An Integrated Solution for Sustainable Care for Multimorbid Elderly Patients with Dementia

CAREPATH

WP8: Impact Promotion, Dissemination, Exploitation and Business Planning

D8.5: Reports on Dissemination and Communication Plan and Activities Third Release

Contractual Date of Delivery to the EC: 30 June 2025

Actual Date of Delivery to the EC: 30 June 2025

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Type (P-prototype, R-report, O-other, ORDP-Open Research Data Pilot, DEM-Demonstrator, ET-Ethics): R-report

Dissemination level (PU-Public, CO-Confidential): PU-Public

Version: Release 3, version 3v4

Total number of pages: *64*

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 945169.

Executive Summary

This document presents the third and final release of Deliverable D8.5, reporting on the full scope of dissemination and communication activities carried out within the CAREPATH project under Task 8.3. It consolidates the outcomes of the project's strategic outreach, knowledge sharing, stakeholder engagement, and visibility efforts across its entire lifecycle.

The three releases of D8.5 reflect the evolving nature of the project's communication approach. The first release (Month 18) established the initial dissemination framework. The second release (Month 36) expanded on this by integrating mid-term outputs and engagement activities. This final release (Month 48) captures the complete set of dissemination achievements, final stakeholder messages, and communication outcomes across all channels, including web, social media, events, publications, video production, and collaboration with related initiatives.

The structure of the document is as follows:

- **Section 1** (Introduction) provides an overview of Task 8.3 and its role within the wider WP8 objectives.
- **Section 2** (Dissemination Strategy) outlines the updated dissemination strategy, including methodology, target audience profiling, and stakeholder messaging, developed in alignment with Tasks 8.1 and 8.2.
- **Section 3** (Communication Channels) documents the communication channels employed, such as the CAREPATH website, newsletters, blog posts, conference participations, academic publications, and multimedia outputs.
- **Section 4** (Dissemination and Communication plans beyond project's life-time) presents the dissemination and communication roadmap beyond the project's conclusion, identifying planned activities and opportunities to sustain visibility and impact.
- **Section 5** Conclusion

This deliverable serves as a comprehensive record of how CAREPATH has communicated its progress, engaged diverse stakeholder groups, and positioned its results for continued relevance and adoption across Europe's digital health landscape.

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1 Introduction

Task 8.3 of the CAREPATH project focused on the design and implementation of a comprehensive dissemination and communication strategy to maximise visibility, raise awareness, and foster engagement with key stakeholders across healthcare, technology, research, and policy sectors. This task played a central role in promoting the project's vision, results, and practical contributions to integrated care for multimorbid elderly patients with dementia.

This final release of Deliverable D8.5 consolidates all dissemination activities undertaken throughout the duration of the project, reflecting an evolving strategy tailored to the project's maturity and emerging outcomes. The deliverable builds upon the two previous reports:

- The **first release** (Month 18) established the foundation of the communication framework, initial channels, and stakeholder outreach plan.
- The **second release** (Month 36) updated this with mid-project outputs, expanded partnerships, and refined stakeholder targeting.
- This **final release** (Month 48) captures the full spectrum of dissemination tools, platforms, outputs, and stakeholder interactions, including the final communication plan and legacy roadmap beyond project completion.

The report outlines how the project's key messages have been shaped and delivered, which stakeholder groups have been prioritised, what communication methods were employed, and what tangible results have been achieved. It highlights the integration of dissemination efforts with exploitation activities (Task 8.2) and stakeholder engagement (Task 8.1), ensuring coherence across all WP8 objectives.

By documenting both the strategic approach and practical execution of CAREPATH's dissemination, this deliverable serves as a comprehensive reference for communicating healthcare innovation and digital transformation initiatives across European research and policy environments.

2 Dissemination Strategy

The dissemination and communication strategy detailed in this deliverable is aligned and interlinked with other key activities and deliverables of WP8:

- **D8.1 (IPR and Innovation Management)** provided the foundation for managing intellectual property across the consortium and informed messaging around exploitation and stakeholder communication. Insights from D8.1, including the Memorandum of Understanding (MoU) process and the mapping of background and foreground IP, have influenced how project results have been positioned in external communications.
- **D8.2 (Branding and Web Presence)** established the initial identity and digital infrastructure of the CAREPATH project, including its visual branding, website, and social media channels. These elements formed the backbone of all online dissemination efforts and have been expanded and adapted throughout the project lifecycle.
- **D8.3 (Preliminary Exploitation and Business Models)** and **D8.4 (Final Exploitation Plan)** both shaped the alignment between dissemination and future exploitation. Messaging across all stakeholder groups, from policymakers and clinicians to technology vendors, was informed by these deliverables' market analyses, value propositions, and strategic positioning of CAREPATH's digital health solutions.

- This final release of D8.5 therefore builds on all preceding WP8 deliverables, serving as both a communication archive and a strategic bridge to exploitation, standardisation, and policy engagement activities beyond the project.

2.1 Objectives

The dissemination and communication strategy of CAREPATH was designed to ensure that the project's vision, progress, and achievements reached relevant audiences across Europe and beyond. The overarching aim has been to promote the widest possible dissemination of project-generated knowledge, reinforce the project's contribution to European digital health innovation, and maximise synergies with the exploitation strategy developed in Task 8.2.

Over the course of the project, the dissemination and communication objectives evolved in response to its maturity, stakeholder engagement needs, and regulatory landscape. The final version of the plan has focused on consolidating impact and strengthening the CAREPATH brand as a credible, evidence-based solution to support the management of multimorbid older adults with dementia.

The plan has been guided by the following strategic objectives:

- **Enhance the commercial potential** of the project's technical and clinical outputs by aligning messaging with the business model and exploitation pathways;
- **Present and promote the project's results** to key stakeholders including policy makers, healthcare providers, industry actors, standards organisations, and academic audiences;
- **Ensure long-term impact** by establishing communication channels and partnerships that can support the continued use, adaptation, and dissemination of project results beyond its funded lifetime;
- **Raise public awareness** of the challenges related to multimorbidity and cognitive impairment in ageing populations, and of CAREPATH's integrated care approach;
- **Promote collaboration** and knowledge exchange with other EU and national-level projects, initiatives, and networks working in digital health, ageing, and dementia care;
- **Inform and empower patients and caregivers** by presenting project outcomes and tools in an accessible, understandable manner that fosters trust, autonomy, and engagement.

These objectives are visually summarised in **Figure 1**, which illustrates the multidimensional goals of the CAREPATH dissemination and communication plan, and their alignment with the project's overall mission and stakeholder landscape.

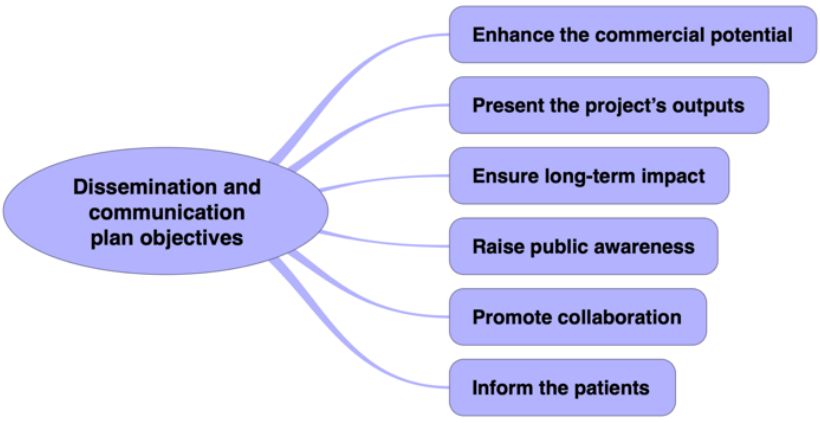


Figure 1. Dissemination and communication plan objectives

2.2 Methodology

This section outlines the structured and iterative methodology applied within WP8: Impact Promotion, Dissemination, Exploitation, and Business Planning, with particular emphasis on the dissemination and communication activities reported in D8.5. The methodology was designed to ensure that CAREPATH's outputs, experiences, and lessons reached their intended audiences in a timely, impactful, and accessible manner, ultimately supporting the project's exploitation, policy uptake, and long-term sustainability.

To maximise coherence and effectiveness, the dissemination approach was broken into three core methodological components:

- **Goal Determination, Content Development, and Branding (What?)**
- **Targeted Audience Identification and Profiling (Who?)**
- **Dissemination Levels and Phases (When?)**

This segmented methodology is illustrated in **Figure 2**.

Figure 2. The segmented dissemination methodology

2.2.1 Goal determination, content and branding (what?)

Dissemination efforts were anchored in clearly defined goals and tailored content creation strategies. CAREPATH dissemination materials were designed to reach well beyond the project consortium, targeting a wide spectrum of stakeholders, including healthcare providers, technology developers, informal caregivers, and patients, across the European digital health landscape.

Three tiers of content engagement were defined to correspond with the stakeholders' level of familiarity, influence, and decision-making power:

1. **Creating Awareness:** Materials at this level aimed to build broad visibility for CAREPATH's objectives and progress. General public-facing outputs such as infographics, newsletters, and social media posts were crafted using clear, non-technical language.
2. **Introducing the CAREPATH Solution:** More detailed communications targeted at professional audiences who could benefit from CAREPATH innovations. Examples include presentations for healthcare professionals, press kits, explainer videos, and white papers tailored to technical and clinical readers.

3. **Engaging Commitment and Action:** Decision-makers and system integrators were addressed with policy briefs, strategic position papers, and direct engagement during workshops and stakeholder events. Content in this category emphasised alignment with public health priorities, evidence of impact, and pathways to adoption or policy integration.

These materials were developed in accordance with the CAREPATH branding guidelines defined in D8.2 and maintained across all channels to support recognition, trust, and cohesion in project identity.

2.2.2 Targeted audiences' identification and profiling (who?)

Dissemination efforts were strategically aligned with a detailed stakeholder mapping exercise that informed the profiling and prioritisation of audiences. The key target groups included:

- **Policy Makers and Regulators:** EU bodies, national and regional health authorities responsible for care innovation and digital transformation agendas;
- **Healthcare Providers:** Hospitals, integrated care organisations, home care services, and insurers positioned as key adopters of the CAREPATH solution;
- **Clinicians and Prescribers:** Professionals involved in care planning, treatment optimisation, and medication management for multimorbid older adults;
- **ICT Developers and Industry Actors:** Companies and SMEs operating in the eHealth and healthtech ecosystem interested in integration, licensing, or co-development;
- **Researchers and Academic Institutions:** Interdisciplinary research teams with a focus on health informatics, gerontology, clinical guidelines, and AI;
- **Patients, Caregivers, and Civil Society:** Individuals and advocacy organisations interested in digital empowerment, co-care models, and person-centred health services.

Each partner in the consortium contributed to audience engagement in line with their institutional roles. Technical partners focused on innovation ecosystems and developer communities, while academic partners took the lead in scientific dissemination and public engagement. Clinical partners and care organisations engaged directly with practitioners and patient networks.

2.2.3 Dissemination levels and phases (when?)

The dissemination strategy was executed in a phased manner aligned with the project's lifecycle. Activities were scaled and adapted over time to reflect the evolving status of project outputs and engagement opportunities.

1. **Phase 1 – Awareness and Positioning (Months 1–12):** Early dissemination focused on introducing CAREPATH's mission, consortium, and goals to target communities. Activities included the launch of the website, creation of project branding, initial stakeholder mapping, and early participation in external events.
2. **Phase 2 – Engagement and Validation (Months 13–36):** As technical developments progressed and pilot sites prepared for deployment, dissemination expanded to include demo presentations, co-creation workshops, social media campaigns, and publications. The focus shifted toward building relationships with early adopters and refining messages based on stakeholder feedback.
3. **Phase 3 – Impact and Legacy (Months 37–48 and beyond):** Final-phase dissemination aimed to consolidate project results, demonstrate benefits, and

facilitate future uptake. Activities included high-profile events (e.g. MIE2025 workshop), policy-facing outputs, peer-reviewed papers, final video animations, and coordination with exploitation and IPR planning activities. The creation of a roadmap for post-project dissemination was also initiated to support sustainability.

This progressive model is shown in **Figure 3**, highlighting how communication efforts matured from awareness-building to adoption facilitation.

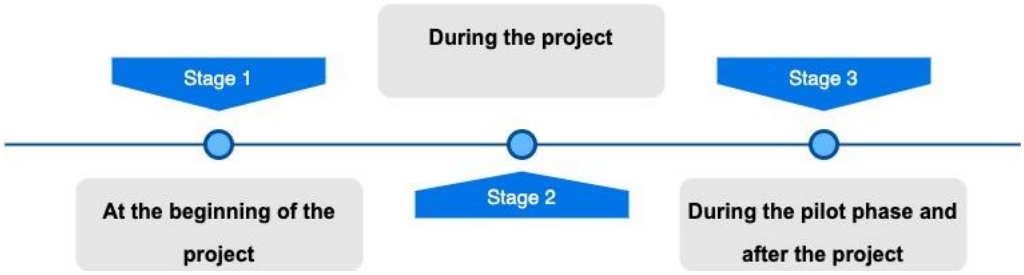


Figure 3. Dissemination Levels and Phases

2.3 Key Stakeholder Messages

CAREPATH's final dissemination phase required clear, stakeholder-specific messages aligned with the maturity of its results and market/policy relevance. The following table provides the updated messaging framework, refined to reflect the latest project developments and available channels:

Table 1 - CAREPATH key stakeholders

Target Audience	Key Messages	Communication Channels
Policymakers	CAREPATH improves care coordination and patient outcomes in multimorbid patients with MCI/mild dementia. Highlights from the Clinical Investigation and Health Economic Assessment show cost-effectiveness and scalability potential. Harmonisation of digital health standards and the case for policy-driven adoption.	Final newsletter, project website, policy briefs, white papers, direct meetings, MIE2025 workshop outputs, ESMED policy contribution.
Public & Private Healthcare Organisations, Insurers	CAREPATH's integrated care model demonstrates reduced fragmentation, better patient adherence, and digital empowerment. Now available for piloting or integration. Alignment with standard care pathways and FHIR-based interoperability frameworks.	Targeted presentations, stakeholder roundtables, digital brochures, adoption interest forms, MIE2025, commercial partner demos.
Health & Care Professionals	CAREPATH offers guideline-driven, patient-centred tools for clinical decision-making, polypharmacy management, and care planning. Insights from the Clinical Investigation and usability feedback support real-world applicability.	Conferences (e.g., MedInfo, ICIMTH, MIE), professional webinars, publications, peer-reviewed papers, instructional videos.
Health ICT Industry	The project offers ready-to-integrate modular components including a FHIR repository, CDS Hooks, semantic rule engine, interoperability middleware, and DSS modules. Business model options available for licensing and co-development.	Dedicated B2B briefings, matchmaking sessions, webinars, partner demos, GitHub repository, licensing enquiries.
Academia & Research	CAREPATH contributes novel approaches in guideline automation, AI-driven alerts, and semantic data interoperability. Results available for follow-up research and Horizon Europe synergies.	Peer-reviewed journals, academic conferences, data access agreements (where possible), research briefings, open-source modules.

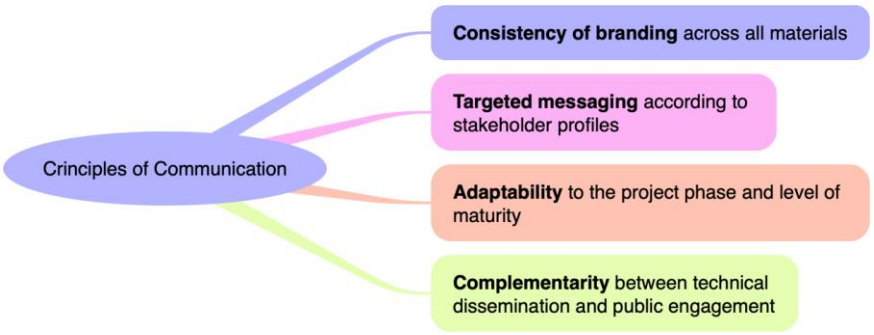
Target Audience	Key Messages	Communication Channels
Patients, Caregivers & Public	CAREPATH helps manage complex health conditions with digital tools tailored for people with memory issues. It supports safer medication, shared care planning, and home monitoring to improve daily life and wellbeing.	CAREPATH animation video, patient group workshops, accessible flyers, social media, website testimonials.

3 Communication Channels

CAREPATH employed a diversified and evolving set of communication channels to support the dissemination of its goals, outputs, and impacts. These included traditional, digital, and in-person channels tailored to the information needs of specific stakeholder groups identified in Section 2.

The selection and use of channels followed four core principles:

- **Consistency of branding** across all materials
- **Targeted messaging** according to stakeholder profiles
- **Adaptability** to the project phase and level of maturity
- **Complementarity** between technical dissemination and public engagement



3.1 Visual Identity and Branding Toolkit

CAREPATH's visual identity was established in WP1 and maintained throughout all project outputs. It formed the basis of recognition, trust, and professional presentation across all communication formats. Key elements included in **Table 2**:

Table 2 - CAREPATH Visual Identity Components

Item	Description	
Project Logo	CAREPATH logo, used on all public materials, presentations, and digital assets	CAREPATH
Partner Logos	Logos of all consortium members presented in communication collateral and joint deliverables	ECLEXYS, Fraunhofer FIT, UKOWL Universitätsklinikum OWL der Universität Bielefeld Campus Klinikum Bielefeld, University of Birmingham, NHS University Hospitals Coventry and Warwickshire NHS Trust

		sescam UCLM CITST SRDC Octilium
Templates	Branded templates for: reports/minutes, PowerPoint presentations, deliverables, and newsletters	
Fonts & Colour Palette	Defined in the visual identity guide to ensure visual consistency	
Email Signatures & Teams and Zoom Backgrounds	Optional assets used by partners for visibility during remote meetings and outreach	

3.2 Core Communication Channels

CAREPATH communication channels were classified into four categories:

3.2.1 Owned Channels

- **Project Website** (www.carepath.care): The central repository for project news, deliverables, public materials, and event announcements. Regularly updated throughout the project (Figure 4).
- **Newsletter**: Issued biannually (later quarterly) to update stakeholders on progress, results, and upcoming events.
- **Social Media**: Primarily via LinkedIn and X (formerly Twitter) accounts of partner organisations, using branded visual content.

3.2.2 Earned & Shared Channels

- **Scientific Publications**: Articles in peer-reviewed journals and conference proceedings.
- **Conference Presentations**: Dissemination at MIE, MedInfo, ICIMTH, and national eHealth events.
- **Media Outreach**: Local/national media appearances by consortium members (e.g., radio, newspapers).
- **Patient and Clinical Networks**: Shared dissemination via hospital communications, patient groups, and NGOs.

3.2.3 Interactive and Multimedia Channels

- **Video Animation**: Final animation summarising CAREPATH's goals, components, and impact.
- **Learning Materials and Videos**: Created to help patients and caregivers using the platform.
- **Demonstration Platforms**: Pilots and usability showcases at clinics and stakeholder events.
- **Surveys and Co-Creation Workshops**: Particularly during WP2, WP4 and WP6.

3.2.4 Targeted Outreach Channels

- **Policy Briefings**: Short documents and presentations tailored to policy-makers at different levels.
- **Exploitation Workshops**: B2B sessions with SMEs and regional authorities.
- **Academic Roundtables**: Engagements with universities and health data researchers.

CAREPATH considers a wide set of outreach means, expanding traditional means with interactive and online-based ones. The communication channels are selected to convey the key messages and key outcomes of the project to the stakeholders.

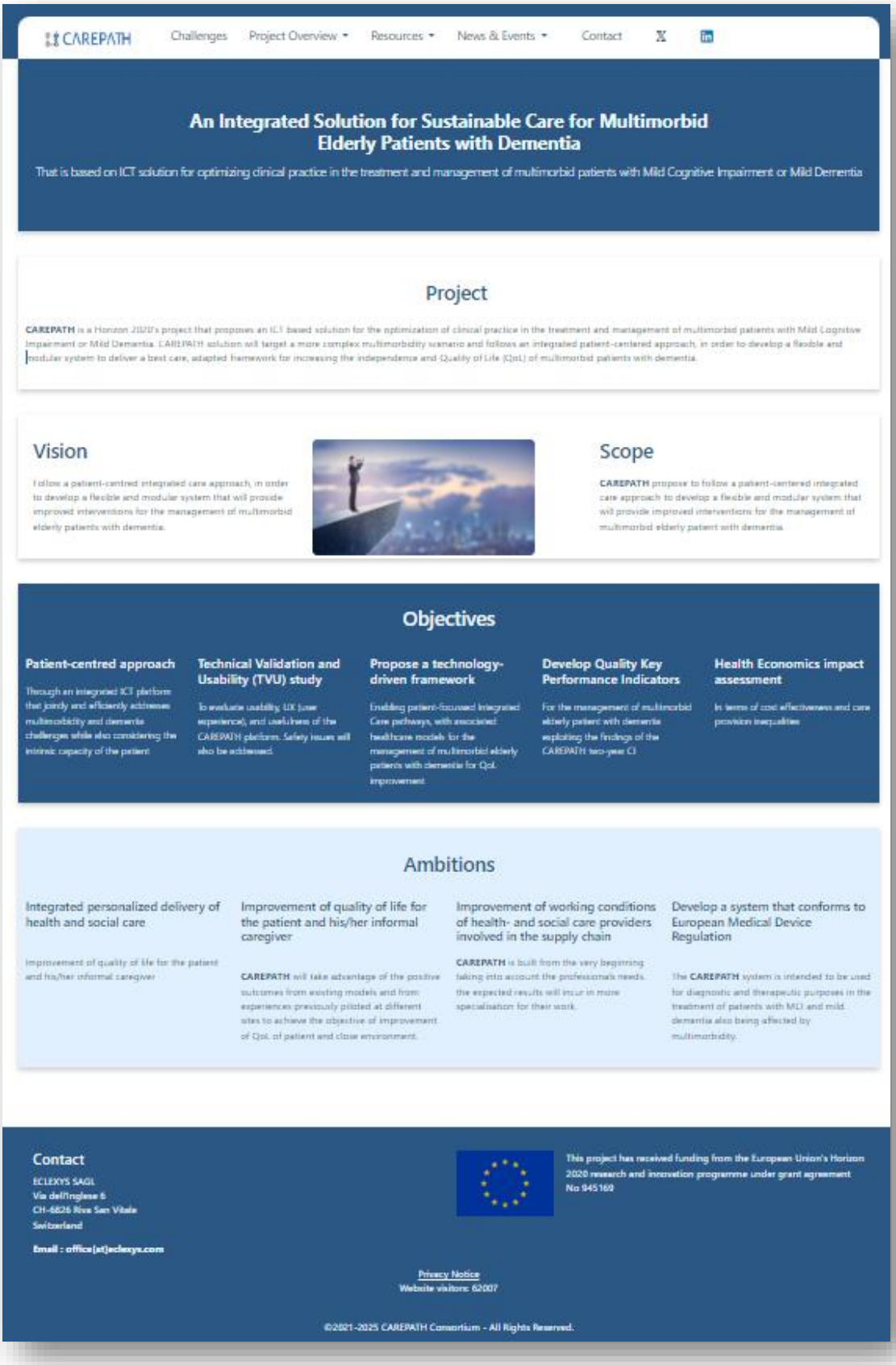


Figure 4. Website Home Page (10/06/2025)

Table 3: Project website visitors

Year	Number of visitors	Expected visitors per year
2025 (Jun)	107177	2000
2024	84220	2000
2023	48011	2000
2022	11264	2000
2021	9000	2000

Figure 5 - Number of Website visitors (15/06/2025)

3.3 Social Media

Social media has been a vital outreach and engagement tool for CAREPATH, enabling the project to communicate with stakeholders outside the immediate consortium and across disciplines. Throughout the project lifecycle, the team actively maintained presence on two platforms: **X (formerly Twitter)** and **LinkedIn**.
These channels were used not only to announce events and disseminate outputs but also to interact with the broader eHealth community, contribute to relevant conversations, amplify consortium members' achievements, and build brand recognition around CAREPATH's core themes of integrated care, patient empowerment, and digital innovation in multimorbidity management.

3.3.1 Platform Profiles

- **X (formerly Twitter):** https://x.com/CAREPATH2021
  Short-form updates, conference coverage, EU project network retweets, and direct interactions with external projects and initiatives.

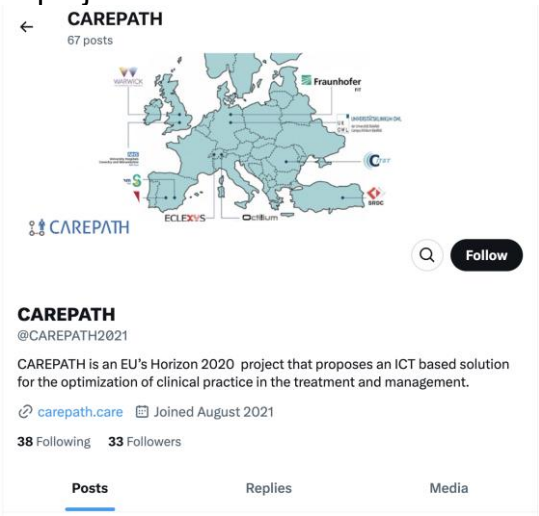


Figure 6 - Project's LinkedIn homepage showing visual identity consistency

- **LinkedIn:** https://www.linkedin.com/in/carepath-project
  Used for milestone announcements, stakeholder engagement, blog sharing, and recruitment of workshop participants.

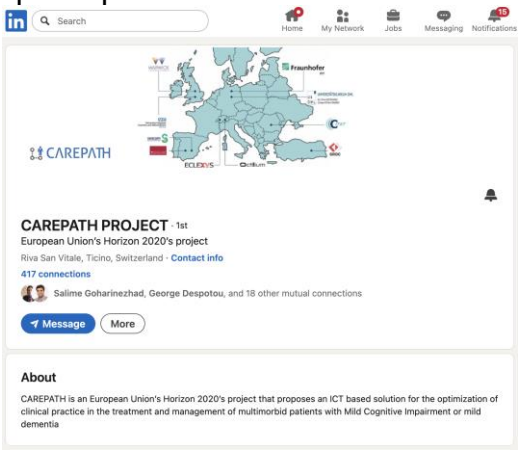


Figure 7 - Project's homepage on the X platform

3.3.2 Engagement Performance

Two key metrics were tracked throughout the project to monitor impact and reach:

- Connected profiles (followers and professional connections)
- Post impressions (number of times posts were displayed on users' screens)

Table 4: Social Media Connections

Platform	Number of connected profiles	Expected number of connected profiles	Performance vs Target
LinkedIn	475	200	✅ 132% above target
X (Twitter)*	38	1000	❌ Lower than expected (due to shift in usage trends and institutional constraints)

Table 5: Social Media Post Impressions

Platform	Number of posts	Impressions
LinkedIn	53	20452
Twitter	70	8680

CAREPATH's social media engagement exceeded expectations on LinkedIn and helped build a lasting presence within the digital health community. Although growth on X was more limited, the platform still provided value during peak events and for cross-project exchange. Future follow-up actions may include **archiving key posts**, **transitioning active followers to a post-project network**, or **sustaining engagement through partner-affiliated institutional pages**.

3.4 CAREPATH Projects Newsletter

The CAREPATH project newsletter has served as a strategic and recurring communication instrument to inform, engage, and mobilise stakeholders across Europe throughout the project lifecycle. Designed to complement the project website, social media presence, and dissemination events, the newsletter offered a consistent and curated source of updates tailored to a wide and diverse audience.
Each edition was structured to reflect the evolving stages of the project, from development and pilot preparation to validation, dissemination, and exploitation. Its goal was to ensure continuity in messaging while addressing the information needs of healthcare professionals, ICT partners, researchers, policymakers, and patient-facing communities.

Core Sections Featured in Each Edition:

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1. Project Progress Highlights

- Recaps of key milestones, deliverables submitted, and consortium achievements.
- Updates from clinical and technical work packages, including pilot site activities.
- Launch announcements for new tools, visual assets, and platforms.

2. Technical Features and Innovation

- In-depth overviews of CAREPATH platform components such as the Patient Empowerment Platform (PEP), Clinical Decision Support Modules (CDSM), and Interoperability Middleware.
- Explainers on the project's use of AI models, semantic technologies, FHIR-based architecture, and decision automation.

3. Stakeholder Perspectives

- Interviews with partners, early adopters, and clinical users sharing real-world insights.
- Reflections from patient and caregiver representatives engaged through the co-design and pilot testing processes.

4. Events and Community Engagement

- Promotion of upcoming project events, including webinars, workshops, and panels.
- Reports and highlights from major dissemination events (e.g. MIE2025, Medica, DMEA).
- Access to recordings, presentations, and media coverage.

5. Get Involved – Calls to Action

- Direct invitations for feedback, collaboration, and replication opportunities.
- Contact information for engagement, including social media and project email.
- Links to public deliverables, policy briefs, and open-access publications.

Each edition of the newsletter was disseminated through:

- The CAREPATH website (www.carepath.care)
- Consortium partner channels
- Stakeholder mailing lists
- Targeted promotion via LinkedIn and X (Twitter)

This contributed not only to broad visibility and transparency during the project but also to **sustained engagement** and **post-project legacy building**.

Figure 8 shows an example layout of the CAREPATH newsletter, illustrating the branding consistency and content diversity delivered across editions.

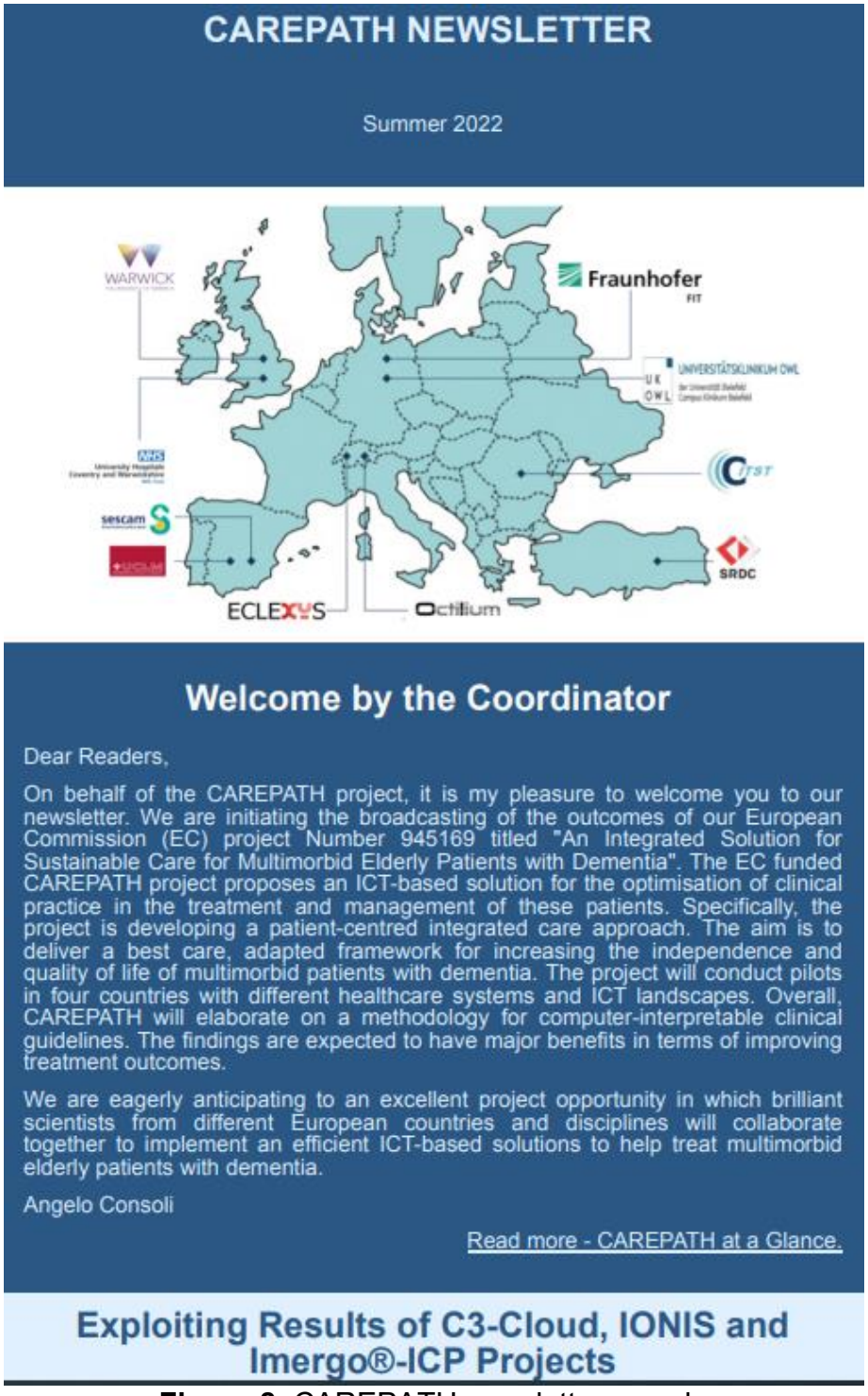

Figure 8. CAREPATH newsletter sample

3.5 Multimedia Production (Animation Video Production strategy and plan)

Multimedia has been a key pillar of CAREPATH's communication strategy, enabling the project to present complex digital health innovations in an accessible, engaging, and multilingual format. The consortium produced a suite of videos that support outreach, training, and stakeholder onboarding, ranging from a flagship animation video to targeted learning content for clinicians, caregivers, and patients.

3.5.1 Main Project Animation Video

The central animated explainer video was professionally produced with **PIX Videos Production Company S.L.** and finalised in **November 2024**. It provides a high-level, visual narrative of the CAREPATH vision, digital tools, stakeholder roles, and real-world benefits. This 3-minute animation has become a cornerstone of the project's dissemination material.

- 🎥 **Watch the main animation video:** CAREPATH Project Explainer Video

Features include:

- Multi-language subtitles (EN, ES, RO, DE, TR)
- Branded visual design and 2D animation
- Integrated storyboards from project pilots and platforms
- Used at events, policy briefings, webinars, and on the website

3.5.2 Additional Video Resources

Beyond the main video, CAREPATH developed a series of targeted audiovisual materials designed to support engagement, training, and knowledge translation across key user groups:

Video Type	Target Group	Purpose
Modular Technology Demonstrations	ICT partners, integrators, funders	Explain core components such as: CDS modules, patient empowerment tools, semantic rule engine, interoperability suite
Learning Videos for Clinicians	GPs, geriatricians, nurses, pharmacists	Show how CAREPATH supports medication review, clinical pathway harmonisation, and care planning
Educational Videos for Caregivers	Informal caregivers, family supporters	Explain self-monitoring, alert systems, and how to use wearable devices or mobile apps
Awareness Clips for Patients	Elderly users, people with MCI/mild dementia	Encourage participation, build digital confidence, explain CAREPATH in plain language

All videos have been made available through:

- The **CAREPATH website**
- **YouTube**, embedded in newsletters, presentations, and event toolkits

- Shared during stakeholder onboarding, workshops, and presentation sessions

Table 6 provides the links to the videos along with the names of the corresponding features they cover.

Table 6 - Short videos of PEP and AICP

Title	Url
PEP: Daily Task	https://youtu.be/67D93WjjRLM?si=DHbs5WSwd0alf1l2
PEP: Medication	https://youtu.be/QbLU3deBQ4w?si=rAPEyXB0O9mFCAtZ
PEP: Diet	https://youtu.be/Zh3uArKVUvU?si=paNrf-dgOUyyGyuW
PEP: Exercise	https://youtu.be/txhGYJk1FCo?si=SZWmpYEBTSaqe_tU
PEP: Appointment	https://youtu.be/rIhxkG2dT-4?si=Pspm9OXZHxYA2IlL
PEP: Custom Task	https://youtu.be/GwD8X6tcgBE?si=KazjI-QXjkrHNrmT
PEP: Symptom	https://youtu.be/Z0CL3VvxDAI?si=Yu57Kl5scXtzh7NC
PEP: Measurement	https://youtu.be/cY_ZCdGvI3c?si=W-OCgyR8cjyYhbds
PEP: Message	https://youtu.be/edATIfq5Fas?si=cgS0jVsGrW6F5Kff
PEP: Reminder	https://youtu.be/F88cMQTNGUs?si=brh_4Xa-s2W-wbui
AICP: Patient Summary	https://youtu.be/WTXwLhCHObQ?si=v7DrdUv1zmI3Iar8
AICP: Early Warning	https://youtu.be/3NiTU-DOCjA?si=8IVFKZ6NYGH2umxy
AICP: Care Plan Adherence	https://youtu.be/1ucCVPX3IHY?si=NmWaNlTui8TC36ut
AICP: Daily Report	https://youtu.be/qnoDlh7mhIA?si=H5sdJ4rtkurrPBtp
AICP: Home Data	https://youtu.be/Y4pJhWREtRk?si=RJZoXykTZvb0QmjB
AICP: Physical Examination, Lab Results and Geriatric Assessment	https://youtu.be/JKh8ck8jWZo?si=clwl8V4dQdryLsUc
AICP: MCI & Mild Dementia Management and Sarcopenia & Frailty	https://youtu.be/Z3szq94erug?si=jqcV9a6VyrU31t74
AICP: Nutrition & Hydration and Physical Exercise	https://youtu.be/bJgqGr1ahX4?si=ml0toCZo_nsSjTOu
AICP: Medication Review	https://youtu.be/o90_Q4R6oTk?si=9_cv2vjCdBvriBUq

3.5.3 Legacy and Future Use

These video assets will remain accessible beyond the project end to:

- Support **post-project exploitation**
- Aid **healthcare provider adoption**
- Serve as a resource for **future EU-funded projects**
- Guide **training for clinicians and digital literacy for caregivers**

Figure 9 showcases a visual sample from the CAREPATH video suite.

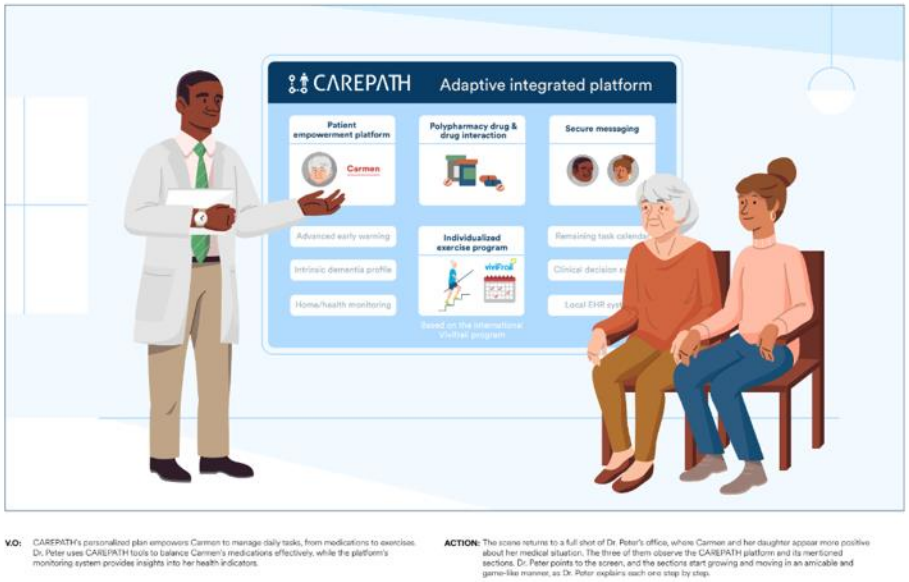

Figure 9. Sample CAREPATH illustration

3.6 Blogs

Over the course of the CAREPATH project, blog publishing has played an integral role in ensuring dynamic, timely, and thematic engagement with stakeholders across sectors. Hosted on the project's website (www.carepath.care/articles) and amplified through **LinkedIn** and **X (Twitter)**, the blogs offered an accessible format to spotlight project developments, research insights, and thought leadership from within the consortium.
Blog posts were published regularly, typically monthly, contributing to visibility, knowledge sharing, and community-building across diverse stakeholder groups including clinicians, ICT partners, researchers, caregivers, and policy professionals.

3.6.1 Blog Topics and Thematic Clusters

The blog catalogue has grown to include over 30 entries covering a wide range of topics, grouped thematically across the project's three reporting periods:

- **Digital Innovation & Technology**
  (e.g. AI in healthcare, interoperability, wearable devices, CDS systems, semantic rule automation)
- **Patient Empowerment & Usability**
  (e.g. accessibility, intrinsic capacity, informal caregiver engagement, elderly digital literacy)
- **Ethics, Policy & Evaluation**
  (e.g. legal aspects of AI, data privacy, health economics, software as medical device (SaMD), spillover effects)
- **Clinical Translation & Guideline Challenges**
  (e.g. multimorbidity management, geofencing, fragmentation of care, clinical decision support)

3.6.2 Performance and Reach

CAREPATH's blog posts generated measurable impact, particularly on **LinkedIn**, where mid- and late-stage posts outperformed earlier ones due to improved targeting, visuals, and SEO. Some blogs were also referenced in academic presentations and stakeholder events.
Table 7 below shows the series of blog posts along with their impression counts on X and LinkedIn:

Table 7. CAREPATH Blog Posts

Publication	Title	Impr. in X[1]	Impr. In Linkedin[2]
October 2021	Sustainable care for multimorbid elderly patients with mild cognitive impairment	117	-
December 2021	Pain Assessment in Patients with Minimal Cognitive Deficit and Mild Dementia	65	-

[1] Figures are updated at 15 June 2025
[2] Ibidem

January 2022	Security, Ethics, Legal and Privacy aspects of AI in the Health domain	228	-
February 2022	Dementia, Comorbidity and ICTs	210	-
March 2022	The challenge of reconciling multiple clinical guidelines in the context of multi-morbidity	98	-
May 2022	The role of economic evaluation in the CAREPATH project	55	-
June 2022	Patient Empowerment Platform for older multimorbid patients with mild dementia or mild cognitive impairment (MCI)	164	-
August 2022	Machine Learning for dementia early detection	142	270
October 2022	Clinical Decision Support Systems (CDSSs) and their applications in daily clinical practice and CAREPATH project	363	520
November 2022	Security aspects of AI in the Healthcare sector	134	423
December 2022	CAREPATH: Converting Polypharmacy Guidelines into Computer Interpretable Rules	357	1168
January 2023	Silver surfers versus low digital literacy among older people	44	530
First reporting period ↑		Second reporting period ↓	
June 2023	Software as Medical Device (SaMD)	-	1550
July 2023	The ethics of artificial intelligence in healthcare	-	1627
August 2023	CAREPATH: the need for new guidelines in multimorbid older adults with mild cognitive impairment or mild dementia	-	430
September 2023	Economic evaluation of technology-based interventions for people with dementia care support and their caregivers: Current situation	26	140
October 2023	The relevance of digital accessibility for seniors	-	264
November 2023	The CAREPATH Approach for Enhancing Medication Management for Older Adults with Cognitive Impairment: Innovations and Challenges	-	-
December 2023	Safeguarding eHealth: Cybersecurity in IoT	-	-
January 2024	Exploring the Top Smart Bracelets with Open Data Access	18	340
February 2024	CAREPATH: Usability of eHealth Apps for Elderly and Persons with Disabilities	13	461

April 2024	Digitalization in the healthcare sector in Germany: current status	18	640
April 2024	Enhancing Elderly Care with Home Automation and Environmental Sensors: A Benefit for Patients with Mild Cognitive Dementia and Multimorbid Conditions	125	445
May 2024	Navigating the Complex Terrain of Drug-Drug Interactions: Leveraging ICT and CDS for Safer Prescribing	20	246
May 2024	The role of Library & Knowledge Services in Modern Healthcare Research	31	361
Second reporting period ↑		Final reporting period ↓	
Jun 2024	Integration of Risk Phenotypes Stratification Models as part of Smart Early Warning Clinical Decision Support in CAREPATH	129	331
July 2024	Elderly Care in Europe: Conditions and Costs	101	506
August 2024	Transforming Clinical Guidelines into Actionable Clinical Decision Support (CDS) Rules	16	559
September 2024	Artificial Intelligence in Medicine: From Vision to Clinical Revolution	15	376
September 2024	Intrinsic Capacity vs. Artificial Intelligence	23	239
October 2024	Geofencing in CAREPATH: Enhancing the Care for Multimorbid Elderly Patients with Dementia, their Independence and Quality of Life	13	271
November 2024	The empowerment of informal caregiver in homecare settings	17	426
December 2024	The relevance of the spillover effects in the evaluation of Alzheimer's disease interventions	13	464
January 2025	Addressing Fragmented Data and Interoperability in Germany's Healthcare System	13	347
January 2025	Intrinsic capacity and aging: maintaining vitality	9	384
February 2025	Transforming the Management of Mild Cognitive Disorders and Dementia through AI-enhanced CDSS	12	294
March 2025	CAREPATH - Data, Delivery and Future Development	19	289
April 2025	Evaluating Usability in Digital Health Systems for Older Adults: The CAREPATH Case Study	129	402
May 2025	Would CAREPATH-intervention be economically efficient? An approach to an Economic analysis using different simulation scenarios	9	176

3.6.3 Lessons Learned and Legacy

- **LinkedIn emerged as the most effective platform** for professional reach, with consistently higher engagement from healthcare, academic, and policy sectors.
- Blog posts featuring **specific clinical applications**, **AI ethics**, and **economic implications** had the highest impression counts.
- A growing number of posts were co-authored by **younger researchers** and **pilot site teams**, helping build internal dissemination capacity.
- Posts remain accessible and are expected to serve as long-tail content supporting **post-project visibility**, **academic referencing**, and **policy engagement**.

3.7 Publications

Peer-reviewed publications, conference papers, and sectoral media coverage have been essential pillars of the CAREPATH dissemination strategy. These classical means of scholarly communication have served to strengthen the project's academic credibility, broaden its scientific impact, and support the transfer of evidence-based innovation into policy and practice.
This channel of dissemination primarily targets:

- Researchers and academic institutions
- Clinicians and health service innovators
- Policy analysts and evaluators
- Digital health professionals
- Standardisation and regulatory communities

CAREPATH publications have been developed by all partner types, including universities, technical organisations, and clinical institutions, demonstrating cross-disciplinary authorship and commitment to open, high-quality knowledge exchange.

3.7.1 Objectives and Impact

Publications have served to:

- Disseminate validated findings from the technical validation and clinical investigation phases
- Document innovations such as Clinical Decision Support Systems, Interoperability Middleware, and semantic automation tools
- Present novel approaches to multimorbidity, intrinsic capacity modelling, and patient empowerment
- Contribute to ongoing European and international discourse around AI in healthcare, SaMD regulation, and guideline integration

CAREPATH results have been presented and published through:

- **Journals** (e.g. digital health, geriatrics, medical informatics)
- **Conference proceedings** (e.g. MIE, ICIMTH, MedInfo and DSAI)
- **Posters, abstracts, and invited presentations**
- **Business publications and policy digests**

A curated selection of CAREPATH publications is listed below. More comprehensive documentation is maintained on the CAREPATH website and internal knowledge base. (A sample of all published articles is attached in **Appendix 2. CAREPATH publications)**

Publication in the Third and final reporting period:

➢ **2025**

- User Experience and Usability Evaluation of the CAREPATH Adaptive Integrated Care Platform

  Authors: AE Akpinar, M Gencturk, O Pournik, TN Arvanitis, GB Laleci Erturkmen
  Publication date: Accepted for presentation and publication in ICIMTH 2025 conference

Journal: Digital Health and Informatics Innovations for Sustainable Health Care Systems

➢ **2024**

- The CAREPATH Study for Personalized Management of Multimorbidity in Elderly with Mild Cognitive Impairment and Mild Dementia (1)

  Authors: Gokce B Laleci Erturkmen, Mert Gencturk, A Emre Akpinar, Omid Pournik, Theodoros N Arvanitis, Antje Steinhoff, Henrike Gappa, Tim Robbins, Rajan Mattu, Ruben Alcantud Corcoles, Pedro Abizanda, Oana Cramariuc, Cristiana Ciobanu, Yehya Mohamad, Jaouhar Ayadi
  Publication date: 2024/8/29
  Journal: Medical Research Archives

- Developing a Help Desk Service for Enhanced Coordination in Health Informatics Projects: A SharePoint and Power Automate Approach (2)

  Authors: Omid POURNIK, Bilal AHMAD, Shramika GOUR, Ashley PEAKE, Chao TONG, James CHURM and Theodoros N. ARVANITIS
  Publication date: 2024
  Journal: Digital Health and Informatics Innovations for Sustainable Health Care Systems

- Advancing Healthcare Through Interoperability: Implementing Scalable Solutions for Patient Data Integration (3)

  Authors: Shramika GOUR, Ashley PEAKE, Chao TONG, James CHURM, Bilal AHMAD, Omid POURNIK, Theodoros N. ARVANITIS
  Publication date: 2024
  Journal: Digital Health and Informatics Innovations for Sustainable Health Care Systems

- Accessible, Smart and Integrated Healthcare Systems for Elderly and Persons with Disabilities (4)

  Authors: Yehya Mohamad, Carlos A. Velasco
  Publication date: 5 July 2024
  Journal: Springer Nature

Publication in the second reporting period:

➢ **2024**

- Transforming evidence-based clinical guidelines into implementable clinical decision support services: the CAREPATH study for multimorbidity management (5)

  Authors: Mert Gencturk, Gokce B Laleci Erturkmen, A Emre Akpinar, Omid Pournik, Bilal Ahmad, Theodoros N Arvanitis, Wolfgang Schmidt-Barzynski, Tim Robbins, Ruben Alcantud Corcoles, Pedro Abizanda
  Publication date: 2024/5/27
  Journal: Frontiers in Medicine

➢ **2023**

- Interoperable E-Health System Using Structural and Semantic Interoperability Approaches in CAREPATH (6)

  Authors: Omid Pournik, Bilal Ahmad, Sarah N Lim Choi Keung, Ashley Peake, Shadman Rafid, Chao Tong, Gokce B Laleci Erturkmen, Mert Gencturk, A Emre Akpinar, Theodoros N Arvanitis
  Publication date: 2023
  Book: Healthcare Transformation with Informatics and Artificial Intelligence
  Pages: 608-611
  Publisher: IOS Press

Publication in the first reporting period:

➢ **2022**

- Key Scenarios, Use Cases & Architecture of an E-health Homecare Instance (7)

  Authors: Yehya Mohamad, Henrike Gappa, Naguib Heiba, Mustafa Yuksel, Carlos A Velasco, Mert Gencturk, Pedro Abizanda, Gokce B Laleci Erturkmen, Antje Steinhoff, Jaouhar Ayadi, Theodoros N Arvanitis, Bilal Ahmad, Omid Pournik, Ioannis Kyrou, George Despotou, Timothy Robbins, Sarah Lim Choi Keung, Khoi Le, Wolfgang Schmidt-Barzynski
  Publication date: 2022/8/31
  Book: Proceedings of the 10th International Conference on Software Development and Technologies for Enhancing Accessibility and Fighting Info-exclusion
  Pages: 25-30

- Protocol for Creating a Single, Holistic and Digitally Implementable Consensus Clinical Guideline for Multiple Multi-morbid Conditions (8)

  Authors: Timothy David Robbins, Devavratha Muthalagappan, Bridgette O'Connell, Jagdeep Bhullar, Leigh-Jayne Hunt, Ioannis Kyrou, Theodoros N Arvanitis, Sarah N Lim Choi Keung, Helen Muir, Omid Pournik, Antje Steinhoff, Wolfgang Schmidt-Barzynski, Oana Cramariuc, Cristiana A Ciobanu, Gokce B Laleci Erturkmen, Mert Gencturk, Mustafa Yuksel, Elena Gómez-Jiménez, Almudena Avendaño Céspedes, Elisa Belén Cortés Zamora, Ruben Alcantud Córcoles, Pedro Abizanda, Yehya Mohamad, Jaouhar Ayadi, Harpal Randeva
  Publication date: 2022/8/31
  Book: Proceedings of the 10th International Conference on Software Development and Technologies for Enhancing Accessibility and Fighting Info-exclusion
  Pages: 1-6

- The design of a mobile platform providing personalized assistance to older multimorbid patients with mild dementia or mild cognitive impairment (MCI) (9)

  Authors: Mert Gencturk, Gokce B Laleci Erturkmen, Henrike Gappa, Wolfgang Schmidt-Barzynski, Antje Steinhoff, Pedro Abizanda, Timothy Robbins, Omid Pournik, Bilal Ahmad, Harpal Randeva, Oana Cramariuc, Theodoros N Arvanitis, Jaouhar Ayadi, Yehya Mohamad, Mustafa Yuksel

Publication date: 2022/8/31
Book: Proceedings of the 10th International Conference on Software Development and Technologies for Enhancing Accessibility and Fighting Info-exclusion
Pages: 37-43

- CAREPATH methodology for development of computer interpretable, integrated clinical guidelines (10)

  Authors: Omid Pournik, Bilal Ahmad, George Despotou, Sarah N Lim Choi Keung, Yehya Mohamad, Henrike Gappa, Gokce B Laleci Erturkmen, Mustafa Yuksel, Mert Gencturk, Wolfgang Schmidt-Barzynski, Antje Steinhoff, Timothy Robbins, Ioannis Kyrou, Harpal Randeva, Jaouhar Ayadi, Theodoros N Arvanitis, Rubén Alcantud Córcoles, Pedro Abizanda, Khoi Le, Elena Gómez Jiménez, Almudena Avendaño Céspedes, Ezgi Kaba, Helen Muir
  Publication date: 2022/8/31
  Book: Proceedings of the 10th International Conference on Software Development and Technologies for Enhancing Accessibility and Fighting Info-exclusion
  Pages: 7-11

- CAREPATH: developing digital integrated care solutions for multimorbid patients with dementia (11)

  Authors: Omid Pournik, Bilal Ahmad, Sarah N Lim Choi Keung, Omar Khan, George Despotou, Angelo Consoli, Jaouhar Ayadi, Luca Gilardi, Gokce Banu Laleci Erturkmen, Mustafa Yuksel, Mert Gencturk, Henrike Gappa, Martin Breidenbach, Yehya Mohamad, Carlos A Velasco, Oana Cramaiuc, Cristiana Ciobanu, Elena Gómez Jiménez, Almudena Avendaño Céspedes, Rubén Alcantud Córcoles, Elisa Belén Cortés Zamora, Pedro Abizanda, Antje Steinhoff, Wolfgang Schmidt-Barzynski, Timothy Robbins, Ioannis Kyrou, Harpal Randeva, Lionello Ferrazzini, Theodoros N Arvanitis
  Publication date: 2022
  Journal: Advances in Informatics, Management and Technology in Healthcare
  Volume: 295
  Pages: 487-490
  Publisher: IOS Press

- Making person-centred health care beneficial for people with mild cognitive impairment (MCI) or mild dementia – results of interviews with patients and their informal caregivers (12)

  Authors: Henrike Gappa, Yehya Mohamad, Martin Breidenbach, Pedro Abizanda, Wolfgang Schmidt-Barzynski, Antje Steinhoff, Timothy Robbins, Harpal Randeva, Ioannis Kyrou, Oana Cramariuc, Cristiana Ciobanu, Theodoros N. Arvanitis, Sarah N. Lim Choi Keung, Gokce Banu Laleci Ertürkmen, Mert Gencturk, Mustafa Yüksel, Jaouhar Ayadi, Luca Gilardi, Angelo Consoli, Lionello Ferrazzini & Carlos A. Velasco
  Publication date: 2022
  Journal: Advances in Informatics, Management and Technology in Healthcare

In: Miesenberger, K., Kouroupetroglou, G., Mavrou, K., Manduchi, R., CovarrubiasRodriguez, M., Penáz, P. (eds.) ICCHP-AAATE 2022. LNCS Volume: 13341
Pages: 468-474
Publisher: Springer, Cham (2022). https://doi.org/10.1007/978-3-031-08648-9_(8)

3.8 Conference Participations

Conference participation has been a cornerstone of CAREPATH's external communication strategy, enabling the consortium to engage with leading stakeholders across digital health, clinical care, informatics, policy, and AI. These participations have served multiple functions: sharing scientific results, gathering feedback from domain experts, raising awareness among potential adopters, and reinforcing CAREPATH's visibility in the European and international innovation ecosystem.

3.8.1 Scientific Visibility and Community Engagement

CAREPATH was represented at numerous high-impact international conferences, workshops, and symposia over the course of the project. These events provided opportunities to:

- Disseminate technical, clinical, and policy-related results
- Contribute to thematic tracks on multimorbidity, guideline integration, and ageing
- Present use cases and demonstrations of the CAREPATH platform components
- Establish connections with peer EU projects and future collaborators

Conference participation in the Third (Final) reporting period:

- **35th Medical Informatics Europe Conference, Intelligent Health Systems: From Technology to Data and Knowledge (MIE2025), Glasgow, UK, May 2025**

  CAREPATH project workshop.
  Omid POURNIK, Naguib HEIBA, Timothy ROBBINS, Mert GENCTURK, Pedro ABIZANDA and Theodoros N. ARVANITIS
  Title: CAREPATH: Empowering Integrated Care for Multimorbid Elderly with Mild Cognitive Impairments and Mild Dementia

Figure 10. CAREPATH consortium presenting at MIE 2025

- **34th Medical Informatics Europe Conference, Digital Health & Informatics Innovations for Sustainable Health Care Systems (MIE2024), Athens, Greece, 25-29 August 2024**

  Omid Pournik (University of Birmingham) presented the project's Helpdesk Service at this conference in Greece.
  Omid POURNIK, Bilal AHMAD, Shramika GOUR, Ashley PEAKE, Chao TONG, James CHURM and Theodoros N. ARVANITIS
  Title: Developing a Help Desk Service for Enhanced Coordination in Health Informatics Projects: A SharePoint and Power Automate Approach

Figure 11. Dr Omid Pournik presenting at MIE 2024

- **34th Medical Informatics Europe Conference, Digital Health & Informatics Innovations for Sustainable Health Care Systems (MIE2024), Athens, Greece, 25-29 August 2024**

  Shramika Pachal (University of Birmingham) presented the project's Helpdesk Service at this conference in Greece.
  Shramika GOUR, Ashley PEAKE, Chao TONG, James CHURM, Bilal AHMAD, Omid POURNIK, Theodoros N. ARVANITIS
  Title: Advancing Healthcare Through Interoperability: Implementing Scalable Solutions for Patient Data Integration

Figure 12. Shramika Pachal (Gour) presenting at MIE 2024

Conference participation in the second reporting period:

- **21st International Conference on Informatics, Management and Technology in Healthcare (ICIMTH23), Athens, Greece, 1-3 July 2023**

  Omid Pournik (UoB) presented the project at this conference in Greece.
  O Pournik, B Ahmad, S Lim Choi Keung, A Peake, R Shadman, C Tong, GB Laleci Erturkmen, M Gencturk, AE Akpinar, TN Arvanitis
  Title: Interoperable E-Health System Using Structural and Semantic Interoperability Approaches in CAREPATH

Figure 13. Dr Omid Pournik presenting at ICIMTH 2023

Conference participation in the first reporting period:

- **18th International Congress of the European Geriatric Medicine Society, London, United Kingdom, 28-30 September 2022**

  Rubén Alcantud Córcoles (SESCAM) gave a presentation on the work in WP6 on "Clinical guidelines and best practices to improve the management of elderly patients with dementia and multimorbidity. A systematic review".

Figure 14. Screenshot of event website: https://eugms2022.com/

Figure 15. Rubén Alcantud Córcoles presenting at 2020 EuGMS

- **Software Development and Technologies for Enhancing Accessibility and Fighting Info-exclusion Conference (DSAI 2022), Lisboa, Portugal, 31 August 31 – 2 September 2022**

  Yehya Mohamad and Carlos Velasco (Fraunhofer) organized a special track at DSAI 2022 on Accessible, Smart, and Integrated Healthcare Systems for Elderly and Disabled People. The special track brought together contributions from international researchers and practitioners focusing on design, development, testing and application of information technologies to healthcare sector, pervasive, mobile, and ubiquitous healthcare systems, pandemic research, accessibility, usability and user experience of medical apps & devices, human behaviour, integrated healthcare approaches, patient empowerment systems, eHealth data standards and interoperability (e.g.

HL7/FHIR), medical device and clinical investigation regulatory frameworks, as well as privacy and security.
8 papers were presented, 6 of them from Horizon 2020 projects:

CAREPATH with 4 papers: https://www.carepath.care/
ESCAPE with 1 paper: https://escape-project.org/
ADLIFE with 1 paper: https://adlifeproject.com/

Figure 16. Screenshot of conference website: **http://dsai.ws/2022**

The 4 papers presented from CAREPATH:

- CAREPATH Protocol for Creating a Single, Holistic and Digitally Implementable Consensus Clinical Guideline for Multiple Multi-morbid Conditions, by Tim R. Robbins et al., presented by Tim Robbins (UHCW) on the work in WP6.
- CAREPATH methodology for development of computer interpretable, integrated clinical guidelines, by Omid Pournik et al., presented by Omid Pournik (WARWICK) on the work in WP3.
- Key scenarios, Use Cases & Architecture of an E-health Homecare Instance, by Yehya Mohamad et al., presented by Yehya Mohamad (Fraunhofer) on the work in WP2.
- The design of a mobile platform providing personalized assistance to older multimorbid patients with mild dementia or mild cognitive impairment (MCI), by Mert Gencturk et al., presented by Mert Gencturk (SRDC) on the work in WP4.

- **20th International Conference on Informatics, Management and Technology in Healthcare (ICIMTH22), Athens, Greece, 1-3 July 2022**

  Omid Pournik (WARWICK) presented the project at this informatics conference in Greece.
  Pournik, O., Ahmad, B., Lim Choi Keung, S. N., Khan, O., Despotou, G., Consoli, A., Ayadi, J., Gilardi, L., Laleci Erturkmen, G. B., Yuksel, M., Gencturk, M., Gappa, H., Breidenbach, M., Mohamad, Y., Velasco, C. A., Cramariuc, O., Ciobanu, C., Gómez Jiménez, E., Avendaño Céspedes, A., Alcantud Córcoles, R., … Arvanitis, T. N. (2022). CAREPATH: Developing Digital Integrated Care Solutions for Multimorbid Patients with Dementia. Studies in health technology and informatics, 295, 487–490. https://doi.org/10.3233/SHTI220771

- **Joint International Conference on Digital Inclusion, Assistive Technology & Accessibility (ICCHP-AAATE 2022), Lecco, Italy, 11-15 July 2022**

  Henrike Gappa (Fraunhofer) presented WP2 work, to understand the user requirements of patients and their informal caregivers and was achieved in CAREPATH by interviews.
  Gappa, H. et al. (2022). Making Person-Centred Health Care Beneficial for People with Mild Cognitive Impairment (MCI) or Mild Dementia – Results of Interviews with Patients and Their Informal Caregivers. In: Miesenberger, K., Kouroupetroglou, G., Mavrou, K., Manduchi, R., Covarrubias Rodriguez, M., Penáz, P. (eds) Computers Helping People with Special Needs. ICCHP-AAATE 2022. Lecture Notes in Computer Science, vol 13341. Springer, Cham. https://doi.org/10.1007/978-3-031-08648-9_54

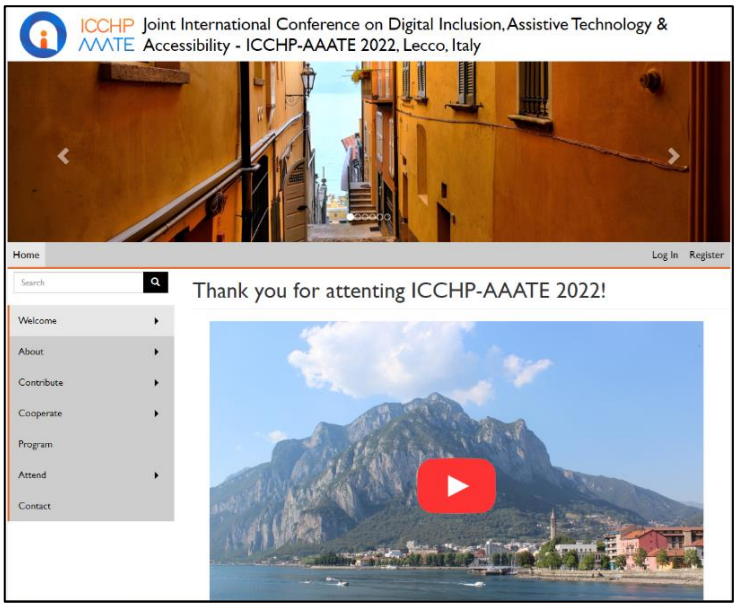

Figure 17. Screenshot of website: **https://www.icchp-aaate.org/**

- **International Conference on Informatics Revolution for Smarter Healthcare (IRSH'2021), 14-15 October 2021**

  At this virtual conference, Angelo Consoli (EXYS) and Tim Robbins (UHCW) gave a keynote on "Sustainable care for multimorbid elderly patients with mild cognitive impairment".
  Abstract:
  The provision of effective health and social care for people with multi-morbidity represents one of the greatest emerging challenges for both healthcare and health-tech providers. Where dementia is present within the multi-morbid conditions, there are additional challenges related to cognitive decline. CAREPATH represents an ambitious EU-funded Horizon 2020 project that proposes an ICT-based solution for the treatment and management of multimorbid patients with mild cognitive impairment or mild dementia. In this presentation, we consider the technical ICT-based privacy, data compliance, data processing and security constraints relevant to multimorbidity care in the context of cognitive impairment alongside a consideration of how these interact with front-line clinical challenges.

3.9 Events Participations

Interactive dissemination offers a chance for personal interaction in academic, commercial and socio-economic conferences and workshops, EU-organised events, trade fairs and exhibitions. It is intended for target groups with a high level of information need and involvement and provides information tailored to highly targeted audiences. It also includes possible interviews in radio or TV stations, as well as consultation activities with other European and/or International funded projects in the domain, which shall be established timely, to ensure a useful exchange and could take the form of a common workshop.

Event participation in the Third (Final) reporting period:

- **CAREPATH Final General Assembly Meeting – Consortium-Wide Collaboration in Birmingham, June 2025**
  The final CAREPATH General Assembly was held in Birmingham in June 2025, bringing together all consortium partners for two days of strategic discussion, coordination, and reflection. As the last full consortium meeting, it provided a platform to present the final outcomes of each work package, address outstanding integration tasks, and align on the remaining dissemination, exploitation, and sustainability actions. The event featured plenary presentations, breakout sessions, and interactive demonstrations of technical components. It also enabled in-person collaboration across technical, clinical, and administrative teams, reinforcing the shared vision and cross-disciplinary spirit that has shaped CAREPATH throughout its implementation. This milestone meeting marked a key moment in consolidating project results and preparing for post-project impact.

- **Delphi Validation Workshop on CAREPATH Clinical Guidelines – Birmingham, June 2025.**
  In June 2025, the CAREPATH consortium successfully organised a Delphi validation session in Birmingham as part of Task 6.4 (WP6), focusing on the review and finalisation of the consolidated clinical guidelines for multimorbid elderly patients with MCI or mild dementia. The workshop brought together a diverse panel of clinicians, including general practitioners, geriatricians, pharmacists, and specialists, from both consortium clinical partners and external expert organisations. The session enabled structured, consensus-driven feedback on the proposed guideline framework, ensuring its relevance, clarity, and applicability in real-world integrated care settings. This collaborative validation process marks a critical step toward the standardisation and adoption of CAREPATH's clinical pathways across European healthcare systems.

Event participation in the second reporting period:

- **Fraunhofer FIT is going to present CAREPATH at the final event of the VR2CARE project, a Horizon2020-funded project. This is part of synergy building between Horizon2020 research projects targeting elderly and disabled persons.**

VR2Care Webinar - Interactive Technologies for Active and Healthy Living

Datum & Uhrzeit	24.Juni 2024 02:30 PM in Amsterdam, Berlin, Rom, Stockholm, Wien
Beschreibung	VR2Care breaks the current VR paradigm in smart living environments by enabling a multi-user mixed reality service, available for embodied exercising group in different physical locations at the same time and with expert exercise supervision. Motivation is empowered in VR2Care by a social commitment. A social experience of several people sharing difficulties and fighting isolation, replaces the "the patient/user and the application"

Figure 18. Fraunhofer FIT is going to present CAREPATH at the final event of VR2CARE project

- **DMEA Trade Fair April 2023 & 2024 Halle 2.2 B, booth D 107[3]: The Fraunhofer team presented concepts and prototypes of CAREPATH 2023 and 2024 at the DMEA trade fair. DMEA is one of Europe's most important events for digital health. Experts from the digital health industry meet in Berlin. In addition to a comprehensive market overview, DMEA offers all players a wide range of opportunities for intensive exchange, targeted networking and effective customer acquisition.**

Figure 19. DMEA Trade Fair April 2023 & 2024, The Fraunhofer team presented concepts and prototypes of CAREPATH

[3] https://www.dmea.de/de/

Event participation in the first reporting period:

- **MEDICA 2022, medical trade fair, Düsseldorf, Germany, 14-17 November 2022**

  Yehya Mohamad (Fraunhofer) has participated in this event and has been talking about the CAREPATH project in his presentations.
  More than 81,000 visitors from various sectors of the global healthcare industry came to Düsseldorf, Germany, to attend MEDICA 2022, the world's leading medical trade fair, and COMPAMED 2022, the international No. 1 for the medical technology supply sector.

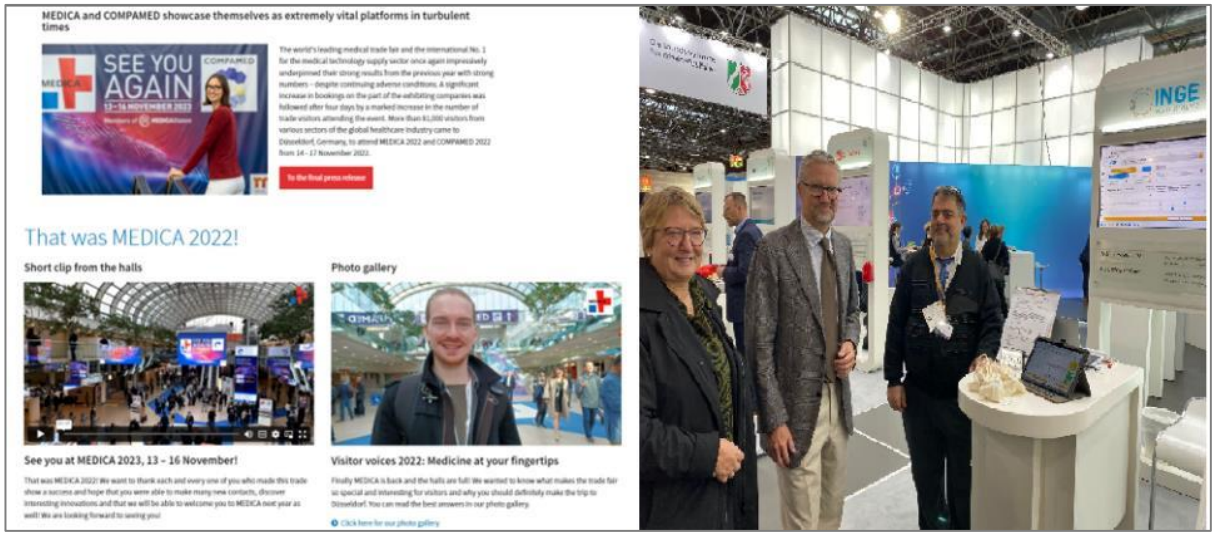

Figure 20. Screenshot of event website: **https://www.medica-tradefair.com/** (left); Yehya Mohammad (right in photo) at the event (right)

- **Quality Circle, GP Initiative meeting, Bielefeld, Germany, 16 November 2022**

  Wolfgang Schmidt-Barzynski (SKB) presented the CAREPATH project to a group of about a dozen General Practitioners in the region of Bielefeld, Germany, at their quality circle meeting. This introduction to the project has provided key information about the project and study for the involvement of these healthcare professionals and support in recruiting patients to the study.

3.10 Collaborations and Networks

3.10.1 Related Projects

CAREPATH has actively monitored and engaged with related European and international projects throughout its lifecycle. The goal has been to foster mutual learning, identify synergies in technical development and clinical implementation, and explore opportunities for cross-dissemination and post-project collaboration.
To this end, several projects were identified that align with CAREPATH's objectives in areas such as integrated care, multimorbidity, digital health platforms, ageing, and patient empowerment. The consortium made efforts to build connections through joint events, expert exchanges, and shared tools, ensuring that CAREPATH is situated within a broader landscape of innovation.
A key milestone in this collaboration effort was the **integration of the VIVIFRAIL programme** into the CAREPATH Patient Empowerment Platform (PEP), extending its scope to support physical function and frailty prevention in multimorbid elderly users.

Table 8. Projects Connected to CAREPATH

Relevant projects	
ESCAPE	ESCAPE: Evaluation of a patient-centred biopsychosocial blended collaborative care pathway for the treatment of multi-morbid elderly patients (H2020-SC1-BHC-2018-2020)
GERONTE	GERONTE: Streamlined Geriatric and Oncological evaluation based on IC Technology for holistic patient-oriented healthcare management for older multimorbid patients (H2020-SC1-BHC-2018-2020)
ADLIFE	ADLIFE: Integrated Personalized Care for Patients with Advanced Chronic Diseases to Improve Health and Quality of Life (H2020-SC1-DTH-2019)
OPEN DEI	OPEN DEI: Aligning Reference Architectures, Open Platforms and Large-Scale Pilots in Digitising European Industry (H2020-DT-2018-2)
VIVIFRAIL	VIVIFRAIL: PROMOTE PHYSICAL EXERCISE IN FRAIL ELDERLY https://vivifrail.com/ (556988-EPP-1-2014-1-ES-SPO-SCP)
INTEGRATE4CARE	INTEGRATE4CARE: Digital integrated health and social care with IT-supported home care counseling visits as specified in §37.3 SGB XI - funded by the European Union from the European Regional Development Fund (EFRE) and the State of Rhineland-Westphalia (Germany)

	(grant agreement number EFRE-0801905).
VR2CARE	The VR2Care is a Horizon2020 funded project. The target user group is elderly and the ecosystem of VR2CARE is a technological response to the factors that condition the practice of physical exercise, designed using co-creation methodologies. https://www.vr2care.eu/ H2020-ICT-2019-3 GRANT AGREEMENT 951978
WARIFA	WARIFA is focused on the prevention of melanoma skin cancer, complications of diabetes and lifestyle risk factors for chronic conditions. AI-based combined early risk assessment can empower citizens to adopt healthier habits and a better lifestyle by providing personalized recommendations on how to change their risk behavior. The benefits of early risk assessment, prevention and intervention will be evident at both individual and healthcare levels. **https://www.warifa.eu**

These collaborations have not only amplified CAREPATH's visibility across the research and healthcare innovation ecosystem but also opened the door to future synergies in research, dissemination, and implementation.

3.10.2 Standardisation

The CAREPATH project has consistently prioritised alignment with relevant standards and contributed to the broader European and international standardisation ecosystem in digital health. By engaging with recognised standards bodies and working groups, CAREPATH not only ensures interoperability, ethical compliance, and security in its technical solutions, but also contributes to shaping emerging frameworks that benefit future research and innovation projects.

- **Contribution to ISO Standards via BSI/IST/35**
  CAREPATH consortium members, notably from the University of Birmingham, have participated in the **British Standards Institution (BSI) IST/35 – Health Informatics Committee**, which serves as the UK's national mirror group to ISO/TC 215 Health Informatics. Through this engagement, CAREPATH has contributed insights derived from the development and deployment of its platform, especially in areas related to:

  - **ISO/TC 215/WG 1**: Architecture, frameworks, and models
  - **ISO/TC 215/WG 2**: System and device interoperability (e.g., HL7 FHIR, CDS Hooks)
  - **ISO/TC 215/WG 4**: Security, safety, and privacy in health informatics

  This connection supports the formalisation of CAREPATH's approaches to semantic integration, consent frameworks, and clinical decision support logic.

- **Long-Term Engagement with W3C Web Standards**
  CAREPATH partner **Fraunhofer** has played an active role in the **World Wide Web Consortium (W3C)** for over 15 years, participating in various technical working groups related to **web accessibility**, **data representation**, and **semantic web technologies**. Through this channel, CAREPATH benefits from early alignment with emerging standards in areas including:

  - Personal Health Records (PHR) interoperability
  - Linked Data applications in healthcare
  - Web-based consent and data portability tools

  This involvement ensures that CAREPATH's web components, such as the Patient Empowerment Platform (PEP) and interoperability middleware, follow best practices and remain compatible with evolving internet protocols and frameworks.

- **Involvement in CEN Workshop Agreement – CWA 17933**
  CAREPATH has also contributed to the **CEN Workshop Agreement (CWA 17933)**, titled *"Digital Health Innovations — Good Practice Guide for Obtaining User Consent for Personal Health Information"*. This initiative, supported through Horizon 2020 projects, is developing a practical framework to help R&I projects and digital health solutions providers obtain **informed, user-friendly, and legally robust consent**.
  CAREPATH's experience with real-world deployment in pilot sites and patient-facing technologies has informed contributions to key aspects of the CWA, including:
  - Structuring consent for multimorbid elderly users with cognitive impairments
  - Addressing usability and accessibility of digital consent forms
  - Managing consent lifecycle events (e.g. updates, withdrawal, data access requests)
  - Ethics-by-design and transparency in AI-enabled clinical tools

  This CWA is expected to guide both future Horizon Europe projects and broader market solutions, especially where GDPR-aligned patient consent is critical.

- **Internal Alignment with Open Standards**
  In addition to external contributions, CAREPATH's technical architecture is built upon or aligned with key **open health data standards**, including:
  - **HL7 FHIR** for data interoperability
  - **CDS Hooks** for integrating decision support modules
  - **SNOMED CT** and **LOINC** terminologies for semantic consistency
  - **IEEE 11073** standards for vital signs and sensor data acquisition

  This alignment supports seamless data exchange, future scalability, and potential cross-project integrations beyond the CAREPATH consortium.

- **Dissemination of Standardisation Insights at MIE2025**
  CAREPATH's contributions to digital health standardisation were also featured at the **MIE2025 Conference (Athens, May 2025)**, during a dedicated CAREPATH project workshop. The session included presentations on **interoperability frameworks**, **clinical guideline automation**, and **consent management** aligned with CWA 17933, HL7 FHIR, and ISO/TC 215 domains. Participants included clinicians, informatics experts, and policy advisors, fostering discussion on practical barriers and strategic enablers to implementing standardised digital solutions for multimorbid elderly patients. This visibility further positioned CAREPATH as an influential contributor to the ongoing development of European and international digital health standards.

CAREPATH's multi-level engagement with standardisation frameworks ensures that its innovations are **interoperable**, **secure**, **ethically grounded**, and **suitable for large-scale adoption**. These activities are expected to continue post-project through institutional memberships and spin-off collaborations.

4 Dissemination and Communication Plan

In the next period of the project, the following dissemination and communication activities are being planned.

4.1 Publication Plan

Several manuscripts are currently in progress for publication in journals:

4.2 Dissemination Plan

As CAREPATH concludes, dissemination and communication efforts have transitioned from awareness and recruitment toward consolidating impact, supporting adoption, and maintaining visibility through sustainable channels. The following activities reflect the project's focus on legacy dissemination, scientific contribution, and policy influence beyond its funded period.

4.2.1 Final and Ongoing Publications

Several manuscripts have been published or are in progress, capturing CAREPATH's technical, clinical, and organisational innovations. These contributions are intended to inform future research, standardisation efforts, and practical adoption.

4.2.2 Final Dissemination Activities

With clinical work concluded and outputs extracted, CAREPATH's final dissemination will focus on public engagement, knowledge transfer, and positioning results for future use.

Ongoing and Legacy Actions:

- **Final CAREPATH Newsletter and Blog Series**
  Reflecting on implementation outcomes, standardisation alignment, patient engagement, and economic impact.
- **Multilingual Animation Video Dissemination**
  Publicly available and used in stakeholder presentations, online campaigns, and external project briefings.
- **Website Access to All Key Outputs**
  All public deliverables, media, and publications are archived at:
  👉 www.carepath.care/articles
- **Conference & Workshop Highlights**
  - **ICIMTH 2025 – Athens**: Presentations on User Experience and Usability Evaluation of the CAREPATH Adaptive Integrated Care Platform

4.2.3 Legacy and Post-Project Dissemination

To ensure ongoing impact and visibility, CAREPATH partners commit to the following:

- **Maintaining open access to video, blog, and publication content** for future referencing by researchers, clinicians, and policymakers
- **Inclusion of CAREPATH results in follow-up Horizon Europe proposals** focused on digitally enabled integrated care, co-managed chronic conditions, and AI-enabled CDS
- **Sustained engagement with standards bodies** via ISO/TC 215, CEN CWA, and W3C working groups, continuing contributions to semantic consent, guideline automation, and interoperability models

5 Conclusions

This final release of Deliverable D8.5 has presented a comprehensive account of the CAREPATH dissemination and communication strategy, reflecting its development, execution, and legacy over the course of the project.
The dissemination framework has been built around a stakeholder-sensitive and impact-oriented approach. We have identified, profiled, and continuously engaged with key stakeholder groups across clinical, technical, policy, and patient domains. Tailored key messages were delivered through carefully selected channels, including scientific publications, blogs, newsletters, social media, professional events, educational videos, and direct stakeholder briefings.
Throughout the project, CAREPATH partners actively participated in numerous international conferences, consortium-wide and public workshops, multi-stakeholder meetings, and joint EU events, ensuring strong visibility and integration within the broader European digital health and ageing research landscape.
In parallel, the project contributed to standardisation activities (e.g., ISO/TC 215, CEN CWA 17933, W3C), collaborated with related Horizon 2020 and regional initiatives, and generated a broad set of peer-reviewed publications, blog content, and media assets, including the publicly released animation video.

As the project enters its post-funding phase, the consortium has put in place a legacy-oriented dissemination plan focused on:

- Sustaining visibility through open-access publication and video content
- Supporting adoption through stakeholder toolkits and training resources
- Continuing strategic influence via standardisation contributions and clustering activities
- Integrating CAREPATH results into future R&I proposals addressing ageing, multimorbidity, and digital care ecosystems

This deliverable not only marks the conclusion of CAREPATH's communication activities within the formal project timeline but also serves as a launchpad for the continued use, sharing, and evolution of its results across the digital health innovation ecosystem.
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Appendices

Appendix 1. CAREPATH final on-screen Script and action

CAREPATH

Script and action on screen

Carmen, 80 years old, was recently diagnosed with mild dementia, only 3 years after being diagnosed with diabetes and heart failure. While waiting for the scheduled appointment with her doctor, Carmen and her daughter Anna were preparing for the worst.
The video opens with a full shot of Carmen, an older white woman appearing in her 60s, and her daughter Anna, a young woman of mixed ethnicity in the waiting room of Dr. Peter's office, sharing an intimate moment with expressions of concern on their faces. Carmen appears tired and sad, while her daughter Anna looks deeply worried. As the narration discusses Carmen's health diagnosis, we see a close-up of her hands holding documents and medical records. Both characters then look at each other.

The EU's healthcare system recognises its limitations in effectively managing the care of patients with multiple conditions, especially when dementia is involved. Currently, healthcare providers lack the resources needed to provide personalized treatment for the multiple patients they see every day. With an ageing population, managing these diverse medical needs is becoming increasingly critical. There are currently 9.1 million patients over the age of 60 who are living with dementia in the EU alone.
A silhouette of Europe with the health symbol inside appears on screen. When it mentions patients with dementia, the silhouette of a head appears, and an abstract ball with tangled and intertwined lines (representing confusion and forgetfulness) emerges inside it. The scene then shows doctors demonstrating denial or sadness to their patients receiving the news in a somber manner. Following this, silhouettes of characters gradually appear one by one, depicting elderly individuals with different genders and physiques. The camera pans upward to reveal the text "9.1 million patients" above them.

CAREPATH is a groundbreaking project that uses innovative Information and Communication Technologies solutions to address the complex healthcare needs of older adults, just like Carmen, who suffers from multiple health conditions, particularly mild cognitive impairment or mild dementia.
With a seamless transition, the CAREPATH logo appears on screen, followed by Carmen smiling as she observes this new solution.

At its core, CAREPATH adopts a patient-centered integrated care approach. This means developing a flexible and modular system that considers each patient's unique needs while providing tailored interventions to enhance their quality of life and independence.
Carmen's face becomes an icon and moves to the center of the frame. Various puzzle pieces appear around her, each containing some of Carmen's needs like medication (represented by some tablets, a glass of water and a clock), exercise (we see some exercise accessories), nutrition (we see some healthy diet ingredients according to Carmen's profile), and cognitive stimulation (we see some abstract balls like the one previously shown with minimalist representation of mental activity, like memory exercises, puzzles, and crosswords. These are related to gamification). These pieces slightly change shape, rotate, and fit together to demonstrate the flexibility and modular quality of CAREPATH. The pieces come together in the center and fit perfectly.
On the screen, we see the title "Recommendations for Carmen" centered at the top.

For instance, clinicians can create personalised patient care plans, utilising clinical decision support recommendations within the Adaptive Integrated Care Platform, or AICP. Patients themselves can access their individualised care plans through the Patient Empowerment Platform, allowing them to review their care plan's daily tasks, like medication intake and exercising, report symptoms and message care team members, among other uses.
Next, we see Dr. Peter, a black middle-aged man, holding a document in his hands. Behind him, there is a screen displaying the text "Adaptive Integrated Platform" and a minimalist representation of the platform. When the voice says "Patients themselves can access…" Dr. Peter exits the frame, and then all the services appear, one by one:

1. "Patient Empowerment Platform", with Carmen's name (when we hear "through the patient empowerment platform").
2. "Polypharmacy drug & drug interaction" with a list of medications appearing on screen and "Individualized exercise program" with the text on screen: "Based on the international VIVIFRAIL program" along with the VIVIFRAIL logo and an illustration of specific types of exercise designed to Carmen's functional capacity. On the side, a calendar checking the remaining tasks (when we hear "medication intake and exercising")
3. "Secure messaging with care team members and patients", with Dr. Peter and Anna appearing as an icon on screen and smiling (when we hear "Message care team members")
4. "Advanced Early Warning Smart Decisions Tools", "Intrinsic Dementia Profile", "Home/Health Monitoring Platform", "Clinical Decision Support Services", "Remaining Tasks Calendar", all these appear a little bit faster to complete the layout of the platform (when we hear "Among other uses").

Moreover, patients can use medical devices for home measurements in their routine, contributing to their monitoring and management. Through placed sensors within patients' homes, CAREPATH collects live patient data, allowing clinicians to see care plan adherence, intrinsic capacity, health and home parameters, as well as early warnings in AICP, facilitating a change in the care plan accordingly.
On the screen, we see Carmen's wrist wearing a smartwatch that tracks her vital signs. This image is enclosed in a frame that moves to the left, revealing a second frame with environmental/domotic sensors. The two frames then shift again, making way for three images of Carmen around her home: one where she looks a bit lost inside her bathroom, another showing her having a fall in the kitchen, and a third where she is sleeping, and on her bedside table there's a family portrait of her with a young Anna and her late husband, a black man. We can observe how real-time data is collected and how adjustments are made to Carmen's personal plan.

Carmen will start her CAREPATH journey guided by Dr. Peter and supported by her daughter Anna. CAREPATH's personalized care plan empowers Carmen to manage daily tasks, from medications to exercises. Dr. Peter uses CAREPATH tools to balance Carmen's medications effectively, while the platform's monitoring system provides insights into her health indicators. Carmen and Anna find utility in the platform's educational features, and remote monitoring with Dr. Peter ensures continuous care. Together, they navigate Carmen's health journey with confidence and empowerment.
Dr. Peter is seen smiling and looking to his side. Then, we see a close-up of Anna, smiling back when mentioned in the narration. The scene returns to a full shot of Dr. Peter's office, where Carmen and her daughter appear more positive about her medical situation. The three of them observe the CAREPATH platform and its mentioned sections. Dr. Peter points to the screen, and the sections start growing and moving in an amicable and game-like manner, as Dr. Peter explains each one step by step.
Next, the video shows a medium shot of Carmen and Anna happily looking at the viewer, with Carmen's phone visible within the CAREPATH platform, displaying her name and profile and the "educational features" section clearly visible.

Overall, CAREPATH seeks to enhance the patient's quality of life, improve caregiver support, and optimize healthcare delivery for this vulnerable population.

The CAREPATH logo is shown in the center, with some of the elderly characters shown before standing below it, happy to have the solution they needed.

Appendix 2. CAREPATH publications

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Appendix 3. Sample of published papers

Published White Paper

CAREPATH: developing digital integrated care solutions for multimorbid patients with dementia

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Abstract. CAREPATH project is focusing on providing an integrated solution for sustainable care for multimorbid elderly patients with dementia or mild cognitive impairment. The project has a digitally enhanced integrated patient-centered care approach clinical decision and associated intelligent tools with the aim to increase patients' independence, quality of life and intrinsic capacity. In this paper, the conceptual aspects of the CAREPATH project, in terms of technical and clinical requirements and considerations, are presented.

Keywords. Clinical Decision Support System, Multimorbidity, Dementia

1. Introduction

In the last decade, development of Clinical Decision Support Systems (CDSSs) has become popular in the health informatics domain[1]. Implementation of CDSS in daily

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medical practices is believed to improve healthcare providers' performance on clinical decision-making, quality of care and patient safety, although there has been disadvantages and limitations in their clinical implications[1]. Meanwhile, healthcare providers face challenges in conciliating recommended tasks and activities of different guidelines in multimorbid patients[2]. The heterogeneity of patients accompanied by the complex nature of their health condition makes the existing guidelines, with disease-oriented approaches incapable of providing the same level of improved patient outcomes in this group of patients[3]. This has highlighted the importance of patient-specific recommendations for multimorbid patients, which are frequently provided through computer-interpretable guidelines (CIGs)[5].

Such co-existence of multimorbid conditions can be very well demonstrated in diagnosis and management of dementia, where most guidelines have focused on managing dementia as a single disease[5]. The existing guidelines have been developed to provide the necessary advice on supporting people with dementia and their caregivers in health and social care, without holistic consideration of their implications on other morbidities and intrinsic capacity of the patient. At the level of "best practice", we are facing increased challenges and difficulties in the use of good clinical guidelines due to the co-existence of dementia with other morbidities[6]. These challenges can include but are not limited to polypharmacy, adverse drug reactions, and frequent non-adherence to treatments[3].

In Europe, the single-disease oriented health system and ageing population, which increases the risk of multimorbidity[7], has affected healthcare costs and efficacy and the sustainability of health systems[8]. When dementia is present, the situation becomes even more complicated[6]. The CAREPATH project is a research project within Horizon 2020 that focuses on the enhancement of healthcare interventions for the management of elderly multimorbid patients suffering from dementia. It aims at developing ICT solutions with integrated patient-centered approaches to care for patients with multimorbidity to increase their independence, quality of life and intrinsic capacity (9). In this paper, we are discussing the conceptual aspects of the CAREPATH project in terms of technical and clinical requirements and considerations.

2. The Holistic CAREPATH Solution

CAREPATH will provide a holistic environment that efficiently addresses multimorbidity and dementia challenge in the elderly population, by delivering three complementary components: (A) A *Home and Health Monitoring* platform implemented at the patients' homes integrated with *Advanced Early Warning Smart Decision Tools*, providing environment aware services with natural and comfortable interfaces for older adults for continuously collecting real time data for early detection of onset and changes in functioning, autonomy, underlying cognitive and physiological functions and to derive dementia profiles and intrinsic capacity of these patients, (B) A *Patient Empowerment Platform* providing personalized assistance to the patients, guidance and reminders about care plan goals and activities, present educational materials for reinforcing treatment adherence; collect feedback from the patients and their informal caregivers via PROMs for carrying out geriatric assessments and (C) An *Adaptive Integrated Care Platform* to be used by health professionals, enabling implementation of adaptive care plans for managing multimorbidity based on evidence from clinical guidelines, but prioritizing and reconciling them with the help of clinical

decision support systems, processing patient's most recent context from the home monitoring environment and Electronic Health Records for calculating risk scores for comorbidities and monitor disease progression and intervention effects and tackling polypharmacy management.

3. Steps for developing integrated patient-centered solutions

Team building: It is of crucial importance to identify and build partnerships with all stakeholders in the CDSS domain. For the CAREPATH project, a consortium is composed of ten organizations (universities, clinical organizations, and SMEs) from six countries (Germany, Romania, Spain, Switzerland, Turkey and UK). The team members have expertise in clinical, technical, health economic and ethical aspects relevant to the project. The clinical investigations will be carried out in Germany, Romania, Spain and UK, four countries with diverse health and social care systems.
Clinical Aspects: The clinical teams are expected to provide patient-centered best practice guidelines based on existing evidence, reviews, legislations, and expert consensus. They should also develop or approve the polypharmacy management services to be implemented in the CDSS. Clinical teams will also support collecting the user requirements and determine characteristics of various target users, as well as instrument specifications in the clinical setting. The clinical teams are also expected to provide a variety of probable scenarios and use cases to be tested during the integrated care plan development and pilot phase.
Technical Aspects: The main task expected from the technical team is to design and introduce a generic reusable architecture. This holistic, cross-sectoral and interdisciplinary patient-centered care model of personalized care services is built on existing prototypes of IONIS, C3-Cloud and imergo®-ICP (10). The system is intended to provide patients, healthcare providers and caregivers with smart early warning CDS services and home and health monitoring capability. There will be critical security and privacy issues to be dealt with during this process to help patients and caregivers better manage health related conditions. Finally, the integrated care solution would be presented in accordance with present standards such as HL7/FHIR, using comprehensive, multilingual clinical healthcare terminologies e.g., SNOMED. The functions will be performed by means of APIs for exchanging electronic health record based on CDS Hooks specification for describing the RESTful APIs and interactions to integrate Clinical Decision Support (CDS) between CDS Clients and CDS Services.
Economic and Ethical Aspects: A Health economic study and analysis is an important part of this project. The acceptability and sustainability of the project is partially determined by the success of adjustments made based on the findings of the health economic studies. The project endures important ethical considerations. An ethical team is required to participate in all phases of the development process to ensure all requirements are met.

4. Concluding Remarks

The health and social needs of ageing populations are often complex and ongoing, spanning a range of areas of functioning and fluctuating over time. Traditional care models for people in later life are frequently fragmented and inefficient[11]. Even in

countries with reasonably well-developed health and social care provision, treatment of dementia patients with multimorbidity is generally provided without careful monitoring of the current intrinsic capacity and dementia profile of the patient. There is a need to employ fundamental changes to the focus of clinical care for older people from treating specific symptoms in a disjointed fashion to adapting holistic approaches according to older people's physical and mental capacities. CAREPATH will follow an integrated patient-centered approach, in order to develop a flexible and modular system that will provide a viable solution for improving the management of multimorbid elderly patients with dementia and possibly improving intrinsic capacity, by delivering a system of care adapted to their needs.

Acknowledgements. The work presented in this paper have been supported the European Union's Horizon 2020 research and innovation programme, under grant agreement No 945169, CAREPATH Project.

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Review status

Deliverable leader:	Omid Pournik (UoB) supervised by Theodoros N. Arvanitis (UoB)
Contributors:	Omid Pournik, Theodoros N. Arvanitis, Jaouhar Ayadi, Yehya Mohamad, Wolfgang Schmidt-Barzynski, Mert Gencturk, Lionello Ferrazzini, Luca Gilardi, Oana cramariuc, Timothy Robbins, Pedro Abizanda Soler
Reviewers:	Oana Cramariuc, Luz María Peña Longobardo
Approved by:	Angelo Consoli

Document History

Date	Changes	Version	Authors
01.06.2025	Initial draft of the deliverable	3v0	Omid Pournik (UoB)
18.06.2025	UoB internal draft review	3v1	Theodoros N. Arvanitis (UoB)
25.06.2025	Shared draft for review	3v2	Oana Cramariuc (CITST), Luz María Peña Longobardo (UCLM)
27.06.2025	Comments received from reviewers	3v3	Oana Cramariuc (CITST), Luz María Peña Longobardo (UCLM)
27.06.2025	Preparing final version with all comments incorporated	3v4	Omid Pournik (UoB)
27.06.2025	Final version uploaded to the project's cloud, ready for submission	3v4	Omid Pournik (UoB)

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