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NEEDLE – FREE BLOOD SAMPLING DEVICES

O. Holovina

Research supervisor V.M. Denisenko
Kyiv National University of technologies and Design

Objective Study the possibility of use of needle-free blood sampling devices.

The following tasks have been set:

1. To analyze the newest needle-free devices for drawing blood samples;
2. To identify the stages of development of needle-free blood sampling devices;
3. To define the fields of application of needle-free blood sampling devices.

Object. The use of needle-free blood sampling devices widely in medical centers and for individual needs.

Research methods. Literature reviews, quantitative techniques have been used to generate a dataset which was analyzed to give definitive conclusions. Theoretical analysis has been used: selection and discussion of theoretical material and descriptive material, in context, and detailed comparison of theories in terms of their applicability.

Scientific novelty and practical significance of the results. The novelty of the research is that the blood test does not need blood. Thanks to a new device, we can find out human condition without entering a needle into the body. The first time it has been developed in Ukraine, Kharkiv. This technology is already used in many medical centers. Also the accuracy of blood sampling has been improved. Now the 'Biopromin' is used in several clinics in Ukraine. Outside these three devices actively used in China, the United Arab Emirates, Czech Republic, Belarus and Russia.

Now you can find out important health indicators without pain! We have three examples of devices that operate according to a given principle.

At the beginning, let's consider the effect of such a device as 'Biopromin'. It allows to get 117 vital signs of the human body without blood sampling in a few minutes. These options include both standard blood count and lots of other important factors that determine the patient's condition. In particular, the device determines the erythrocyte sedimentation rate, total protein, cells and other indicators. Ukrainian invention is extremely simple. Patients should attach to the body just 5 sensors: 2 in the neck near the carotid artery, 2 in the armpits and the last on his stomach. Then the doctor enters to the computer program individual parameters of the patient: age, sex, weight, height, pulse rate and respiration. In fact, the device is a portable ultra-compact diagnostic laboratory, allowing an integrated rapid analysis of the entire body.

The device is irreplaceable in critical condition of the patient when necessary to take immediate decisions and do not have time to determine the vital parameters of traditional methods. The device is not only convenient but also extremely accurate. Possible error is 2%. The device is miniature. Research conducted by one person (doctor) in any conditions in the presence of any computer to which it is connected. Software Analyzer running the operating system Windows XP, Vista, WINDOWS 7.

Ukrainian worked on his device long 25 years. The device does not require consumables and expensive reagents for chemical analysis. And the only disadvantage – is price. We'll get a miracle medicine at about 20 thousand dollars [1].

Though the pain they cause is minor and fleeting, a lot of people still find something pretty unsettling about needles. When it comes to conducting a routine blood test, US-based company Tasso Inc. believes that these unpleasant pricks can be removed from the equation



completely. Its ping pong ball-sized *HemoLink* blood sampler can be operated by the patient at home, and needs only to be placed against the skin of the arm or abdomen for two minutes to do its job. *HemoLink* is designed as a low-cost, disposable device made from as few as six injection-molded plastic parts. Inside is a vacuum, which enables a small sample of blood to be drawn from tiny open channels into a small tube through a process known as capillary action. This process is made possible by forces that dictate the flow of tiny fluid streams, even against gravity.

"At these scales, surface tension dominates over gravity, and that keeps the blood in the channel no matter how you hold the device," says Tasso Inc.'s vice president and co-founder Ben Casavant.

Tasso Inc. plans on applying to the US Food and Drug Administration for approval at the end of this year, with hopes of bringing *HemoLink* to market in 2015. If this eventuates, its benefits could be two-fold: easing the pain for needle-phobic patients and making healthcare cheaper and more accessible by eliminating countless trips to the doctor [3].

The *PIVO* system, developed by Velano Vascular, draws blood through a small plastic tube that is threaded through a patient's IV catheter. No needle. No need to poke the patient.

"This has the potential to significantly improve the patient experience here," said Cheryl O'Malley, vice president of medical-surgical services at UH. "Patients will forgive one or two sticks because they're in the hospital and they're sick, but after that it is one of their most common complaints."

The *PIVO* device is designed for use on inpatients, not for outpatients who visit the doctor for a quick test or check up. In many cases, inpatients need regular blood draws and have to be roused at all hours to get stuck with a needle. *PIVO* allows the procedure to be performed with minimal pain and disruption, UH administrators said. It also has the potential to reduce infection by eliminating the need for central-line blood draws. The *PIVO* system is also being tested in a clinical study at Brigham & Women's Hospital in Boston -- a teaching hospital of Harvard Medical School. But the roll-out at UH is the first time an academic medical center has deployed it in a real-world hospital setting. Velano Vascular, the company that makes the device, is hoping the *PIVO* system sets a new standard of care in hospitals in the U.S. and worldwide. Blood draws are the most common invasive procedure in the U.S., with more than 400 million performed annually.

Velano's chief executive and founder is Cleveland native Eric Stone who, as a teenager, was treated for Crohn's disease at UH's Rainbow Babies & Children's Hospital. Stone said he was motivated to pursue the product, in part, by the memory of being roused at night to be stuck with a needle - an annoyance he hopes to end for future patients at Rainbow. [2].

Research results Nowadays a bloodless blood test has become a reality. However, its effectiveness is still being evaluated. Though approved by the Food and Drug Administration, the device is just beginning to be piloted in hospitals. UH is testing it in the telemetry and cardiac intensive care units at its Case Medical Center in Cleveland. The *PIVO* system is also being tested in a clinical study at Brigham & Women's Hospital in Boston. A needle-free device 'Biopromin' developed in Ukraine, Kharkiv is not only convenient but also extremely accurate. It allows to carry out medical examination for lots of people very quickly and non-invasively. It gives the report/survey with 124 parameters of organism including hemogram, biochemical, functional, hemodynamic and immunological parameters. The only disadvantage – is price about 20 thousand dollars.

Conclusions. The possibility of use of three devices has been studied and compared: 'Biopromin', *HemoLink* device, *PIVO* device. The research has been conducted in the field of application and stages of development of needle-free blood sampling devices.



Key words: needle-free device, blood samples, blood draws, ANESA

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UDC 391

UKRAINIAN CULTURE IN THE CONTEXT OF WORLD'S FASHION

Student V.P. Romaniuk, gr. BT-15

Research supervisor N.M. Pisarenko
Kyiv National University of technologies and Design

Fashion of each country, despite the general globalization, has its characteristic features. This is driven by global fashion process. Ukraine has brought its emotions and its own conceptual, intellectual femininity into the world of fashion. The soul of Ukrainian fashion is in the millennial culture. The point is global and Ukrainian context, in which Ukrainian designers live and work.

The aim of the investigation is to reveal the popularity of Ukrainian traditional clothes not only in our country but also abroad.

The aim presupposes the solution of the following **tasks**:

1. To show the richness of Ukrainian culture.
2. To demonstrate the versatility of Ukrainian embroidery.
3. To reveal the role of embroidery in everyday life of Ukrainian people.
4. To display Ukrainian culture as an inspiration for designers all over the world.
5. To expose the work of Ukrainian designers in the world.

The object of the research is Ukrainian national clothes.

The choice of the **methods** of investigation is determined by the aim, the tasks of the research and the material analyzed. They include: the study of Ukrainian culture, analysis of Ukrainian national clothes, analysis of world designers fashion shows and work development of Ukrainian designers.

The novelty of this research is that nobody popularized Ukrainian culture so widely yet, and in particular our national dress for all people in the world which I think is very important.

The practical value of the research consists in the possibility of using the actual material for the development of Ukrainian culture in itself, to understand the importance of embroidery in our country and abroad.