NHS
South West
Genomic Laboratory Hub

The SW GLH genetic testing service for solid tumours:

A guide for cancer clinicians

1. Introduction

- The SW Genomic Laboratory Hub (SWGLH) was implemented in 2018 to deliver genetic and genomic analyses for all patients with cancer and rare disease across the SW region.

- The SWGLH is a centralised service established as a partnership between North Bristol NHS Trust (NBT) and the Royal Devon and Exeter NHS Foundation. All cancer genetic services will be delivered from NBT.

- The SWGLH is part of a network of seven English GLHs established to drive the standardisation and rapid uptake of new genomic services and technologies and to ensure equity of patient access.

- This document provides guidance to NHS clinical cancer services to facilitate access to the cancer genetic testing services.

2. What cancer genetic test technologies are available at the SWGLH?

- The indications and test technologies for the SWGLH cancer genetic testing service are defined in a National Genomic Test Directory (NGTD) that is available at: https://www.england.nhs.uk/publication/national-genomic-test-directories/

- The NGTD will be regularly updated through an expert panel and peer review process based on advances in best clinical practice and scientific knowledge. We anticipate expansion of the NGTD to include many additional genes for existing tumour types, and additional tumour types for gene panel analysis. For instance, for existing tumour types we expect inclusion of additional gene targets such as the tumour agnostic biomarkers NTRK1,2 & 3 during 2020-21.

Gene panel analyses

- There will be a phased implementation of gene panel testing from April 2020. After this, most cancer genetic tests will be provided by large gene panel analyses in which each tumour sample will be sequenced for approximately 500 genes (TSO500 panel).

- For each tumour type, genes for analysis and reporting back to the clinical team will only be those that influence current standard of clinical care, those linked to

treatments expected to be approved imminently and those that inform eligibility or stratification in clinical trials.
e.g. for NSCLC, the gene panel will provide information on EGFR, ALK fusions and ROS1 fusions (standard of care tests) and also BRAF, KRAS, NTRK1,2 & 3 fusions, RET fusions, MET amplifications, MET skipping, PIK3CA, HER2, ALK mutations

- The selection of which genes will be analysed for each tumour type is currently being determined through national discussions between GLH cancer leads and oncology experts and will be reviewed on an ongoing basis.

Direct mutation tests

- In addition to large gene panel analysis, there are some tumour types and genes that will be analysed as a single gene test. This reflects the need for different technologies to be used to detect some gene variants, or for a cost-effective approach to be taken for common variants.

- The results from gene panels and single tests for a single patient will be combined and reported together.

Whole genome sequencing

- A small number of tumour types will have WGS performed. The current WGS cancer indications are sarcoma, paediatric tumours and acute leukaemia. WGS is currently expected to begin in mid-2020.

- In order to ensure timely return of clinically actionable genetic test results, rapid gene panel testing, or direct mutation analysis may also be performed on these samples in parallel with WGS. Dual testing will be reviewed as turnaround times for the national WGS service matures.

3. Which tumour types are eligible for analysis?

- The ultimate aim of the cancer genetic testing service within the GLH network is to provide a clinically relevant molecular profile for all tumour types at diagnosis and again in the event of relapse.

- This will be achieved through a phased implementation of new testing services at the SWGLH from April 2020, beginning with the application of new large panel analyses for tumour types for which genetic testing is already part of NHS standard of care.

4. What tumour samples are required for the new testing service?

- Gene panel and direct mutation tests will be initially be performed on FFPE samples obtained at biopsy or surgical resection or from cytology samples.

- The new cancer genetic tests require some small changes in the way that samples are processed and transported to the laboratory. These are described in more detail in the SWWLH document "*The new NHS genetic testing service for solid tumours: Guide for Cellular Pathologists"* which has also been distributed to SW region NHS Trusts.

- A pathologist's assessment of the sample is critical to ensure that sufficient neoplastic cells are present for genetic analysis. If the SWGLH does not receive a sufficient sample for complete genetic analysis a single tumour-specific test may need to be prioritised.

5. How can cancer genetic tests be requested?

- Cancer genetic tests should be requested using the **SW GLH solid tumour request form** available at https://www.nbt.nhs.uk/south-west-genomic-laboratory-hub

- For all cancer genetic tests other than the WGS indications, the SWGLH does not currently require confirmation of patient consent for testing. Clinicians are advised to follow host Trust consent policy.

- To ensure clinically acceptable test turnaround times, **it is essential that requests for molecular analysis are initiated as early in the patient pathway as possible**. Tissue samples **must also be transported to the SWGLH using the rapid transport routes** that have been established from all SW Trusts. Further information about sample transport has been given to the local Pathology teams**.**

6. How will test results be reported?

- The SWGLH will issue a genomic report containing the results only for those genes that are clinically relevant for the specific tumour tested. A clinical interpretation will also be given for standard of care (NICE approved) treatments.

- To ensure rapid communication, genetic test reports will be issued by expert Clinical Scientists at the SWGLH via an email addressed to a member or members of the clinical team identified on the test request form. We anticipate this could be the MDT coordinator, Pathologist, Oncologist or other designated members of the clinical team. Improved reporting through electronic distribution direct to local Pathology systems is currently being developed by the SWGLH.

- For the infrequent cases that require further discussion, genetic test results will be discussed at a weekly SW GLH Genomics Tumour Advisory Board (GTAB), held by Webex. The GTAB will be open to the cancer clinical team and will also include a pathologist, an oncologist and a clinical scientist. The referring clinical team will be notified that their case is being discussed. The forum is also open for local teams to bring any reported cases for discussion. The GTAB is intended to discuss cases rapidly after completion of laboratory analyses.

- Clinicians and Pathologists may request analysis of other genes from the 500-gene panel that are not part of the core group assessed for that tumour type, discussion with the SW GLH team.

7. What will be the turnaround time for genetic tests?

- The SWGLH aims to report gene panel analysis **within 7-10 working days of sample receipt** at the Genetics Laboratory to help ensure that genetic information is available to clinicians to guide selection of treatment for cancer.

- For special circumstances, when genetic test results are required more urgently than this, the SWGLH may provide an urgent service in which a rapid single gene test may be performed instead of the large gene panel. This approach will also be taken in the event of scanty or poor quality material. Clinicians or Pathologists are invited to contact the Bristol Genetic laboratory directly to access this service.

- To enable rapid turnaround times, it is critical that decisions to request genetic testing and transport of tissue samples to the SW GLH occurs as rapidly as possible after sample collection.

8. How will tests be funded?

- The genetic and genomic analysis of cancer samples specified in the NGTD will be funded centrally by NHSE from April 2020. The existing funding for these services is currently being calculated and will be removed from local budgets.

- Genetic laboratory testing outside the NGTD will not be centrally funded. However, some of these tests may be available at the SW GLH. Please contact us if there is a test that you are interested in.

9. Where can more information be found?

The main source of information will be the SW GLH website:

https://www.nbt.nhs.uk/south-west-genomic-laboratory-hub

For further information or for feedback, please contact the SW GLH team directly:

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