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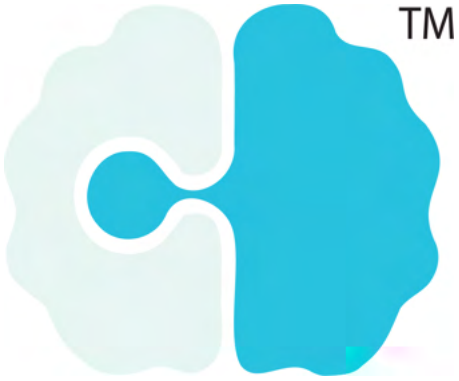

HORIZON-WIDERA-2023-ACCESS-02

ChatMED

Grant ID: 101159214

Bridging Research Institutions to Catalyze Generative AI Adoption by the Health Sector in the Widening Countries

Deliverable D5.1

Report on Training, STSEs, and Summer School Activities in Period 2

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D5.1 - Report on Training, STSEs, and Summer School Activities in Period 2	
Date:	**August 29, 2026**
Lead Beneficiary:	**JSI**
Type:	**R**
Author(s):	**Monika Simjanoska Misheva, Primož Kocuvan, Matjaž Gams**
Dissemination level:	**PU**
Version:	**3.2**

Abstract: This deliverable reports ChatMED Period 2 training, short-term scientific exchange (STSE), Summer School, art exhibition, dissemination, networking, exploitation, research-output, and follow-up proposal-development activities. It documents Year 2 training on project and financial management, quality assurance, software engineering, secure medical-AI data architectures, publishing, proposal development, and the national EU4Health capacity-building dimension linked to the April 2026 Ljubljana mission. STSE 2 translated the converging requirements of GDPR, NIS2, the EU AI Act, and the European Health Data Space into institutional governance practices and generated an under-review open Zenodo manuscript. Summer School 2 integrated neurology and AI education and culminated in a live NeuroOrch demonstration, while the Cognitive Horizons exhibition extended interdisciplinary engagement through art. Period 2 research dissemination includes peer-reviewed and open outputs and the DeLTA 2026 conference papers, including a Best Student Paper Award. The project ecosystem was further strengthened through formal industry partnerships, a Future Internet Special Issue, traditional and online media coverage, and an expanded portfolio of follow-up proposals.

HISTORY OF CHANGES

Date	Issue	Author	Summary of main changes
23.6.2026	1.0	Monika S. Misheva	Provided links to all the materials that need to be included in the report.
07.07.2026	2.0	Primož Kocuvan	Report is completed, proof-reading is pending.
28.08.2026	3.0	Monika S. Misheva	Polished Period 2 report; expanded abstract, added public dissemination links, scientific outputs, STSE 2 publication outcome, DeLTA 2026 papers, and references.

28.08.2026	3.1	Monika S. Misheva	Website coverage rechecked; added EU4Health training impact, industry partnerships, newsletter and Special Issue dissemination, STSE research dissemination, external media coverage, and expanded public-source cross-references.
28.08.2026	3.2	Monika S. Misheva	Added Year 2 proposals.

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List of Acronyms

AI – Artificial Intelligence
AP-HP – Assistance Publique – Hôpitaux de Paris
API – Application Programming Interface
ARIS – Slovenian Research and Innovation Agency
BAEP – Brainstem Auditory Evoked Potentials
CI/CD – Continuous Integration / Continuous Delivery
CNDE – Communication, Networking, Dissemination and Exploitation
COBISS – Co-operative Online Bibliographic System and Services
COST – European Cooperation in Science and Technology
CRPD – Central Registry of Patient Data
CSF – Cerebrospinal Fluid

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CT – Computed Tomography
DeLTA – International Conference on Deep Learning Theory and Applications
DICOM – Digital Imaging and Communications in Medicine
DPIA – Data Protection Impact Assessment
EDx – Electrodiagnostics
EEG – Electroencephalography
EHDS – European Health Data Space
EHR – Electronic Health Record
EMG – Electromyography
EU – European Union
FCSE – Faculty of Computer Science and Engineering
FHIR – Fast Healthcare Interoperability Resources
FMN – Faculty of Medicine in Niš
GDPR – General Data Protection Regulation
GenAI – Generative Artificial Intelligence
ICT – Information and Communication Technologies
IHE – Integrating the Healthcare Enterprise
INSERM – French National Institute of Health and Medical Research (Institut national de la santé et de la recherche médicale)
IQ – Intelligence Quotient
JIF – Journal Impact Factor
JSI – Jožef Stefan Institute
KPI – Key Performance Indicator
LLM – Large Language Model
M-LEAF – Multidimensional Evaluation Framework for Medical LLM Applications
MDPI – Multidisciplinary Digital Publishing Institute
MRI – Magnetic Resonance Imaging
NEO – National Evidence Observatory
NIJZ – National Institute of Public Health of Slovenia
NIS2 – Network and Information Systems Directive 2
ORCID – Open Researcher and Contributor ID
PEP 8 – Python Enhancement Proposal 8
PU – Public
RACI – Responsible, Accountable, Consulted, Informed
RAG – Retrieval-Augmented Generation
RIA – Research and Innovation Action
SAM3 – Segment Anything Model 3
SICRIS – Slovenian Current Research Information System
SSEP – Somatosensory Evoked Potentials
STSE – Short-Term Scientific Exchange
TDGEP – Tech Diplomacy Global Institute Executive Program
TIA – Transient Ischemic Attack
TU Graz – Graz University of Technology
UKIM – Ss. Cyril and Methodius University in Skopje

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VEP – Visual Evoked Potentials
WIDERA – Widening Participation and Spreading Excellence

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Training Curriculum Report for Year 2

Training Report 1

Host Institution:

Jožef Stefan Institute - JSI, Ljubljana, Slovenia

Training session 1 (number of participants):

7. October – 9. October 2025 (13 participants confirmed + temporary listeners online)

Training session 1 (presenters): Primoz Kunaver, Ziga Kolar, and Primoz Kocuvan

The ChatMED consortium held the training session from 7-9 October 2025 at the Jožef Stefan Institute in Ljubljana, during the 28th Information Society Multiconference, IS2025. The event was directed at technical staff, administrative staff, and senior researchers, and it was designed to strengthen the operational skills needed for EU-funded interdisciplinary research. The session was perceived as a capacity-building activity focused on project management, financial control, quality assurance, and software engineering, all in service of executing ChatMED's mission with greater precision and efficiency.

The training was structured around a practical problem: complex interdisciplinary projects can fail not only because of weak science or weak software, but because roles are unclear, risks are not identified early, budgets are not monitored consistently, deliverables are not quality-gated, and code or documentation practices are not standardized. Therefore, the training was as an effort to build a common administrative and technical operating system for ChatMED: clear responsibilities, auditable processes, shared tools, software discipline, and documentation.

Interdisciplinary Project Management

Source available at: https://chatmed-project.eu/knowledge-repository/training-session-2-1-1-interdisciplinary-project-management/

The training introduced the RACI model - Responsible, Accountable, Consulted, Informed - as a practical way to reduce ambiguity in interdisciplinary work. The critical rule was that several people may be responsible for doing the work, but only one person should be accountable for the final decision. This distinction matters in a consortium setting because shared work without a single accountable owner can create delays, duplicated effort, and unresolved disagreements. The management component also walked participants through the project lifecycle: initiation, planning, execution, monitoring, and closure. This lifecycle framing connects administrative practice with technical delivery: a project is not complete when an activity happens, but when the result is handed over, documented, traceable, and usable.

Risk management was treated as proactive rather than reactive. The event highlighted examples such as GDPR issues and staff turnover, and it described the use of clear mitigation triggers: if a defined risk condition occurs by a defined date, a defined response follows. This converts risk management from a list of worries into an operational mechanism.

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Quality Assurance and Testing

Source available at: https://chatmed-project.eu/knowledge-repository/training-session-2-1-4-quality-assurance-and-testing/

Quality assurance was presented as a mechanism for trust and reproducibility, not as a bureaucratic layer. The event described the use of quality gates before external submission of deliverables. These gates verify completeness, supporting evidence such as data or test results, and compliance with intellectual-property and security requirements. In this model, a deliverable is not judged only by whether it exists; it must be complete, evidence-based, compliant, and reviewable. The training also introduced Definition of Ready and Definition of Done. This prevents teams from starting work on vague tasks or releasing outputs that cannot be checked, reused, or integrated. Traceability was another key concept. The event described a traceability matrix that links each requirement to a specific task, validation test, and final deliverable. This is especially important in EU-funded research and medical-AI development, where evaluators, auditors, clinicians, and technical teams need to know how a requirement became a task, how the task was validated, and which final output satisfies it.

Tools for Effective Project Management

Source available at: https://chatmed-project.eu/knowledge-repository/training-session-2-1-3-tools-for-effective-project-management/

The EMDESK training positioned the platform as a project and financial management tool for EU research projects, especially Horizon Europe projects. The slides described EMDESK as an end-to-end collaborative research-management platform for project planning, budgeting, resource allocation, execution, and monitoring. It is cloud-based, GDPR-compliant, hosted in Germany, and designed for multi-partner research environments where work packages, tasks, milestones, resources, documents, and budgets must be tracked together. The key features presented were project planning and scheduling through tasks, milestones, and dependencies; multiple views such as Gantt, table, and Kanban; budgeting and financial control over costs and resources; resource management and allocation of effort; multi-project management; and integration of finance, project planning, and collaboration in one tool. The slides also emphasized tutorials, trainings, and customer support as strengths, because a tool designed for complex consortia needs adoption support, not only functionality.

As a follow-up, the FCSE team and the UKIM Rectorate held an additional meeting with EMDESK representatives to discuss the potential adoption of the platform at faculty and university level. However, the solution was found to require substantial financial investment. Consequently, FCSE decided to develop an internal alternative - the Tasko project management system.

Tasko was designed and developed from scratch, drawing on the practical experience and accumulated knowledge of staff involved in managing research projects. The system was immediately put into operational use within the ChatMED project and subsequently adopted for the new Vezilka project.

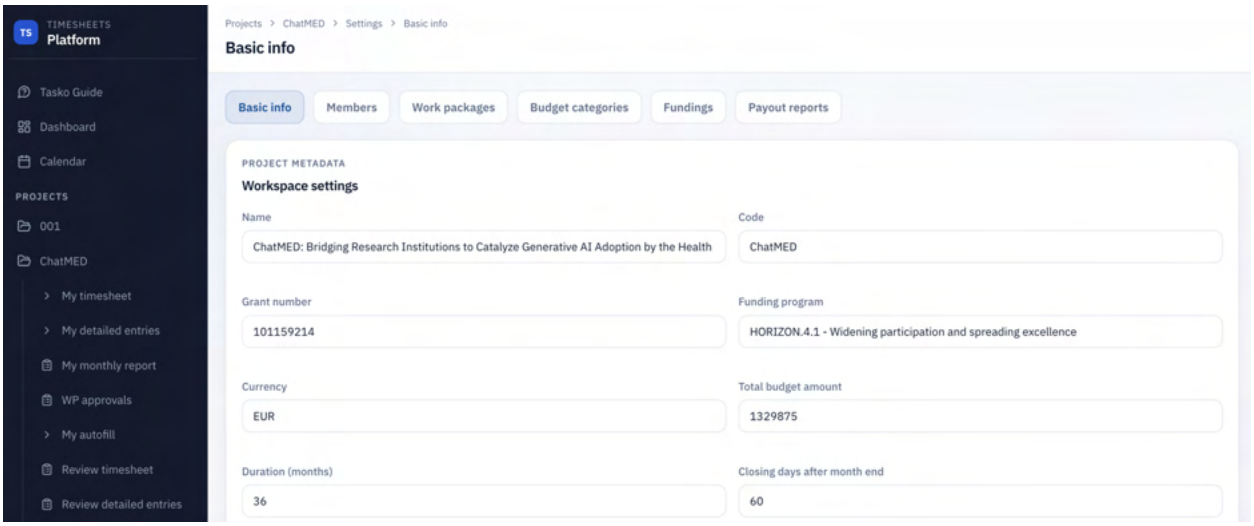

Figure 1. Tasko - The new FCSE's project management system.

Software Best Practices

Source available at: https://chatmed-project.eu/knowledge-repository/training-session-2-1-2-software-best-practices/

The software best-practices training covered three areas: Git version control and CI/CD, Sphinx documentation, and Python coding standards. Git fundamentals included distributed version control, repository setup, staging and committing changes, branching, merging, and conflict handling, followed by an introduction to CI/CD workflows using tools such as GitHub Actions, GitLab CI/CD, and Jenkins. The documentation component introduced Sphinx and ReStructuredText for generating maintainable Python documentation, while the coding-standards component focused on PEP 8, including naming conventions, indentation, code consistency, and readability. Examples of obfuscated code were also used to demonstrate the importance of writing transparent and maintainable software.

Figure 2. Training session in Ljubljana (October 2025).

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Training Report 2

Host Institution:

Jožef Stefan Institute - JSI, Ljubljana, Slovenia

Training session 2 (number of participants):

16. April - 17. April 2026 (20 participants confirmed + temporary listeners online)

Training session 2 (presenters): Primoz Kunaver, Hajdi Kosednar, Tadej Horvat, and Matjaz Gams

National EU4Health Capacity-building Dimension

The April 2026 Ljubljana training was also the practical continuation of a national capacity-building initiative for North Macedonia's participation in the EU4Health Programme. In March 2026, ChatMED contributed to the newly formed national EU4Health working group through a strategic introductory training that explained the programme's implementation-oriented logic, the need to map national health-system gaps to European priorities, and the institutional team and partnerships required for competitive participation. The source is available at: https://chatmed-project.eu/knowledge-repository/eu4health-participation-strategy-for-north-macedonia/.

This preparation was followed by the 16–17 April mission at JSI. In addition to consortium researchers, the mission brought together representatives of the Ministry of Health of North Macedonia, the Macedonian Red Cross, the national health-IT vendor Sorsix, FCSE, the Faculty of Medicine in Skopje, JSI and TU Graz. Collaboration with the National Institute of Public Health of Slovenia (NIJZ) added a concrete national eHealth implementation perspective. The mission therefore linked the Year 2 curriculum on data ethics, legislation, databases, proposal writing and scientific visibility with policy-facing capacity building, eHealth benchmarking, networking and preparation for future EU4Health participation.

Slovenian eHealth as a National Infrastructure Model

Source available at: https://chatmed-project.eu/knowledge-repository/training-session-2-2-bonus-slovenian-ehealth-system/

The presentation by Hajdi Kosednar, Head of the Healthcare Informatics Center at the National Institute of Public Health of Slovenia, presented Slovenia's nationally centralized eHealth infrastructure. Developed initially by the Ministry of Health and managed by NIJZ since 2015, the system provides nationwide services including ePrescription, eReferral, eAppointment, the Central Registry of Patient Data (CRPD), zVEM patient portal, zVEMPlus for professionals,

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TeleRadiology, and TeleStroke. All public and private healthcare providers participate, while patients and professionals are identified through nationally managed identity and authentication mechanisms. NIJZ is known as one of the most effective implementator of the EU4Health initiative, and therefore, represents an important know-how for North Macedonian representatives present at the session.

The presented infrastructure combines secure national networking through zNET, centralized identity and authorization management, two national data centres, standardized APIs, and interoperability based primarily on IHE and openEHR. CRPD enables exchange of both structured and unstructured clinical information, while access is governed through professional roles, legal basis, authorization rules, and audit trails. Patients can access their records through zVEM and may authorize trusted persons or guardians to act on their behalf.

The Slovenian experience demonstrated the value of national coverage, common standards, secure identity management, interoperability, and centralized governance, while also highlighting challenges such as healthcare-sector rigidity, data-protection requirements, limited human resources, integration costs, and the burden of structured clinical documentation. The presentation positioned the forthcoming EHDS as an important mechanism for further harmonization of EHR standards and primary and secondary health-data use across Europe.

Proposal Writing and Research Funding

Source available at: https://chatmed-project.eu/knowledge-repository/training-session-2-2-4-proposal-writing-research-funding/

The proposal-writing session was a practical exercise in turning a research idea into a competitive, fundable proposal. Participants worked on defining objectives, methodology, innovation, impact, work packages, partner roles, verification methods, dissemination, data management, and commercialization, while aligning the proposal with call priorities and evaluation criteria. Particular emphasis was placed on aspects often underestimated in research proposals, including market impact, intellectual property, project management, stakeholder engagement, exploitation, and post-project sustainability. Participants were encouraged to clearly define the value proposition, competing solutions, target users, expected benefits, risks, and the contribution of each partner.

The session concluded with a short hands-on exercise in which participants designed an AI-based project for reducing hospital emergency-department waiting times, defining the problem, innovation, expected impact, implementation structure, and key arguments for why the proposal should be selected.

Data Ethics and Legislation

Source available at: https://chatmed-project.eu/knowledge-repository/training-session-2-2-1-data-ethics-legislation/

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The data-ethics and legislation session positioned ChatMED within the key regulatory frameworks for medical AI: GDPR, the EU AI Act, and the European Health Data Space. Its central message was that legal and ethical requirements should be incorporated into system design from the outset through privacy by design, explainability, fairness, accountability, and human oversight. The session distinguished between lower-risk and high-risk AI systems, emphasizing that medical AI generally requires stricter risk management, transparency, conformity assessment, and human supervision. These principles were illustrated through two ChatMED use cases. HomeDOCtor was presented as a public-facing AI service requiring clear disclosure that users are interacting with AI, strong data minimization, local hosting, and no unnecessary retention of personal information. The Neurology AI Orchestrator was treated as a high-risk clinical-support system in which the neurologist remains responsible for the final decision.

The session also addressed the tension between the need for high-quality clinical data and GDPR requirements. It stressed the use of informed consent where applicable, pseudonymization and anonymization, diverse datasets, and the exclusion of identifiable patient data from training unless a valid legal basis exists. Overall, the training promoted an ethics-by-design approach in which compliance, transparency, fairness, and human control are embedded throughout the lifecycle of medical AI systems.

Database Management and Integration

Source available at: https://chatmed-project.eu/knowledge-repository/training-session-2-2-2-database-management-and-integration/

The database-management session focused on designing secure and compliant data architectures for medical LLMs and retrieval-augmented generation. Core principles included role-based access control, least privilege, high availability, data integrity, confidentiality, and strict separation of operational and training data.

A central distinction was made between pseudonymization and true anonymization, with the latter required before data are used for model training. For text data, the session covered named-entity recognition, masking, and synthetic-data generation; for medical imaging, it highlighted the need to remove identifiers from both DICOM metadata and visible scan content.

The two ChatMED use cases illustrated different requirements. HomeDOCtor relies on a secure vector database of verified medical guidelines, temporary caching, and deletion of user prompts, while the Neurology Orchestrator requires controlled integration with hospital EHRs and multimodal data such as MRI, CT, and EEG. The session also stressed FHIR interoperability, secure APIs, immutable audit logs, and security by design, with the goal of making ChatMED systems both trustworthy and ready for integration with European healthcare infrastructures.

Importance of Publishing in High-impact Journals

Source available at: https://chatmed-project.eu/knowledge-repository/training-session-2-2-3-importance-of-publishing-in-high-impact-journals/

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The Publishing for Global Impact session focused on improving international research visibility, responsible use of AI in research, and the selection of meaningful publication KPIs. It emphasized that publishing impact begins before submission through appropriate journal selection, strong metadata, consistent author identity, ethical disclosures, open dissemination, and active maintenance of researcher profiles. The presentation compared the roles of Google Scholar, Scopus, Web of Science, COBISS, SICRIS, and ARIS, stressing that journal fit and field relevance should come before metrics such as JIF or CiteScore. Researchers were encouraged to track outputs, citations, profile completeness, international collaboration, indexing, and journal quality through a regularly updated dashboard rather than optimizing a single indicator.

A broader ethical dimension linked publishing with scientific responsibility, truth, uncertainty, bias, and public trust. The session concluded with practical recommendations for maintaining ORCID and bibliographic profiles, standardizing affiliations and acknowledgements, identifying suitable journals, monitoring KPIs, and increasing the global visibility of research outputs.

Figure 3. Training session in Ljubljana (April 2026).

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Additional Training Session: ChatMED as an Inspiration for Successful WIDERA Twinning Proposals

Source available at: https://chatmed-project.eu/knowledge-repository/bonus-training-session-for-fcse-chatmed-as-an-inspiration-for-successful-widera-twinning-proposals/

ChatMED served as the basis for a targeted capacity-building session titled “ChatMED as an Inspiration for Successful WIDERA Twinning Proposals,” delivered by project coordinator Prof. Monika Simjanoska Misheva for academic staff at the Faculty of Computer Science and Engineering, Ss. Cyril and Methodius University in Skopje, ahead of the April 2026 Horizon Europe WIDERA Twinning proposal deadline. The session used the successful ChatMED project as a practical example of how a competitive Twinning proposal can be conceptualized, written, and strategically positioned. It highlighted key elements of successful proposal development, including a clear strategic focus, a strong impact narrative, a balanced consortium combining Widening and Advanced partners, measurable objectives and KPIs, structured capacity-building activities such as trainings, staff exchanges, and summer schools, and sustainable impact beyond the project lifecycle. The training also addressed practical writing guidance and common mistakes, stressing the need to avoid generic content, maintain balanced budgeting, and build strong dissemination and exploitation strategies. Overall, the session reflected ChatMED’s broader capacity-building mission by translating real project experience into actionable guidance, strengthening FCSE’s institutional readiness and helping researchers prepare stronger future Twinning proposals.

Figure 4. Additional training session in Skopje (April 2026).

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Report on STSE 2

Title: Medical Data Security & Compliance: Ensuring data integrity, security, and adherence to legal norms.

Name of Staff Members: Valentina Trajanova

Host Institution: Jožef Stefan Institute (JSI), Ljubljana, Slovenia

Exchange Period: May 2026 (7 working days online and 7 working days in person)

Figure 5. Year 2 STSE in Ljubljana (May 2026).

The growing use of artificial intelligence in healthcare requires research institutions to look beyond scientific and technical outputs. They must also safeguard sensitive data, address cybersecurity risks, maintain transparent procedures, support audits, and respond to evolving European regulation. These issues formed the basis of the short-term scientific exchange undertaken by the Head of the Legal Department of FCSE at the Jožef Stefan Institute in Ljubljana. The exchange took place during a period of major regulatory change, shaped by GDPR, the EU AI Act, the European Health Data Space, and stronger cybersecurity requirements. Before the visit, FCSE reviewed its national and internal legal framework related to personal data protection, cybersecurity, health data, and AI. This showed that, although North Macedonia has GDPR-aligned legislation, some internal FCSE procedures require modernization, particularly those defining responsibilities, agreements, retention rules, and roles when sensitive data are used in international research.

Cybersecurity was also identified as an institutional, not only technical, responsibility. NIS2-inspired national legislation is emerging, but practical implementation remains developing. For FCSE, this means integrating cybersecurity into project planning, risk management, documentation, procedures, and accountability structures. Similar questions arise from the EHDS, particularly around lawful access, sharing, reuse, and interoperability of health data, and from the AI Act, which introduces requirements related to risk assessment, transparency, human oversight, and AI literacy.

The visit to JSI allowed FCSE to compare its current practices with those of an experienced European research institution. Discussions covered international project administration, GDPR practice, AI Act readiness, EHDS data governance, audit requirements, and cybersecurity management. One particularly useful example was JSI's centralized project-management system, which records proposals, approved projects, budgets, project categories, and spending flows, supporting transparency, institutional memory, reporting, and audit readiness.

The exchange confirmed that international research projects require more than strong scientific outputs. They also depend on data-management plans, controller–processor arrangements, retention rules, audit records, procurement documentation, accountability structures, and clear guidance for researchers and administrative teams. For FCSE, this points to practical improvements such as updated data-protection procedures, data-sharing templates, DPIA guidance, cybersecurity workflows, AI risk-assessment checklists, audit records, and stronger coordination between legal, technical, administrative, and research staff.

A key lesson was that GDPR, NIS2-inspired cybersecurity rules, the AI Act, and the EHDS should not be treated as isolated legal topics. They need to be translated into everyday institutional processes. AI and health-data projects should therefore begin not only with a scientific concept, but also with checks on data responsibility, legal basis, access rights, storage, security, transfer, partner obligations, human oversight, incident procedures, and audit readiness.

For ChatMED, these lessons are directly relevant because the project operates at the intersection of sensitive health data, AI systems, clinical expertise, public trust, and institutional accountability. The exchange therefore provides a practical basis for strengthening FCSE's governance mechanisms and moving from general regulatory awareness toward a reusable institutional framework for responsible AI-in-health research.

Following the Ljubljana visit, FCSE prepared a direct research output - a manuscript titled *"Institutional Operationalisation of the Converging EU Digital Rulebook for Trustworthy AI-in-Health Research"*, currently under review and openly available as a Zenodo preprint: https://zenodo.org/records/20812892. The paper develops the exchange findings into a reproducible institutional-governance model rather than treating GDPR, NIS2, the EU AI Act, and the EHDS as separate compliance exercises. Its central contribution is a six-layer Institutional Accountability Architecture spanning regulatory governance, data governance, cybersecurity governance, algorithmic governance, EHDS interoperability, and project-management/audit readiness. The framework converts legal obligations into operational roles, templates, registers, safeguards, and auditable workflows, supporting a shift from ad hoc project-by-project compliance toward reusable institutional capability. This is particularly relevant for Widening and candidate-country institutions, where governance capacity can directly determine the ability to participate credibly in cross-border AI-in-health research.

Report on Summer School 2

Title: A holistic approach to understanding how AI can revolutionize neurology.

Host Institution: Faculty of Medicine in Nis (FMN), Serbia

Venue: Sokobanja, Hotel Sunce

Funded by the European Union

Period: 27-31 May 2026

Participants: 21 participants

From 27 to 31 May 2026, ChatMED held its second summer school in Sokobanja, Serbia, under the theme “Neurology and AI Fusion.” The event brought together participants from medicine, computer science, engineering, and AI research to build a shared understanding of how artificial intelligence can meaningfully support neurological care. Rather than conventional training, the school was designed as an interdisciplinary bridge between clinicians and technical researchers, helping both groups better understand clinical problems, data limitations, and the requirements for useful and safe AI tools.

The summer school supported ChatMED’s broader objective of strengthening GenAI capacity in Widening countries and advancing the development of a multimodal healthcare platform. Participants were introduced to neurological reasoning, AI and machine-learning applications in neurology, ethical handling of clinical data, and the potential use of LLMs for symptom analysis, diagnostic support, and research assistance. The emphasis was on understanding how clinical needs can be translated into technically meaningful and researchable problems.

The school also promoted active collaboration through mixed clinical–technical teams, brainstorming, and discussion of future publications, project ideas, and research synergies. The following sections summarize the main thematic sessions and topics covered during the summer school.

The First Clinical Principle: Symptoms are not Diagnoses

Source available at: https://chatmed-project.eu/knowledge-repository/summer-school-2-1-introduction/

The introductory session established a central principle for the school: clinical problems must be understood before technical solutions are designed**.** Neurological reasoning begins with symptoms, but moves through neuroanatomical localization, possible disease, diagnostic testing, and treatment. The same symptom can arise from very different disorders, making context essential. For AI researchers, the key lesson was that detecting a symptom or pattern is insufficient unless the system contributes meaningfully and safely to clinical decision-making.

Neurological Examination as Structured, Imperfect, Clinically Meaningful Data

Source available at: https://chatmed-project.eu/knowledge-repository/summer-school-2-2-clinical-neurology-foundations/

The session presented the neurological examination as hypothesis-driven clinical data covering cognition, speech, cranial nerves, motor function, reflexes, sensation, coordination, gait, and autonomic signs. Participants learned how findings support anatomical localization and why laterality, severity, distribution, missing information, and examiner variability matter. AI can help structure examinations, identify inconsistencies, quantify selected signs, and support localization, but uncertainty and clinician interpretation must remain visible.

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Diagnostic Tests Change Probability, not Truth

Source available at: https://chatmed-project.eu/knowledge-repository/summer-school-2-2-clinical-neurology-foundations/

Diagnostic testing was presented as a way to change clinical probability rather than establish absolute truth. Test interpretation depends on the clinical question, pre-test probability, sensitivity, specificity, prevalence, and patient context. MRI, EEG, EMG and cognitive tests may produce incidental, nonspecific, or incomplete findings. The key message for AI development was that systems should support rational testing and contextual interpretation rather than encourage unnecessary testing or convert uncertain findings into definite diagnoses.

Electrodiagnostics: from Waveforms to Workflows

Source available at: https://chatmed-project.eu/knowledge-repository/summer-school-2-3-diagnostic-methods/

The electrodiagnostics session introduced nerve-conduction studies and EMG as extensions of the neurological examination. Participants learned how these methods help localize disorders, distinguish axonal, demyelinating, neuropathic and myopathic patterns, and monitor disease over time. Potential LLM applications included summarizing longitudinal records, identifying missing information, drafting structured reports and producing patient-friendly explanations, always with clinician verification and sign-off.

CT, MRI, and AI in Neuroradiology

Source available at: https://chatmed-project.eu/knowledge-repository/summer-school-2-3-diagnostic-methods/

The neuroradiology session explained how CT and MRI answer different clinical questions and how imaging can be transformed into AI tasks. CT was presented as fast and particularly useful in emergencies, while MRI provides richer soft-tissue and biological information through multiple sequences. AI applications included segmentation, registration, classification and longitudinal comparison. The session stressed that imaging AI must remain linked to the clinical question, generalize across scanners and hospitals, and preserve diagnostic uncertainty.

EEG and Evoked Potentials

Source available at: https://chatmed-project.eu/knowledge-repository/summer-school-2-3-diagnostic-methods/

EEG and evoked potentials were presented as functional diagnostic tools whose interpretation depends on clinical context, technical quality, patient state and artifacts. Participants reviewed normal and abnormal EEG patterns, epilepsy evaluation, and VEP, SSEP and BAEP testing. AI can support signal-quality assessment, artifact and seizure detection, waveform measurement and longitudinal monitoring, while LLMs can structure reports and clinical context. Neither should independently convert a signal abnormality into a diagnosis.

Alzheimer's Disease and Biomarkers

Source available at: https://chatmed-project.eu/knowledge-repository/summer-school-2-4-neurology-diseases-1/

The Alzheimer's disease session focused on molecular biomarkers, early diagnosis and selection for anti-amyloid therapy**.** It covered CSF and plasma biomarkers, ApoE genotyping, imaging and evolving biological definitions of Alzheimer's disease. Particular attention was given to differences between frameworks that define Alzheimer's biologically and those requiring both biomarkers and clinical symptoms. The session demonstrated how increasingly sensitive biomarkers create new opportunities for early diagnosis while also raising important interpretation and management challenges.

Epilepsy as a Clinical, Longitudinal, Multimodal Problem

Source available at: https://chatmed-project.eu/knowledge-repository/summer-school-2-4-neurology-diseases-1/

Epilepsy was presented as a clinical, longitudinal and multimodal condition, not simply an EEG-classification problem. Diagnosis integrates seizure semiology, witness descriptions, EEG, imaging, medication response and disease course while distinguishing epileptic events from mimics and provoked seizures. AI opportunities include EEG and video analysis, wearable monitoring and seizure detection, while LLMs can structure histories, diaries and follow-up information. Clinical diagnosis and interpretation must remain with the neurologist.

Movement Disorders and Parkinson's Disease as Measurable Clinical Signs

Source available at: https://chatmed-project.eu/knowledge-repository/summer-school-2-5-neurology-diseases-2/

The movement-disorders session showed why conditions such as Parkinson's disease are well suited to quantitative AI analysis**.** Clinical signs including bradykinesia, tremor, gait abnormalities and asymmetry can be captured through video, sensors and longitudinal monitoring. AI can measure movement characteristics and support digital biomarkers, while neurologists provide the clinical meaning and context. The session emphasized that quantitative assessment can complement, but not replace, clinical reasoning or the patient–neurologist relationship.

Stroke: Urgency, Pathways, and AI Aligned to Time-Critical Care

Source available at: https://chatmed-project.eu/knowledge-repository/summer-school-2-5-neurology-diseases-2/

The stroke session emphasized rapid recognition, diagnosis and treatment of a time-critical neurological emergency**.** It covered ischemic and hemorrhagic stroke, TIA, FAST/BEFAST recognition, risk factors, stroke scales, imaging, stroke-unit care, thrombolysis and mechanical

thrombectomy. Potential AI applications included detection of hemorrhage and large-vessel occlusion, imaging analysis, outcome prediction, triage and rehabilitation monitoring, while LLMs could support structured handovers, documentation and identification of missing pathway information.

Headache and Migraine

Source available at: https://chatmed-project.eu/knowledge-repository/summer-school-2-5-neurology-diseases-2/

The headache session emphasized that AI should go beyond simple migraine classification and help distinguish primary headaches from potentially dangerous secondary causes**.** The training covered migraine, tension and cluster headache, red flags, treatment, prevention and emerging therapies. Potential AI applications included digital headache diaries, trigger and attack prediction, medication-overuse detection, wearable monitoring and therapy-response assessment. LLMs could help structure histories and summarize longitudinal information for clinicians.

AI in Healthcare: What Changes for the Doctor

Source available at: https://chatmed-project.eu/knowledge-repository/summer-school-2-6-ai-in-healthcare-what-does-this-mean-for-the-doctor/

The session positioned AI as a tool that **supports rather than replaces clinicians**. Its greatest value was presented in structuring records, standardizing terminology, reducing repetitive documentation, improving interoperability and helping patients understand medical information. AI should be integrated into hospital information systems, with outputs treated as drafts that clinicians accept, modify or reject. Transparency, provenance, auditability and human responsibility remain essential, with the final clinical decision and signature always remaining human.

Data, Regulation, and Clinician Responsibility

Source available at: https://chatmed-project.eu/knowledge-repository/summer-school-2-7-data-and-regulation-why-must-the-clinician-care/

The regulatory session explained why clinicians need practical knowledge of GDPR, NIS2, the EU AI Act and the EHDS**.** Topics included lawful data use, data quality and provenance, cybersecurity, medical-device classification, human oversight, vendor assessment, incident reporting and institutional governance. The central message was that clinicians do not need to become legal experts, but must understand the responsibilities attached to using AI and health data. Compliance therefore requires both trustworthy technology and functioning institutional governance mechanisms.

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ChatMED in Vivo: NeuroOrch from Methodology to Platform

Source available at: https://chatmed-project.eu/knowledge-repository/summer-school-2-7-chatmed-in-vivo/

The final session demonstrated NeuroOrch as a working ChatMED prototype, translating the clinical-reasoning methodology developed in D7.1 into a structured multi-agent workflow. The live demonstration showed how patient information progresses through risk assessment, hypothesis generation, localization, differential diagnosis, diagnostic planning, treatment planning, contraindication checking, quality validation and report generation. Participants also tested the clinician-evaluation framework, which combines ratings, safety flags and free-text feedback, with safety treated as a mandatory gate before clinical use. Details of the platform will be presented in the consequitve deliverables D8.1, D8.2, and D8.3.

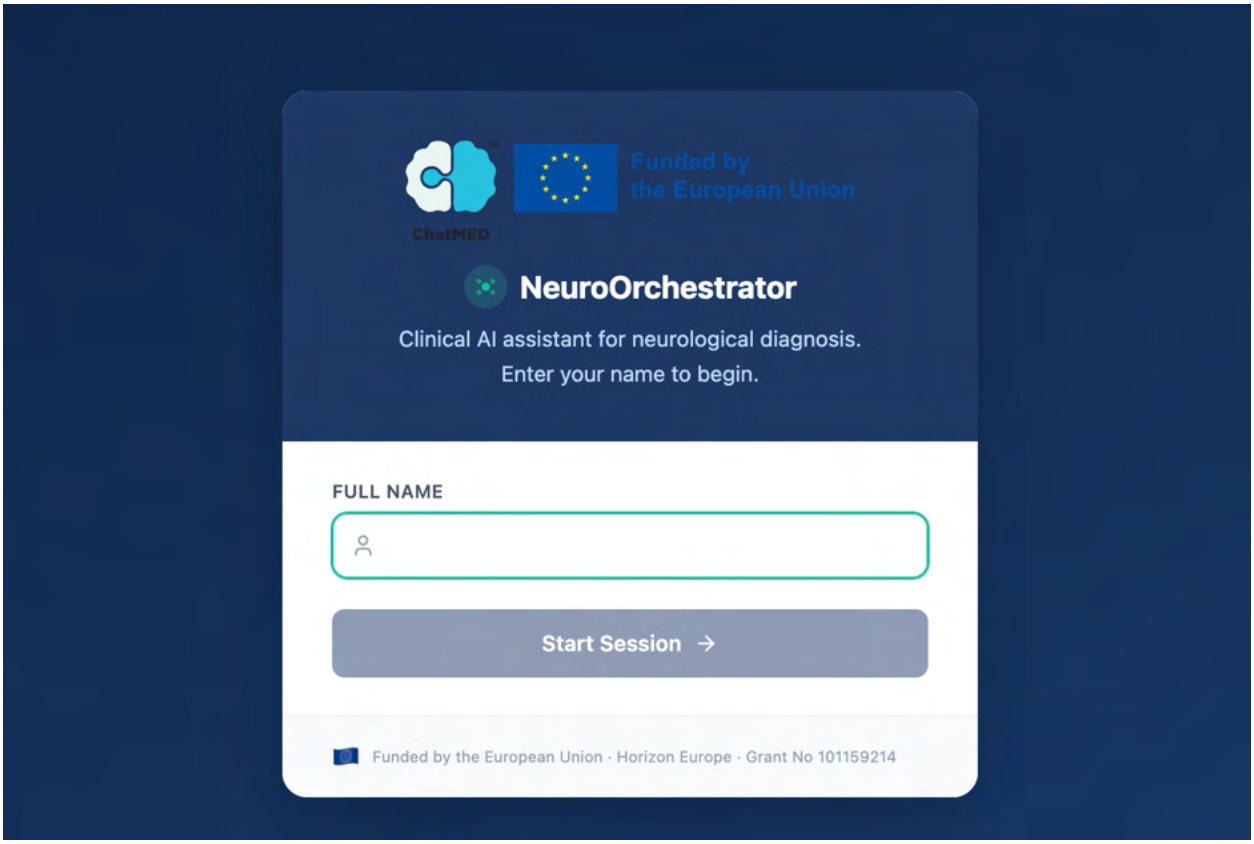

Figure 6. The NeuroOrchestrator login form.

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Integrated Outcomes

Across all slides, the central educational outcome was a shared language between clinicians and AI researchers. Participants learned that neurological problems are defined, measured, monitored, and translated into technical solutions; that symptoms are not diagnoses; that tests change probabilities rather than create certainty; and that clinical context is essential for safe AI development. The realistic AI roles identified across sessions were narrative structuring, red-flag detection, missing-information detection, longitudinal summarization, diagnostic-workflow support, rational testing support, EDx and imaging documentation, EEG and EP context structuring, seizure and movement detection, diary analysis, digital biomarkers, patient-friendly explanation, handover support, and evaluation through clinician-rated workflows. The corresponding limits were consistent: AI must not replace clinical responsibility, erase uncertainty, sign autonomously, overinterpret tests, ignore mimics, or convert possibilities into confirmed diagnoses. The final message of the Sokobanja school was that future healthcare AI will not be built by technology alone. It depends on collaboration among people who understand patients, data, and safe system design; clinicians and engineers must define problems together, evaluate tools together, and share responsibility. The page closes with the core principle that good AI in medicine does not begin with an algorithm; it begins with the right clinical question.

A few photos from the subsequent days showcase the energy, interaction, and collaborative spirit that defined the event.

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Figure 7. Summer School 2 in Sokobanja (May 2026).

Art Exhibition 2

“Cognitive Horizons: When Art Became Part of the School of Minds” presented art as an additional language for exploring questions of intelligence, memory, cognition, identity, and the relationship between biological and artificial systems. The event was positioned alongside lectures, workshops, and discussions, adding a reflective dimension to the School of Minds. Rather than functioning as decorative illustrations of technology, the artworks acted as visual provocations, encouraging participants to consider scientific and technological themes from a different perspective. The whole gallery is available at: https://chatmed-project.eu/cognitive-horizons-when-art-became-part-of-the-school-of-minds/.

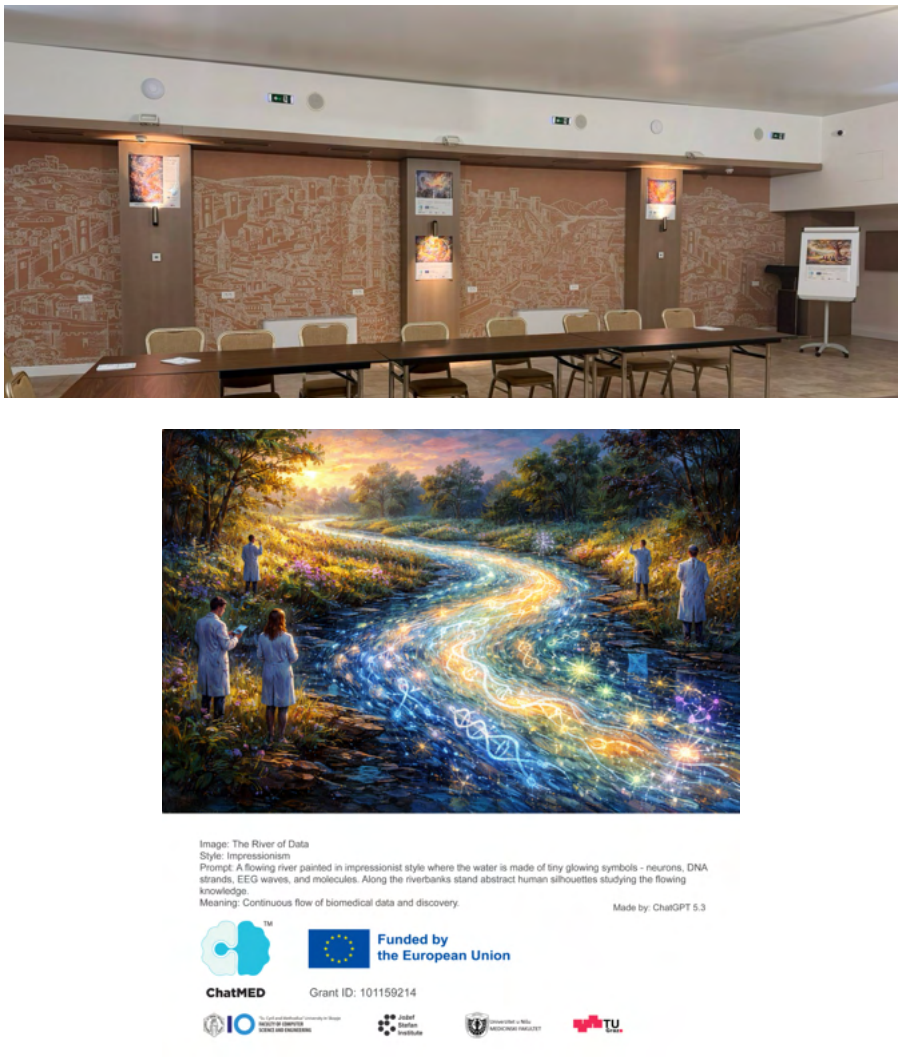

Figure 8. Art Exhibition 2 in Sokobanja (May 2026).

Communication, Networking, Dissemination, and Exploitation Activities

The public-facing accounts of the CNDE and dissemination activities below are maintained on the ChatMED website, which functions as the project's main dissemination layer for event reports, news, blogs, and research highlights. Downloadable educational and presentation materials are retained in the Knowledge Repository at the website. The highlights are described as follows.

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Communication & Networking

ChatMED Presentation at Twinning Info Day in Niš, Serbia

ChatMED was presented at the Twinning Info Day held on 15 September 2025 in Niš, Serbia, and organized by the Faculty of Electronic Engineering within the framework of the Twinning project “Twinning for Excellence in Adaptive Edge AI” (AIDA4Edge). The event brought together representatives of 12 Twinning projects at different stages of implementation and from diverse research fields, creating a platform for presenting project activities, exchanging experiences, and discussing shared challenges. ChatMED was represented by Prof. Stevo Lukić, who presented the project alongside initiatives including TWIN-RELECT, ARTIFACT, TAICHIP, UR–DATA, SUNRISE, InnovAntiBiofilm, InPlasTwin, RETLAMI-SEE, TRANSIT, BIOMICS, and AIDA4Edge. A key part of the event was the discussion session, where participants addressed practical aspects of project implementation such as continuous reporting, open science, risk management, interim review meetings, financial reporting, and intellectual property rights. ChatMED’s participation contributed to the visibility of the project within the wider European Twinning community and supported peer learning, collaboration, and the exchange of practical guidance among project teams.

ChatMED Secures Formal Partnerships with Industry Leaders

During Period 2, ChatMED also formalized partnerships with four industry actors to strengthen the pathway from research to implementation. The partnership with Sorsix, vendor of the national health information system in North Macedonia, focuses on exploring integration of ChatMED capabilities into clinical information-system workflows. Fingerprint Diagnostics contributes specialized expertise in early cancer detection and domain knowledge; Bioengineering extends the ecosystem toward microbiology and laboratory interpretation; and Ekonet, part of the Kontron Group, contributes infrastructure and embedded/offline deployment expertise. Together, these collaborations broaden the project’s access to clinical workflows, specialized biomedical knowledge and deployment infrastructure, supporting the objective of turning research prototypes into solutions that can be evaluated and used in realistic healthcare environments.

The Power of Timely Action: A Healthcare System that Delivers

ChatMED took part as a panelist at the 4th AmCham North Macedonia Healthcare Conference in a discussion titled “Recommendations for Improvement in the Year Ahead,” focused on practical priorities for strengthening the healthcare system. The panel continued work from a previous expert workshop that examined the transition from a reactive to a proactive healthcare model, improved access to medicines and medical devices, better use of health data, and functional decentralization of the healthcare system. The discussion addressed key challenges and systemic bottlenecks while emphasizing feasible and actionable solutions for the coming year. The event also highlighted the importance of collaboration, evidence-based decision-making, and a shared vision for a modern, data-driven healthcare ecosystem. Participants included moderator Maja Kambovska from the AmCham Healthcare Committee, Dalibor Frtunik from Sorsix, Margarita Spasenovska from the World Health Organization, Monika Simjanoska Misheva from

the Faculty of Computer Science and Engineering in Skopje, and Vesna Velikj Stefanovska from the Faculty of Medicine at Ss. Cyril and Methodius University in Skopje, whose dialogue contributed to defining concrete steps toward more timely, proactive, and effective healthcare delivery.

Figure 9. Panelist at 4th AmCham North Macedonia Healthcare Conference in Skopje.

Building Bridges for Future Healthcare Innovation

ChatMED participated in a strategic networking meeting in Paris on 4 December 2025, hosted at the invitation of AP-HP and INSERM, with the aim of building long-term relationships and developing ideas for future COST and Horizon Europe applications. The meeting brought together a broad European network of institutions and experts, including partners from Switzerland, Poland, Lithuania, Portugal, Norway, North Macedonia, and Italy, as well as representatives connected through ChatMED's widening activities, such as an AI ethics expert and a Macedonian national health system vendor. ChatMED presented four key "stories" to demonstrate the value and future direction of its ecosystem: the project's rapid development as a launchpad for new proposals, the Human Evaluation Platform for keeping clinical experts involved in assessing generative AI outputs, the use of multi-agent systems in drug discovery, and the integration of ChatMED with Electronic Health Record systems to reduce administrative burden and support decision-making at the point of care. The meeting was presented as an important step toward a unified European health-tech network, strengthening links among ethical experts, vendors, universities, and research institutes while laying the groundwork for future collaborative proposals in digital health.

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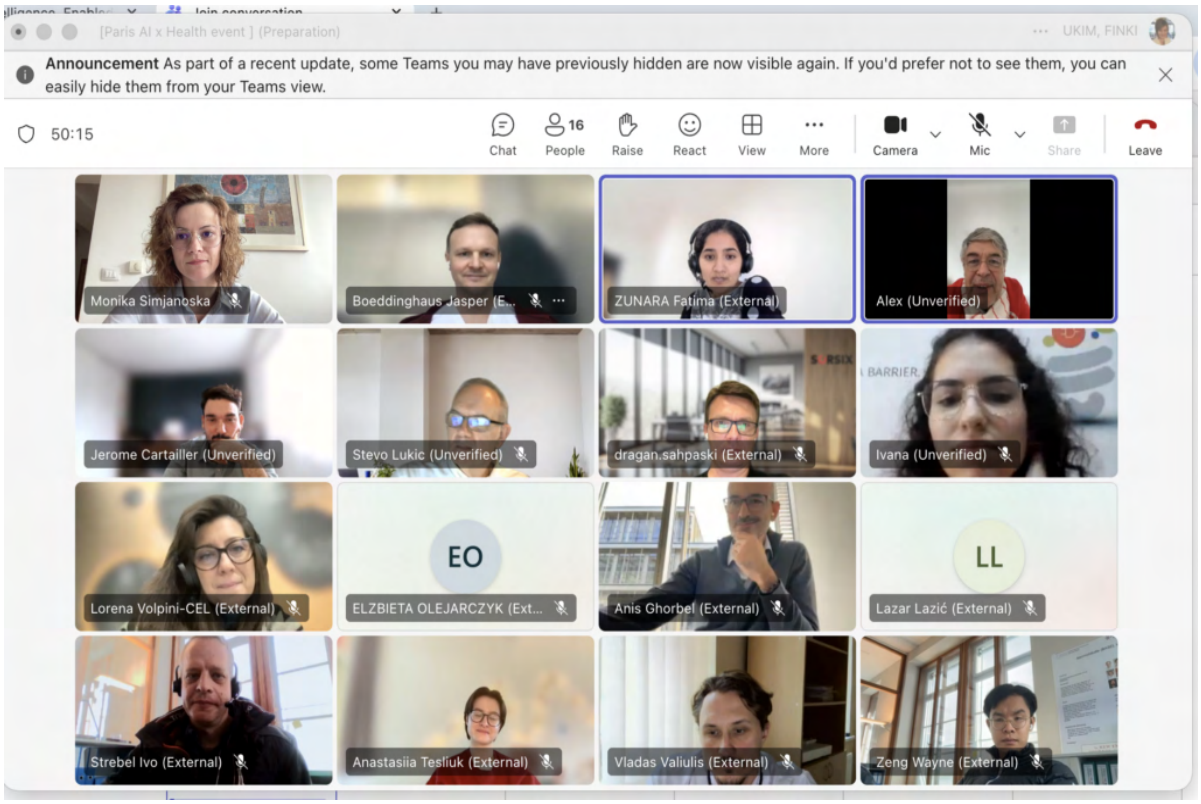

Figure 10. Networking meeting in Paris (December 2025).

ChatMED Coordinator Featured in Podcast on AI in Medicine

ChatMED coordinator Dr. Monika Simjanoska Misheva appeared as a guest on the Dr. Chadikovski Podcast, hosted by Macedonian surgeon Dr. Vladimir Chadikovski, in an episode focused on the role of artificial intelligence in medicine and the question of whether AI could one day replace surgeons and physicians. The discussion presented AI as a tool for supporting, rather than replacing, medical professionals, especially by helping clinicians analyze complex medical data, detect hidden patterns, and improve diagnostics, treatment planning, and data-driven decision support. The episode also introduced the broader vision of ChatMED, which aims to use Large Language Models and advanced AI systems to support medical diagnosis and treatment recommendations while preserving the central role of human expertise in clinical decision-making. Released on 19 February 2026, the episode generated strong public engagement, reaching more than 40,000 YouTube views globally within the first weeks, showing significant interest in AI-driven healthcare innovation when explained through dialogue between clinicians and researchers. ChatMED's participation in the podcast also strengthened public awareness of the project's mission to connect cutting-edge AI research with real clinical practice and to promote trustworthy, responsible AI systems that support physicians and improve patient care.

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Figure 11. Podcast participation in February 2026.

ChatMED 2025 Year in Review

On 1 January 2026, ChatMED issued a Year in Review newsletter summarizing the project's 2025 scaling, research, partnership and capacity-building milestones. The retrospective highlighted the Pharos AI Factory connection, institutional memoranda with industry, scientific production, conference presence and the management training delivered at IS2025. As a dissemination product, the newsletter consolidated project achievements into a concise public-facing format and directed audiences toward the project website, repositories and social channels. Newsletters have been quarterly issued up to date and are available at the project website.

MDPI Special Issue: Call for Papers

ChatMED further extended scientific dissemination by supporting the Special Issue "Machine Learning and Computational Methods for Smart Healthcare Applications" in Future Internet. The public call invited work on LLMs in healthcare, clinical decision support, multimodal AI, patient-facing systems, human-in-the-loop designs, ethical and regulatory alignment, and computational infrastructure for real-world deployment. The Special Issue therefore functions as a dissemination and community-building mechanism beyond the consortium, encouraging research that connects methodological innovation with practical medical implementation.

ChatMED Featured at the 4th Balkan School for Pediatricians in Skopje

ChatMED was featured at the 4th Balkan School for Pediatricians, held on 27 March 2026 at the Hilton Hotel in Skopje, where the project coordinator participated as an invited panelist in a session dedicated to the application of artificial intelligence in pediatrics. The panel brought together medical experts and researchers to discuss current opportunities and future directions for AI in pediatric healthcare, with ChatMED contributing perspectives on how advanced AI methods, including Large Language Models, can support clinical practice through improved diagnostics, decision support, and personalized care pathways. The discussion also addressed important conditions for the responsible adoption of AI in healthcare, including reliability, ethical

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use, and integration into existing clinical workflows. ChatMED's participation strengthened its role in connecting the AI research community with medical professionals in the region and marked another step in promoting responsible, practical, and impactful use of AI in real-world healthcare settings.

Figure 12. Panelist at 4th Balkan School for Pediatricians.

AI in Medicine: Not Science Fiction, but a Question of Education

ChatMED coordinator Prof. Monika Simjanoska Misheva appeared on the North Macedonia TV program "Македонија наутро" to discuss what Generative AI means for healthcare and why the debate in North Macedonia should move from whether AI should be used to how it can be implemented responsibly. The discussion emphasized that AI is already present in medicine through diagnostic devices with built-in AI, but that the rapid development of new systems requires careful ethical, regulatory, and educational preparation. Through ChatMED, the focus is placed on both research and education, with the main challenge identified not as software development itself, but as safe and ethical implementation under frameworks such as the EU AI Act and related regulations. The message was clear that AI will not replace doctors, but can support them by improving efficiency and diagnostic accuracy, while clinical judgment, empathy, and responsibility remain with physicians. The discussion also stressed that AI systems depend directly on the quality of medical data, making responsible data collection, curation, and sharing essential. Another key point was the need for interdisciplinary education: engineers must understand clinical reasoning, while doctors must learn to use AI tools critically. Patients were also included in the discussion, as more people now use AI to explore symptoms before visiting a doctor; this can make patients better informed, but it also requires awareness that AI may be wrong. Prof. Simjanoska Misheva concluded that AI-based systems could realistically become a public support layer in the Macedonian healthcare system within about five years, but only if accompanied by a national campaign for AI literacy across healthcare and society.

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ChatMED Coordinator Monika Simjanoska Misheva Received Women in Tech® Macedonia Award at Presidential Ceremony

ChatMED coordinator Prof. Dr. Monika Simjanoska Misheva was recognized at the first Women in Tech® Macedonia Awards, held on 26 May 2026 at the Cabinet of the President of the Republic of North Macedonia under the patronage of President Gordana Siljanovska-Davkova. The ceremony celebrated innovation, leadership, and influence in the national IT and innovation ecosystem, and was organized by Women in Tech® Macedonia in cooperation with the Ministry of Digital Transformation. Prof. Simjanoska Misheva was recognized for her role in advancing disruptive technological innovation and creating visible European impact through ChatMED, described in the source as the largest EU project of its kind coordinated by Ss. Cyril and Methodius University in Skopje and focused on generative artificial intelligence in healthcare. For ChatMED, the award was presented not only as an individual achievement, but also as confirmation of the importance of connecting research, healthcare, industry, and institutions at a time when AI is increasingly shaping the transformation of health systems. The recognition also reflected the collective work of the ChatMED consortium, partners, researchers, clinicians, students, and collaborators, while reinforcing the project's mission to strengthen responsible, human-centered, and clinically meaningful use of generative AI in medicine.

Figure 13. WomenInTech Macedonia Awards ceremony.

From Women in Tech Recognition to Tech Diplomacy

Following the Women in Tech® Macedonia recognition, the ChatMED coordinator was nominated by the President of North Macedonia to join the inaugural cohort of the Tech Diplomacy Global Institute Executive Program (TDGEP). The nomination extended ChatMED's capacity-building impact beyond medical AI by connecting its implementation challenges with broader questions of technology governance and digital sovereignty. The experience highlighted that translating research into practice requires not only technology, but also institutions, regulation, data, infrastructure, funding, trust, and coordinated national action.

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Turning Tech Diplomacy into a National Evidence Initiative

The TDGEP experience subsequently inspired NEO – the National Evidence Observatory, an initiative aimed at identifying, connecting, and mobilizing North Macedonia's dispersed knowledge and technological capacities. Building on lessons from ChatMED, NEO seeks to connect national strategic priorities with evidence and expertise already available through universities, research groups, European projects, companies, and the international research diaspora. The initiative therefore represents a progression from strengthening one research ecosystem through ChatMED toward developing a broader evidence-based mechanism for national technological decision-making and digital sovereignty. The tool is recognized and supported by the President of North Macedonia, H. E. prof. Gordana Siljanovska-Davkova who shared her attitude on the social media. The full post is available at: https://www.facebook.com/share/p/1BGQU2zhVJ/?mibextid=wwXIfr.

Figure 14. Meeting with the President of North Macedonia (Ohrid 2026).

External media coverage (traditional and online outlets)

In addition to the television appearance and the Dr. Chadikovski podcast described above, Period 2 generated external media coverage that increased the visibility of ChatMED's leadership, healthcare-AI mission and wider innovation ecosystem:

- Konekt.mk – "Моника Симјаноска Мишева ќе ја претставува Македонија во престижната меѓународна програма за Tech Diplomacy" (3 July 2026) reported the selection of the ChatMED coordinator to represent North Macedonia in an international Tech Diplomacy programme. The coverage followed the Most Disruptive Award and

broadened public visibility of the leadership and international networking capacity surrounding the project and the wider national technology ecosystem.

- SkopjeInfo – “Ќе нè замени ли вештачката интелигенција? Не, но ќе нè натера да работиме поинаку” (27 August 2026) published a long-form interview that explicitly presented ChatMED as a Horizon Europe project coordinated at FCSE/UKIM and discussed the role of AI in healthcare, the need for high-quality structured data and institutional readiness, the Vezilka AI Antenna, and the principle that AI should support rather than replace physicians. The interview connected ChatMED’s technical work with broader public discussion on responsible AI adoption, digital sovereignty, education and national innovation capacity.

Dissemination

Best Paper Achievements

ChatMED received two research-paper distinctions during Period 2. At the 28th Information Society Multiconference (IS2025) in Ljubljana, the TU Graz team received the Best Paper Award for “Extraction of Knowledge Representations for Reasoning from Medical Questionnaires.” The work transforms expert-curated symptom-checker knowledge into formal decision trees and logical representations, providing transparent structures against which AI reasoning can be tested.

At the 7th International Conference on Deep Learning Theory and Applications (DeLTA 2026) in Porto, the paper “Evaluating SAM3 and MedGemma for Brain Tumor MRI: Zero-Shot Segmentation, Linear Probing, and Multimodal Diagnosis” received the Best Student Paper Award. The study explores the transfer of recent foundation models to brain-tumor MRI and examines the opportunities and limitations of combining segmentation with multimodal diagnostic reasoning.

Peer-Reviewed Journal Publications

Prompt-to-Pill: Multi-Agent Drug Discovery and Clinical Simulation Pipeline [1] introduces a multi-agent framework connecting drug discovery, preclinical evaluation, and clinical simulation within a single coordinated pipeline. The work demonstrates how specialized AI components can be integrated into an end-to-end, traceable drug-development workflow.

RAGCare-QA: A Benchmark Dataset for Evaluating Retrieval-Augmented Generation Pipelines in Theoretical Medical Knowledge [2] introduces a benchmark dataset for systematically evaluating RAG architectures in medical knowledge applications. The dataset supports comparison of alternative retrieval strategies and provides an open resource for medical RAG research.

AI Act Compliance Within the MyHealth@EU Framework: Tutorial [3] examines how AI-related transparency, provenance, human oversight, and risk-management information can be incorporated into interoperable European health-data exchange. The work connects AI Act compliance with the MyHealth@EU technical environment.

Exploring the Potential of Topological Data Analysis for Explainable Large Language Models: A Scoping Review [4] reviews the use of Topological Data Analysis for understanding internal LLM representations, robustness, and model behaviour. The work positions topology as a promising approach for deeper explainability in high-risk applications such as healthcare.

Multi-Agent Readiness Scoring Methodology in Bioinformatics Domain [5] introduces a methodology for assessing whether bioinformatics LLMs are ready for integration into multi-agent workflows. The study highlights the difference between strong domain performance and operational readiness for interoperable, agent-based systems.

Conference Publications

ICT Innovations 2025

Evaluating LLMs on the Extractive Question-Answering Task in Macedonian [6]. The paper evaluates large language models on an extractive question-answering task in Macedonian, contributing evidence on their performance in a low-resource language setting. The work is relevant to ChatMED's broader objective of developing AI systems that are usable beyond high-resource languages and better adapted to regional linguistic contexts.

IS2025 – 28th Information Society Multiconference, Ljubljana, Slovenia

Source available at:
https://chatmed-project.eu/knowledge-repository/conference-papers-is2025-ljubljana-slovenia/

ChatMED presented five papers at IS2025, covering complementary aspects of trustworthy and clinically useful AI in healthcare. The contributions ranged from formal knowledge representations and multidimensional LLM evaluation to privacy-sensitive deployment, patient-facing medical communication, and assessment of rapidly evolving LLM reasoning capabilities:

- **Beyond Accuracy: A Multidimensional Evaluation Framework for Medical LLM Applications (M-LEAF).** The paper introduces M-LEAF, a framework for evaluating medical LLMs across eight dimensions extending well beyond diagnostic accuracy, including interaction quality, safety, robustness, transparency, uncertainty, governance, and workflow factors. Its purpose is to identify clinically important weaknesses that may be hidden by conventional accuracy-only evaluation.
- **Evaluating Large Language Models for Privacy-Sensitive Healthcare Applications.** Using HomeDOCtor as the motivating application, the work examines how LLM utility can

be balanced against privacy, security, and GDPR requirements. It proposes practical evaluation and deployment safeguards and shows that locally deployable open-weight models can offer viable options for privacy-sensitive healthcare, although important performance trade-offs remain.

- **Extraction of Knowledge Representations for Reasoning from Medical Questionnaires.** The paper proposes an automated methodology for converting medically curated questionnaires into decision trees and formal logical rules. These representations create an explainable and deterministic knowledge base that can support rigorous testing and verification of LLM and medical expert-system reasoning. The contribution received the IS2025 Best Paper Award.
- **Evaluating the Accuracy and Quality of ChatGPT-4o Responses to Patient Questions on Reddit.** The study evaluated ChatGPT-4o on epilepsy-related questions collected from the r/AskDocs community and assessed by four physicians. Responses were generally rated highly for accuracy, clarity, relevance, and comprehensiveness, while empathy emerged as the weakest dimension, supporting a complementary rather than replacement role for LLMs in patient communication.
- **IQ Progression of Large Language Models: Evaluating LLM Cognitive Capabilities.** This paper examines historical performance of leading LLMs on IQ-style benchmarks and maps model performance against human reference distributions. The analysis identifies rapid improvement over 2024–2025 while stressing that such psychometric comparisons should be interpreted cautiously and alongside broader measures of machine intelligence.

BIOINFORMATICS 2026 – 17th International Conference on Bioinformatics Models, Methods and Algorithms

Drug Repurposing for COVID-19 [7]. The study presents an integrated computational pipeline combining deep-learning drug–target interaction prediction, molecular docking, and LLM-driven molecular generation for COVID-19 drug repurposing. Rather than proposing a new therapy directly, it demonstrates a reproducible workflow for rapidly prioritizing existing compounds for further investigation in urgent infectious-disease settings.

Entropy and Stemness Index-Based Quantification of Epigenetic Dysregulation for Machine Learning-Driven Stratification of Representative Cancer Types [8]. The work investigates DNA-methylation entropy, local methylation instability, and the methylation-derived stemness index across representative cancer cohorts. The results indicate that epigenetic instability is strongly associated with malignant transformation, while its relationship with established tumor aggressiveness and clinical outcomes is more complex and cancer-type dependent.

DeLTA 2026 – 7th International Conference on Deep Learning Theory and Applications, Porto, Portugal

A Decision Pipeline for RAG Architecture Selection in Medical Education: Empirical Analysis and Cost-Performance Guidelines [9]. The paper compares Vanilla, Vector, Graph, and Hybrid RAG architectures on the 420-question RAGCare-QA benchmark. Based on differences in accuracy, latency, and operational cost, it proposes a three-stage decision framework that turns RAG architecture selection into an evidence-based engineering process rather than an ad hoc technical choice.

Evaluating SAM3 and MedGemma for Brain Tumor MRI: Zero-Shot Segmentation, Linear Probing, and Multimodal Diagnosis [10]. The study evaluates how recent foundation models transfer to brain-tumor MRI, examining zero-shot segmentation, linear probing, and multimodal diagnostic reasoning. It highlights both the potential and current limitations of combining image segmentation with multimodal clinical reasoning and received the DeLTA 2026 Best Student Paper Award.

Open Preprints and Manuscripts Under Review

NeuroVLM-Bench: Evaluation of Vision-Enabled Large Language Models for Clinical Reasoning in Neurological Disorders [11]. The open preprint evaluates vision-enabled LLMs on neurological imaging and clinical reasoning tasks, examining diagnostic performance, structured outputs, calibration, and computational efficiency.

Institutional Operationalisation of the Converging EU Digital Rulebook for Trustworthy AI-in-Health Research [12]. Developed as a direct scientific outcome of STSE 2, the manuscript translates GDPR, NIS2, the AI Act, and EHDS requirements into an institutional accountability framework for AI-in-health research. The manuscript is openly available on Zenodo and is currently under review.

Exploitation

Vezilka: A New AI Beacon for the Region

Vezilka was announced as a major milestone for the ChatMED ecosystem and as a new “AI Antenna” established as a key node of the Greek Pharos AI Factory, giving innovators in North Macedonia secure access to powerful European AI resources and supercomputing infrastructure without requiring massive local infrastructure. The initiative is intended to support the development of a skilled AI workforce, modernize public services, and enable AI solutions in areas such as health, energy, culture and language, agriculture, and digital public administration, including work toward a Macedonian language model. The source presents Vezilka as a direct result of ChatMED’s capacity-building mission, noting that the proposal was authored by ChatMED member Prof. Dimitar Trajanov and that the achievement demonstrates how project participants are becoming active architects of regional AI development. For ChatMED, Vezilka is especially significant in healthcare, as it can provide the computing power and specialized infrastructure needed to deploy advanced medical AI models at scale, helping move research results from the laboratory into national health infrastructure to improve patient outcomes and

streamline medical workflows. Overall, Vezilka is presented as a sustainable platform for future innovation and as a regional beacon through which ChatMED's medical AI pilots and wider AI initiatives can continue to develop beyond the project itself.

TopX: A ChatMED Derivative Project Strengthens the North Macedonia–Austria Research Collaboration

TopX was presented as a new derivative project emerging from the ChatMED research ecosystem and strengthening bilateral research collaboration between North Macedonia and Austria. The project, titled "TopX – Comparative Study of Explainable AI Techniques with a Focus on Topological Data Analysis," was selected among 14 joint scientific-research projects between the two countries financed by the Ministry of Education and Science of the Republic of North Macedonia, with implementation planned for two years starting on 1 July 2026. As a continuation of cooperation initiated and reinforced through ChatMED, TopX will explore and compare explainable AI methods, with particular attention to Topological Data Analysis as a mathematically grounded approach for improving the interpretability, reliability, and transparency of AI models. The article emphasizes that explainability is becoming a core requirement for trustworthy AI, especially as AI systems are increasingly used in sensitive and high-impact domains where scientific validity, regulatory readiness, and real-world adoption depend on transparent model behavior. Led by Prof. Dr. Kostadin Mishev and Prof. Dr. Franz Wotawa, TopX is presented as another successful step in Macedonian–Austrian scientific cooperation, opening new opportunities for joint research, capacity building, and future European project development.

Year 2 Proposal Submissions

The mid-term progress report had already recorded four Horizon/EuroHPC follow-up proposals by 31 December 2025 (ChatMED-CARE, ChatMED-GLIA, 3D-SMASH under HORIZON-CL4-2025-03, and the EuroHPC AI Antenna), together with two bilateral submissions and one COST Action proposal. During Year 2, the proposal-development pipeline expanded further. Table 1 consolidates the proposals submitted during Period 2, including submissions already reported at mid-term and subsequent Year 2 submissions. The 2026 3D-SMASH entry represents a separate submission/resubmission under HORIZON-CL4-2026-05 and is therefore counted separately.

Table 1. Year 2 proposal submissions.

Acronym	Call / action	Coordinator	Consortium / requested grant
ChatMED-CARE	HORIZON-HLTH-2025-01-CARE-01	UKIM, North Macedonia	17 beneficiaries / €16.57M
ChatMED-GLIA	HORIZON-EIC-2025-PATHFINDERCHALLENGES-01-02	UKIM, North Macedonia	10 beneficiaries / €3.95M
3D-SMASH (2025)	HORIZON-CL4-2025-03	Gesellschaft fur Angewandte Mikro und Optoele, Germany	9 beneficiaries / €4.99M

Acronym	Call / action	Coordinator	Consortium / requested grant
TopX – Comparative Study of Explainable AI Techniques with a Focus on Topological Data Analysis	Bilateral scientific-research cooperation	UKIM, North Macedonia	2 beneficiaries / €20K
IDEAL	COST OC-2025-1-28842	Belgrade Center for Digital Humanities	71 proposers
3D-SMASH (2026)	HORIZON-CL4-2026-05 (RIA)	Gesellschaft fur Angewandte Mikro und Optoele, Germany	11 beneficiaries / €6.67M
AI-CLiMB	HORIZON-WIDERA-2026-02-WIDENING-01 (Twinning)	UKIM, North Macedonia	4 beneficiaries / €1.17M
AIDE	HORIZON-WIDERA-2025-01-ACCESS-01 (European Excellence Initiative)	Ege University, Türkiye	18 beneficiaries / €5.00M
TrustGenAI4CKM	HORIZON-HLTH-2025-01-TOOL-03 (RIA)	UKIM, North Macedonia	14 beneficiaries / €12.57M

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Summary

Deliverable D5.1 reports the main training, short-term scientific exchange, Summer School, dissemination, networking, and exploitation activities implemented during ChatMED Period 2. Two dedicated training sessions were complemented by two additional capacity-building activities in Skopje: a national EU4Health training supporting North Macedonia's participation in the programme and a WIDERA Twinning proposal-development session based on ChatMED experience. Together, these activities strengthened competences in project and financial management, quality assurance, software engineering, research funding, scientific publishing, secure medical-data architectures, regulatory compliance, and institutional preparedness for European funding and health-data initiatives.

STSE 2 focused on the practical institutional implementation of GDPR, NIS2, the EU AI Act, and the EHDS, translating regulatory requirements into governance, cybersecurity, data-management, and audit practices and generating a dedicated research manuscript.

Summer School 2, held under the theme "Neurology and AI Fusion," brought together clinical and technical participants to connect neurological reasoning with responsible AI development and culminated in a live demonstration of the NeuroOrch multi-agent platform.

Period 2 also strengthened ChatMED's scientific and societal impact through peer-reviewed and open research outputs, conference participation and two Best Paper distinctions, industry partnerships, public and policy engagement, media visibility, and the Cognitive Horizons art exhibition. Exploitation and sustainability were further supported through the Vezilka AI Antenna, the TopX bilateral project, and an expanded portfolio of Horizon Europe, COST, and bilateral follow-up proposals, demonstrating how ChatMED's capacity-building activities are generating new research collaborations and opportunities beyond the original project.

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References

[1] Vichentijevikj, I., Mishev, K., & Simjanoska Misheva, M. (2026). Prompt-to-Pill: Multi-Agent Drug Discovery and Clinical Simulation Pipeline. Bioinformatics Advances, 6(1), vbaf323. https://doi.org/10.1093/bioadv/vbaf323

[2] Dobreva, J., Karasmanakis, I., Ivanisevic, F., Horvat, T., Kitanovski, D., Gams, M., Mishev, K., & Misheva, M. S. (2025). RAGCare-QA: A benchmark dataset for evaluating retrieval-augmented generation pipelines in theoretical medical knowledge. Data in Brief, 63, 112146. https://doi.org/10.1016/j.dib.2025.112146

[3] Simjanoska Misheva, M., Shahpaski, D., Dobreva, J., Bukovec, D., Gjorgjioski, B., Nikolov, M., Frtunikj, D., Lameski, P., Aliu, A., Mishev, K., & Gams, M. (2025). AI Act Compliance Within the MyHealth@EU Framework: Tutorial. Journal of Medical Internet Research, 27, e81184. https://doi.org/10.2196/81184

[4] Sekuloski, P., Kitanovski, D., Goshev, I., Mishev, K., Misheva, M. S., & Dimitrievska Ristovska, V. (2026). Exploring the Potential of Topological Data Analysis for Explainable Large Language Models: A Scoping Review. Mathematics, 14(2), 378. https://doi.org/10.3390/math14020378

[5] Gjorgjioski, B., Bukovec, D., Vichentijevikj, I., Kitanovski, I., Mishev, K., & Simjanoska Misheva, M. (2026). Multi-Agent Readiness Scoring Methodology in Bioinformatics Domain. Future Internet, 18(8), 409. https://doi.org/10.3390/fi18080409

[6] Milev, S., Simjanoska Misheva, M., & Mishev, K. (2025). Evaluating LLMs on the Extractive Question-Answering Task in Macedonian. Web Proceedings of the 17th ICT Innovations Conference, p. 190.

[7] Kralevska, A., Vichentijevikj, I., & Simjanoska Misheva, M. (2026). Drug Repurposing for COVID-19. In Proceedings of the 19th International Joint Conference on Biomedical Engineering Systems and Technologies, Vol. 2: BIOINFORMATICS (pp. 633–640). SciTePress. https://doi.org/10.5220/0014372200004070

[8] Bukovec, D., Kungulovski, G., Gievska, S., & Simjanoska Misheva, M. (2026). Entropy and Stemness Index-Based Quantification of Epigenetic Dysregulation for Machine Learning-Driven Stratification of Representative Cancer Types. In Proceedings of the 19th International Joint Conference on Biomedical Engineering Systems and Technologies, Vol. 2: BIOINFORMATICS (pp. 527–538). SciTePress. https://doi.org/10.5220/0014418400004070

[9] Dobreva, J., Horvat, T., Gams, M., Mishkovski, I., Mishev, K., & Simjanoska Misheva, M. (2026). A Decision Pipeline for RAG Architecture Selection in Medical Education: Empirical Analysis and Cost-Performance Guidelines. Presented at the 7th International Conference on Deep Learning Theory and Applications (DeLTA 2026), Porto, Portugal. Open preprint: https://doi.org/10.5281/zenodo.17092851

[10] Kostova, T., Kitanovski, I., Simjanoska Misheva, M., & Mishev, K. (2026). Evaluating SAM3 and MedGemma for Brain Tumor MRI: Zero-Shot Segmentation, Linear Probing, and

Multimodal Diagnosis. Presented at the 7th International Conference on Deep Learning Theory and Applications (DeLTA 2026), Porto, Portugal. Best Student Paper Award.

[11] Trojachanec Dineva, K., Andonov, S., Ivanoska, I., Kitanovski, I., Gramatikov, S., Kostova, T., Simjanoska Misheva, M., & Mishev, K. (2026). NeuroVLM-Bench: Evaluation of Vision-Enabled Large Language Models for Clinical Reasoning in Neurological Disorders. arXiv:2603.24846. https://arxiv.org/abs/2603.24846

[12] Trajanova, V., Horvat, T., Gradisek, A., Gams, M., Mishev, K., & Simjanoska Misheva, M. (2026). Institutional Operationalisation of the Converging EU Digital Rulebook for Trustworthy AI-in-Health Research. Zenodo. Manuscript under review. https://doi.org/10.5281/zenodo.20812892