NICE advice

Bladder EpiCheck for detecting bladder cancer recurrence

Medtech innovation briefing
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Summary

- The **technology** described in this briefing is Bladder EpiCheck. It is used for detecting recurrence in people who are having surveillance after treatment for non-muscle-invasive bladder cancer.
- The **innovative aspects** are that it provides a non-invasive method for detecting cancer recurrence. The test provides an objective result based on the methylation patterns of 15 biomarkers and uses standard laboratory equipment.
- The intended **place in therapy** would be as well as or instead of cystoscopy, and instead of cytology or other urine biomarker tests in people having surveillance for non-muscle-invasive bladder cancer.

- The **main points from the evidence** summarised in this briefing are from 1 systematic review and network meta-analysis, 3 prospective cohort studies and 1 retrospective cohort study of 3,064 people having surveillance after treatment for non-muscle-invasive bladder cancer. The systematic review and meta-analysis reported pooled overall results as follows: a sensitivity of 74%, a specificity of 84%, a positive predictive value of 48% and a negative predictive value of 94%. In high-grade cancer, these results were 91%, 81%, 43% and 98%, respectively.
- **Key uncertainties** around the evidence or technology are that some of the available evidence is from studies with a relatively small sample size and short follow-up duration. There is currently no published evidence in an NHS setting.
- **Experts advised** that the technology is not yet widely used in the NHS, but aside from cost, they were not aware of any major barriers to adoption. The main potential benefit identified by the experts was fewer repeat cystoscopies in some people. Two out of 5 experts felt uncertain about the efficacy of the test and its advantages over other biomarker tests already available.
- The **cost** of Bladder EpiCheck is £300 per test (excluding VAT). The cost of standard care is around £240 per test for cystoscopy and around £3 per test for cytology.

The technology

The Bladder EpiCheck (Nucleix) is an in vitro diagnostic urine test used to help detect bladder cancer recurrence. It is intended to be used alongside cystoscopy during surveillance regimens in people previously diagnosed with non-muscle-invasive bladder cancer (NMIBC).

The test analyses 15 DNA methylation biomarkers that are associated with bladder cancer, and determines whether the methylation patterns indicate the presence of cancer. The test is done using a urine sample (10 ml or more), collected in a hospital or community clinic, and is processed and analysed in a laboratory by a laboratory technician. The test procedure consists of the following steps:

- The urine sample is centrifuged to create a cell pellet.
- DNA is extracted from the cell pellet using the Bladder EpiCheck DNA extraction kit.

- The extracted DNA is digested using a methylation-sensitive restriction enzyme provided in the Bladder EpiCheck test kit. This cleaves the DNA at specific sites if unmethylated.
- The digested DNA is amplified by quantitative real-time polymerase chain reaction (PCR) using locus-specific primers and probes provided in the Bladder EpiCheck test kit. The Bladder EpiCheck test is designed for use with QIAGEN Rotor Gene Q and Rotor Gene Q MDx real-time PCR instrument platforms or the Applied Biosystems 7500 Fast Dx real-time PCR instrument.
- The Bladder EpiCheck software analyses the methylation status of the 15 biomarkers and automatically produces a patient and summary report.

The Bladder EpiCheck test results contain a quantitative score for the person (EpiScore) and a positive or negative result based on this score. The EpiScore ranges from 0 to 100, with a higher score indicating more methylation. A score of 60 or over is considered positive for bladder cancer. Test results are then sent to the person's urologist.

Innovations

The technology is non-invasive and is designed to provide a simple and objective urine test to detect recurrence of bladder tumours. It uses standard laboratory equipment. Currently used methods are cystoscopy and cytology. Cystoscopy is an invasive procedure that can be burdensome to patients and the health system. Cytology is a non-invasive urine test. Both cystoscopy and cytology are subjective tests because they rely on visual evaluation and operator interpretation. The company claims that cytology has very low sensitivity for low-grade disease, and moderate sensitivity in high-grade disease. One expert who commented on this briefing stated that cytology is highly sensitive for high-grade disease and is comparable to Bladder EpiCheck. The technology is intended to increase confidence in recurrence detection and reduce the number of cystoscopies done.

Current care pathway

People who have had treatment for NMIBC need surveillance because of the risk of recurrence and disease progression. Standard follow-up care after NMIBC treatment is regular cystoscopy, which is sometimes supplemented with urinary cytology. The frequency and duration of cystoscopic follow up varies depending on the person's cancer severity and risk (see NICE's guideline on bladder cancer). Cytology is offered with

cystoscopy, except for the follow up of low-risk NMIBC, when its use is not recommended. Urinary biomarkers may also be offered with cystoscopy and cytology. Experts who commented on this briefing noted, however, that these biomarker tests have not yet become part of NHS standard care.

The following publications have been identified as relevant to this care pathway:

- NICE's guideline on the diagnosis and management of bladder cancer.
- The European Association of Urology guidelines on non-muscle-invasive bladder cancer. Section 5.7.3 of the guideline discusses the potential application of Bladder EpiCheck and other molecular tests in replacing or postponing cystoscopy in the follow up of low or intermediate NMIBC. The guideline states that, although not yet tested in randomised controlled trials, available evidence suggests 4 promising urine biomarkers may be able to detect high-grade recurrences in this patient group, with sensitivities approaching that of cystoscopy.

Population, setting and intended user

Bladder EpiCheck would be used to monitor for recurrence during follow up after treatment for NMIBC.

More than 20,000 people are diagnosed with bladder cancer (invasive and non-invasive) each year in the UK (2016 to 2018; My Diagnosis Counts, Fight Bladder Cancer). Bladder cancer is 3 times more common in men (My Diagnosis Counts, Fight Bladder Cancer), but women are more likely to present with advanced stage cancer and typically have less favourable prognosis and outcomes. It is more common in older adults, with most new cases diagnosed in people aged 60 and over. In some people, NMIBC may come back after treatment (known as recurrence). Repeated surveillance with cystoscopy and cytology are done to help detect recurrence and reduce the risk of disease progression. People having regular cystoscopy may experience anxiety and procedural discomfort.

The Bladder EpiCheck test would be used in secondary care with or instead of cystoscopy, and instead of urine cytology or other urine biomarker tests currently used for detecting recurrence. Urine samples would be collected by nurses in a hospital or community clinic. The samples would be processed and analysed in a laboratory by a laboratory technician and test results sent to the person's urologist.

Costs

Technology costs

The cost per test for Bladder EpiCheck is £300 (excluding VAT). It includes the cost of shipping the urine sample to the testing laboratory. There are no costs associated with software installation. The company states that reagents in the kit have an expiry date of a year from manufacturing. If the kit or any reagents within the kit are found to be damaged, the kit will be replaced free of charge by the company.

Costs of standard care

Costs per test for standard care, including the cost of consumables and healthcare professionals' time:

- Cystoscopy: £240 (national cost collection data 2019/20; healthcare resource group [HRG] code LB72A, diagnostic flexible cystoscopy, 19 years and over) or £1,789 (national cost collection data 2019/20; HRG code LB73Z, diagnostic flexible cystoscopy using photodynamic fluorescence).
- Cytology: £3 (national cost collection data 2019/20; currency code DAPS01, cytology).

Resource consequences

The technology is not currently used in the UK. Launch is planned for 2022. Using the test as well as or instead of cystoscopy for monitoring during follow up may lead to an initial increase in resource use. However, the test may release resources if it results in earlier diagnoses and subsequent treatment by more accurately detecting cases of bladder cancer. It may also release resources if used as part of a modified surveillance strategy that reduces the number of cystoscopies done.

One economic study was identified (Lotan et al. 2021) comparing the cost of standard surveillance with a modified surveillance strategy (surveillance alternated between cystoscopy and Bladder EpiCheck every 3 to 6 months). Results showed that, for the UK, the modified surveillance strategy resulted in a cost saving when the cost of Bladder EpiCheck was less than £365. Using the Bladder EpiCheck test also reduced the number and frequency of cystoscopies from 5.2 tests over 2 years for standard care to 3.5 tests

for the strategy using Bladder EpiCheck (assuming a specificity of 85.8% for the test).

The company states that urologists do not need training to interpret the EpiScore, but training is provided for laboratory staff running the Bladder EpiCheck test. No changes to facilities or infrastructure are needed to adopt the technology.

Regulatory information

Bladder EpiCheck is CE marked as an in vitro diagnostic (In Vitro Diagnostic Directive [IVDD]; general category).

Equality considerations

NICE is committed to promoting equality of opportunity, eliminating unlawful discrimination and fostering good relations between people with particular protected characteristics and others.

Bladder cancer is more common in men than women; 73% of cases in the UK are in men, and 27% are in women. Despite a lower incidence of bladder cancer in women, rates of survival are lower for women than for men. It mainly affects older people, with the highest incidence rates in people aged 85 to 89 years for women and 90 years and over for men (Cancer Research UK, 2018). People of European family origin have a much higher risk of developing bladder cancer than those of African American, Hispanic or Asian family origin. People with cancer are protected under the Equality Act 2010 from the point of diagnosis. Age, sex and race are protected characteristics under the Equality Act 2010.

Clinical and technical evidence

A literature search was carried out for this briefing in accordance with the interim process and methods statement for medtech innovation briefings. This briefing includes the most relevant or best available published evidence relating to the clinical effectiveness of the technology. Further information about how the evidence for this briefing was selected is available on request by contacting mibs@nice.org.uk.

Published evidence

Five studies are summarised in this briefing, including 1 systematic review and network meta-analysis, 3 prospective studies and 1 retrospective cohort study. The evidence base for Bladder EpiCheck presented in this briefing included 3,064 people having surveillance after treatment for non-muscle-invasive bladder cancer (NMIBC).

Another study was identified in which Bladder EpiCheck was used to detect disease in people with upper urinary tract carcinoma before having a radical nephroureterectomy (Pierconti et al. 2021a). The study is not presented in detail here because the population was out of scope for this briefing.

The clinical evidence and its strengths and limitations are summarised in the overall assessment of the evidence.

Overall assessment of the evidence

Studies were done in appropriate populations and the sensitivity and specificity of the test were compared to an appropriate reference standard (cystoscopy, cytology and histology).

Across the studies, the overall sensitivity of the test ranged from 62% to 90% and its specificity ranged from and 82% to 88%. The high-grade sensitivity of the test ranged from 79% to 100%, and the high-grade specificity ranged from 85% to 91%.

Bladder EpiCheck's pooled high-grade negative predictive value (NPV) was reported as 98%, and the overall pooled NPV was reported as 94% (Laukhtina et al. 2021), which is higher than the standard care methods of cystoscopy and cytology. Also, based on the pooled specificity reported, using Bladder EpiCheck could result in fewer false-positive results. It may be possible that the test is detecting early epigenetic changes in pre-cancerous cells, but future studies with longer-term follow up would be needed to correlate false-positive results with later recurrence. Many of the studies were limited by their single-visit design or did not clearly report the length of follow up. The longest duration of follow up reported was a median of 12 months (ranging between 9 and 15 months; Pierconti et al. 2021b).

Many of the studies did not clearly report whether the urologists and pathologists were blinded to Bladder EpiCheck results; not blinding would increase the risk of bias. There is

currently no published evidence on the technology being used in the UK or the NHS. Most of the studies evaluated the diagnostic accuracy of the test only. Larger studies with longer-term follow up would be helpful, preferably done in an NHS setting. In addition to diagnostic accuracy outcomes, studies could also evaluate the downstream consequences of using the test, such as the impact on clinical outcomes and resource use, including costs associated with false test results and inappropriate treatment.

Laukhtina et al. (2021)

Study size, design and location

Systematic review and network meta-analysis assessing the diagnostic accuracy of novel urinary biomarker tests in non-muscle-invasive bladder cancer. A corrigendum to Laukhtina et al. (2021) was published in 2022, correcting typographical errors made in the original article.

Interventions and comparator

The systematic review and meta-analysis included studies that assessed the diagnostic accuracy of urinary biomarker tests (Xpert Bladder Cancer, Bladder EpiCheck, ADXBLADDER, Uromonitor, Cxbladder monitor) compared with a reference standard of cystoscopy or histopathology.

Key outcomes

The meta-analysis included 21 studies, with a reported total of 7,330 people. This included 10 studies for Xpert Bladder (2,806 people), 5 for Bladder EpiCheck (1,684 people), 3 for ADXBLADDER (2,053 people) and 2 each for Uromonitor (262 people) and Cxbladder Monitor (1,112 people). Overall, the tests showed sensitivities of up to 93%, specificities of up to 84%, positive predictive values (PPVs) of up to 67%, and NPVs of up to 99%. The detection of high-grade recurrence showed similar diagnostic accuracy compared with that of any-grade recurrence for the tests evaluated (Expert bladder, Bladder EpiCheck and ADXBLADDER). The pooled results for Bladder EpiCheck specifically were as follows: sensitivity 74%, specificity 84%, PPV 48% and NPV 94%. For high-grade recurrence, the pooled results for Bladder EpiCheck were: sensitivity 91%, specificity 81%, PPV 43% and NPV 98%. The network meta-analysis (based on 13 of the studies) showed that most of the diagnostic values of the tests (except for specificity) were significantly higher than those of cytology for detecting recurrence. The authors concluded that the high

diagnostic accuracy of the studied novel urinary biomarkers supports their utility in the NMIBC surveillance setting. They noted that all of these have the potential to help prevent unnecessary cystoscopies safely in the NMIBC surveillance population.

Strengths and limitations

Strengths were as follows. The study was a meta-analysis including a range of studies of urine biomarker tests. Study selection and data extraction were done by 3 reviewers independently. Discrepancies were resolved by referring to the senior author (study selection) or by consensus with the co-authors (data extraction). Risk of bias for included studies was evaluated using a validated tool (the Quality Assessment of Diagnostic Accuracy Studies [QUADAS-2] tool).

Weaknesses were as follows. The included studies were heterogeneous in terms of patient population, reference standards used and the prevalence of recurrence rate. But the study used a random-effect model to account for heterogeneity across the studies. Some of the studies did not report data on blinding and most of the studies did not include cut-off values for the tests; however, this is not relevant for Bladder EpiCheck because it has a set cut-off. The protocol used for cystoscopy follow up was not reported in most of the included studies. Not all biomarkers in the meta-analysis had multicentre prospective studies, but Bladder EpiCheck did.

Cochetti et al. (2021)

Study size, design and location

Single centre, prospective, blinded cohort study in 40 adults with non-muscle-invasive bladder cancer, treated with intravesical Bacillus Calmette–Guérin (BCG) or mitomycin C therapy, who were under surveillance for high risk of recurrence, in Italy.

Intervention and comparator

The diagnostic performance of Bladder EpiCheck, photodynamic diagnosis (PDD)-guided cystoscopy and urinary cytology were compared with a histological diagnosis.

Key outcomes

Bladder EpiCheck had an area under the receiver operator curve (AUROC) of 0.95. The

high-grade results for detecting recurrence were as follows: sensitivity 100%, specificity 90.9%, PPV 90% and NPV 100%. There was good agreement between diagnosis using Bladder EpiCheck and histological findings (Cohen's kappa test score of 0.9, $p<0.001$). Test performance was not affected by haematuria or turbid urine (2 and 5 people, respectively). The type of instillation therapy received did not significantly impact the diagnostic performance of the test. The sensitivity of the test was 100% for people who had either Bacillus Calmette–Guérin (BCG) or mitomycin C instillation, but its specificity was slightly lower in people who had BCG therapy than in people who had mitomycin C (92.9% compared with 87.5%). PDD had an area under the curve of 0.51. For detecting recurrence, overall sensitivity was 61%, and high-grade results were as follows: sensitivity 29%, specificity 41%, PPV 46% and NPV 56%.

Strengths and limitations

Strengths: The study had a prospective design and enrolled people consecutively. The Bladder EpiCheck results were not used in clinical practice, so the investigators were blinded to the findings. Bladder EpiCheck was tested in an important subset of people with NMIBC, those who had intravesical instillations, which might affect the sensitivity and specificity of a urine biomarker. Bladder EpiCheck was compared with another established diagnostic test, PDD-guided cystoscopy.

Weaknesses: The study was done in a single centre and had a small sample size. It was also limited by the single-visit design. The sub-analysis of intravesical treatments may have been underpowered.

Pierconti et al. (2021b)

Study size, design and location

Prospective single-centre cohort study in 205 people with high-grade NMIBC who had treatment with intravesical BCG or mitomycin C therapy, in Italy. During follow up, 151 people had a recurrence, which were all high-grade; 54 had negative cytology, cystoscopy and histology results and were considered to not have a recurrence.

Intervention and comparator

Bladder EpiCheck tests results were compared with urine cytology using histological diagnosis as a reference standard. Results were compared at early follow up (within the

3 months after intravesical therapy) or later (more than 3 months after intravesical therapy).

Key outcomes

In early follow up, the high-grade results for Bladder EpiCheck were as follows: sensitivity 92.1%, specificity 85.1%, PPV 77.8% and NPV 95.0%. For cytology, the respective results were 85.0%, 86.3%, 72.3% and 93.2%. In later follow up, the high-grade results for Bladder EpiCheck were as follows: sensitivity 96.8%, specificity 78.0%, PPV 60.0% and NPV 98.6%. For cytology, the respective results were 77.4%, 85.7%, 64.9% and 91.8%. The sensitivity and specificity of Bladder EpiCheck in people with papillary disease at early follow up were as follows: sensitivity 76.9% and specificity 96.3%. For cytology, the respective results were 73.3% and 90.4%. In people with carcinoma in situ the sensitivity and specificity of Bladder EpiCheck at early follow up were as follows: sensitivity 100% and specificity 80.9%. For cytology, the respective results were 92.0% and 81.4%, respectively. The AUROC was 99.5% for Bladder EpiCheck and 85.5% for cytology. The sensitivity of Bladder EpiCheck was always higher than that of cytology during the whole follow-up period both for papillary NMIBC and carcinoma in situ.

Strengths and limitations

Strengths: The study was prospective in design and enrolled people consecutively. People in the study had BCG or mitomycin C, and results were compared with cytology. Samples were evaluated by 2 expert cytopathologists with more than 10 years' experience. When a consensus could not be reached, a third uropathologist expert was consulted. The median follow up was 12 months (range 9 to 15 months).

Weaknesses: The study included a relatively small number of people from a single centre. It did not include a multivariate analysis or a comparison with low-grade cancer. The study did not compare Bladder EpiCheck with cystoscopy.

Pierconti et al. (2021c)

Study size, design and location

Retrospective, single-centre cohort study involving 374 people with high-grade NMIBC having intravesical BCG or mitomycin C, in Italy.

Intervention and comparator

Bladder EpiCheck test results were compared with urine cytology using histological diagnosis as a reference standard. Bladder EpiCheck test results were assessed for correlation with the different categories of The Paris System for Reporting Urinary Cytology (TPS).

Key outcomes

Results showed that EpiScore increased in TPS categories from negative for high-grade urothelial carcinoma (NHGUC) to high-grade urothelial carcinoma (HGUC) TPS categories. When cytological categories of NHGUC and atypical urothelial cells were compared, an EpiScore of less than 60 correlated with NHGUC (p=0.0003, odds ratio 3.925, 95% confidence interval [CI] 1.907 to 8.081, Fisher's exact test). When atypical urothelial cell and suspicious for high-grade urothelial carcinoma (SHGUC) or SHGUC and HGUC categories were compared, an EpiScore of 60 or more correlated with SHGUC (p=0.0031, OR 3.791, 95% CI 1.612 to 8.915) and with HGUC (p=0.0027, OR 3.957, 95% CI 1.639 to 9.550, Fisher's exact test). For NHGUC, the sensitivity of Bladder EpiCheck was 100%, specificity was 89.9%, PPV was 100% and NPV was 5%. For atypical urothelial cells the results were 81.8%, 52.3%, 42.8% and 84.6%, respectively. For SHGUC they were 86.6%, 52.3%, 56.5% and 84.6%, respectively. For HGUC they were 98.8%, 100%, 100% and 85.7%, respectively. The company stated that when comparing Bladder EpiCheck and cytology with the histological reference standard, the high-grade sensitivity for Bladder EpiCheck was 95%, and specificity was 82%, and the high-grade sensitivity for cytology was 90%, and specificity was 84%. The company provided the data comparing Bladder EpiCheck and cytology with the histological reference standard and stated that, although not reported in the study, values could be calculated from the publication.

Strengths and limitations

Strengths: All results were reviewed by at least 2 experienced uropathologists. The cohort focused on the subpopulation of people with a history of high-grade disease having treatment. Follow up was for 1 year.

Weaknesses: The study was retrospective in design and included people undergoing surveillance at a single centre in Italy. The study did not compare Bladder EpiCheck with cystoscopy.

Witjes et al. (2018)

Study size, design and location

Prospective, multicentre blinded cohort study involving 440 people (22 years and over) with NMIBC being monitored cystoscopically.

Intervention and comparator

Bladder EpiCheck tests results were compared with cytology, and cystoscopy results were confirmed by histology.

Key outcomes

Of the 440 people enrolled in the study, 353 were included in the diagnostic performance analysis. Results from 87 people were excluded because of inconclusive diagnosis according to the reference standard (50 people), no Bladder EpiCheck results (30 people), or both (7 people). For Bladder EpiCheck, the overall results were as follows: sensitivity 68.2%, specificity 88.0%, PPV 95.1%, NPV 44.8% and AUROC 82%. When excluding low-grade recurrence, the high-grade sensitivity was 91.7%, NPV was 99.3% and AUROC was 94%. Recent intravesical instillations did not impact the test's performance.

Strengths and limitations

Strengths: The study was prospective in design and included a relatively good number of people having surveillance at multiple centres in Europe. The investigators were blinded to Bladder EpiCheck test results.

Weaknesses: The study population included only people of European family background, so the results may not be generalisable to a wider, more diverse population. No follow-up data was collected, so false positives could not be correlated with later recurrences. No data was available about the presence of urinary tract infections.

Sustainability

The company did not make any sustainability claims for the technology.

Recent and ongoing studies

- EpiCheck and Short-term Intensive Chemoresection in NMIBC. Trial identifier: NCT04162704. Status: recruiting. Indication: bladder cancer. Devices: EpiCheck. Estimated completion date: October 2022. Country: Denmark.
- Genetic Testing in Upper Tract Urothelial Carcinoma (UTUC): the Epicheck Study. Trial identifier: NCT04702347. Status: recruiting. Indication: urological cancer. Devices: EpiCheck. Estimated completion date: February 2021 (manuscript submitted and accepted). Country: Spain.

Expert comments

Comments on this technology were invited from clinical experts working in the field and relevant patient organisations. The comments received are individual opinions and do not represent NICE's view.

All experts were familiar with using biomarkers for the surveillance of non-muscle-invasive bladder cancer (NMIBC) but none had used the Bladder EpiCheck test before.

Level of innovation

Four experts felt the technology is innovative, while 1 felt that it is a minor variation on existing biomarker tests for NMIBC. Three experts said that the technology is unlikely to replace standard care. Two stated that it might be used as an adjunct in some people, to reduce the frequency of more invasive tests such as cystoscopy in people with low and intermediate risk. One stated that it could augment current standard care, and another said the technology has the potential to replace urine cytology. Four experts noted that there are several other commercially available urine biomarker tests for diagnosing NMIBC. Two noted that although in use, these tests have not become standard care in the NHS. One expert noted that the main difference between Bladder EpiCheck and other biomarker tests is that it tests for multiple biomarkers. Another noted that some alternatives are point-of-care biomarker tests, have similar diagnostic accuracy to Bladder EpiCheck and are possibly less expensive.

Potential patient impact

Three of the experts said that the main patient benefit would be a possible reduction in the frequency of repeated cystoscopies, which are invasive and can be burdensome for the patient. Two experts said the technology may also help reduce the use of urine cytology, with 1 noting that cytology has a low sensitivity and specificity in low-grade bladder cancer. One expert said the main benefit to patients is that the technology provides a non-invasive and rapid diagnosis at the primary care level, possibly leading to earlier referral to a urologist. Two experts said that all people having surveillance for NMIBC could potentially benefit from the test. One said that people with high-risk NMIBC and elderly patients would benefit most from the test. One said that elderly people diagnosed with urinary tract infections would benefit most. Another said that people with intermediate-risk NMIBC would benefit most through a reduced frequency of cystoscopies. This expert noted that a reduction in cystoscopies is less likely to occur for people with high-risk cancer because of the consequences of missed cancer detection.

Potential system impact

Two experts said the test has the potential to improve outcomes and reduce hospital visits. Another expert agreed with this, provided there is further evidence showing improved specificity. One expert said the test may help triage patients awaiting cystoscopy for NMIBC, but noted that more data was needed to confirm this. One expert said it could free health system resources if used in a select group of patients (intermediate risk). One expert thought the technology would cost more than standard care, while 3 felt it could cost less than standard care overall. One of these experts noted that using the test may reduce the need for surgery. The expert highlighted that surgery is associated with increased morbidity and a minimum of 5 to 7 days of recovery, and that cystectomy is associated with impaired quality of life for patients. One expert felt the test would cost the same as standard care but may reduce urologist and pathologist time. Four experts noted that some minor changes to clinical facilities may be needed to adopt the technology in the NHS. This included access to laboratory testing for sample analysis, sample storage facilities and laboratory staff training. One of the experts said that because it is a simple urine test, no additional facilities or changes to existing facilities would be needed.

General comments

All experts noted that the technology is not currently widely used in the NHS. Three experts were not aware of any issues that would prevent it being adopted in the NHS. Two experts felt that the cost of the technology was a potential barrier to adoption. One of these experts also noted that the test is relatively new and has not shown a significant advantage over other available biomarker tests. One expert stated that the true positive and negative rates would need to be established in widespread clinical practice and another had uncertainties around the efficacy of the test because of the limited evidence available. The other 3 experts had no concerns around the efficacy of the test. Three experts thought the test has the potential to be used in most or all district general hospitals, 1 said it would be used in a minority of hospitals, and another said that it was not possible to predict this at present.

Expert commentators

The following clinicians contributed to this briefing:

- Professor Noel Clarke, consultant urological surgeon, professor of urological oncology, The Christie Hospital, Manchester, did not declare any interests.
- Mr Rami Issa, consultant urological surgeon, St George's Hospital, London, did not declare any interests.
- Mr Nikhil Vasdev, consultant urological surgeon and associate medical director for cancer services, East and North Hertfordshire NHS Trust, did not declare any interests.
- Mr Vishwanath Shivaling Hanchanale, consultant urological and robotic surgeon, Liverpool University Hospitals NHS Foundation Trust, did not declare any interests.
- Dr Anand Sharma, consultant medical oncologist, East and North Hertfordshire NHS Trust and Mount Vernon Cancer Centre, did not declare any interests.

Development of this briefing

This briefing was developed by NICE. The interim process and methods statement for medtech innovation briefings sets out the process NICE uses to select topics, and how the

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