

FIRST INTERNATIONAL STANDARD FOR COMMON GENETIC TEST APPROVED BY WHO

Geneva - The first international standard for a human genetic test was approved by the World Health Organization (WHO) today. Use of the standard will help to improve the accuracy and quality of laboratory results worldwide from a frequently used genetic test. This test identifies a genetic predisposition to thrombosis -- a potentially life-threatening blood condition -- and could therefore enable people to take preventive measures.

"Establishment of the first international standard for a genetic test is an important milestone. Genetic testing procedures are playing a vital and growing part in clinical medicine. This new standard will help to ensure that the tests are giving accurate results worldwide," said Dr David Wood, Coordinator of Quality Assurance and Safety of Biologicals at WHO.

The newly established standard, formally called an International Reference Panel, relates to the testing of patients for a particular genetic mutation known as Factor V Leiden. Discovered in 1994, this mutation is one of the most common genetic risk factors for venous thrombosis (blood clot), and is involved in 20-40% of all cases. Factor V Leiden induces a defect in the natural anti-coagulation system.

The test for Factor V Leiden is one of the most frequent genetic tests carried out in clinical laboratories. It determines the presence or absence of the mutation, which has been shown to result in a seven-fold to 80-fold higher risk of thrombosis depending on whether the individual carries one or two copies of the gene respectively

The new standard was agreed at the 55th session of one of WHO's longest-standing committees, the WHO Expert Committee on Biological Standardization (WHO ECBS) which is meeting from 15 to 18 November in Geneva. It is composed of ten global experts from academia, industry and national regulatory authorities, as well as 25 advisors.

One of WHO's key functions, specified in its Constitution, is to develop, establish and promote international standards with respect to biological and other products. WHO is the world authority on biological standards, and has established more than 300 standards covering vaccines; blood products; therapeutic biological products, such as insulin; and diagnostic tests, such as those that detect HIV in a blood product.

Researchers are currently investigating whether or not there is a link between air travel and deep vein thrombosis. This is one example of a condition which may be more likely as a result of the Factor V Leiden mutation. Having information about their genetic make-up could allow travellers at risk to take additional precautions.

The standard for Factor V Leiden was developed by WHO partner and the leading international laboratory for biological standards, the National Institute for Biological Standards and Control (NIBSC) in the United Kingdom, in collaboration with colleagues from the clinical National Quality Assessment schemes for Blood Coagulation and the Royal Hallamshire Hospital in Sheffield, UK.

"This is an important step in genetic medicine. I am delighted that the NIBSC has taken the international lead in developing the first WHO standard for a genetic test. This will provide information on susceptibility to venous thrombosis, and ultimately will deliver clinical benefits for people at increased risk of developing thrombosis," said Professor Gordon Duff, Chairman of the NIBSC Board. NIBSC is currently developing several other new reference standards to support testing for a range of other clinically important genetic characteristics.

DNA-based genetic testing offers enormous promise for improved disease management by giving doctors better information about patients on which to base diagnosis and decisions about treatment or counselling. It also offers the potential for better targeting of therapies and drugs to those patients most likely to benefit. Hundreds of different genetic tests are currently available.

A recent study estimated that in the European Union alone more than 700 000 genetic tests were performed in 2002; and found that at least 700 laboratories and 900 clinical centres in Europe were carrying out genetic tests.¹ Though the exact number is unknown, it is likely that millions of genetic tests are being carried out worldwide each year.

Setting standards is particularly critical as genetic testing has expanded to more and more laboratories throughout the world. Genetic testing must be done consistently in all laboratories around the world and to high quality standards in order to give confidence in the results.

A standard for a biological product is essentially a yardstick (either on paper or in an ampoule, in which there is a specially prepared reference material) which enables laboratories around the world to compare results. The work of the WHO Expert Committee on Biological Standardization contributes to global public health in a fundamental way since the written guidance and reference preparations established on its recommendations define international technical specifications for the quality and safety of biological medicines and in vitro diagnostic procedures.

Once a WHO collaborating laboratory physically creates a standard, it is typically evaluated by 15 other top laboratories. The WHO ECBS reviews all the laboratory data and decides to approve or not the proposed standard for international use. The rigorous assessment of the standard for the Factor V Leiden genetic test was carried out by an international panel of investigators in conjunction with the International Society on Thrombosis and Hemostasis (ISTH).

The announcement of the first international standard for the genetic diagnosis of the Factor V Leiden mutation is a significant step forward in the assurance of high quality genetic testing. In the future, the WHO ECBS will likely approve standards for other genetic tests, the increasing use of which will enable prevention and early treatment of genetic disorders, improving quality of life.

For further information, please contact: Ms Melinda Henry, Information Officer, Immunization, Vaccines and Biologicals Department, World Health Organization, Geneva: Tel.: +41 22 791 2535, Fax: +41 22 791 4227, E-mail: henrym@who.int; or Dr Stephen Inglis, Director, National Institute for Biological Standards and Control, Hertfordshire: Tel.: +44 1707 641000, Fax: +44 1707 646854, E-mail: singles@nibsc.ac.uk.

All WHO Press Releases, Fact Sheets and Features as well as other information on this subject can be obtained on the WHO website: www.who.int. The website of the WHO Immunization, Vaccines and Biologicals Department is: <http://www.who.int/vaccines/>. The full list of WHO biological standards can be obtained at: <http://www.who.int/biologicals/>

¹ Ibarreta, D., Elles, R., Cassiman, J-J., Rodriguez-Cerezo, E., and Dequeker, E. Towards quality assurance and harmonization of genetic testing services in the European Union. *Nature Biotechnology*, 22, 1230-1235 (October 2004).