EURIZON FELLOWSHIP PROGRAMME
Remote Research Grants

Final report

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Final report

Introduction

This final report presents a summary of the implementation and outcomes of the project “Improving Professional Communication on Biosecurity and Biohazard Management in Medicine, Pharmacy, and Biotechnology”, supported by the EURIZON grant under the European Union’s funding framework. The project was conducted over four quarters and aimed at enhancing interdisciplinary knowledge exchange, mobility, and cooperation in critical areas of biosafety and professional communication. While the detailed report for the first-fourth quarters has been submitted separately, this final report outlines the overall progress, key deliverables, personnel engagement, and reflections on the project’s achievements and impact.

1. Summary of progress

1.1. Short overview of project goals and duration

Biosafety is a critical concern in the fields of medicine, pharmacy, and biotechnology. Proper biosafety practices are essential to prevent the spread of infectious diseases and protect the health and safety of researchers, healthcare professionals, and the public. This project was initiated to address the growing need for enhanced biosafety measures and communication strategies within these fields.

Project background and objectives

The primary objective of this project is to increase awareness and implementation of biosafety principles in medicine, pharmacy, and biotechnology through comprehensive international staff training and the dissemination of knowledge via scientific publications. The specific objectives are:

1. Conduct International Staff Training: To enhance the knowledge and skills of researchers and healthcare professionals in biosafety principles and practices. Training sessions will be led by experts in the field and conducted in English or Ukrainian.

2. Develop Educational Materials: To create accessible, high-quality educational resources, including online courses, webinars, and other instructional materials, to support ongoing biosafety education.

3. Publish a Special Issue of a Peer-Reviewed Journal: To disseminate current research and best practices in biosafety through a special issue of "The Innovative Biosystems and Bioengineering," a Scopus-indexed journal. This issue will feature articles from leading experts on topics such as biosafety regulations, risk assessment, and biosecurity.

Biosafety is foundational to the integrity and success of medical, pharmaceutical, and biotechnological research and practice. Ensuring biosafety:

- *Prevents Disease Spread*: Reduces the risk of laboratory-acquired infections and the inadvertent release of pathogens into the environment.

- *Protects Researchers and Public Health*: Safeguards the health of researchers, healthcare workers, and the general population.
- *Maintains Research Integrity*: Ensures the reliability and validity of scientific research by preventing contamination and ensuring accurate results.
- *Supports Regulatory Compliance*: Helps institutions comply with national and international biosafety regulations and guidelines, avoiding legal and financial penalties.
- *Promotes Public Trust*: Enhances the credibility and public trust in scientific research and healthcare institutions by demonstrating a commitment to safety and ethical standards.

Timeline:
The project is planned to be implemented over the course of one year, with specific milestones and activities scheduled for each phase:
Months 1-3:
- Identify Experts: Select biosafety experts to lead training sessions.
- Develop Training Sessions: Create detailed plans and content for the training sessions.
Months 4-6:
- Conduct Training Sessions: Deliver training to researchers and healthcare professionals.
- Develop Educational Materials: Create and distribute online courses, webinars, and other resources.
Months 7-9:
- Identify Journal and Prepare Articles: Select a peer-reviewed journal and prepare articles for the special issue.
Months 10-12:
- Publish Special Issue: Release the special issue of the journal.
- Disseminate Educational Materials: Ensure wide distribution and accessibility of the educational resources developed.

By adhering to this timeline, the project aims to significantly enhance biosafety knowledge and practices in the targeted fields, contributing to improved health and safety outcomes globally.

1.2. Highlights from Q1–Q4

Quarter 1 (Months 1–3)

To achieve the project's overarching goal of improving biosafety awareness and practices across medicine, pharmacy, and biotechnology, we had prioritized the identification of highly qualified experts and the design of structured, effective training sessions.

A comprehensive **set of criteria had been developed** to guide the selection of biosafety specialists, ensuring that each chosen expert demonstrated strong credentials in terms of academic background, field experience, professional standing, availability, and interpersonal competencies. The selection process had been carefully designed to uphold both scientific rigor and communicative clarity, with an emphasis on inclusivity and sustainability.

1. Qualifications
Experts had been required to hold advanced academic degrees (Master's, Ph.D., or equivalent) in disciplines relevant to biosafety, microbiology, biotechnology, or closely related fields. Additional certifications in biosafety or laboratory safety—particularly from recognized international organizations such as the American Biological Safety Association (ABSA)—had been treated as significant assets.

2. Experience
The selected professionals had demonstrated a minimum of 5 to 10 years of practical experience in biosafety-related domains, with proven engagement in medical, pharmaceutical, or biotechnological settings. Their previous involvement in the development of biosafety protocols, execution of risk assessments, and management of biohazardous substances had been essential. Moreover, many had previously conducted training in biosafety and biosecurity, equipping them with the pedagogical skills necessary to translate technical knowledge into accessible, context-relevant learning. Documented research contributions and publications had further reflected their active engagement with contemporary developments in the field.

3. Reputation
Professional credibility had been assessed based on contributions to peer-reviewed journals, presentations at scientific forums, and active membership in biosafety associations. Peer recognition through awards, leadership positions, or testimonials had played an important role in the evaluation process. High-impact publications and citation metrics had been considered indicators of thought leadership and influence within the biosafety community.

4. Availability
The project had required a high level of scheduling flexibility and consistent responsiveness. Experts had committed to the training calendar, including various delivery formats (in-person, online, hybrid) to meet the logistical needs of a diverse and international audience. Additionally, a willingness to engage in post-training consultations or mentoring had been considered a valuable contribution to long-term capacity building.

5. Interpersonal Skills
The ability to communicate complex biosafety topics in a clear, structured, and engaging manner had been essential. All selected experts had demonstrated strong communication skills and the capacity for productive collaboration with the project team and fellow trainers. Their flexibility in adjusting content and approach, based on participant feedback, had contributed significantly to the effectiveness of the training. Cultural sensitivity had been emphasized, especially in the context of multinational participation, ensuring that all sessions were inclusive and respectful of diverse perspectives.

6. Multilingual Ability (Optional)
While proficiency in English had been a baseline requirement, additional fluency in other languages—particularly Ukrainian—had been viewed as a practical advantage for adapting sessions to specific regional contexts.

Also, to **identify potential biosafety experts** for our training sessions, we conducted a comprehensive literature review. This process ensured that we selected the most qualified and reputable individuals.

Therefore, **the second step** involved a systematic literature review using globally recognized academic databases such as PubMed, Scopus, and Google Scholar. These platforms provided access to a wide range of peer-reviewed publications. A comprehensive list of thematic keywords—covering areas such as biosafety, biosecurity, biocontainment, laboratory biosafety, pathogen control, drug and food safety, evaluation of medical devices, and biosafety of nanomaterials—guided our search strategy. This ensured alignment with the project's core themes and allowed us to focus on authors whose work demonstrated both scientific rigor and practical relevance.

A total of **over 890 publications** from research teams **across 36 countries** were reviewed. Inclusion criteria were based on publication quality (with preference for high-impact journals), consistent authorship on biosafety-related topics, and thematic relevance. From this pool, 52 experts were identified based on their strong publication records, frequent citations, and professional affiliations with respected institutions such as universities, research centers, and public health agencies. These individuals represented diverse global regions, including North America, Europe, Asia, and Australia, and possessed an average of over 16 years of professional experience.

In parallel, professional **networking platforms** such as LinkedIn and ResearchGate were utilized to extend our search beyond academic outputs. These platforms allowed for deeper insights into experts' career trajectories, institutional roles, research interests, and visibility in the biosafety field. We also analyzed conference programs and speaker lists from recent symposia on biosafety and related topics. This allowed us to identify prominent figures who have demonstrated leadership and innovation in the field through invited talks and active roles in conference organization.

Further industry insights were obtained by **mapping** the number of companies associated with key biosafety terms on LinkedIn. This data informed us about the level of industry engagement across subfields. Terms such as "food safety" and "drug safety" were linked to thousands of organizations, while others, like "biosafety of nanomaterials" or "biocontainment", showed more niche representation. This pattern was useful in understanding market-driven research trends and the availability of specialists in certain domains.

Experts identified through these channels were assessed not only on their academic and professional credentials but also on indicators of recognition—such as awards, leadership roles in biosafety organizations, or editorial responsibilities in relevant journals.

To ensure privacy and compliance with data protection regulations, all personal data were stored securely and used solely for internal purposes. Only anonymized and aggregated data are included in this report.

Initial outreach was carried out to **establish contact** with selected experts. Each received a personalized introduction to the project, along with an invitation to collaborate. A key condition for involvement was voluntary, unpaid participation in knowledge-sharing activities such as trainings, webinars, or peer reviews.

Gender Dimensions

The composition of the expert cohort had reflected **gender balance**, incorporating both women and men across scientific, technical, and training roles. This equitable representation had enriched the diversity of perspectives and fostered more holistic approaches to biosafety challenges. Throughout the project, efforts had been made to promote gender inclusivity not only in team composition but also in research design, data interpretation, and communication practices. Gender analysis had been integrated into key activities to identify and address potential disparities in healthcare outcomes. Furthermore, the project had actively supported the professional development of women in STEM, contributing to the broader advancement of gender equity in science and technology.

By the end of the first quarter, outreach had been made to 53 experts, resulting in confirmed interest from 7 individuals across several countries, including the USA, Philippines, Ukraine, and Poland. Their anticipated contributions are as follows:

- Two experts agreed to lead webinars.
- Four offered to participate as peer reviewers.
- One committed to publishing research outcomes relevant to the project.

The engagement of these experts marks a significant milestone, confirming the project's capacity to mobilize an international network of professionals and laying the groundwork for high-quality, cross-disciplinary training activities in biosafety.

Table 1. Summarized criteria and results of biosafety expert choice

Category	Details
Number of Experts	53 (as of the Q1) + 14 at the end of Q2
Institutions Represented	Universities, Research Institutes, Governmental Bodies
Regions Covered	North America, Europe, Asia, Australia
Areas of Expertise	Biosafety, Biosecurity, Biocontainment, Risk Assessment, Biosafety Training
Average Years of Experience	16+ years
Publication Frequency	High (10+ publications in the last 5 years)
Citation Impact	High (Frequently cited in leading biosafety journals)
Professional Recognition	Awards, Honors, Leadership roles in professional biosafety organizations

The following geography is available among the refined experts:

Figure 1. Map of geography of biosafety experts

As part of the project preparation, a **preliminary content structure and session outline** were developed to guide the biosafety training sessions. This task involved organizing the training material and creating a framework for the sessions to ensure comprehensive coverage of biosafety principles and practices.

1. Content Structure Development

Identified **key topics and areas** that need to be covered based on the objectives of the project and the expertise of the selected experts. Topics included risk assessment, biosecurity measures, biocontainment strategies, and biosafety regulations. Developed a **high-level content structure** that outlines the main themes and subtopics for each training session. This structure ensures that all relevant aspects of biosafety are addressed. Incorporated **feedback** from the experts regarding their preferred areas of focus and specific topics they will cover. This integration helps align the content with the experts' expertise and the needs of the participants.

2. Session Outline Development

Defined clear **objectives for each session** to guide the learning outcomes and ensure that participants achieve a solid understanding of each topic. Created **detailed agendas** for each session, including the sequence of topics, duration, and interactive elements such as case studies or Q&A sessions. Identified and prepared **materials and resources** needed for each session, such as presentation slides, handouts, and supplementary reading materials. Developed **methods for evaluating** the effectiveness of each session, including feedback surveys and assessments to measure participant understanding and engagement.

3. Expert Review

Shared the preliminary content structure and session outlines with the participating experts for their review and input. Collected feedback to ensure that the content meets the standards and expectations of both the experts and the project objectives. Made necessary revisions to the content structure and session outlines based on expert feedback to improve clarity and effectiveness.

As a result of successful implementation of this task, preliminary plans and structure of trainings were developed.

To support the upcoming biosafety training sessions, training plan templates were created, and necessary training materials were identified. This task involved developing structured training plans and compiling resources to ensure effective delivery and engagement during the sessions.

In light of the ongoing war in Ukraine and its associated challenges—including shelling, power outages, and migration issues—the determination of training session formats required careful consideration to ensure the safety and accessibility of all participants.
The possibility of shelling and other security threats poses significant risks to in-person training sessions. Ensuring **participant safety** is a top priority, which necessitates careful planning and consideration of safe venues, if any, and alternative formats.
Restrictions and risks associated with travel, including safety concerns and potential delays, affect the feasibility of in-person training. The safety of participants travelling to and from training locations was considered.

To mitigate safety and logistical issues, **online training sessions are being prioritized**. This format allows for flexible scheduling and eliminates the risks associated with travel and in-person gatherings. Online platforms also provide the flexibility to adjust to any sudden changes in the security situation. For those who can safely participate in-person, hybrid sessions are being considered. These sessions will combine online and in-person components, allowing participants who are unable to attend physically to join virtually. This approach also provides flexibility in accommodating participants from different locations. In advance, a hybrid format is envisaged, which can be easily transformed into an online training format, in times of occurrence of the above-mentioned risks.
As the main venue for meetings and conferences, the multi-functional **smart shelter CLUST SPACE** is offered for students, teachers and employees of Sikorsky Kyiv Polytechnic Institute, opened in the university Denysenko Scientific and Technical Library. CLUST SPACE combines shelter and modern coworking. The space can accommodate about 500 people. The entire infrastructure, in particular the ventilation system, is designed for a long stay.
More information about CLUST SPACE: https://www.youtube.com/watch?v=0EmxrJ3_ayo

Figure 2. Photo of smart shelter CLUST SPACE internal design

To facilitate **virtual and hybrid training sessions**, we selected and configured online platforms. This included setting up accounts, testing technical features, and ensuring that the platforms met the needs of all participants. Measures were implemented to ensure the reliability of these platforms, including backup systems and technical support to address any potential issues.

Based on the needs for extensive features, interactivity, and user familiarity, **Zoom** was recommended as the primary platform for most training sessions.

By the end of the Q1, the project achieved the following milestones:

- A final list of selected biosafety experts was completed.
- Formal invitations and agreements were extended, with follow-up meetings held to confirm participation and define individual contributions.
- Planning meetings were organized to align training content with project objectives.
- Preliminary agreements were secured with most engaged experts.
- A full session outline and content structure were developed - Standardized templates for training plans were finalized and initial versions of all training materials—slides, handouts, and references—were drafted and distributed for review.

Quarter 2 (Months 4–6)

A comprehensive search was conducted to expand the pool of biosafety experts beyond those initially identified in Q1. As a result of this search, we were able to identify an **additional 14 experts** who were invited to participate in the conference. Several of them actively contributed to conference sessions, sharing their insights and expertise with the broader community.

Given the significance of the conference as a platform for knowledge sharing, the experts were specifically engaged to contribute to the training sessions that would be featured during the event. Their expertise was vital in shaping the content presented at the conference, ensuring that it aligned with current best practices and emerging trends in the field.

During the Q2, significant progress was made in defining the training materials essential for the project's objectives. The team started the development of comprehensive training materials - presentations for webinars and workshops, as well as for conferences.

A set of materials - slides, posters, schedules for workshops and the conference - has been developed during Q2 to increase attention to audience activities on social media (Facebook, LinkedIn) and for e-mailing (see Dissemination set and Q2 quarterly report).

In preparation for the upcoming training sessions and conference, the project team undertook several key logistical arrangements to ensure a smooth and effective experience for all participants. Developed during Q2 comprehensive participant kits that included printed handouts and digital resources. A selection of digital materials was compiled and made available to participants, including access to presentations, and supplementary resources (such as infographics and checklists). Carefully curated handouts featuring key information and summaries of training materials were prepared for distribution during the conference. The Conference program and banner for the public announcement was designed. These handouts serve as valuable resources for participants, allowing them to follow along with presentations and take notes.

We successfully delivered **multiple training sessions** designed to equip researchers and healthcare professionals with essential biosafety principles. We implemented innovative training methods, including hybrid formats that allowed for greater accessibility. These sessions focused on interactive learning and real-world applications, with participation from over 60 attendees. Participant feedback highlighted the effectiveness of interactive workshops, which received positive evaluations for their engaging nature.

Additionally, presentations and resources were created for the **open lectures** scheduled from October 17-31, 2024. These lectures were designed to complement the workshops and main conference topics, providing deeper insights into specific areas of biosafety. The materials developed for these sessions include comprehensive slide decks that aim to enrich the learning experience for participants.

Table 2. Set of Workshops developed and conducted during Q2

Title of the training session	Date	Duration	Language	Location	Speaker
Standards for performing bioanalytical studies, basic concepts of "good laboratory practice" (GLP). Planning and conducting the experiment. Research using cell lines, laboratory animals	11.09.2024	1.5 hours	Ukrainian	Online	Olena Holembiovska
Scientific-practical and engineering-technological principles of obtaining and using stem cells	13.09.2024	1.5 hours	Ukrainian	Online	Tetiana Lutsenko
Specifics of development and testing of biological origin products	17.10.2024	2.1 hours	English	Online	Tetiana Lutsenko
Biosafety of biomedical product technologies	21.10.2024	1.5 hours	English	Online	Olena Holembiovska
Biosafety and biosecurity in biological research	23.10.2024	1.5 hours	English	Online	Oleksandr Besarab
Biocompatibility of medical devices and biosafety	25.10.2024	1.2 hours	Ukrainian	Online	Vladyslav Kasianenko
Medical biotechnology. Biosafety and biosecurity	29.10.2024	2.5 hours	English	Online	Larysa Kalashnikova
Prevention of biological threats in wartime	30.10.2024	1.5 hours	Ukrainian	Online	Igor Khudetskyy
Concept of specialists training in biosafety and biosecurity	31.10.2024	2 hours	Ukrainian	Online	Valentyna Motronenko

Figure 3. Screenshot of the starting slide of the workshop "Biosafety of biomedical product technologies"

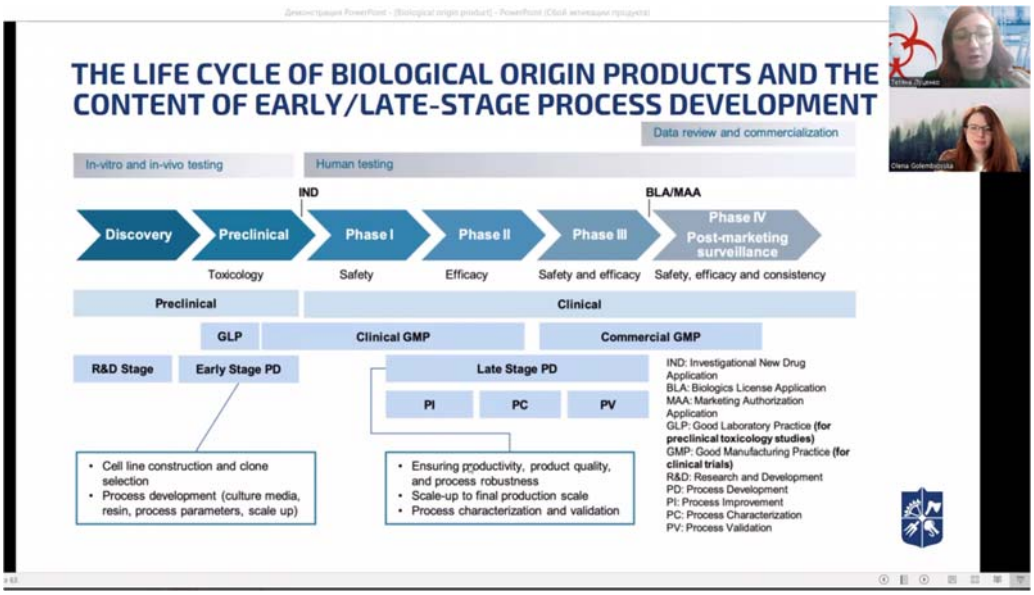

Figure 4. Screenshot of the slide of the workshop "Specifics of development and testing of biological origin products"

Following each event, we analyzed the feedback results to make necessary adjustments for future workshops. This analysis helped us understand what worked well and where enhancements could be made, ensuring that we continually improve the quality and relevance of our training sessions. By incorporating participant input, we aimed to create more engaging and effective learning experiences moving forward.

As part of the project's ongoing efforts to promote biosafety and bioethics, two key educational manuals have been developed and published to support the advanced training of professionals in these fields. These resources serve as both comprehensive textbooks and training materials, directly aligned with the workshops conducted within the scope of the project.

1. Prevention of Biological Threats in Wartime : Educational manual for advanced training of biosafety and bioethics specialists
Compilers: I.Yu. Khudetskyy, O.Y. Galkin, T.M. Lutsenko, O. I. Holembiovska, L.Ye. Kalashnikova, O.B. Besarab, V.V. Motronenko, and O.K. Biloshytska.
Publisher: Igor Sikorsky Kyiv Polytechnic Institute
Year: 2024
Pages: 110
Available as: Electronic resource

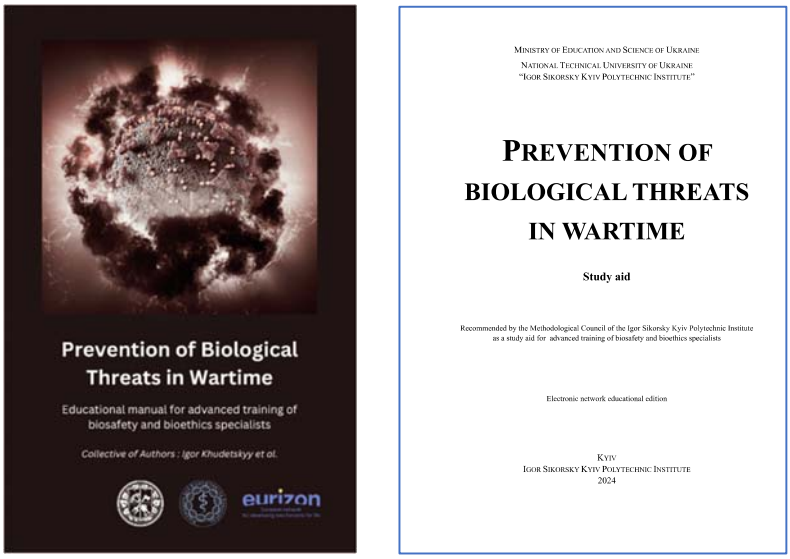

Figure 5. Title pages of the manual Prevention of Biological Threats in Wartime, developed under the project

The "Prevention of Biological Threats in Wartime" manual offers an in-depth analysis of biological threats in the context of warfare, including both historical and contemporary perspectives. It explores:

- The structure of biological threats during wartime, focusing on the evolution of biological threats in military conflicts.
- Interactive analysis of biothreats and biosecurity in modern warfare.
- Traditional infections as instruments in hybrid warfare, and the complexities of binary and multi-component biological weapons.
- Special focus on infections of war and their potential use in conflicts.

Sections of the textbook:

- Biological pathogenic agents in human history
- Biological threats: the evolution of the concept and its modern content
- Biological and medical characteristics of human infectious disease agents that can be used for the development of biological weapons

This textbook is specifically designed for advanced training and professional development of biosafety and biosecurity specialists, particularly in the context of biological threats during wartime.

2. Biosafety Issues of Genetically Modified Organisms and Recombinant Products : Educational manual for advanced training of biosafety and bioethics specialists
Compilers: T.M. Lutsenko, O.Y. Galkin, O. I. Holembiovska, I.Yu. Khudetskyy, L.Ye. Kalashnikova, O.B. Besarab, V.V. Motronenko, O.K. Biloshytska, and L.M. Dronko.
Publisher: Igor Sikorsky Kyiv Polytechnic Institute
Year: 2024
Pages: 108

Available as: Electronic resource

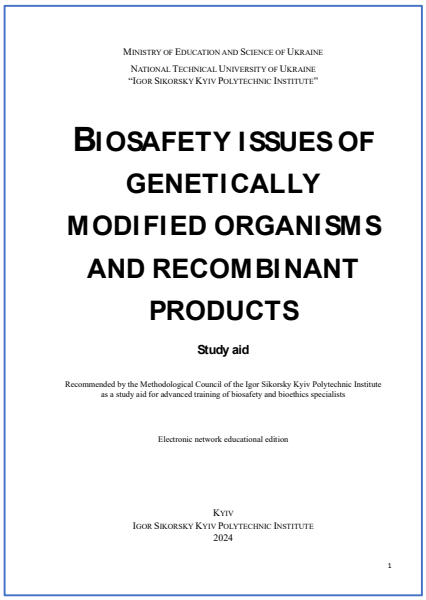

Figure 6. Title pages of the manual Biosafety Issues of Genetically Modified Organisms and Recombinant Products, developed under the project

The "Biosafety Issues of Genetically Modified Organisms and Recombinant Products" manual provides essential information on the development, testing, and regulation of biological products, such as biological drugs and genetically modified organisms (GMOs). Key topics include:

- Basic concepts and types of biological drugs.
- The role of biotechnology in the production of biological products.
- Stages of biological drug development, including quality control methods.
- Special focus on GMOs and related biosafety issues.

Sections of the textbook:

- Modern approaches to the creation of biological products using recombinant technology
- Genetically modified organisms and biosafety issues

This textbook aims to improve the qualifications of specialists in biosafety, bioethics, and bioengineering fields, specifically focusing on the complexities of biological products and their regulatory requirements.

Both manuals have been recommended by the Academic Council of the Faculty of Biomedical Engineering for further review and approval by the Methodological Commission of Igor Sikorsky Kyiv Polytechnic Institute.

In addition to supporting the content of two workshops within the project, these textbooks are also invaluable resources for higher education students pursuing degrees in biosafety, biosecurity, biomedical engineering, and related fields. These materials are particularly relevant for students

enrolled in the 163 Biomedical Engineering specialty (now G22) at Igor Sikorsky Kyiv Polytechnic Institute, as well as for those studying courses like “Biosafety, Biosecurity, and Bioethics” for master's students and “Introduction to the Profession” for bachelor's students.

To make the resources widely accessible, the textbooks have been made available in open access on the fplatforms both in English and Ukrainian versions (see detailed Q2 quarterly report).

These open-access materials are intended to further the knowledge and skills of those involved in the fields of biosafety, biosecurity, and bioethics, both in academia and professional practice. Additionally, the aforementioned platforms were utilized for organizing and sharing all other materials related to the project, including workshops, presentations, and other educational resources.

Educational materials developed by the staff of Igor Sikorsky Kyiv Polytechnic Institute are also publicly available on the library's online platform ELAKPI (https://ela.kpi.ua). One of the main tools for disseminating research results in open access is the institutional repository. For researchers at KPI, the Electronic Archive of Scientific and Educational Materials of Igor Sikorsky Kyiv Polytechnic Institute (ELAKPI) serves as this repository, providing wide access to academic resources, including the materials from the project.

In preparation for the IV International Scientific and Practical Conference on "Biosafety and Modern Rehabilitation Technologies: Theory, Practice, and Perspective," the project team successfully finalized venue bookings and secured technical support for both the open lectures and the conference.

We **organized and hosted the IV International Scientific and Practical Conference on "Biosafety and Modern Rehabilitation Technologies."** The conference attracted over 150 participants, including experts, researchers, and practitioners from around the globe. The event featured keynote speeches, panel discussions, and interactive workshops that facilitated knowledge exchange and collaboration. Attendees provided positive feedback on the organization, the relevance of topics discussed, and the opportunities for networking. This conference served as a pivotal platform for disseminating current research and best practices in biosafety and rehabilitation.

As a result of taking into account the risks assessed at the Q1 stage, a panel discussion was planned and held offline in the CLUST SPACE smart shelter at Beresteyskyi avenue, 37, Kyiv, KPI Scientific and Technical Library (https://maps.app.goo.gl/bbwesutCjfuYvd8X6). All section meetings on the second part of the first day and the entire second day were planned to hold online for the safety of the participants using ZOOM as an online platform.

All participants were provided with access credentials to an online platform where they can find digital copies of presentations and supplementary materials after the conference, such as certificates and a book of abstracts.

Logistical arrangements for each session were finalized through coordination with the venue. This included seating configurations for participants, audio-visual equipment setup to facilitate smooth

presentations, and provisions for virtual participation. Participant kits were prepared, containing printed materials and resources to enhance the learning experience. Additionally, rehearsal sessions were conducted to allow speakers to practice and familiarize themselves with the venue and equipment.

Promotional materials for the conference were developed, including eye-catching flyers and engaging social media posts. These materials were strategically designed to increase visibility and attract participants, ensuring that a wide audience is informed about the event's objectives and offerings. The promotional campaign effectively utilized various platforms to reach potential attendees, highlighting key speakers and session topics to generate interest.

Figure 7. Promotional materials about IV International Scientific and Practical Conference, on Biosafety and Modern Rehabilitation Technologies: Theory, Practice, and Perspective, October 24-25, 2024

A diverse panel of speakers was established, encompassing a range of expertise to cover various aspects of biosafety and rehabilitation technologies. The selected speakers include leading researchers, practitioners, and industry professionals who are recognized for their contributions to the field.

Figure 8. Photos from the IV International Scientific and Practical Conference, on Biosafety and Modern Rehabilitation Technologies: Theory, Practice, and Perspective, October 24-25, 2024

During the Conference we facilitated 4 sessions (1 plenary and 3 section meeting), which included keynote speeches from prominent experts in biosafety and rehabilitation technologies, and **interactive workshop** from leading expert Vladyslav Kasyanenko BIOCOMPATIBILITY AND BIOSAFETY OF MEDICAL PRODUCTS designed to encourage participant engagement and knowledge sharing. Each session was

structured to promote dialogue and included Q&A segments that allowed attendees to engage directly with the speakers.

Additionally, we provided structured networking opportunities, such as dedicated breaks and informal meet-and-greet sessions, to foster connections among attendees and speakers. This environment enhanced collaboration and community building within the field, enabling participants to share ideas, discuss potential partnerships, and exchange contact information for future collaboration.

At the end of each session, participants expressed their sincere appreciation to the speakers for their informative and engaging presentations. Many participants took the opportunity to thank the speakers for sharing their expertise, and several also acknowledged the value of the discussions and insights gained during the sessions. These expressions of gratitude highlighted the positive impact of the event and the meaningful contributions of both speakers and attendees.

Following the conference, we analyzed the feedback data to measure the effectiveness of the event. Key metrics included overall satisfaction ratings, attendance levels for individual sessions, and participant engagement during discussions. The analysis revealed valuable insights, such as the participants' appreciation for the high level of organization, the interesting and interactive nature of the workshops, and an overall positive assessment of the conference. These findings underscore the success of the event and highlight areas to maintain for future initiatives (for details see Q2 quarterly report).

After the conference, we ensured that all participants received access to recorded sessions, presentation slides, and supplementary materials (see Dissemination part of this Report). These resources were made available on our conference website and shared via email, allowing attendees to revisit key discussions and insights at their convenience. This dissemination aimed to enhance the learning experience and provide valuable reference materials for ongoing professional development.

By the end of the Q2, the project successfully achieved several important milestones:

- Logistical arrangements for the workshops were effectively implemented, resulting in the successful delivery of interactive online sessions that engaged over 68 participants. These sessions promoted collaboration, knowledge exchange, and practical learning.
- The IV International Scientific and Practical Conference "Biosafety and Modern Rehabilitation Technologies: Theory, Practice, and Perspective" was conducted, attracting 51 in-person attendees and over 120 online participants. The event fostered dynamic discussions and facilitated valuable networking among professionals in the field.
- Participant feedback was collected following both the workshops and the conference. This feedback will be crucial for evaluating the overall impact and effectiveness of the events, as well as for identifying areas for enhancement in future project activities.

Quarter 3 (Months 7–9)

This stage of the project aimed to identify the most specialized and appropriate scientific journals for publishing papers on biosafety, biosecurity, and related topics for authors from Ukraine and abroad. The analysis was conducted in two phases: first, a review of Ukrainian journals using the **Register of Scientific Publications of Ukraine**, and second, a global journal searches through Scopus. Journals were categorized into **"A"** (international) and **"B"** (local) based on their indexing. A list of relevant keywords related to biosafety was used to evaluate each journal's scope. The results indicated that **"Innovative Biosystems and Bioengineering"** (Scopus-indexed) and **"Biomedical Engineering and Technology"** (local) were the most suitable journals for publishing biosafety-related research. **Innovative Biosystems and Bioengineering** was particularly advantageous due to the absence of article publishing charges (APC), while both journals are published by Igor Sikorsky Kyiv Polytechnic Institute, facilitating logistics and collaboration.

The results of the analysis of Ukrainian journals indexed by Scopus/Web of Science regarding their coverage of biosafety, biosecurity, and related issues were as follows. A total of 55 journals were analyzed. Of these, only one journal was found to be highly relevant to biosafety issues (the journal Innovative Biosystems and Bioengineering), 28 journals were of moderate relevance, and 26 journals did not consider biosafety and biosecurity as a target topic at all

Similarly, we analyzed purely local Ukrainian journals (Appendix 1). Among this group of journals, we found only one journal (Biomedical Engineering and Technology) that declares biosafety issues in its focus and scope (namely: the "Biosafety and Biosecurity Engineering" topic).

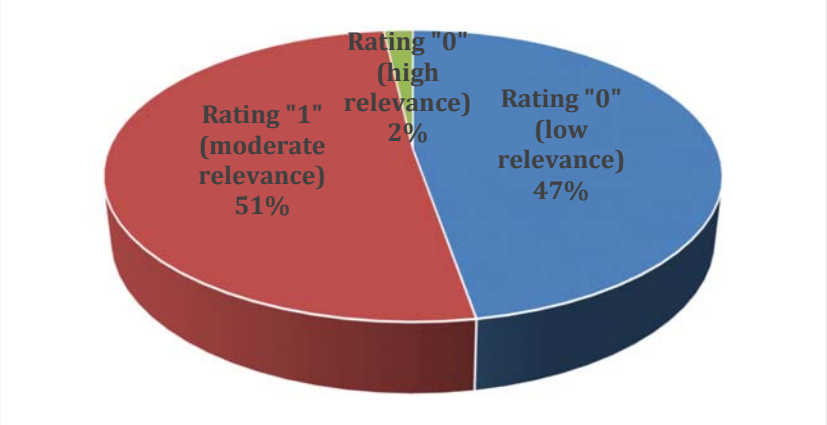

Figure 9. Ukrainian scientific journals that are indexed by Scopus/Web of Science: relevance to biosafety issues

Next, we conducted the analysis of Scopus-indexed journals. For analysis we use the SCOPUS website https://www.scopus.com/. We select the field "source title" and the keyword "biosafety".

A generalized analysis of Ukrainian and global journals indexed by Scopus has shown the presence of 6 most relevant journals from the point of view of biosafety issues. One of these journals is the Ukrainian journal "Innovative Biosystems and Bioengineering" https://ibb.kpi.ua/. An important

advantage of this journal is the APC absence. This journal is published by Igor Sikorsky Kyiv Polytechnic Institute, which can significantly improve logistics and other production processes for the formation of a special issue of the journal (since the project executors are employees of Igor Sikorsky Kyiv Polytechnic Institute).
Among local Ukrainian journals, one was found that focuses, among other things, on engineering problems of biosafety and biosecurity ("Biomedical Engineering and Technology" http://biomedtech.kpi.ua/). This journal is also published by Igor Sikorsky Kyiv Polytechnic Institute.
Thus, based on the results of the search and analysis of scientific publications in Ukraine and the world, we confirmed the initial hypothesis formed at the beginning of 2022: to choose "Innovative Biosystems and Bioengineering" https://ibb.kpi.ua/ and "Biomedical Engineering and Technology" http://biomedtech.kpi.ua/ as the journals for publishing a series of articles on biosafety, biosecurity, and related issues.

So, at the end of Q3 all planned milestones was achieved:

- Shortlisted potential peer-reviewed journals – Innovative Biosystems and Bioengineering was identified as the most suitable journal, and discussions were initiated with its editorial board and among local Ukrainian journals, one was found that focuses, among other things, on engineering problems of biosafety and biosecurity Biomedical Engineering and Technology.
- A formal proposal for a special issue on biosafety was submitted and approved by Innovative Biosystems and Bioengineering.
- A preliminary agreement was reached with the editorial team of the journal on the timeline, special issue requirements, and editorial oversight.
- The Call for Papers (CFP) was finalized and disseminated to a wide audience through mailing lists, social media, and professional networks, attracting submissions from around the globe.
- Initial articles were received from identified experts and training session participants, with support provided to authors in preparing their manuscripts.
- Comprehensive guidelines were shared with authors to ensure clarity and consistency in manuscript submissions. Authors received guidance on formatting, structure, and content, adhering to the journal's specific requirements.
- First manuscripts were submitted to the journal and formatted according to the submission requirements.
- The peer review process was successfully initiated, and reviewers were assigned to manuscripts.

Quarter 4 (Months 10–12)

The objectives of the Q4 of the project implementation were to publish specialized issues of two journals that were previously identified and verified, namely: The *Innovative Biosystems and Bioengineering* https://ibb.kpi.ua/ and The *Biomedical Engineering and Technology* http://biomedtech.kpi.ua/. Both journals are published by the National Technical University of Ukraine "Igor Sikorsky Kyiv Polytechnic Institute". Special issues should be devoted to issues of biosafety and biosecurity in biomedical engineering, biotechnology and pharmacy. The best articles should be published in the *Innovative Biosystems and Bioengineering* journal, which is indexed by the international Scopus database, and the remaining articles that are acceptable in terms of quality - in the *Biomedical Engineering and Technology* journal.
We focused on manuscripts in English - for the greatest dissemination of scientific information, but did not rule out the possibility of publication in Ukrainian (in case of importance and relevance of the scientific issue).
In order to inform the scientific community about our plans to publish a special issue on biosafety issues, we placed a number of announcements in December 2024 and January 2025.

Manuscript submission was scheduled for February 28, 2025. And a decision on the content of the special issues was made by April 1, 2025. With this schedule, we should have managed to complete the project on time by April 30, 2025 (taking into account the time for technical processing of manuscripts and work with journal websites).
We additionally informed the scientific community, including those with whom we communicated at the previous stages of the project.

During the reporting period, 22 manuscripts were submitted to us, which were evaluated by the editorial board and independent reviewers (double-blind review with the involvement of two reviewers for each manuscript).
The decision of the editorial board was as follows:

- **5 the best manuscripts** were published in the *Innovative Biosystems and Bioengineering* journal (See Appendix 1 for the Title page);
- **9 manuscripts** that were accepted and corresponded to the biosafety issues were published in the *Biomedical Engineering and Technology* journal (See Appendix 2 for the Title page);
- 8 manuscripts were rejected due to inconsistency with the topic of the special issue (biosafety and biosecurity) or due to insignificant scientific contribution (we will not provide information about these submissions due to ethical and confidential considerations).

The 5 best manuscripts were approved for publication in the ***Innovative Biosystems and Bioengineering*** journal https://ibb.kpi.ua/issue/view/18939.

Figure 10. Call for Papers published on different resources

Thus, a total of 14 articles by 41 authors (36 from Ukraine, 2 from the USA, 1 from Latvia, 1 from Malta, and 1 from Canada) representing the following 13 institutions, organizations, and enterprises were published in special issues of the journals:

- Bogatsky Physico-Chemical Institute of the National Academy of Sciences of Ukraine, Ukraine
- George Washington University, USA
- Giant Tiger Stores Limited, Canada
- Igor Sikorsky Kyiv Polytechnic Institute, Ukraine
- Institute of Molecular Biology and Genetics, NAS of Ukraine, Ukraine
- Institute of Pharmacology and Toxicology of the National Academy of Medical Sciences of Ukraine, Ukraine
- Interchem SLC, Ukraine
- Lashkaryov Institute of Semiconductor Physics, NAS of Ukraine
- Paton Institute of Electric Welding, Ukraine
- Propharma International Trading Limited, Malta
- Taras Shevchenko Kyiv National University, Ukraine
- University of Oregon, USA

To evaluate the effectiveness, clarity, and applicability of the developed educational materials, a structured feedback collection process was implemented during Month 12 and all previous results and analytics was also analysed. Surveys and short feedback forms were distributed to participants of training sessions, workshop attendees, and selected academic and clinical partners. These tools aimed to assess the usability, relevance, and perceived impact of the materials.

The feedback collection was conducted via:

- Online surveys (Google Forms) shared through email and project-related mailing lists. The survey was designed to gather insights from participants, researchers, educators, and other stakeholders who engaged with the project's open-access materials.;
- In-session forms filled out after workshops (see quarterly progress report for quarter Q2);
- Informal interviews during follow-up calls with key institutional users and Conference Session during Q2.

A total of 24 responses were received for the Final Feedback Survey. The majority of participants were based in **Ukraine** (14 respondents), followed by **France** and **Italy** (2 each). Additional respondents were located in the **USA**, **Czech Republic**, **Latvia**, and **Poland** (1 each). This distribution highlights the project's strong engagement with both local and international academic and professional communities.

Overall, the feedback from respondents was highly positive. The majority rated the quality of the project's educational materials as either **excellent** or **good**, noting that the content was well-prepared, scientifically rigorous, and relevant to current challenges in biosafety and biosecurity. A significant proportion of participants indicated that the materials fully or mostly covered key biosafety topics

relevant to their fields, particularly in medicine, biotechnology, and pharmacy. The accompanying journal publications were generally considered **very useful** or **somewhat useful** for academic and professional development, offering up-to-date insights and encouraging evidence-based discussion.

Participants highlighted several topics as particularly impactful, including biosafety risks associated with hybridoma technology, ethical and safety considerations in embryological research, the biosafety of ultrasound therapies, and challenges related to organ-on-a-chip systems.
Prevention of biological threats in wartime – one of the most frequently mentioned topics, reflecting current regional and global concerns regarding biohazard preparedness in conflict zones.
Biosafety of biomedical product technologies - this theme was among the top concerns, emphasizing the importance of safety protocols throughout the lifecycle of biomedical products—from development and testing to clinical application and post-market monitoring.
Management of biological risks in medical-biological research - this theme underscores the need for institutional frameworks and practical tools to ensure biosafety during experimental and translational research.
Medical biotechnology: biosafety and biosecurity - participants valued content focused on integrating safety practices within innovative biotechnological development processes.

Over 75% of respondents stated they had either already applied or planned to apply the knowledge gained through the project in their teaching, clinical practice, or research.

Importantly, many participants reported feeling **more confident** discussing biosafety and biosecurity issues in professional settings as a direct result of their engagement with the project.

The materials were widely viewed as **accessible**, with respondents praising the clarity of language, structured presentation, and availability in both English and Ukrainian. Various formats were used during the project, and the most commonly accessed included **presentations**, and **case studies**. Many users expressed appreciation for the diversity of content delivery, which allowed flexibility in learning and integration into institutional training.

Participants provided thoughtful and constructive suggestions to enhance the impact and effectiveness of future biosafety and biosecurity educational initiatives. The following key themes emerged:

1. Integrate **interactive learning formats**, such as virtual case studies, scenario-based simulations, and live Q&A sessions with field experts.
2. Emphasize **real-life applications** by incorporating analysis of practical biosafety situations that mirror challenges in clinical, laboratory, and field settings.
3. Explore the use of **artificial intelligence (AI)** for data interpretation, biosafety risk prediction, and ethical analysis in research.
4. Introduce **virtual labs and VR-based simulations** to model biosafety outcomes and enhance experiential learning.

5. Involve professionals from **public health, veterinary medicine, and environmental sciences** to foster a One Health approach to biosafety education.
6. Offer **certificates of participation or completion**, which are valuable for academic and professional advancement.
7. Organize **follow-up activities**, including online mentoring sessions, webinars, and possibly a **summer school**, to deepen engagement and allow further professional development.
8. Ensure **continuous updates** to the educational content to reflect the most recent biosafety regulations, standards, and technologies.
9. Maintain the **high standard of presentations and resource clarity**, which participants noted as a key strength of the current project.
10. Encourage **more in-person biosafety events** in Ukraine to support practical engagement, peer learning, and the development of a national biosafety community.

In the final section, over half of the survey participants expressed interest in staying engaged with the topic and were open to participating in future projects or follow-up activities, signaling strong ongoing interest in biosafety and biosecurity education.

Participants expressed strong appreciation for the project and its educational impact. The feedback highlighted the following:

- Many noted that the project was well-organized, informative, and useful — with several describing it as “excellent” or “well-structured and practical.”
- Respondents thanked the organizers and sponsors for creating a platform that supported **knowledge exchange, professional growth**, and engagement in critical biosafety topics.
- **Suggestions for Future Focus**:
  - Include **more region-specific case studies** tailored to local biosafety and biosecurity challenges.
  - Consider **expanding the project into a longer-term program**, potentially offering **a certificate course** to formalize and extend learning opportunities.
- Participants praised the content as **clear, informative, and accessible to a wide audience**.

This feedback reinforces the positive reception of the project and provides direction for thoughtful expansion and localization in future editions.

Thus, at the end of Q4 all planned milestones was achieved:

- Final manuscripts were submitted to the targeted journals.
- The special issue was published in *Innovative Biosystems and Bioengineering* and *Biomedical Engineering and Technology*.
- Educational materials were finalized and uploaded to the designated platform.
- Educational materials were disseminated to the research community.
- Feedback was collected from users of the educational resources.

- The final project report was submitted to stakeholders.

1.3. General overview of progress and achievements across the entire project

The primary objective of the project was to strengthen training capacity and knowledge exchange in the fields of biosafety and biohazard management in medicine, pharmacy and biotechnology, with a focus on open access education and cross-institutional collaboration. This included the development of high-quality educational resources, public outreach through open lectures and workshops, and scientific dissemination via a dedicated journal issue.

All core objectives were successfully met:

- **Expert teams** in biosafety were selected and mobilized.
- **Comprehensive educational materials** and structured training sessions were developed and delivered.
- **A suitable international journal** (*Innovative Biosystems and Bioengineering*) was selected for disseminating project outcomes.
- **Public and professional engagement** was achieved through open events, publications, and digital platforms.

1.4. Reflection on the extent to which the objectives were fulfilled

The project fully met and, in several areas, exceeded its original objectives. All planned activities were implemented within the designated timeframes and yielded high-quality outputs. The interdisciplinary approach enabled the integration of expertise from medicine, pharmacy, and biotechnology, leading to richer educational content and more impactful training sessions.

Moreover, the emphasis on **open access and digital dissemination** ensured that the resources developed reached a broader audience than initially anticipated. The publication of a special journal issue provided lasting visibility to the project's scientific contributions. Importantly, the networks and collaborative frameworks established during the project are expected to continue generating impact beyond its official conclusion, supporting future training initiatives, joint publications, and policy-relevant actions in the field of biosecurity.

2. Current status of the project

2.1. Final status of all work packages/tasks

The project was structured into four main work packages (WPs), each with clearly defined tasks. All work packages have been fully completed according to the timeline and scope described in the project proposal.

Ref	Name	Start Month	End Month	Duration (M)	Month 1	Month 2	Month 3	Month 4	Month 5	Month 6	Month 7	Month 8	Month 9	Month 10	Month 11	Month 12
Project Months					1	2	3	4	5	6	7	8	9	10	11	12
WP1	Project management	1	12	11	1	1	1	1	1	1	1	1	1	1	1	1
T1.1	Form a project team and assign roles (e.g., team leader, researcher, coordinator)	1	12	11	1	1	1	1	1	1	1	1	1	1	1	1
T1.2	Monitoring project activities and reporting	1	12	11	1	1	1	1	1	1	1	1	1	1	1	1
T1.3	Risk and quality management	1	12	11	1	1	1	1	1	1	1	1	1	1	1	1
T1.4	Data management plan	1	12	11	1	1	1	1	1	1	1	1	1	1	1	1
T1.5	Continuous Monitoring of Legal, Ethical, Societal aspects	1	12	11	1	1	1	1	1	1	1	1	1	1	1	1
WP2	Identifying experts	1	10	9	1	1	1	1	1	1	1	1	1	1		
T2.1	Define the criteria for selecting biosafety experts (e.g., qualifications, experience, areas of expertise)	1	2	2	1	1										
T2.2	Establish a selection committee to review and approve potential experts	1	2	2	1	1										
T2.3	Conduct a literature review and online research to identify potential experts in biosafety	1	10	10	1	1	1									
T2.4	Create a database of potential experts with contact information and a summary of their qualifications	1	10	10	1	1	1	1								
T2.5	Reach out to identified experts via email or phone to introduce the project and gauge their interest in par	1	10	10	1	1	1	1	1							
T2.6	Review responses from contacted experts and finalize the selection based on the established criteria	1	10	10	1	1	1	1	1							
T2.7	Obtain formal agreements from selected experts, outlining their roles and responsibilities	1	10	10	1	1	1	1	1							
WP3	Development and conducting of training sessions	3	7	5			1	1	1	1	1					
T3.1	Needs Assessment	3	6	4			1	1	1	1						
T3.2	Curriculum and Content Development, Material Design and Creation	3	6	4			1	1	1	1						
T3.3	Expert Recruitment and Training Format Selection	3	5	3			1	1	1							
T3.4	Training Delivery	5	6	2					1	1						
T3.5	Feedback Collection and Evaluation	5	7	3					1	1	1					
WP4	Development of educational materials	4	12	7				1	1	1	1	1			1	1
T4.1	Content Research and Analysis	4	6	3				1	1	1						
T4.2	Material Design and Creation	4	6	3				1	1	1						
T4.3	Expert Review and Feedback	4	6	3				1	1	1						
T4.4	Finalization and Formatting	6	6	1						1						
T4.5	Distribution Planning and Launch	6	12	5						1	1	1			1	1
WP5	Special issue in a peer-reviewed journal	7	11	5							1	1	1	1	1	
T5.1	Identify and Select Target Journal	7	8	2							1	1				
T5.2	Develop a Call for Papers	7	10	4							1	1	1	1		
T5.3	Recruit Guest Editors	7	10	4							1	1	1	1		
T5.4	Review and Selection Process	7	11	5							1	1	1	1	1	
T5.5	Promotion and Publication	10	12	3										1	1	1
WP6	Data Analysis, Documentation, and Future Roadmap	9	12	4									1	1	1	1
T6.1	Comprehensive Data Analysis	9	10	2									1	1		
T6.2	Documentation of Insights and Recommendations	10	11	2										1	1	
T6.3	Strategic Planning for Future Initiatives	11	12	2											1	1
WP7	Dissemination, Exploitation, Communication And Business Planning	1	12	12	1	1	1	1	1	1	1	1	1	1	1	1
T7.1	Dissemination and communication plan	1	2	2	1	1										
T7.2	Exploitation and Sustainability Plan & IP Management	10	11	2										1	1	
T7.3	Establishing an online and media presence	1	12	4						1	1				1	1
T7.4	Public outreach and joint activities with other EU funded initiatives and networks	3	11	9			1	1	1	1	1	1	1	1	1	

Figure 11. Gantt diagram of the project

2.2. Overview of deliverables achieved

Although no formal deliverables were specified in the original application, the project successfully produced a number of tangible results aligned with its objectives. These include:

Output Type	Description	Status
Expert Network	A working group of biosafety and communication specialists from multiple institutions	Completed
Training Sessions and Workshops	Series of interactive training events (online and hybrid) with broad institutional participation	Completed
Educational Materials	Manuals, presentations, video lectures, and supplementary content made openly accessible	Completed
Special Journal Issue	Peer-reviewed special issue in *Innovative Biosystems and Bioengineering* Peer-reviewed special issue in *Biomedical Engineering and Technology*	Published
Public Webinars and Events (Conference)	Open-access lectures and awareness events for a broader audience	Completed
Digital Dissemination	Materials shared via institutional repositories and online platforms	Completed

2.3. Outstanding items and future steps

There are **no outstanding tasks or incomplete activities** remaining within the scope of the funded project. All planned work packages and outputs were completed in accordance with the proposed timeline and objectives.
However, several future-oriented steps are being considered to maximize the sustainability and long-term impact of the project:

- Continued use and updating of training materials by partner institutions for academic and professional development purposes.
- Integration of project outcomes into existing biosafety and biotechnology curricula in participating universities.
- Expansion of the expert network to include additional regional stakeholders in the fields of public health and biotechnology.
- Exploration of further funding opportunities (e.g., Erasmus+, EU4Health) to build on the project's foundations and scale the training to more institutions.
- Follow-up publications or policy briefs based on the project's findings to support national and institutional strategies in biosafety education.

2.4. Overall completion status

The project is considered **100% complete.**

All activities outlined in the initial project plan have been successfully implemented, and all intended outcomes were achieved within the planned timeline. The project did not require any extensions, and no critical delays occurred.

Key indicators of full completion include:
- All planned training sessions were delivered.
- Educational materials were finalized, translated, and made openly accessible.
- The special issue in a peer-reviewed journal was published on schedule.
- Dissemination activities reached both academic and professional audiences.
- A foundation was established for further institutional collaboration and educational use.

In summary, the project fully met its goals and delivered sustainable results with ongoing impact beyond the formal project period.

3. Summary of personnel commitment

3.1. List of key contributors and roles

Role	Name	Qualifications and Experience	Tasks
Principal Investigator	**Alexander Galkin**	D.Sc. in Biology; Project management	- Overseeing the overall progress of the project. - Coordinating activities between team members. - Ensuring adherence to timelines. - Making final decisions regarding the selection of experts.
Team Member 2 (Training Specialist)	**Tetiana Lutsenko**	PhD in Biotechnology; Curriculum development and training	- Providing technical support for the selection of experts. - Corresponding with experts. - Assisting in the final decision-making process for expert selection with Alexander Galkin and Olena Holembovska. - Conducting trips for direct communication with potential experts. - Preparing promotional campaigns for subsequent stages.
Team Member 3 (Training Specialist)	**Olena Holembiovska**	PhD in Pharmacy; Curriculum development and training	- Compiling the project report. - Assisting in the final decision-making process for expert selection with Alexander Galkin and Tetiana Lutsenko.

Role	Name	Qualifications and Experience	Tasks
			- Conducting trips for direct communication with potential experts.
Team Member 4 (Biosafety Expert)	**Igor Khudetskyy**	M.D.; Biosafety in medicine, pharmacy, and biotechnology	- Developing and filling training materials. - Collaborating with experts. - Selecting topics and justifying objectives for training content.
Team Member 5 (Scientific Publications Manager)	**Larysa Kalashnikova**	PhD in Biology; Scientific publications management	- Providing translation and technical support. - Forming templates for training materials.
Team Member 5* (Scientific Publications Manager)	**Oleksandr Besarab**	PhD in Technical Sciences; Scientific publications management	- Providing process of publishing the special issue of the peer-reviewed journal. - Disseminated a Call for Papers
Team Member 6 (Scientific Publications Manager)	**Valentyna Motronenko**	PhD in Biotechnology; Laboratory and scientific publications management	- Contributing to the content of training materials. - Assisting other team members with their research and publication tasks as needed
Team Member 7 (Scientific Publications Manager)	**Oksana Biloshytska**	PhD in Biomedical cybernetics; Laboratory and scientific publications management	- Conducting research activities to contribute to the special issue. - Providing support to other team members in their research and publication efforts. - Contributing to the logistical arrangements for training sessions and publications.
Team Member 8 (Research Assistant)	**Liliia Dronko**	Master's degree in Biomedical Engineering; Laboratory experience and research support	- Conducting research activities as outlined in the project plan. - Supporting other team members in various tasks to ensure project milestones are met.

* - see 3.3. Notes on staff changes or exceptional contributions

3.2. Overview of time dedication

The combined efforts of the internal team and external experts have ensured a comprehensive and well-rounded approach to the project. The significant time commitment from both parties has

facilitated the timely development of training programs, biosafety protocols, and publication strategies. The resources provided have been instrumental in creating high-quality training materials and ensuring compliance with biosafety regulations. The collaborative contributions have enabled the project to achieve critical milestones and maintain steady progress toward its objectives.

Internal Team Members:

Role	Time Allocated	Resources Provided	Contribution
1. Principal Investigator	Full-time commitment, approximately 40 hours per week	Project management tools, communication platforms, budget oversight	Oversees project direction, coordinates team activities, ensures alignment with project goals, and manages budget
2. Training Specialists (2 Members)	Full-time commitment, approximately 40 hours per week each	Curriculum development resources, training materials, and evaluation tools	Develops and implements training programs, and develop evaluating strategy of training effectiveness
3. Biosafety Expert	Part-time commitment, approximately 20 hours per week	Access to biosafety protocols, regulatory guidelines	Ensures compliance with biosafety regulations, develops and implements biosafety protocols, and provides guidance on best practices for training program development
4. Scientific Publications Managers (3 Members)	Part-time commitment, approximately 20 hours per week each	Coordination with authors and editors	Start managing the publication process, develops publication strategies, and coordinates with authors and editors
5. Research Assistant	Part-time commitment, approximately 20 hours per week	Research materials	Conducts research activities, assists team members, and coordinates with authors and editors

Internal Team Contribution

- **Average Time Commitment**: Approximately **180 hours per week** across all internal team members.
- **Roles Involved**:
  - Project coordination and administrative support
  - Educational content creation and formatting
  - Technical support (e-learning platforms, webinar delivery)
  - Communication, reporting, and dissemination
- **Duration:** 12 months
- **Estimated Person-Months**: ~18–20 person-months (assuming a full-time equivalent of 160 hours/month per person)

External Experts

- **Expert Group**: 7 biosafety experts from Q1 and 14 experts from Q2

- **Average Time Commitment**: **5–10 hours per week per expert**, depending on the project phase
- **Total Weekly Input**: Approximately **50–75 hours per week**
- **Roles and Contributions**:
  - Designing and delivering training content
  - Reviewing and validating educational materials
  - Providing real-world case studies and continuous professional insight
- **Duration**: 9–10 active months (mainly during training and material development phases, expertise of article manuscripts)
- **Estimated Person-Months**: ~8–10 person-months (across all five experts)

3.3. Notes on staff changes or exceptional contributions

A notable change in the team structure for Q3 was the replacement of Dr. Larysa Kalashnikova by Dr. Oleksandr Besarab in the role of Scientific Publications Manager. Dr. Besarab, who is a PhD and Head of the Department of Translational Medical Bioengineering at KPI, joined the team on November 1, 2024, bringing a more relevant expertise in scientific publishing, especially related to the special issue of the peer-reviewed journal. His involvement ensures that the publication process will be handled with greater efficiency and expertise, which is crucial for the success of this aspect of the project.

4. Description of travels

4.1. Summary table of mobilities

Name	Date	Destination	Purpose of Travel
Tetiana Lutsenko	June 6-7, 2024	Kaunas University of Technology (Kaunas, Lithuania)	Participation in the ECIU International Forum within the framework of the international project "ECIU4Ukraine vol.2" of the program "Solidarni z Ukraina". The visit has established a strong foundation for future collaboration in biomedical engineering and biosafety
Olena Holembiovska	July 4th, 2024	Claude Bernard University (UCBL), Lyon, France	Held a key meeting with Dr. Christophe Marquette, discussing the scope and potential of scientific collaboration. Agreed to explore joint research projects and exchanged ideas for collaboration in bioprinting with live cells and nanotechnology

			together with biosafety in bioprinting. Consideration of the possibility of involving Dr. Christophe Marquette, director of the Laboratory of Enzymatic and Biomolecular Engineering and the scientific coordinator of the 3d.FAB bioprinting laboratory as an expert for this project.
Olena Holembiovska	July 8-11, 2024	Czech Health Technology Institute, Prague Faculty of Biomedical Engineering, Czech Technical University, Prague BTL Medical International medical device factory, Prague L I N E T spol. s r.o., Slaný Prusa Research 3D printing company, Prague	Significant interactions with industry and academic leaders, resulting in a mutual interest in collaboration and exchange programs. Commitment from Czech Health Technology Institute and Czech Technical University to explore joint research projects and student exchanges
Alexander Galkin	September 9-13, 2024	University of Burgundy (Dijon, France)	The discussions facilitated connections with French colleagues, establishing a foundation for future collaboration. Valuable insights were obtained regarding current trends and opportunities in the fields of biosafety and biosecurity. The visit strengthened international ties and set the stage for collaborative research and educational programs
Lilia Dronko	September 9-27, 2024	Czech Technical University (CTU) Faculty of Biomedical Engineering (Kladno, Czech Republic) Comedeq; Linet; BTL Production in Benešov	Strengthened collaboration between Faculty of Biomedical Engineering Igor Sikorsky Kyiv Polytechnic Institute and colleagues at the Czech Technical University, as well as industry

			representatives from Comedeq, LINET, and BTL. Enhanced understanding of biosecurity aspects within biomedical technologies through hands-on experience in tissue engineering and safety assessments. Development of valuable skills in creating and testing tissue and organ substitutes, contributing to ongoing research in the field. Improved knowledge of the safety and functionality of medical devices, including practical applications of electromagnetic fields and medical gases in clinical settings. Established connections for future collaborations and research opportunities, fostering a network that bridges academia and industry.
Alexander Galkin, Tetiana Lutsenko, Olena Holembiovska, Valentina Motronenko	October 4, 2024	Biopharma Plasma LLC (Bila Tserkva, Ukraine)	Based on the results of the meeting and negotiations, the signing of a cooperation agreement between Biopharma Plasma LLC and the Igor Sikorsky Kyiv Polytechnic Institute has been initiated
Tetiana Lutsenko, Lilia Dronko and Olena Holembiovska	October 2-4, 2024	International Exhibition Center, 15, Brovarsky prospect (Kyiv, Ukraine)	The visit facilitated a deeper insight into the latest innovations in medical technology, strengthened connections between academia and industry, and equipped students with knowledge on biosafety practices essential for their future careers. Overall, it was a significant step towards bridging the gap between

			education and real-world applications in healthcare
Alexander Galkin, Olena Holembiovska, Larysa Kalashnikova and Igor Khudetskyy	October 31, 2024	Center of Innovative Entrepreneurship of National Technical University of Ukraine "Igor Sikorsky Kyiv Polytechnic Institute", 37, Prospect Beresteisky (Kyiv, Ukraine)	The event provided valuable networking opportunities, connecting the team with innovators and industry leaders, fostering potential collaborations in biomedical engineering and healthcare. They explored cutting-edge innovations, particularly those using artificial intelligence for diagnostics and therapy, as well as advancements in infection control and rehabilitation.
Valentyna Motronenko	November 28-30, 2024	Warsaw University of Technology (Warsaw, Poland)	The main focus was to create specialized Master's programs that would not only benefit both Ukrainian and Polish students but would also allow students to gain expertise in biosafety research, biosecurity policy, and biotechnological safety protocols.
Olena Holembiovska & Tetiana Lutsenko	February 8-21, 2025	1. Faculty of Medicine, Department of Internal Diseases, Rīga Stradiņš University, Riga East University Hospital, Hipokrāta Str. 2, Rīga, LV-1038, Latvia. 2. University of Urbino Carlo Bo, Department of Biomolecular Sciences, School of Pharmacy, Piazza del Rinascimento n°06, 61029 Urbino (PU), Italy. 3. Institute of Molecular and Supramolecular Chemistry and Biochemistry (UMR 5246, University Lyon 1-	The visit aimed to prepare workshops and training sessions, as well as familiarize participants with advanced biosafety methods from European partners. The activities enhanced the knowledge of Ukrainian researchers in biosafety, which is crucial for research in medicine, pharmaceuticals, and biotechnology, and strengthen scientific ties between Ukraine and European countries.

		CNRS), Bâtiment Edgar LEDERER, 1, rue Victor Grignard, F-69100 Villeurbanne, Lyon, France.	

All mobilities contributed to the exchange of experience, institutional networking, and alignment of training priorities in biosecurity and biotechnology education.

4.2. Relevance of travels to project goals

The international travels conducted during the project period were directly aligned with the objectives of enhancing professional communication, expanding biosafety education capacity, and fostering cross-institutional collaboration. Specifically, the mobilities:

- Enabled direct knowledge exchange with European partners experienced in biosafety training, simulation-based learning, and biotechnology education.
- Facilitated the alignment of educational standards and teaching tools, contributing to the development of the project's training sessions and educational materials.
- Strengthened international partnerships, which supported both the dissemination of the project outcomes and the long-term sustainability of the initiative.
- Provided access to cutting-edge facilities and methodologies, particularly in simulation centers and nanobiotechnology labs, enriching the project's scientific and methodological foundation.

Overall, these mobilities were essential for reinforcing the project's core value of international cooperation and were instrumental in achieving its educational and dissemination goals.

4.3. Any travel-related challenges or lessons learned

While all planned mobilities were successfully completed, several minor challenges were encountered:

- Logistical Coordination: Synchronizing travel dates with host institutions' availability required flexibility and early planning. Adjustments to itineraries were occasionally necessary due to institutional scheduling changes.

Lessons Learned:

- Early and proactive coordination with partner institutions significantly reduces travel uncertainties.
- Maintaining flexible travel dates and having contingency options ensures resilience to unexpected administrative or institutional changes.
- Clear communication between administrative units and project teams improves efficiency in handling travel formalities.

Despite these minor challenges, all mobilities delivered strong value and were successfully integrated into the overall project strategy.

5. Dissemination

Throughout the duration of the project, dissemination activities were carried out through multiple channels including peer-reviewed publications, participation in academic mobility and scientific events, organization of open-access lectures and webinars, and extensive online engagement. These efforts aimed to ensure that both scientific and educational outcomes reached a wide audience across institutions, countries, and professional sectors.

A special issue on biosafety and biohazard management in biomedical sciences was prepared in collaboration with the journal Innovative Biosystems and Bioengineering. The articles addressed the topics of professional communication, safety practices in pharmaceutical and laboratory settings, and training frameworks in biosafety.
All articles were made openly accessible and included full acknowledgment of EU support under the EURIZON initiative.

Project team members actively participated in international academic mobility activities and institutional events, delivering presentations, lectures, and engaging with potential collaborators. These included visits to partner universities in France, Italy, Latvia and the Czech Republic, where project activities and findings were shared.
Workshops and open lectures were also conducted locally and online, covering biosafety-related content tailored to students, academic staff, and healthcare professionals.

An online project hub was created on the Open Source Biomedicine and Bioengineering Association Platform (https://bmbe.pro/en/international-projects/), offering access to key materials, open lectures, and updates. Social media platforms (Facebook and LinkedIn) were used to increase visibility of project milestones, share expert insights, and engage with a broader professional and academic audience.
Webinars conducted by invited experts were recorded and made freely available through institutional repositories.

External stakeholders—including biosafety experts, academic journal editors, and representatives of healthcare and pharmaceutical organizations—were involved at multiple stages. Their participation helped refine the content of training materials, provided input for publications, and expanded the network for future cooperation.

#	Related to travel No (only if applicable)	Dates	Kind of dissemination (talk, poster, paper)	Title	Repository & publishing medium (journal) or conference venue (for talk, poster, etc.)	Links to the repository & journal or to the event's website (talk, poster)	EU-Acknowledgment yes/no?
1	no	01/09/2024	Social media posts	Join Us for a Series of Virtual Events on Biosafety and Biohazard Management!	LinkedIn & Facebook	https://www.linkedin.com/posts/helene-golembiovska-b68370141_join-us-for-a-series-of-virtual-events-activity-7251505487437819904-Ce2F?utm_source=share&utm_medium=member_desktop&rcm=ACoAACJnMYAB8HY8-YByDC9CfUWU-nDspzFbcr4 https://www.facebook.com/helene.golembiovska/posts/10229829426032956?rdid=zNkYFW4EFefOHGUI	yes
2	no	03/09/2024	Promo post	Powerful biosafety workshops	University Repository	https://bi.fbmi.kpi.ua/2024/09/03/powerful-biosafety-workshops-/	yes

#	Related to travel No (only if applicable)	Dates	Kind of dissemination (talk, poster, paper)	Title	Repository & publishing medium (journal) or conference venue (for talk, poster, etc.)	Links to the repository & journal or to the event's website (talk, poster)	EU-Acknowledgment yes/no?
3	yes	10/09/2024	Talk and presentation	Cross-border training in Biosafety	University of Burgundy (Dijon, France)	https://bi.fbmi.kpi.ua/2024/10/01/visit-to-the-czech-technical-university/	yes
4	no	11/09/2024	Open lecture	Standards for performing bioanalytical studies, basic concepts of "good laboratory practice" (GLP). Planning and conducting the experiment. Research using cell lines, laboratory animals	Online	https://bi.fbmi.kpi.ua/2024/09/11/bioanalytical-research-standards-for-future-biomedical-engineers/	yes
5	no	13/09/2024	Open lecture	Scientific-practical and engineering-technological principles of obtaining and using stem cells	Online	https://bi.fbmi.kpi.ua/2024/09/13/scientific-practical-and-engineering-technological-principles-of-obtaining-and-using-stem-cells/	yes
6	yes	20/09/2024	Talk	Strengthened collaboration between Faculty of Biomedical Engineering Igor Sikorsky Kyiv Polytechnic Institute and colleagues at the Czech Technical University, as well as industry	Czech Technical University (CTU) Faculty of Biomedical Engineering (Kladno, Czech Republic)	https://bi.fbmi.kpi.ua/2024/10/01/visit-to-the-czech-technical-university/	yes

#	Related to travel No (only if applicable)	Dates	Kind of dissemination (talk, poster, paper)	Title	Repository & publishing medium (journal) or conference venue (for talk, poster, etc.)	Links to the repository & journal or to the event's website (talk, poster)	EU-Acknowledgment yes/no?
				representatives from Comedeq, LINET, and BTL			
7	no	01/10/2024	Social media posts	Invitation to the IV Scientific and Practical International Conference "Biosafety and Modern Rehabilitation Technologies: Theory, Practice, Prospects"	Facebook	https://www.facebook.com/helene.golembiovska/posts/pfbid0229932118160195?rdid=KrJIBdIYt43bSseb	yes
8	yes	3/10/2024	Talk	Discussions on biosafety aspects with representatives, enhancing understanding of current industry standards	33 International Medical Exhibition PUBLIC HEALTH 2024	https://publichealth.com.ua/en	yes
9	yes	4/10/2024	Talk	Issues of cooperation between the faculty and the leader of the Ukrainian pharmaceutical business in the production of blood products and biotechnological products	Biopharma Plasma LLC (Bila Tserkva, Ukraine)	https://bi.fbmi.kpi.ua/2024/10/04/visit-to-the-biopharma-plasma-company/	yes
10	no	17/10/2024	Presentation in workshop	Specifics of development and testing of biological origin products	University Repository	https://bmbe.pro/wp-content/uploads/2024/11/WORKSHOP_Lutsenko.pdf	yes
11	no	21/10/2024	Presentation in workshop	Biosafety of biomedical product technologies	University Repository	https://bmbe.pro/wp-content/uploads/2024/1	yes

#	Related to travel No (only if applicable)	Dates	Kind of dissemination (talk, poster, paper)	Title	Repository & publishing medium (journal) or conference venue (for talk, poster, etc.)	Links to the repository & journal or to the event's website (talk, poster)	EU-Acknowledgment yes/no?
						1/WORKSHOP_HOLEMBIOVSKA.pdf	
12	no	23/10/2024	Presentation in workshop	Biosafety and biosecurity in biological research	University Repository	https://bmbe.pro/wp-content/uploads/2024/11/WORKSHOP_Besarab.pdf	yes
13	no	25/10/2024	Presentation and talk in workshop	Biocompatibility of medical devices and biosafety	Faculty YouTube Channel	https://www.youtube.com/@BioMed-KPI/streams https://bi.fbmi.kpi.ua/2024/10/23/biocompatibility-of-medical-devices-and-biosafety/	yes
14	no	25/10/2024	Conference papers and talks	Golembiovska O., Ruzhitska B. BIOSAFETY ASPECTS OF PRODUCTION AND USE OF MICROFLUIDIC CHIPS: ISSUES AND CRITICAL ANALYSIS. p.199-208	IV International Scientific and Practical Conference on Biosafety and Modern Rehabilitation Technologies: Theory, Practice, and Perspective - Conference Proceedings	http://biomedconf.kpi.ua/biosafety24/paper/viewFile/31629/18857 https://www.youtube.com/@BioMed-KPI/streams	yes
15	no	25/10/2024	Conference papers and talks	Shcherbyna V., Galkin O. CHALLENGING ISSUES IN THE DEVELOPMENT OF ANTI-CANCER DRUGS BASED ON MONOCLONAL ANTIBODIES, p. 215-217			yes

#	Related to travel No (only if applicable)	Dates	Kind of dissemination (talk, poster, paper)	Title	Repository & publishing medium (journal) or conference venue (for talk, poster, etc.)	Links to the repository & journal or to the event's website (talk, poster)	EU-Acknowledgment yes/no?
16	no	25/10/2024	Conference papers and talks	Golembiovska O., Dmytrenko O. ENSURING BIOSAFETY DURING STORAGE AND TRANSPORTATION OF SUPPOSITORIES: THEIR IMPACT ON PRODUCT SAFETY, p. 223-226			yes
17	no	25/10/2024	Conference papers and talks	Lutsenko T., Golembiovska O., Dronko L. PROBLEMATIC ISSUES IN THE DEVELOPMENT OF A WOUND HEALING AGENT, p. 227-230			yes
18	no	25/10/2024	Conference papers and talks	Golembiovska O., Bubelo V. BIOSAFETY OF SUPPOSITORIES: ANALYSIS OF PATHOGENS AND CONTAMINATION RISKS p. 238-242			yes
19	no	25/10/2024	Conference papers and talks	Kalashnikova L. BIOSAFETY AND BIORISKS OF MEDICAL BIOTECHNOLOGIES p. 231-237			yes
20	no	25/10/2024	Conference paper	Pashinska V.A., Vysotska O.V. MANAGEMENT OF BIOLOGICAL RISKS IN MEDICAL-BIOLOGICAL RESEARCH AS A COMPONENT OF			yes

#	Related to travel No (only if applicable)	Dates	Kind of dissemination (talk, poster, paper)	Title	Repository & publishing medium (journal) or conference venue (for talk, poster, etc.)	Links to the repository & journal or to the event's website (talk, poster)	EU-Acknowledgment yes/no?
				THE BIOSAFETY SYSTEM AND BIO PROTECTION p. 191-194			
21	no	25/10/2024	Conference paper	Shcherbak D. PERSPECTIVE OF USING ANTLER STEM CELLS FOR ACCELERATED AND SCARLESS WOUND HEALING p. 195-198			yes
22	no	25/10/2024	Conference paper	Khairulin A.R., Chalenko M.A. CRISPR/CAS9 GENE EDITING TECHNOLOGIES: APPLICATIONS, RISKS AND BIOSAFETY, p. 209-214			yes
23	no	25/10/2024	Conference paper	Valchuk S.I INFECTION CONTROL AS ONE OF THE KEY ELEMENTS BIOSAFETY IN MEDICAL INSTITUTIONS, p. 218-222			yes
24	no	25/10/2024	Conference paper	Chernetsky A.S., Shevchuk K.M., Besarab O.B. BIOSAFETY ASPECTS OF HYBRIDOME TECHNOLOGY p. 243-247			yes
25	no	27/10/2024	Social media video	Kyiv Polytechnics offer new solutions in biosafety and rehabilitation!	University Facebook	https://www.facebook.com/watch/?v=1325415632201856&ref=sharing	yes
26	no	27/10/2024	Social media video	Video about the Biosafety and Rehabilitation Conference	LinkedIn	https://www.linkedin.com/posts/helene-golembiovska-	yes

#	Related to travel No (only if applicable)	Dates	Kind of dissemination (talk, poster, paper)	Title	Repository & publishing medium (journal) or conference venue (for talk, poster, etc.)	Links to the repository & journal or to the event's website (talk, poster)	EU-Acknowledgment yes/no?
						b68370141_biosafety-rehabilitation-engineeringinnovations-activity-7259321901951401985-OQY9?utm_source=share&utm_medium=member_desktop&rcm=ACoAACJnMYAB8HY8-YByDC9CfUWU-nDspzFbcr4	
27	no	27/10/2024	Social media posts	Exciting Highlights from the International Conference on Biosafety and Rehabilitation!	LinkedIn	https://www.linkedin.com/posts/helene-golembiovska-b68370141_exciting-highlights-from-the-international-activity-7259323223920558080-KkXD/?utm_source=share&utm_medium=member_desktop	yes
28	no	29/10/2024	Presentation in workshop	Medical biotechnology. Biosafety and biosecurity	University Repository	https://bmbe.pro/wp-content/uploads/2024/11/WORKSHOP_Kalashnikova.pdf	yes

#	Related to travel No (only if applicable)	Dates	Kind of dissemination (talk, poster, paper)	Title	Repository & publishing medium (journal) or conference venue (for talk, poster, etc.)	Links to the repository & journal or to the event's website (talk, poster)	EU-Acknowledgment yes/no?
29	no	30/10/2024	Presentation in workshop	Prevention of biological threats in wartime	University Repository	https://bmbe.pro/wp-content/uploads/2024/11/WORKSHOP_Khudetskyy.pdf	yes
30	yes	31/10/2024	Talk	Biosafety aspects discussion	XIII Festival of Innovation Projects “Sikorsky Challenge 2024: innovations for peace and security of Ukraine"	https://fbmi.kpi.ua/en/news-en/3293/	yes
31	no	31/10/2024	Presentation in workshop	Concept of specialists training in biosafety and biosecurity	University Repository	https://shorturl.at/qNwRg	yes
32	no	16/12/2024	Faculty news	Call for papers : special issue on the biosecurity and biohazard management in medicine, pharmacy and biotechnology	Faculty webpage & open source Biomedicine and Bioengineering Association Platform Webpage	https://fbmi.kpi.ua/news-ua/3571/ https://bmbe.pro/en/call-for-papers-special-issue-on-the-biosecurity-and-biohazard-management-in-medicine-pharmacy-and-biotechnology-2/	yes
33	no	01/01/2025	Educational manual	Biosafety issues of genetically modified organisms and recombinant products [Electronic resource]: Educational manual for advanced training of biosafety	University Repository	https://bi.fbmi.kpi.ua/wp-content/uploads/Biosafety-issues-of-gmo-and-	yes

#	Related to travel No (only if applicable)	Dates	Kind of dissemination (talk, poster, paper)	Title	Repository & publishing medium (journal) or conference venue (for talk, poster, etc.)	Links to the repository & journal or to the event's website (talk, poster)	EU-Acknowledgment yes/no?
				and bioethics specialists / Igor Sikorsky Kyiv Polytechnic Institute; compilers: T.M. Lutsenko at all. – Electronic text data (1 file). – Kyiv: Igor Sikorsky Kyiv Polytechnic Institute, 2024. – 104 p.		recombinant-products.pdf	
34	no	01/01/2025	Educational manual	Prevention of biological threats in wartime [Electronic resource]: Educational manual for advanced training of biosafety and bioethics specialists / Igor Sikorsky Kyiv Polytechnic Institute; compilers: I.Khudetskyy at all. – Electronic text data (1 file). – Kyiv: Igor Sikorsky Kyiv Polytechnic Institute, 2024. – 110 p.	University Repository	https://bi.fbmi.kpi.ua/wp-content/uploads/Prevention-of-biological-threats-in-wartime.pdf	yes
35	yes	13-14/02/2025	Training	Biosafety in Bioprinting with Living Cells and Microfluidics	University of Urbino Carlo Bo, Department of Biomolecular Sciences, School of Pharmacy	https://www.linkedin.com/posts/helene-golembiovska-b68370141_biosafety-bioprinting-microfluidics-activity-7308150083215118339-awf4?utm_source=share	yes

#	Related to travel No (only if applicable)	Dates	Kind of dissemination (talk, poster, paper)	Title	Repository & publishing medium (journal) or conference venue (for talk, poster, etc.)	Links to the repository & journal or to the event's website (talk, poster)	EU-Acknowledgment yes/no?
						&utm_medium=member_desktop&rcm=ACoAACJnMYAB8HY8-YByDC9CfUWU-nDspzFbcr4	
36	yes	17-18/02/2025	Training	Biosafety Training in Bioprinting	Institute of Molecular and Supramolecular Chemistry and Biochemistry (UMR 5246, University Lyon 1-CNRS),	https://www.linkedin.com/posts/helene-golembiovska-b68370141_eurizon-bioprinting-biosafety-activity-7308142380245798912-QQkD?utm_source=share&utm_medium=member_desktop&rcm=ACoAACJnMYAB8HY8-YByDC9CfUWU-nDspzFbcr4	yes
37	yes	25/03/2025	Talk	Problems and Prospects for Sustainable Development of the System for Admission of Dietary Supplements and Food Products for Special Medical Purposes to the Ukrainian Market	Roundtable on the regulation of dietary supplements Marzeev Institute of Public Health of the National	https://fbmi.kpi.ua/news-ua/3650/	yes

#	Related to travel No (only if applicable)	Dates	Kind of dissemination (talk, poster, paper)	Title	Repository & publishing medium (journal) or conference venue (for talk, poster, etc.)	Links to the repository & journal or to the event's website (talk, poster)	EU-Acknowledgment yes/no?
					Academy of Medical Sciences of Ukraine		
38	no	2/04/2025	Talk	Future joint projects in the field of biomedical engineering were discussed: establishment of rehabilitation centers; implementation of digital technologies to improve the quality of medical services; programs on biosecurity and biosafety.	Visit of the Deputy Prime Minister of the Czech Republic to Igor Sikorsky Kyiv Polytechnic Institute	https://fbmi.kpi.ua/en/news-en/3694/	yes
39	yes	7-10/04/2025	Talk	Discussion of joint projects, renewal and expansion of double degree programs; enhancement of mobility opportunities for both students and academic staff	The International Staff Week Le Mans Université, France	https://fbmi.kpi.ua/en/news-en/3690/	yes
40	yes	11/04/2025	Talk	Internationalization of research in biosafety and bioethics	Institution Nationale des Invalides — the National Institute for Disabled Veterans in Paris, France	https://fbmi.kpi.ua/en/news-en/3688/	yes
41	no	24-25/04/2025	On-line seminar	Peculiarities of functioning of quality assurance systems of	Online	https://bmbe.pro/en/seminar-features-of-quality/	Yes

#	Related to travel No (only if applicable)	Dates	Kind of dissemination (talk, poster, paper)	Title	Repository & publishing medium (journal) or conference venue (for talk, poster, etc.)	Links to the repository & journal or to the event's website (talk, poster)	EU-Acknowledgment yes/no?
				healthcare institutions in modern conditions			
42	no	30/04/2025	Article	Inhibition of Cytochrome P450 Activities by Propoxazepam: Safety Assessment in Context for Potential Drug Interactions	Special Issue: Innovative Biosystems and Bioengineering - Vol. 9 No. 2 (2025): Biosecurity and Biohazard Management in Medicine, Pharmacy and Biotechnology	https://doi.org/10.20535/ibb.2025.9.2.309378 https://ibb.kpi.ua/article/view/309378	yes
43	no	30/04/2025	Article	Optimization of Parameters of Saline Sodium Citrate Buffer for Stability of Colloidal Gold Nanoparticles Used in DNA Hybridization Biosensor	Special Issue: Innovative Biosystems and Bioengineering - Vol. 9 No. 2 (2025): Biosecurity and Biohazard Management in Medicine, Pharmacy and Biotechnology	https://doi.org/10.20535/ibb.2025.9.2.310991 https://ibb.kpi.ua/article/view/310991	yes
44	no	30/04/2025	Article	Anti-adhesion Properties of 4-(adamantyl-1)-1-(1-aminobutyl)benzole Against Staphylococcus aureus	Special Issue: Innovative Biosystems and Bioengineering - Vol. 9 No. 2 (2025): Biosecurity and Biohazard Management	https://doi.org/10.20535/ibb.2025.9.2.313507 https://ibb.kpi.ua/article/view/313507	yes

#	Related to travel No (only if applicable)	Dates	Kind of dissemination (talk, poster, paper)	Title	Repository & publishing medium (journal) or conference venue (for talk, poster, etc.)	Links to the repository & journal or to the event's website (talk, poster)	EU-Acknowledgment yes/no?
					in Medicine, Pharmacy and Biotechnology		
45	no	30/04/2025	Article	Biosafety Aspects of Hybridoma Technology: Nature of Risks and Approaches to Their Management	Special Issue: Innovative Biosystems and Bioengineering - Vol. 9 No. 2 (2025): Biosecurity and Biohazard Management in Medicine, Pharmacy and Biotechnology	https://doi.org/10.20535/ibb.2025.9.2.320712 https://ibb.kpi.ua/article/view/320712	yes
46	no	30/04/2025	Article	In silico Models for Predicting Ames Mutagenicity of Environmental Factors	Vol. 9 No. 2 (2025): Biosecurity and Biohazard Management in Medicine, Pharmacy and Biotechnology	https://ibb.kpi.ua	yes
47	no	30/04/2025	Article	Biosafety of obtaining and using transdermal delivery systems for antihypertensive drugs in the form of microneedles	Special Issue: Biomedical Engineering and Technology - Vol. 2 No. 17 (2025)	https://doi.org/10.20535/.2025.17.326964 http://biomedtech.kpi.ua/article/view/326964	yes
48	no	30/04/2025	Article	Biosafety of human interferon-alpha-2b production for medical use	Special Issue: Biomedical Engineering and Technology - Vol. 2 No. 17 (2025)	http://biomedtech.kpi.ua/issue/view/19257	yes

#	Related to travel No (only if applicable)	Dates	Kind of dissemination (talk, poster, paper)	Title	Repository & publishing medium (journal) or conference venue (for talk, poster, etc.)	Links to the repository & journal or to the event's website (talk, poster)	EU-Acknowledgment yes/no?
49	no	30/04/2025	Article	Biosafety and bioethics in the design of embryological research	Special Issue: Biomedical Engineering and Technology - Vol. 2 No. 17 (2025)	https://doi.org/10.20535/.2025.17.328624 http://biomedtech.kpi.ua/article/view/328624	yes
50	no	30/04/2025	Article	Biosafety of ultrasound therapy	Special Issue: Biomedical Engineering and Technology - Vol. 2 No. 17 (2025)	http://biomedtech.kpi.ua/issue/view/19257	yes
51	no	30/04/2025	Article	Biological and technological safety of organ-on-a-chip systems: challenges, prospects, and international standardization	Special Issue: Biomedical Engineering and Technology - Vol. 2 No. 17 (2025)	http://biomedtech.kpi.ua/issue/view/19257	yes
52	no	30/04/2025	Article	Biosafety of obtaining and using of a titanium implant with hydroxyapatite coating	Special Issue: Biomedical Engineering and Technology - Vol. 2 No. 17 (2025)	http://biomedtech.kpi.ua/issue/view/19257	yes
53	no	30/04/2025	Article	Biosafety in the production and application of DNA biosensors	Special Issue: Biomedical Engineering and Technology - Vol. 2 No. 17 (2025)	http://biomedtech.kpi.ua/issue/view/19257	yes
54	no	30/04/2025	Article	Biosafety of the production of femoral bioimplants using 3D bioprinting	Special Issue: Biomedical Engineering and Technology - Vol. 2 No. 17 (2025)	http://biomedtech.kpi.ua/issue/view/19257	yes

#	Related to travel No (only if applicable)	Dates	Kind of dissemination (talk, poster, paper)	Title	Repository & publishing medium (journal) or conference venue (for talk, poster, etc.)	Links to the repository & journal or to the event's website (talk, poster)	EU-Acknowledgment yes/no?
55	no	30/04/2025	Article	Current issues of biosafety in the work of a physical therapist	Special Issue: Biomedical Engineering and Technology - Vol. 2 No. 17 (2025)	https://doi.org/10.20535/.2025.17.328627 http://biomedtech.kpi.ua/article/view/328627	yes

6. Delays and suggestions

6.1. Delays encountered during the project

The project experienced minor delays during the initial stages of international coordination due to overlapping summer breaks and limited availability of certain external experts. Additionally, publication timelines for the special issue required extra time for peer review and editorial processes, extending slightly beyond the originally planned schedule.

At the end of the project only a few of delays posed some additional problems, such as:

Delayed Peer Review Process:
The peer review process for some manuscripts submitted to the *Biomedical Engineering and Technology* journal extended beyond the initially planned timeframe. This was due to the availability of reviewers and additional revision cycles requested by the editorial board. As a result, the final acceptance of certain articles was postponed to May 2025, instead of April.

Survey Feedback Collection:
The process of gathering feedback from users of educational materials progressed slower than expected. Response rates were initially low, requiring extended outreach and reminders to achieve a representative dataset.

These delays did not critically affect the achievement of key deliverables or milestones, but they slightly shifted the internal timeline for documentation and reporting.

6.2. How They Were Addressed

• **Expert Availability**: The team adjusted internal timelines to ensure flexibility in scheduling training sessions and expert consultations. As a result, all expert contributions were successfully integrated without compromising content quality.

• **Publication Timeline**: Close communication was maintained with the journal's editorial team to align expectations. The submission and peer review process was expedited as much as possible, and final publication is now scheduled with confirmed acceptance of all submitted articles.

Despite these adjustments, all core tasks were completed, and the project achieved its intended outcomes within the overall timeline of the grant.

6.3. Recommendations for Similar Future Initiatives

• **Build Flexibility into Timelines**: When involving international collaborators or academic journals, include buffer periods to accommodate administrative delays or seasonal breaks.

• **Initiate Publication Planning Early**: Engage with journal editors in advance and agree on tentative timelines to ensure smooth coordination of special issues or thematic collections.

• **Strengthen Digital Collaboration**: Tools like shared calendars, project management platforms, and hybrid meeting setups proved essential and should be prioritized in future collaborative efforts.

7. Issues or Challenges

Throughout the project lifecycle, the team encountered several challenges—scientific, organizational, and logistical in nature—that required flexible responses and adaptive management. While none of these issues significantly compromised the delivery of core outcomes, they provided valuable insights into cross-institutional collaboration, interdisciplinary communication, and digital education delivery. This section outlines the key difficulties faced, the mitigation strategies implemented, and gener

Challenge Category	Description	Period	Mitigation / Outcome
Security situation	Ongoing war in Ukraine: air raids, blackouts, internet disruptions	Full project period (Q1-Q4)	Conduct offline training sessions in locations that meet safety requirements during martial law (have certified shelters or are located in them). Conduct online training sessions using streaming services or other alternative formats. Switched to flexible online formats, used backup power, asynchronous access ensured
Forced relocation and emigration of specialists to safer regions or abroad	Inability to involve experts who are abroad in training sessions	Full project period (Q1-Q4)	Ensure expert interchangeability in a certain area for conducting offline training sessions. Seek alternative formats for training sessions, including online and hybrid formats
Expert availability	Time zone differences and delayed responses from international experts	Q2-Q4	Adjusted communication schedule, extended deadlines, used flexible templates
Involvement of foreign experts	Ban on entry to countries under martial law for employees of European educational institutions	Full project	Find experts in Ukraine who have the appropriate qualifications and can replace them. Engage foreign

Challenge Category	Description	Period	Mitigation / Outcome
		period (Q1-Q4)	experts online using streaming services
Reviewer Availability for Special Issue Articles	Difficulty finding qualified reviewers in specialized biosafety areas caused delays in article processing	Q3-Q4	Extended review deadlines; worked with journal editors to recruit additional reviewers
Travel and movement restrictions	Government-imposed travel restrictions or personal limitations may prevent some participants from traveling to training locations. Issues related to transportation connectivity under martial law. Need to consider the safety of participants traveling to and from training locations	Full project period (Q1-Q4)	Flexible organization of training for those who cannot attend in person.
Conference participation accessibility	Variations in availability due to personal commitments, geographical barriers, and potential disruptions from external factors limited attendance, particularly for those unable to join live sessions	Q2, Q4	Expanded hybrid training formats and provided recordings of sessions for later viewing
Mental health fatigue	Long-term psychological stress among staff and participants	Q3-Q4	Built in flexible deadlines, internal team check-ins, workload redistribution
Manuscript preparation delays	There were delays in the manuscript preparation process due to external constraints on authors, such as the ongoing conflict and limited access to research databases. Some authors struggled to meet the journal's rigorous formatting and content requirements.	Q3-Q4	The team offered extended deadlines for manuscript submissions to accommodate the authors' needs, allowing for more time to prepare high-quality papers. The project team provided additional guidance to authors on manuscript preparation, including offering feedback on structure, content, and formatting to help authors meet the journal's standards.

Challenge Category	Description	Period	Mitigation / Outcome
			The team ensured that all submission guidelines were clear and accessible. They also prepared FAQs and example documents to assist authors with the submission process.
Logistical instability	Difficulty securing in-person event options due to martial law and alerts. Delays in the delivery of necessary supplementary materials for training sessions (handouts, coffee breaks, in case of long-term training, etc.).	Q2-Q4	Prioritized hybrid/online sessions, confirmed safe venue (CLUST SPACE). Local courier services, postal operators, and delivery services in Ukraine are fully adapted to wartime conditions. Possibility of choosing another operator (more than 4 postal services operate in the country). Anticipatory calculation of delivery times considering possible delays. Possibility of obtaining planned services from other providers or adjusting the timing of their provision
Publication bottlenecks	Peer-review delays, technical editing workload for two journals simultaneously	Q4 only	Parallel editorial workflows, early article triage, support from publication managers
Feedback collection delay	Slower-than-expected return of evaluation forms after training dissemination	Q4 only	Extended deadline for feedback, used multiple reminder channels (email, social media)
Budgetary constraints	Rising local costs for translation, layout, and technical editing Ukrainian authors, in particular, faced financial difficulties due to the ongoing conflict. The article processing charges (APCs) required by certain journals posed a significant barrier to submission for some potential contributors.	Q4	Internal redistribution of tasks, volunteer-based proofreading and formatting. To support Ukrainian authors and others facing financial constraints, the team ensured that there would be no article processing charges (APCs) for submissions to the special issue in Innovative

8. Further elaborations, notes, etc.

8.1. Added value for the institution/region/field

This project has significantly enhanced institutional capacity in biosafety and biohazard management through the development of interdisciplinary training programs and knowledge-sharing practices. It fostered cross-sector collaboration among experts in medicine, pharmacy, and biotechnology—fields where biosafety awareness is critical but often unevenly addressed.

At the regional level, the project provided a rare opportunity for Central and Eastern European institutions to access and contribute to high-quality, open-access educational resources on biosecurity. This has helped bridge knowledge gaps, especially in underrepresented academic and healthcare communities.

8.2. Potential for follow-up projects or collaboration

The established network of experts and partner institutions has laid the groundwork for further cooperation. Based on participant feedback and stakeholder engagement, several follow-up initiatives could be pursued, including:

- Expansion of the training model into more specialized areas (e.g., antimicrobial resistance, lab emergency protocols).
- Development of multilingual versions of the educational resources.
- A long-term collaborative platform for sharing biosecurity best practices across Europe and associated countries.

There is also strong potential for future EU-funded projects that build on this foundation to address biohazard preparedness in light of global health risks.

8.3. Final reflections

This initiative has proven the effectiveness of combining educational innovation with international collaboration to address urgent scientific and societal challenges. The flexibility, engagement, and expertise of the teams involved were key to its success. Lessons learned during implementation will continue to inform institutional practices and inspire new directions for capacity building in biosafety and public health preparedness.

Grant records include but are not limited to Grantee, financial, technical, scientific and other records. All grant project records must be retained by the Grantee for a period of two (2) years after final payment under this Grant. All grant project records are subject to audit pursuant to

Section 9 of Grant Agreement. Upon completion of the second year of record retention, the Grantee shall submit all project records to the STCU and EURIZON Secretariat.
When intellectual property arises under this project, the Grantee will inform the STCU and the Executive Director, will inform the Funding Party in a timely fashion. The Grantee shall hold all rights worldwide to intellectual property arising from this agreement. Exploitation of results shall be limited to applications for peaceful purposes. In this regard, the Grantee shall ensure that any results which could result in concerns over proliferation of weapons technology and transfer of sensitive technologies will be treated in accordance with relevant laws of Ukraine and international agreements and conventions to which Ukraine is a party.

PUBLICATIONS AND ACKNOWLEDGMENT

Open Access to Peer-Reviewed Publications

These grants are funded by the European Union (through EURIZON H2020 project, grant agreement 871072) and, as mentioned in the Term of reference of the call, with this comes the obligation **to ensure open access (free, online access for any user) to all peer-reviewed publications relating to your research results.**
Peer reviewed publications refer to publications that have been evaluated by scholars (peers) in a given field of research. The predominant type of peer-reviewed scientific publication is the journal article, for which open access is mandatory. In addition, beneficiaries are also strongly encouraged to provide open access to other types of scientific publications, some of which may, in some cases, not be peer-reviewed, including monographs, books, conference proceedings, and grey literature (informally published written material not controlled by scientific publishers, e.g. reports).

Beneficiaries are free to deposit their peer-reviewed publications in those repositories most appropriate for their subject and publication (for instance a thematic or institutional repository). However, please note that **it is mandatory for them to continuously report all publications related to their project to the STCU and EURIZON Secretariat (dissemination template).**

Acknowledgment of the EU funding

As mentioned in the Term of reference of the EURIZON FELLOWSHIP PROGRAMME: “Remote Research Grants for Ukrainian Researchers” (Microsoft Word - EURIZON Remote Research Grants Terms of Reference for applicants draft.docx (desy.de)) :
For all communication relating to the Remote Research Grant and for any dissemination of results, such as through publications, posters, conference papers, etc. the selected Ukrainian teams (beneficiaries) and their European partners are required to ensure the visibility of the EU and EURIZON emblems, and to acknowledge the funding by including the following text, unless

agreed otherwise: **“This project has received funding through the EURIZON project, which is funded by the European Union under grant agreement No.871072.”**

For more information on publication and acknowledgment duties under European funded projects: https://ec.europa.eu/research/participants/docs/h2020-funding-guide/grants/grant-management/dissemination-of-results_en.htm

Signed by: Alexander Galkin