Whole genome sequencing for specific conditions

Improved diagnosis of rare conditions and better understanding of cancer

Comprehensive, linked diagnostic data coupled with effective informatics analysis to give a full picture of patients By 2025:

New taxonomy of medicine based on underlying cause and personal response

Integrated clinical services taking a 'whole body' approach

Tailored, optimised and more effective therapies for better outcomes

New NHS relationships with academia, industry, patients & patient groups



## Mainstreaming genomic medicine for *Eng* personalisation: the UK's 'Moonshot Moment'

The New Frontier is here whether we seek it or not. Beyond that frontier are uncharted areas of science and space... unsolved problems....

unanswered questions...

It would be easier to shrink from that new frontier, to look to the safe mediocrity of the past...

But I believe that the times require imagination and courage and perseverance



John F Kennedy, 1960





## **GEP: current and future**

#### **Dr Anneke Seller, Scientific Director, HEE Genomics Education Programme**

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### **HEE Genomics Education Programme**

- Established in 2014 with £20m Department of Health funding until March 2018. HEE 'BAU' post 2018.
- Aims of GEP up to 2018:



- GEP builds on work of NGEDC, founded following recommendations in the 2003 White Paper: 'Our Inheritance Our Future'
- Strong links with the National School of Healthcare Science



#### **Assurance framework**





- Impact across whole education continuum for prospective and current workforce, across all professions
- Remit ranging from awareness raising (e.g. genetics vs genomics) to highly specialised (e.g. tumour assessment)
- Gap analysis to ensure we're not duplicating efforts; and initiating joined-up activity between specialist groups and/ or establishing networks so we are not working in isolation.

Comprehensive reach across 1.3M NHS staff

Using up-to-date methods rooted in educational theory and practice • - evidence-based approach. And evaluating our impact.

- **Strategy and approach**

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Key aims:









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### HEE Genomics Education Programme: Progress to date



### **Update: Resources to support 100kGP**



**Eligibility Wheels: 55 at-a-glance guides** across **15 medical specialties** to help clinicians identify eligible participants to join the 100,000 Genomes Project. **1,060+ downloads to date.** 

**Consent & Ethics: Short online course** designed for clinicians seeking participant consent to join the 100,000 Genomes Project. **2,200+ course completions to date.** 

Sample Processing and DNA Extraction: Series of instructional videos produced for staff in molecular genetics and histopathology labs. 3,100+ views to date.

**Tumour Assessment Tool: Education and training modules** for healthcare scientists and histopathologists on accurately assessing tumour samples for genomic sequencing. (DUE SUMMER 2017)

Validation of Results: Package of education designed for clinical scientists who are verifying the pathogenic variations being returned by the sequencing process. (DUE 2017/18)

**Feedback of Results: Package of education** aimed at clinicians who interpret the genomic results report, and identify elements that will inform the patient's prognosis and treatment. **(DUE AUTUMN 2017)** 



### **Update: Professions and curricula**

#### Level 4 Apprenticeships:

Worked with NSHCS to develop 3 genomics modules

#### **Scientist Training Programme:**

- STP in Genomics:
  - Established specialist outcome in genomic counselling
    - First cohort of 15 trainees started in 2015 (GEP pump primed)
    - Approved as accredited training programme by HCPC
  - Facilitated development of specialist outcome in Molecular Pathology (2018)
- Advised on new curricula development (e.g. Decontamination Science)
  Higher Specialist Scientist Training:
- Led the development of HSST in Clinical Bioinformatics (Genomics)
  - First cohort 6 trainees in 2015
  - Facilitated registration of first clinical bioinformaticians onto HCPC register





### Update: Professions and curricula cont.

#### **Higher Specialist Scientist Training:**

 Funded places on the HSST in Genetics, Molecular Pathology of Acquired Disease, and Clinical Bioinformatics (Genomics)

#### Nursing and Midwifery workforce:

- Genomics present in curriculum framework for Nursing Associate role **Medical workforce:**
- GEP invited to comment on RCGP curriculum as part of review process

#### **High priorities:**

- Accredited Scientific Practice (HCS workforce)
- Undergraduate nursing and medical curricula
- Engaging with relevant Royal Colleges to discuss postgraduate medical and surgical curricula





### **Update: Academic qualifications**

- Master's in Genomic Medicine launched in 2015 with funding for 550 MSc and 1,000 CPPD places.
- Additional 32 MSc places have been made available where demand is highest.



- 86% of all MSc places filled as of Mar 17.
- **33% of CPPD places filled** as of Mar 17.
- Marketing focus for 17/18 is PGCert and individual CPPD modules.
- Five academic pilot programmes approved for 17/18.
- Work commenced to **analyse expertise** that has developed through the MSc in Genomic Medicine. This will identify geographical and professional gaps that can be targeted by the programme.





### **Update: Research and innovation**

- Post doctoral, doctoral and secondment research fellowships launched, with **£1.3 million funding**
- Aim to develop research capabilities in genomics at all levels of NHS to enhance and diffuse evidence-based genomics practice
- More than 60 applications (equivalent of £12m), majority employed by NHS GMCs; high-quality



- Representation from a range of health professions, including medical, nursing and midwifery, allied health and healthcare management
- Project topics include personalised healthcare, cancer, rare diseases, infectious diseases, 100kGP data (clinical and social)
- Awards to be announced w/c 19th June 2017



### **Update: Workforce transformation**

- Funded 13 GMC training and education leads
- Engaged with range of professional groups (eg nursing and midwifery, biomedical scientists, primary care)
- Launched NHS Faculty of Genomic Medicine: alumni and experts to act as genomic champions within wider workforce, with oversight from advisory group informing GEP strategy and policy
- Exploring **patient pathways** to identify NHS touchpoints (e.g. familial hypercholesterolaemia)
- Forming the HEE Training and Education Genomics England Clinical Interpretation Partnership to facilitate rapid knowledge transfer from 100,000 Genomes Project into training and education





### **Update: Website and online learning**

- GEP website now reaching 23,000+ visitors and 130,000+ page views per quarter.
- In addition to 100,000 GP resources, it features:
  - Introductory online courses (eg Intro to Bioinformatics)
  - Just-in-time resources (e.g. genetic conditions factsheets)
  - Videos on genomics, rare disease, WGS
  - Image library of educational infographics
  - Genomics resources library (curated links to relevant education)
- Another significant online achievement is our FutureLearn MOOC (massive open online course) on WGS. Total learner registrations 12,000+, with a third run of the course scheduled for 22<sup>nd</sup> May 2017.





### **Update: International collaborations**

 We are actively exploring international education and research partnerships with a number of genomics organisations across the world, including:



• Separately, in line with UKTI strategy for NHS organisations, we are putting together an international prospectus to potentially monetise our educational resources and expertise for non-UK audiences



### **Update: Impact and evaluation**

• Measuring impact of each individual resource through to large-scale projects investigating transformational change. Involves both:



#### **Process evaluation**

Looking at our approaches and seeing how they could be improved, e.g.:

- Establishing the Master's programme in Genomic Medicine
- Embedding education and training leads within a GMC



#### Impact evaluation

Measuring the change that has resulted from the programme, e.g.:

- Acquiring new knowledge and skills
- Direct (or indirect) change on professional practice
- Sphere of influence: impact at an organisational level (all impacts the patient experience)
- Considering where we've had most impact, and the costs associated with that



Health Education England

### HEE Genomics Education Programme: Forward look



### Forward look: Strategic context

#### HEE Mandate deliverables

#### 2017-18 deliverables

As a key partner of the 100,000 Genomes Project, to deliver the final year of the £20m Genomics Education Programme and plan for transition to business as usual

#### **Overall 2020 goals**

Embed genomic education at all levels in the current and future workforce



- NHS Five-Year Forward View next steps : expand the NHS genomics capability; by end of 2018/19 develop a genomic medicine service in England underpinned by a consolidated lab infrastructure and facilitated by informatics data and analytical platforms
- NHSE strategy 'Improving outcomes through Personalised Medicine'





### Forward look: Future role & function

 To provide strategic oversight, policy development and direction to support implementation of a safe and high-quality genomic medicine service in mainstream NHS through development of the underpinning education and training for the specialist and the wider workforce, including:



- new skills and new roles, e.g. bioinformatics, genetic counselling, specialist nurses, molecular pathology
- o workforce planning: right numbers, right place, right time
- To be a world leader in genomics education
- Maximise impact by working with all relevant stakeholders and other HEE programmes of work (e.g. Leadership, Informatics, and Research and Innovation)





### **Forward look: Challenges**

- **Competing priorities:** Securing resources within HEE
- Workforce planning: Who and how many do we need?
- **Professional curricula:** Embedding genomic competences in all undergraduate and postgraduate curricula
- Genomic Medicine Master's framework: Reaching mainstream NHS professionals future funding?
- **GMC T&E leads:** How can we maintain funding for these posts?
- Faculty of Genomic Medicine: Maintaining the multi-professional group of alumni and stakeholders to act as advisers and champions
- Responding to changes in training models: e.g. apprenticeships
- Education resources: Keeping up-to-date; refreshing old and developing new
- Evaluating the impact: Is our approach and strategy effective?
- International activity: Collaboration and contribution to UKTI



**NHS** Health Education England

#### The GEP team



Sue Hill CSO



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Siobhan Simpson Education Development



Pauline Simpson Project Manager



Charlotte Szczepanik Project Administrator





#### **Discussion and Feedback**

# What are the key priorities to ensure we deliver the workforce transformation required in genomics?

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#### Health Education England

#### Responses

- Embed genomics into mainstream activity
  - Are LWABs the right place? Making sure genomics is on the agenda.
  - Who is taking responsibility for implementing innovation (genomics) in the NHS?
- Raising awareness of the Genomics Education Programme and its role and function within HEE so that staff know how to access education and training.
- Public and patients need to address language barriers
- Targeting primary care
  - GPs knowing and understanding how to signpost and refer appropriately
  - Referral practices making sure defined pathways are in place
  - Local clinical genomics champions who can be contacted for advice and support by other GPs
- Encouraging and motivating an already stretched service
  - Investing time and effort
  - Use of case studies as a hook to demonstrate relevance
  - Create a social movement with patients
  - Making materials/education more readily available e.g. utilising HEE STAR
- The clinical workforce is already responsive to change but they must be able to see the benefits.



#### Responses

- Ensuring students undertaking the MSc in Genomic Medicine are sharing practice in their locality
- Data interpretation having enough bioinformaticians
- Having sufficient genetic counsellors
- Releasing people from service to undertake education
- Development of a repository of resources to ensure we're not duplicating effort
- Network of people who can provide face-to-face teaching (building on the Faculty of Genomic Medicine)
- Engagement with Royal Colleges genomics present in curricula going forward
- Genomics as part of mandatory training
- Systematic approach governance and structure for genomics across HEE both local and national
- Knowledge to frontline services how applicable is genomics to the patient in front of them?
- Patient safety safeguarding families to ensure they are getting best genetic service throughout mainstream medicine





#### **Discussion and Feedback**

- How do we engage with key partners to drive workforce transformation in genomics?
- We need to systematically embed genomics into pre and post-registration education and training? Apart from engaging with the regulators and royal colleges what are the local and national actions for HEE?

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#### **Engaging with key partners**

- Focus message on prevention rather than cure
- Show benefits of genomics return on investment
- Communities of practice can drive this forward
- Infographics are useful educational and communication tools can convey complex messages simply
- Produce a genomics elevator pitch
- Get together the 6 ALBs for a summit on genomics
- Clarity on how much genomics upskilling is needed for each clinical group
- Using apps and technology to support access to specific, relevant resources
- Define and understand key partners and educate them in genomics
- Financial incentives for stakeholders funding, accreditation





Apart from engaging with the regulators and royal colleges what are the local and national actions for HEE?

- 100,000 Genomes Project on the NIHR portfolio will encourage more to attending training
- Genomic champions in different Trusts working in networks
- Ethics robust training on this
- Is there enough support for patients when the results from the100,000 Genomes Project start coming back?
- Not just the patient but the impact on family too
## The Genomics **Education Programme**

A funded NHS initiative that ensures healthcare professionals have the genomics knowledge they need for the future.



### **Key partners**

NHS Public Health Department England England of Health **NHS** Genomic Genomics Medicine Centres

Health Education England

**GeCIP** domains

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#### Events

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Our team facilitates a series of genomics workshops and events that run alongside the education programme.

in genomics learning.

Our educational resources

Short online courses

clinical practice.

development.

Multimedia

**Training tools** 

Master's in Genomic Medicine

Multidisciplinary qualifications that can be applied to research and

Engaging and interactive courses

that are tailored for professional

Digital training to directly support

A collection of informative videos.

images and animations that assist

the 100,000 Genomes Project.

<sup>66</sup>At times it feels like we are learning a new language, but it is definitely worth it. ??

Katherine, Nurse

# Genomics is for everybody

### Highly specialised workforce



- Molecular pathology
- Molecular haematology

#### Specialised clinical workforce



- Cancer surgery and medicine
- Cardiovascular, diabetes and neurology specialist teams



### Wider clinical workforce

General practice and other healthcare professionals

#### **Raising awareness**



Managers, commissioners, patients and public

66 The programme is part of a bigger movement. across the country, genomics and personalised medicine is the future. ??

Brenda, Masters Student

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Genomics Education Programme The programme has been set up to ensure staff in the health and care system have the knowledge skills and experience to keep this country a world leader in genomic and precision medicine. Read more



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Master's in Genomic Medicine (Fully Funded to NHS Staff)



Modules

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# After everything you have heard this morning describe in no more than 3 words how you're feeling about the future of Genomics in Healthcare?





Based on today's discussion, describe in no more than 3 words what you are going to do to champion genomics in your workplace?

