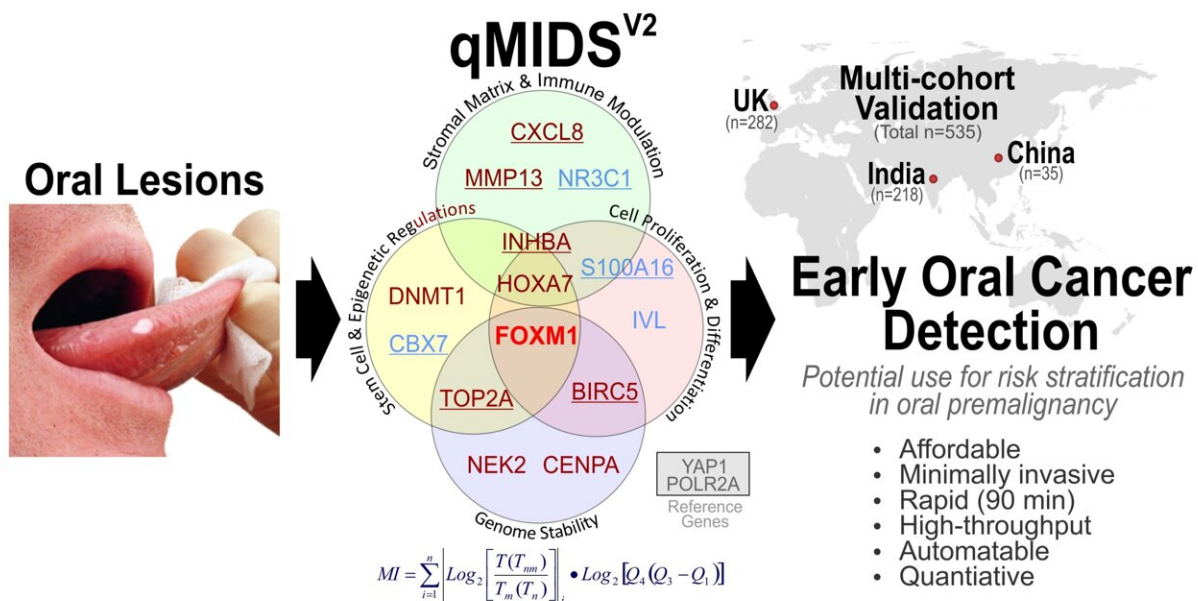


New PCR test for oral cancer set to revolutionize diagnosis and treatment

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Graphical abstract. Credit: *Cancers* (2022). DOI: 10.3390/cancers14061389

Researchers at Queen Mary University of London have developed the world's first PCR test for mouth cancer. The test has now been proved with patients from China, India and the UK, with the results published in the international journal, *Cancers*. The inventor, Dr. Muy-Teck Teh, named the test the Quantitative Malignant Index Diagnosis System (qMIDS).

The [test](#) is quick and easy. It only needs the PCR machine used in COVID testing and a technician to operate it. It could be rapidly rolled out around the world at very little extra cost. A tiny sample (the size of half-a-grain of rice) is taken from the suspicious area in the patient's [mouth](#) and the test only takes 90 minutes after reaching the technician—similar to a COVID PCR test.

There are 8,300 cases of mouth cancer in the UK every year. 7 in 10 of these cancer cases start with white or red patches in the mouth. These are called pre-[malignant lesions](#), but only 1 in 10 of these will turn into cancer.

Until now there hasn't been a perfect way to identify the lesions likely to develop into cancer. There is a grading system which highly skilled consultant oral pathologists use to assess the tissue samples through a microscope. However, this grading system does not always accurately predict or capture the lesions that will or have become cancerous. This is because early changes—from pre-malignant to cancerous—are happening at a genetic and chemical level, which can't be picked up by a microscope.

Pre-malignancies usually occur at a single location but can also affect the whole mouth. This can make it difficult for a clinician to decide where to take samples. In these cases, the surgeon may need to do multiple biopsies. Even then, they may not capture the area that will become cancerous.

Without knowing definitively whether a lesion is cancerous, patients with pre-malignancy must be reviewed regularly over a long period of time, even if they're at low risk, creating anxiety and disruption for the patient, as well as cost for the NHS. On the other hand, if a "mild" case develops into cancer, the patient may have already been discharged from hospital, so they often delay seeking treatment because they don't think

they have cancer. As a result of this delay, treatment is more aggressive, costly and less likely to succeed.

qMIDS diagnostic accuracy would mean that 90% of low-risk patients could be discharged from hospital to go back to their dentist or GP for review. Or they might be tested in the dentist's surgery and only referred to secondary care if they were high risk. High-risk cases could also be detected in the pre-cancer period and treated definitively, thereby saving the patient's life with minor surgery, better cure rates and quality of life, as well as a huge reduction in health service costs.

The test process is largely automated, removing the need for expensive pathologists. There's also no need for invasive biopsies. The tests can be carried out on multiple sites when patients have lesions affecting large areas throughout the mouth.

Co-study lead, Professor Iain Hutchison, stated: "qMIDS dramatically improves our management of [mouth cancer](#) and its pre-cancerous state, saving lives and healthcare costs. Surgeons and dentists anywhere in the world can use this test for minimally invasive tissue samples because all it needs is a PCR machine and the technician who operates it.

"qMIDS will help us identify [patients](#) with pre-malignancies that will never transform to cancer, so they can be reassured and discharged from hospital review. Patients with high-risk premalignancy can have [minor surgery](#) to remove the lesion before it has transformed to [cancer](#), thereby curing the patient and saving them [major surgery](#), which in turn reduces health service costs. It is a powerful tool especially when used in conjunction with conventional histopathology assessment."

More information: Muy-Teck Teh et al, Molecular Signatures of Tumour and Its Microenvironment for Precise Quantitative Diagnosis of Oral Squamous Cell Carcinoma: An International Multi-Cohort

Diagnostic Validation Study, *Cancers* (2022). DOI: [10.3390/cancers14061389](https://doi.org/10.3390/cancers14061389)

Provided by Queen Mary, University of London

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