Genomics Education Programme

NHS Health Education England

GeNotes: A New Online "Just in Time" Genomics Resource for Healthcare Professionals

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Background

Recent advances in genomic sequencing technologies, in combination with decreasing costs of testing, and increasing availability of targeted therapies, mean that genomic profiling is fast becoming a fundamental part of cancer care[1]. Clinicians involved in the care of patients with cancer need to consider not only tumour-based molecular profiling to identify key somatic driver mutations to which targeted agents might potentially be directed, but also constitutional (germline) testing, to identify those individuals harbouring heritable genetic aberrations contributing to their cancer risk. Identification of variants in cancer susceptibility genes can facilitate individualised planning of surgery, radio- and chemotherapy and targeted agents, as well as implementation of strategies to mitigate the risk of future cancers in the patient and their at risk relatives[2].

Reconfiguration of NHS Genomic Medicine Services, along with publication of NHS England's Genomic Test Directories for Cancer[3] and Rare and Inherited Disease[4] (including heritable cancer syndromes), aim to improve access to, and standardise application of, genomic testing for patients with cancer across the country. Oncologists and other clinicians are increasingly empowered to arrange constitutional genetic tests for eligible patients, without requiring preceding referral to Clinical Genetics. However, "mainstreaming" of genetic testing has been limited in the UK and other countries internationally by lack of confidence and knowledge in Genomic Medicine among clinicians working in cancer care[5-8]. These factors have spurred the development of GeNotes.

Aim of GeNotes

GeNotes is a new online "just in time" interdisciplinary educational resource for clinicians which is being developed in collaboration with Health Education England's Genomic Education Programme.

The aims of GeNotes are: to provide clinicians with up-to-date, clinically-focused information to enable them to identify when, and what type of, genomic testing might be indicated for their patient; to discuss implications of such results on treatment and further patient management; to recognise limitations of genomic testing; to discriminate between somatic and constitutional genomic aberrations; and to navigate the new NHS Genomic Testing Directories.

Development of GeNotes

Subject Matter Experts (SMEs) across the NHS were recruited to a number of specialty-specific working groups (Oncology, Cardiology, Endocrinology, Foetal and Women's Health, Paediatrics, Primary Care and Pharmacogenomics). The oncology working group, co-chaired by Consultants in Medical Oncology and Clinical Genetics, comprises a group of Specialist Registrars/Clinical Fellows in Medical and Clinical Oncology, each of whom have a specialist interest in Genomics, and Specialist Registrars in Clinical Genetics with specialist interest in Cancer. Content is developed and reviewed by at least two clinicians, with oversight from the chairs, before upload to the GeNotes platform.

Tiered GeNotes Resources

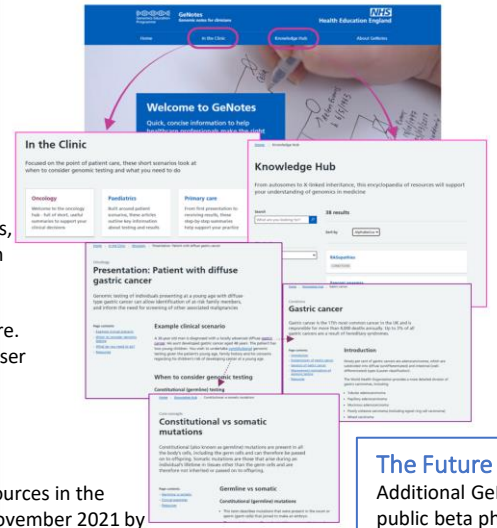
Tiered Resources include Tier 1 "**In the Clinic**" clinically-focused documents, based on common clinical scenarios arising in Oncology clinics; including scenarios exemplifying when genomic testing should be considered, and scenarios demonstrating how genomic test results should be managed.

Within each "In the Clinic" document are links to relevant additional resources, including NHS Genomic Test Directory, patient information, relevant external resources (e.g. NICE guidelines, guidelines from expert groups) as well as links to relevant Tier 2 "**Knowledge Hub**" resources.

The Knowledge Hub is a digital encyclopaedia of multi-media resources which is shared across all specialties. It includes information on cancer types, genomic targeted therapies, cancer predisposition syndromes, inheritance patterns, genomic technologies, and the NHS Genomic Medicine Service and Genomic Laboratory Hub infrastructure. All relevant documents are linked, such that the user can easily explore related educational content as and when required, individualised to their own learning needs.

Evaluation of GeNotes: Methods

Private beta phase testing of the first wave of resources in the Oncology section of GeNotes was completed in November 2021 by an independent agency (Lagom Strategy). Evaluation included moderated usability testing (n=5), feedback questionnaire (n=21), review of website analytics and follow-up interviews (n=6)



Evaluation of GeNotes: Results

In the private beta testing period between 4th – 29th October 2021, **96 unique users** accessed GeNotes, reviewing an average of **7.65 pages** per session, with a total of **1270 page views**.

Of those users completing the feedback survey, almost half were consultants (n=10, 48%), and the majority were medical oncologists (n=13, 62%). Almost half of respondents worked in specialist cancer hospitals (n=10, 48%), with smaller proportions in teaching (n=6, 29%) or district general (n=5, 24%) hospitals. The vast majority (n=20, 95%) of respondents stated they were **very likely or likely to use GeNotes in the future**, and the same proportion **very likely or likely to recommend GeNotes to other practitioners**.

GeNotes scored highly on the System Usability Scale questions , with mean System Usability Scores 90/100. Participants provided comments on various aspects of the platform.

"It's very accessible, not overwhelming and very concise, it gives you the important information that you would need in the clinic".

"As a specialty trainee in oncology this is going to be a very useful resource in clinic and also for my own learning."

"Whenever I get a tricky case I just email my friend. Now there is a resource I can go and check instead."

The Future of GeNotes

Additional GeNotes resources are in development, with public beta phase planned for later in 2022. Initial evaluation indicates that GeNotes will provide a valuable and practical educational resource for clinicians.

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