under 1 year old were vaccinated in The Gambia or in 1–15 year olds in Thailand. A further trial in infants is underway in Tanzania as this is the age group in Africa most at risk. While the concept of combining epitopes from different antigens and stages is a good one, this particular peptide is unlikely to be used outside South America, and even here will probably be superseded.

**Multiple antigen-epitope-gene approach**

The multiple antigen-epitope-gene approach to malaria vaccine development is widely perceived as the only way to achieve good antiparasitic and disease immunity. An important element of such an approach is likely to be an immune response to the sexual cycle that begins with the male and female gametocytes produced in the blood and is completed within the feeding mosquito. The acquired sexual stage immunity prevents mosquitoes becoming infected and, in model infections, it is possible to induce a very strong transmission blocking immunity with sexual stage antigens expressed by gametes or by post-fertilisation ookinetes. One small safety and immunogenicity phase I clinical trial has been done so far with a recombinant form of Pf525, the dominant post-fertilisation surface antigen of *P. falciparum*. Such a vaccine could be used alone in some low endemic situations or in combination with other vaccines or other control measures, when it would serve particularly to reduce the transmission of vaccine or drug resistant mutants.

Seven *P. falciparum* antigens, three pre-erythrocytic, three asexual blood stage, and one sexual stage have been expressed simultaneously in recombinant form in an attenuated vaccinia virus called NYVAC 7; the first clinical trial with it has been done. DNA vaccines giving expression of CSP and other pre-erythrocytic stage antigens, which have given promising results in animal studies, will also soon be tested clinically.

What can be expected in the next five to 10 years? A fairly safe prediction is that no vaccines will go into control programmes, although the need for these increases progressively. However, alongside the continuing basic research there are now organised attempts to develop what we have in concert with the pharmaceutical industry and to prepare field trial centres. The absolute requirement is for long and sustained investment.

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**Is proficiency testing in cervical cytology proficient?**

The proficiency test in cervical cytology may not be proficient, whether aimed at assessing individuals or laboratories as a whole, according to arguments from Dr C J R Stewart in a recent issue. 1 Stewart's article follows a recent editorial on the same subject in *Cytopathology* and comes at a time when the draft guidelines for the NHS cervical screening programme (NHSCSP) are being revised for proficiency testing. Stewart's views, and those of Slater,2 reflect widespread scepticism about the way proficiency testing is carried out in the UK. Indeed, the British Society for Clinical Cytology and the Royal College of Pathologists had rejected the original draft guidelines, although supporting the need for some form of external quality assessment.

In an article referred to by Stewart, Valente says candidly that one of the goals of proficiency testing is to "weed out the incompetent", although he points out that there is no evidence that proficiency testing improves laboratory performance. 3 He also says that "common sense would indicate that the recognition of accepted diagnostic criteria is a valid measure of competence" and that "we must not lose sight of the education role of proficiency testing". 4 Stewart suggests that internal quality control, accreditation, and comparison of performance and outcome might equally or even better be able to identify poor performance. Is an external assessment needed as well?

Stewart must be justified in saying that there is no evidence that mortality from cervical cancer is affected by proficiency testing. Laboratory performance would have to be uniformly standard for a long time to be reflected in mortality, which is difficult to compare in small populations. More to the point, he says that proficiency does not reflect laboratory false negative rates. Sensitivity of primary screening is proportional to the number of abnormalities known to be present and would be expected to be high in a set of 10 slides that the set of which were known to be abnormal. Sensitivity of primary screening can be monitored by re-screening negative slides, but ultimately...
depends on accurate checking and reporting in the labora-
tory, and can therefore only be carried out as a component
of internal quality control. Seeding test slides into routine
work is impractical: experienced screeners, trained as they
are to detect rare events in cervical smears, would
undoubtedly recognise the test slides before even putting
them under the microscope.

Yet screeners need to know, for their own self
confidence, that they are able to recognise the full
spectrum of cytological abnormalities, and can separate
negative from inadequate, and low from high grade
dyskaryosis. Furthermore, heads of departments need an
objective assessment of the tendency of their screeners and
biomedical scientists to over or underreport using
standardised case material. They also need to be aware of
any diagnostic blind spots that would take a long time to
show up through rapid review. By its nature, proficiency
testing identifies only extreme examples of poor perfor-
mance in primary screening. This is a positive advantage,
leading to well deserved reassurance most of the time. Even
without being a test of primary screening sensitivity, profi-
ciency testing for cytology screeners is important, parti-
cularly if an educational role can be introduced.

Proficiency testing is a rather better test for pathologists,
which is probably the reason that it is us, rather than mem-
ers of the National Association of Cytologists, who are
 loudest in criticising the tests. If it is to be used to identify
poor performance, it would not be much use if all the
abnormal cell groups were clearly and accurately marked
on the slides. A pathologist needs to be able to examine the
whole slide, identify cell groups that may have been missed,
and make his or her own mind up about the presence or
absence of significant abnormality. The high proportion of
abnormal slides in the proficiency testing set is nearer rou-
tine practice for a pathologist than for a screener although
a mixture of appropriately and inappropriately marked
slides in addition to unmarked ones could make it more
reflective of normal practice.

Without some form of external quality assurance or pro-
ciency testing how could poor performance be detected
early enough for remedial action to be taken without com-
promising the career of the person concerned? It must be
better to have an objective assessment, with previously
agreed protocols, than relying on the much more difficult
methods of comparing reporting rates, reviewing reported
work, and other investigations that can be highly damaging
to all concerned.

Proficiency testing could better reflect routine practice
by not excluding borderline and inadequate tests, which
account for a considerably greater percentage of laboratory
results than all grades of dyskaryosis combined. An exter-
nal test that included the complete spectrum of cytological
change, assessed by correlation with a majority verdict of a
panel of cytologists (as well as by correlation with histology
and follow up as appropriate) could go a long way towards
providing a test that was educational for all grades of
staff—as well as providing a test that could detect gross
degrees of discordance.

Stewart has aired some reasonable objections to current
methods of proficiency testing, and rightly suggests that a
revised scheme should be subjected to evaluation and
analysis of its intended benefits before being adopted. Per-
haps the NHSCSP will develop a revised test that is more
acceptable, better than the equally widely criticised tests
used in the USA, and worthy of a screening programme
that has been so successful in preventing invasive cervical
cancer and reducing its mortality.

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2 Slater DN. Quality assurance in cervical cytopathology—time for a more
3 Valente PT. Government mandated cytology proficiency testing: time for

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*J Clin Pathol* 1997 50: 536-537
doi: 10.1136/jcp.50.7.536

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