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EDITORIAL

Training European Health Care Providers in Adolescent and Young Adult (AYA) Oncology: The Joint Action Networks of Expertise (JANE) on AYA with Cancer Perspective

Virginia Livellara[1] · Marina N. Rosanu[2] · Daniel Stark[3] · Annalisa Trama[4] · Salvatore Provenzano[5] · Chiara Prampolini[4] · Paolo G. Casali[5,6] · Gianluca Vago[6] · Manolis Saloustros[7] · Ian Murphy[8] · Josef H. Vormoor[9,10] · Katie Rizvi[11] · Fedro Peccatori[2] · Andrea Ferrari[6,12]

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Abstract
Adolescents and young adults with cancer represent a distinct and historically underserved population, whose clinical and psychosocial needs are not adequately addressed by traditional pediatric or adult oncology training pathways. While awareness of AYA-specific challenges has increased over the last two decades, substantial gaps in professional education and training persist across Europe. The Joint Action Networks of Expertise (JANE) has recently enabled the creation of a formal European Network of Expertise (NoE) dedicated to AYAs with cancer, offering a unique opportunity to address these gaps in a coordinated and sustainable manner. In this paper, we describe the educational needs in AYA oncology, summarize existing recommendations on AYA-specific training, and present the vision and planned actions of the JANE NoE on AYAs with cancer to develop structured, multidisciplinary, trans-age educational programmes across Europe.

Keywords Adolescent and young adult cancer · Oncology education · Healthcare training · Multidisciplinary care · Survivorship · European networks · JANE

Virginia Livellara and Marina N. Rosanu contributed equally to this work.

Fedro Peccatori and Andrea Ferrari contributed equally and share last authorship.

✉ Fedro Peccatori
fedro.peccatori@ieo.it

[1] Department of Pediatric Hematology/Oncology, Giannina Gaslini Children's Hospital, Genoa, Italy

[2] Gynecologic Oncology Department, European Institute of Oncology IRCCS, Milan, Italy

[3] Institute of Medical Research, University of Leeds, UK and Leeds Teaching Hospitals NHS Trust, Leeds, England, UK

[4] Department of Epidemiology and Data Science, Evaluative Epidemiology Unit, Fondazione IRCCS Istituto Nazionale dei Tumori, Milan, Italy

[5] Mesenchymal and Rare Cancer Medical Oncology Unit, Fondazione IRCCS Istituto Nazionale dei Tumori, Milan, Italy

[6] Department of Oncology and Hemato-oncology, University of Milan, Milan, Italy

[7] Department of Oncology, University Hospital of Larissa, Larissa, Greece

[8] Childhood Cancer International - Europe, Amsterdam, Netherlands

[9] Hemato-oncology Department, Princess Máxima Center for Pediatric Oncology, Utrecht, Netherlands

[10] Utrecht University Medical Center, Utrecht, Netherlands

[11] Youth Cancer Europe, Cluj-Napoca, Romania

[12] Pediatric Oncology Unit, Fondazione IRCCS Istituto Nazionale dei Tumori, Milan, Italy

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Introduction – Why Health Care Providers Involved in AYA Care Require Specific Oncology Training

Adolescents and young adults (AYAs) with cancer represent a distinct and historically underserved patient population, situated at the intersection between paediatric and adult oncology. Over the past two decades, increasing attention has been directed towards the unique clinical, biological and psychosocial characteristics of cancer in this age group, highlighting important differences in disease presentation, tumour biology, treatment response and long-term outcomes when compared with younger children or older adults [1–3].

Despite growing recognition of the specific needs of AYAs with cancer, oncology care and professional training have historically remained dichotomised between paediatric and adult pathways. As a result, AYAs often fall between established systems, experiencing variable access to specialised, age-appropriate expertise, multidisciplinary support, and dedicated services. This structural gap has been associated with diagnostic delays, inconsistent treatment approaches, lower participation in clinical trials, and poorer improvements in survival compared with children and older adults. Moreover, existing oncology training pathways frequently lack structured exposure to the age-specific clinical and psychosocial dimensions of AYA cancer care [2, 4].

In response to these unmet needs, several collaborative initiatives have been developed to advocate for dedicated AYA oncology programmes in Europe. Among these, the European Society for Medical Oncology (ESMO) and the European Society for Paediatric Oncology (SIOPE) established the ESMO–SIOPE AYA Working Group, which was created with a strong educational focus (https://www.esmo.org/about-esmo/organisational-structure/educational-committee/adolescents-and-young-adults-working-group). A key contribution of this initiative was the publication of a position paper providing comprehensive recommendations on models of care, multidisciplinary collaboration, and training needs in AYA oncology [2]. In parallel, initiatives such as the European Network for Teenagers and Young Adults with Cancer (ENTYAC) and the European Youth Cancer Network (YARN) have contributed to raising awareness, supporting the development of harmonised standards of care, and advocating for education, training, and policy development in AYA oncology (https://siope.eu/news/news-from-entyac/, https://health.ec.europa.eu/non-communicable-diseases/cancer/europes-beating-cancer-plan-eu4health-financed-projects/projects/eu-cayas-net_en). In parallel, additional initiatives within major European scientific societies are increasingly recognising the need to strengthen AYA-specific education. Within the European Hematology Association (EHA), the establishment of an AYA-focused taskforce and the development of dedicated educational activities further reflect the growing awareness that training in AYA care should extend across both oncology and hematology disciplines. Importantly, patient advocacy organisations have assumed a central and increasingly structured role in this landscape, leading and co-designing evidence-based recommendations for age-appropriate AYA cancer care, contributing to the definition of minimum standards for specialised services, and actively shaping educational priorities for healthcare professionals across Europe [5].

While these efforts have led to important advances in service organization and advocacy, less systematic attention has been devoted to the training of healthcare professionals working with AYA patients. Training in AYA oncology cannot be limited to the acquisition of disease-specific medical knowledge, but requires competencies spanning age-appropriate communication, psychosocial care, fertility preservation, survivorship planning, and the ability to navigate and coordinate care across pediatric and adult services, in order to address the complex clinical and psychosocial needs of this population and the challenges related to transitional life phases [6].

In 2010, Hayes-Lattin and colleagues provided a foundational framework outlining the educational needs of healthcare professionals involved in AYA oncology, highlighting gaps in knowledge, skills and training pathways [1]. Since then, the field has evolved substantially. The emergence of national and international networks, the growing emphasis on survivorship and quality of life, and the increasing involvement of patient advocacy organizations have reshaped both the scope and the delivery of AYA cancer care, underscoring the need to revisit and update training priorities. In parallel, major advances in oncology, including targeted therapies, immunotherapies, and molecularly driven treatment strategies, have improved survival across several malignancies affecting AYAs, resulting in a growing population of long-term survivors. This shift has brought long-term toxicity management, fertility preservation, survivorship care, and age-specific psychosocial vulnerabilities to the forefront of contemporary AYA oncology practice, reinforcing the need for dedicated, up-to-date training. Although this pattern is not universal across all malignancies, some cancers in AYAs have been reported to present at more advanced stages and to display distinct survival trajectories compared with

older adults, reflecting a complex interplay of delayed diagnosis, age-related clinical factors, and, in selected tumour types, distinct biological features [7]. These observations highlight the need for age-adapted treatment strategies and complex, individualised clinical decision-making in this population.

In parallel, several structured training programmes and educational initiatives in AYA oncology have been developed over the past decade, including university-based courses and professional training pathways involving multidisciplinary teams and different health-care professional profiles. Examples include academic programmes such as those developed at the University of Coventry (https://pureportal.coventry.ac.uk/en/activities/3rd-global-adolescent-and-young-adult-with-cancer-congress/), as well as national and society-led initiatives, including the AYA oncology advanced training course at the Università degli Studi di Milano (https://www.unimi.it/it/corsi/corsi-post-laurea-e-formazione-continua/master-e-perfezionamento/catalogo-corsi-di-perfezionamento/aa-2025/2026-nella-terra-di-mezzo-oncologia-delladolescente-e-del-giovane-adulto-adolescents), educational programmes supported by Fondazione Menarini (https://fondazione-menarini.com/it/corsi-ed-eventi/info-evento.html/get-up-stand-up-for-ayas-with-cancer, https://fondazione-menarini.com/content/dam/fondazione/documents/events/872/Versione%2030%20Gennaio%20Programma_Milano_AYA_6-7_02_10.pdf). Together, these initiatives reflect a growing recognition that effective AYA cancer care requires coordinated, multiprofessional training across medical, nursing, psychosocial and allied health disciplines.

Within this evolving European landscape, the establishment of formal Networks of Expertise (NoEs) represents a further step towards supporting clinical care, research, and education. In particular, the Joint Action on Networks of Expertise (JANE) has identified AYAs with cancer as a priority area, providing a structured framework in which training and education can be embedded as core components of high-quality, equitable AYA oncology care across Europe.

The Network of Expertise on AYAs with Cancer

JANE, promoted by the European Commission and funded under the EU4Health Programme, represents a major step forward in the development of structured, pan-European oncology networks. Within JANE, seven transversal NoEs have been established to address priority areas in cancer care, including a dedicated NoE for adolescents and young adults with cancer (https://jane-2.eu/wp11/).

The NoE on AYAs with cancer is conceived as a collaborative platform bringing together paediatric and adult oncology professionals, allied healthcare providers, researchers, patient advocates, and policy stakeholders. Its overarching goal is to improve equity, quality, and outcomes of AYA cancer care across European Member States by fostering collaboration, harmonising approaches, and supporting the implementation of evidence-based models of care.

Among its key objectives, the NoE aims to support the development of AYA-dedicated programmes, promote clinical and translational research, improve access to clinical trials, define core outcome indicators, and ensure sustainability of AYA initiatives beyond the duration of the Joint Action. Skills development represents a central pillar of this strategy.

By positioning education and training within a formal Network of Expertise, the NoE represents an evolution from earlier awareness-driven initiatives towards a coordinated European model focused on capacity building, standardization and long-term sustainability. This approach provides a concrete response to previously identified gaps in professional education and creates a robust foundation for re-evaluating educational needs and training strategies in contemporary AYA oncology.

Educational Needs in AYA Oncology: Existing Recommendations

The need for dedicated training in AYA oncology has been clearly articulated for more than a decade, with multiple international initiatives highlighting core competencies required for healthcare professionals caring for AYA with cancer. These competencies extend beyond disease-specific medical knowledge and encompass practical, organisational, and communication skills essential to deliver age-appropriate, multidisciplinary care [2].

Key educational domains include:

- AYA-specific medical knowledge, encompassing epidemiology, tumor biology, treatment response, and long-term effects across the AYA age spectrum;
- Competence in age-appropriate communication, including engagement with patients and families, shared decision-making, and the use of alternative communication tools;
- Multidisciplinary care delivery skills, enabling coordination between paediatric and adult oncology services

and integration of psychosocial, fertility, and survivorship expertise;
- Understanding of ethical, legal, and social issues relevant to AYAs, particularly in relation to consent, autonomy, and transitions of care.

Despite these clear recommendations, formalised and consistently implemented training pathways in AYA oncology remain limited in Europe, often relying on local initiatives or individual expertise rather than structured curricula. Large surveys of healthcare professionals across Europe have also identified education on AYA cancer care as one of the most frequently reported unmet needs, underscoring the importance of developing dedicated training programmes [8].

Recent international efforts to define core outcome sets (COS) for AYAs with cancer further highlight the complexity and multidimensionality of AYA care. The development of an AYA-specific COS, incorporating both clinical and patient-reported outcomes across on-treatment and off-treatment phases, underscores the need for healthcare professionals to be trained beyond traditional disease-centred endpoints. Competence in understanding, collecting, and interpreting outcomes related to quality of life, psychosocial functioning, and survivorship is increasingly essential in AYA oncology practice [9]. These considerations highlight the need for a structured, coordinated European framework to translate these recommendations into sustainable interdisciplinary training pathways.

Training Within the JANE NoE on AYAs with Cancer: Vision and Planned Actions

Within the JANE NoE on AYAs with cancer, training is envisioned as a strategic instrument to reduce disparities in care and to ensure sustainability of AYA programmes across Europe. The NoE adopts a multidisciplinary and trans-age approach, recognising that effective AYA care requires shared competencies across paediatric and adult oncology, nursing, psychology, primary care, and patient advocacy.

Planned training activities include the development of a European AYA training curriculum tailored to different professional profiles, combining core educational modules with country-specific adaptations. While a harmonised European framework is essential, the development of adapted national training pathways will also be crucial to account for local healthcare system organisations, regulatory environments, and linguistic diversity, particularly in initiatives involving patients, caregivers, and multiple stakeholders. Importantly, AYAs with cancer, together with their families and caregivers, will be actively involved in the co-design and structuring of both educational content and training programmes, ensuring that these initiatives are aligned with real-life needs, priorities, and lived experiences. Training initiatives will address not only clinical management but also organisational models of care, referral pathways, and patient and public involvement.

Collaborations with major European scientific societies will be essential to maximise impact, avoid duplication of efforts, and foster coordinated, joint initiatives in AYA education and training across disciplines. In this context, educational platforms such as the EHA Campus may contribute to the development and dissemination of AYA-focused educational materials, including aspects related to hematological malignancies and chronic non-malignant conditions affecting the AYA population.

By leveraging existing expertise and collaborating with scientific societies and national programmes, the NoE aims to promote harmonisation while respecting local healthcare contexts. Importantly, training will be integrated with other NoE activities, including guideline development, research promotion, and monitoring of AYA cancer indicators, ensuring coherence and long-term impact.

Conclusions

The creation of the JANE Network of Expertise on AYAs with cancer offers a unique opportunity to move from fragmented educational initiatives toward a coordinated European strategy for training in AYA oncology. Building on existing evidence and recommendations, the NoE places education at the core of its mission, recognising that improving outcomes for AYAs requires healthcare professionals who are adequately trained to address their specific clinical and psychosocial needs.

Through structured, multidisciplinary, and sustainable training programmes, the NoE aims to contribute to the development of a new generation of professionals capable of delivering high-quality and equitable care to adolescents and young adults with cancer across Europe. Key components of this strategy include the development of a shared European educational repository to collect and disseminate up-to-date training materials, the implementation of "train-the-trainers" models to build local capacity

and ensure scalability, and the establishment of strong collaborations with universities and academic institutions to support formal recognition and potential certification of AYA oncology training pathways.

Together, these actions are designed to promote harmonisation while allowing adaptation to national contexts, thereby ensuring both quality and sustainability of educational initiatives. The proposed modular structure of the training curriculum, summarised in Table 1, provides a practical framework for the implementation of comprehensive and flexible educational programmes in AYA oncology across Europe.

Table 1 Proposed curriculum modules for training in AYA oncology

Module	Main topics	Key competencies addressed
Introduction & Epidemiology	Definition of AYA population, incidence, diagnostic delays, health system barriers	Understanding AYA-specific cancer burden and system challenges
Biology & Molecular Aspects	Tumor biology, genetic predisposition, molecular profiling, precision medicine	Applying biologic knowledge to personalized AYA care
Disease-Specific Managment	Hematologic malignancies, solid tumors, rare cancers in AYAs	Delivering age-adapted clinical management
Therapeutic modalities	Surgery, chemotherapy, radiotherapy, targeted therapies, immunotherapy	Optimizing treatment strategies and managing toxicities
Survivorship & Long-Term Care	Late effects, second malignancies, survivorship models, lifestyle interventions	Planning long-term follow-up and survivorship care
Fertility & Reproductive Health	Fertility preservation, counseling, sexual health	Integrating reproductive health into oncology care
Psychosocial Aspects	Mental health, education, career impact, peer and family support	Providing holistic psychosocial assessment and care
Health Systems & Policy	Organization of AYA services, inequalities, supportive care, policy frameworks	Implementing effective AYA care models
Clinical Trials & Research	Barriers to enrollment, ethics, AYA trial networks	Promoting research participation
Education, Advocacy & Prevention	Vaccination, advocacy, public health campaigns, digital health tools	Supporting prevention and patient engagement

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Declarations

Conflict of Interest The authors declare no conflicts of interest relevant to the content of this manuscript.

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