

- 2 To evaluate the organization of the assessment of 164 interns over two days.
3. Identify typical competency gaps.
4. Determine the simulator's potential for ensuring a level playing field.
5. Formulate recommendations for implementation.

Materials and Methods

The study was conducted at the Simulation and Assessment Center of VGMU on June 25–26, 2026. A total of 164 medical interns specializing in “Internal Medicine” and “General Practice” participated.

The simulation tool used was the “MedExam” system on a tablet-mounted table. It simulates the full cycle of a physician's actions: taking the patient's complaints and medical history, physical examination, percussion, palpation, auscultation, ordering laboratory tests (complete blood count, urinalysis, biochemistry, necrosis markers, coagulogram, electrolytes, and blood gas analysis) and diagnostic tests (pulse oximetry, blood pressure, ECG, echocardiogram, chest X-ray). The diagnosis is entered via a virtual keyboard; treatment is entered into the prescription sheet, specifying the medication, route of administration, and dosage. The simulation system responds to therapy with changes in blood pressure, heart rate, ECG, and auscultation findings. Color-coded indicators show whether prescriptions are correct.

The “Diagnostics” and “Emergency Care” stations are combined into a comprehensive 10-minute scenario. The examinee is the on-call physician. Ten scenarios are used: myocardial infarction (including cardiogenic shock), pulmonary embolism (fulminant and with infarct pneumonia), pneumonia with infectious-toxic shock, hypertensive crisis with acute left ventricular failure, atrial fibrillation, complete AV block, and ventricular tachycardia. The scenarios complied with the protocols of the Ministry of Health of the Republic of Belarus.

All examinees were using the simulation system for the first time and were not familiar with the scenarios. A tutor provided assistance with the interface. Actions were recorded in a digital protocol. Assessment was based on a three-point scale.

Results

The assessment confirmed the feasibility of comprehensively evaluating 164 interns over two days. The format allowed for the evaluation of a holistic algorithm of actions rather than individual procedures. Overall, the interns' level of preparation was high. However, analysis of the protocols revealed systemic deficiencies:

- incomplete collection of symptoms and medical history, omitting details significant for differential diagnosis;
- disruption of the sequence and incompleteness of the physical examination, as well as insufficient or excessive diagnostic activity;
- difficulties in interpreting laboratory and diagnostic test data, both individually and in terms of their clinical interrelationships;
- errors in prescribing treatment, taking into account complications that have developed and changes in the patient's condition;

- Incorrect selection of dosage and route of administration for medications, especially in emergency situations.

Discussion

These data enable departments to adjust their training programs. Digital recording ensures objectivity and minimizes subjectivity. The aspect of fairness is particularly important. The traditional system places interns from remote areas at a disadvantage. The VS tablet platform partially addresses this issue: the program can be used on portable devices outside of inpatient centers. This opens up opportunities for on-site evaluations and training, ensuring equal conditions.

Conclusions

Experience with conducting final assessments using the “MedExam” simulation system has shown that this tool is a valid, objective, and informative means of comprehensively evaluating the professional competence of medical interns. The simulation system replicates the full cycle of medical practice in a dynamic situation, identifying both the graduates' strengths and systemic deficiencies that require correction.

Future development plans include: expanding the library of clinical scenarios to cover other specialties; integrating AI-based modules for assessing communication skills; and improving the quality of visualization. A key focus remains the development of distance learning formats that ensure equal access to simulation technologies for medical residents from all regions of the country. “MedExam” has the potential to become the foundation of a national platform for the objective assessment and support of physicians' professional competencies at all stages of their careers.

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THE ROLE OF THE CARDIOPULMONARY RESUSCITATION WORKSHOP AND THE PHANTOM SIMULATION COURSE IN THE RESIDENCY PROGRAM FOR THE SPECIALTY OF “ANESTHESIOLOGY AND RESUSCITATION”

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Abstract. This paper presents the results of training for first-year residents in the specialty of Anesthesiology and Resuscitation. It demonstrates the variety of disciplines in which simulation-based training is used and its outcomes.

Scientific specialty: 3.2.3. Public Health and Health Care Organization, Sociology and History of Medicine.

Relevance

An anesthesiologist-resuscitator must possess certain technical and non-technical skills, which are developed during residency training and maintained throughout their professional career. Simulation-based training is an important educational resource that allows residents to

develop the skills specified in the professional standard for anesthesiologists and intensivists in a specialized setting, under conditions that are safe for both themselves and their patients.

Objective

To investigate the effectiveness of simulation-based training for residents in the specialty 31.08.02. Anesthesiology and Resuscitation

Materials and Methods

A two-year longitudinal study was conducted to evaluate the effectiveness of a cardiopulmonary resuscitation (CPR) workshop and a phantom-simulation course (PSC) among 9 first- and second-year residents in the specialty 31.08.02, Anesthesiology and Resuscitation. Both courses are included in the residency training curriculum developed at Immanuel Kant Baltic Federal University. In the curriculum for the 2024 and 2025 residency cohorts, the cardiopulmonary resuscitation workshop is included in the mandatory portion of Block 1. The total duration of the course was 1 credit unit (c.u.) or 36 instructional hours, of which 30 hours were allocated for in-class instruction with the instructor and 6 hours for independent study. The course is conducted according to the generally accepted methodology recommended by the Russian National Resuscitation Council.

The phantom-simulation course for the 2024 cohort was included in the elective courses, which are selected by the students. The total duration of the course is 2 credit units (c.u.) or 72 instructional hours, distributed across classes in the 1st and 4th semesters. One credit unit is allocated for each semester, of which 30 hours are for in-class instruction and 6 hours are for independent study.

Changes were made to the 2025 curriculum regarding the FSK, which was moved to the required portion of Block 1 courses and had its total number of hours increased to 3 credit units, distributed evenly across the 1st, 2nd, and 4th semesters. Classes were held in October 2025 and February 2026, with the assessment session taking place in June 2026.

After the second semester, an assessment of theoretical knowledge of algorithms was conducted on the digital educational platform, the RU MEDIUS virtual clinic, using the following scenarios: "Preoperative Examination," "Tracheal Intubation," "Central Venous Catheterization (v. subclavia dextra)," and "Anaphylactic Shock."

Results

After completing the theoretical course, the residents took an interim knowledge assessment on the RU MEDIUS digital educational platform. The requirement for admission to sessions at the simulation center was to complete the scenarios in exam mode and achieve a score of over 90 points. All residents passed the stations on their first attempt, with a median score of 94 [90;98] points. During the practical session, they practiced basic cardiopulmonary resuscitation (CPR) and automated external defibrillation. As a result of the training, the residents achieved the following median values: compression rate of 115 [100; 120] per minute, compression depth of 5.5 [5.0;5.8] cm, full release of com-

pression 90 [84; 100], and correct hand placement in the center of the chest — 100%.

The phantom-based simulation course included training in the technical skills of tracheal intubation and central venous catheterization. The criterion for mastery of the skill was the accurate performance of the procedure. For both stations, key skills to be developed included verifying the availability and functionality of necessary equipment, adhering to aseptic and antiseptic protocols, and preventing potential complications.

The "Preoperative Examination" station proved to be the most challenging in terms of establishing the sequence of actions and completing documentation.

The "Anaphylactic Shock (AS)" station included two scenarios: a call to the surgical department's procedure room and the onset of shock in the operating room during induction of anesthesia. At the beginning of the training, three residents had difficulty calculating the dose of epinephrine for intravenous administration in the operating room. Subsequently, all necessary technical and non-technical skills were mastered.

A final assessment conducted at the end of the second semester on the RU MEDIUS digital educational platform showed that the residents completed the "Tracheal Intubation" station in 3.3 [2.7; 4.0] minutes, with a median score of 89 [89; 89.0] (minimum — 84, maximum — 100) points, with 2.0 [2.0; 2.0] errors (minimum — 0, maximum — 3). Results for the "Central Venous Catheterization (v. subclavia dextra)" station: median total score 90 [86.0; 96.0] (minimum — 82, maximum — 98), time to complete the station — 13.1 [12.3;13.3] (minimum — 10.1, maximum — 16.6) min., number of errors — 5[2.0;7.0] (minimum — 1, maximum — 9). "Preoperative Examination" station: median total score 87 [82.0;89.0] (minimum — 78, maximum — 89), time to complete the station — 8.5[8.3;10.0] (minimum — 8.2, maximum — 13.4) min, number of errors — 6 [5.0; 8.0] (minimum — 5, maximum — 10). "Anaphylactic Shock" station: median total score 96 [93.0; 96.0] (minimum — 87, maximum — 98), time to complete the station — 10[9.5;11.2] (minimum — 6, maximum — 14.3) min., number of errors — 2[2.0;3.0] (minimum — 1, maximum — 6).

Discussion

By the end of the first year of training, residents have developed the necessary skills to a sufficient level, but there is some variation in their retention of these skills. The most problematic stations remain "Preoperative Examination" and "Central Venous Catheterization (v. subclavia dextra)," where the highest number of errors occurred.

Conclusions

The separation of simulation training into distinct courses — "Cardiopulmonary Resuscitation Workshop" and "Phantom Simulation Course" — and the conduct of sessions in the first and second semesters have yielded good results. A comprehensive approach to training, incorporating both theoretical and practical components, enables residents to develop the necessary skills. The residents demonstrated a sufficient level of knowledge retention.

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