

Title page

Title: Development of online cancer resources to support pre-registration nurses and allied health professionals to increase their knowledge and understanding of cancer care

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Abstract

Cancer rates are increasing, and more people are living with cancer and its consequences. Healthcare students will be caring for people affected by cancer in all clinical contexts. However, pre-registration programmes can include limited cancer education and not all students will have the opportunity for a clinical placement in a cancer setting. This can result in healthcare students feeling unprepared to care for people affected by cancer. To address this need, nine e-learning modules, collectively called the Foundations of Cancer Care, have been developed to support students' knowledge, understanding and confidence about cancer. This paper outlines the development and peer review of the Foundations of Cancer Care. The resultant modules will be freely available to all those with an Open Athens account or NHS or UK university email address via the NHS Learning Hub (<https://learninghub.nhs.uk/>) from Spring 2023.

Key words *Please provide 5–6 searchable terms.*

Cancer, student, pre-registration, e-learning, evaluation, education peer review

Key points

- Pre-registration healthcare students can have limited access to specialist cancer education and cancer clinical placements during their pre-registration programmes and can, therefore, feel unprepared to care for people affected by cancer
- E-learning modules can be an effective method to increase students' knowledge and understanding of cancer
- The use of e-learning in conjunction with additional learning opportunities, such as supplementary reading, face to face sessions, discussions, action learning sets and mentorship are advocated to deepen students' knowledge and understanding.

Manuscript

Background

Cancer is the one of the leading causes of death worldwide and in the United Kingdom (Global Burden of Disease 2019, Cancer Collaboration et al., 2022). Projections forecast the global disease burden of cancer will continue to rise over the next two decades (Foreman et al., 2018). To sustain and secure the cancer care workforce, it is vital pre-registration programmes prepare healthcare students to care for people affected by cancer. However, provision of cancer and end of life care education can be limited in nursing and allied health professionals' programmes (Nilsson *et al.*, 2022; Flood and Shepherd, 2021).

In the UK, the Aspirant Cancer Career and Education Development programme (ACCEND) Framework outlines nationally agreed cancer focused learning outcomes and core cancer capabilities in practice (CiPs) for pre-registration healthcare students (ACCEND, 2023; Potter and Taylor, 2022). To increase access to cancer education for pre-registration healthcare students, and support implementation of the ACCEND framework, nine e-learning modules, collectively called 'The Foundations of Cancer Care', have been developed. This paper outlines the development and peer review evaluation of the modules.

Development

Following review of existing e-learning resources, a programme called Cancer Nursing Careers was identified on the Health Education England (HEE) e-Learning for Healthcare (e-LfH) platform. Cancer Nursing Careers consists of eight modules aligned to the Royal College of Nursing (2017) Career and Education Framework for Cancer Nursing. With permission from the original authors, the Cancer Nursing Careers modules were revised, renewed and rewritten for a pre-registration audience to meet the learning outcomes outlined in the ACCEND Framework (Health Education England, 2023). This was undertaken by a team of UK nurses and allied health professionals who work in Higher Education Institutions (HEIs) and are cancer specialists in pre-registration curricula and pedagogy.

Modules were adapted to include perspectives of nursing and allied health professionals and to develop learning at an appropriate level for pre-registration students. This included the development of reflective questions and recommended workplace learning scenarios to help students understand how they could link theory to practice.

Peer review method

Peer review and quality assurance was undertaken with students, healthcare professionals and technology enhanced learning experts to ensure the learning was relevant and fit for purpose.

Twenty-five third year pre-registration nursing BSc nursing students at one English university were invited to complete the first three modules and an evaluation e-survey. Ethical advice was obtained from the university Ethics Committee and the Chair confirmed that no ethical approval was required, and the evaluation could take place within standard module evaluation procedures. The evaluation e-survey consisted of eight questions, adapted from the Kirkpatrick model of evaluation (Kirkpatrick and Kirkpatrick, 2019). This included Likert scale responses to elicit views on the modules and free text responses about what participants liked and thought could be improved. Finally, participants were asked to rate their overall opinion of the modules from very poor, poor, neutral, good, very good.

Healthcare professionals with an interest in cancer care and pre-registration education were also asked to review the modules. The healthcare professionals were sent links to the modules and the evaluation e-survey.

Peer review results

In total, 19 students completed the survey. Seven (36.8%) indicated no clinical experience of cancer care and seven (36.8%) had experienced a clinical placement in a cancer setting (table 1).

Table 1. Student nurse participant characteristics

Descriptors		n	%
Clinical experience of cancer care (<i>participants were allowed to check more than one option</i>)	None	7	36.8
	I have had a clinical placement in a cancer service setting during my course	7	36.8
	I have not had a cancer specific placement during my course, but I have cared for people with cancer during my clinical placements	7	36.8
	I have worked as a health care assistant in cancer services	2	10.5
	I have cared for people with cancer whilst working as a health care assistant in a non- cancer setting	3	15.8

Overall, 18 (94.7%) students rated the modules as very good (n-10, 52.6%) or good (n-8, 42.1%) and one (5.3%) did not answer. Almost all (n-18, 94.7%) agreed or strongly agreed the modules could increase pre-registration healthcare students' knowledge and understanding of cancer and its treatment and could increase pre-registration healthcare students' confidence about cancer care in practice (table 2). All students (n-19, 100%) agreed or strongly agreed the learning objectives were relevant to pre-registration healthcare students. Almost three quarters (n-14, 73.7%) agreed or strongly agreed the content was written at the right level for pre- registration healthcare students, two (10.5%) disagreed and four (21.1 %) did not agree or disagree (table 3).

Table 2: Levels of student agreement regarding modules content

Please state your level of agreement with the following statements. Do you think these modules could support pre-registration healthcare students to.....	Pre-registration students						Healthcare professionals					
	Strongly disagree/ disagree		Neither agree or disagree		Strongly agree/ agree		Strongly disagree/ disagree		Neither agree or disagree		Strongly agree/ agree	
	n	%	n	%	n	%	n	%	n	%	n	%
Increase knowledge and understanding of cancer and its treatment	0	0	1	5.3	18	94.7	0	0	0	0	6	100
Examine current national policies, guidance and local healthcare processes influencing organisation of cancer services and care for people affected by cancer	0	0	2	10.5	17	89.5	0	0	0	0	6	100
Explore public and professional attitudes to cancer	0	0	3	15.8	16	84.2	0	0	0	0	6	100
Describe the biological basis of cancer and examine how this informs practices relating to risk reduction, early detection, screening, diagnosis, staging and grading of cancer, personalised treatment decisions.	0	0	0	0	19	100	0	0	0	0	6	100
Analyse the physical, psychological, emotional and social impact of cancer and its treatment across the spectrum of cancer care.	0	0	2	10.5	17	89.5	0	0	0	0	6	100
Examine the range of support (a) informational, (b) emotional, (c) esteem, (d) social network support, and (e) tangible support needs of people living with and beyond cancer, palliative and end of life care.	0	0	1	5.3	18	94.7	0	0	0	0	6	100
Analyse models of communication and psychological support for addressing the emotional concerns of patients and/or their caregivers.	0	0	1	5.3	18	94.7	0	0	0	0	6	100
Examine own professional role as part of multi-professional team contributing to person-centred assessment and care for people affected by cancer including self-care, self-management and rehabilitation/reablement.	0	0	1	5.3	18	94.7	0	0	0	0	6	100
Explore own support and development needs and identifying opportunities for clinical supervision, support and development.	0	0	2	10.5	17	89.5	0	0	0	0	6	100

Table 3: Levels of student agreement regarding modules level

Please state your level of agreement with the following statements. Do you think these modules could support pre-registration healthcare students to.....	Pre-registration students						Healthcare professionals					
	Strongly disagree/ disagree		Neither agree or disagree		Strongly agree/ agree		Strongly disagree/ disagree		Neither agree or disagree		Strongly agree/ agree	
The learning objectives are relevant to pre-registration healthcare students	0	0	0	0	19	100	0	0	0	0	6	100
The content is written at the right level for pre-registration healthcare students	2	10.5	3	15.8	14	73.7	0	0	0	0	6	100
The content is appropriately challenging for pre-registration healthcare students	1	5.3	4	21.1	14	73.7	0	0	0	0	6	100
The content is too basic for pre-registration healthcare students	16	84.2	2	10.5	1	5.3	6	100	0	0	0	0
The suggested workplace activities are helpful and relevant to pre-registration healthcare students	0	0	2	10.5	17	89.5	0	0	0	0	6	100
These modules could increase pre-registration healthcare students' confidence about cancer care in practice	0	0	1	5.3	18	94.7	0	0	0	0	6	100

From the qualitative comments, when asked what they liked about the modules, students highlighted (1) modules are interactive, informative, and easy to navigate; (2) helpful for learning about cancer and cancer care; (3) perceived link and continuity with post-registration resources; and (4) pitched correctly at learner’s level. Exemplar quotes are presented on Table 3.

Table 3. What students liked about the modules

Area	Exemplar quotes
Modules are interactive, informative, and easy to navigate	<p>‘The revision activities were helpful’</p> <p>‘They are engaging and go into just the right amount of detail. I like how the information is delivered, its interactive and so keeps me engaged.’</p> <p>‘They were engaging and informative. Easy to navigate and follow-up information is relevant, and information is separated into different categories to be understandable.’</p> <p>‘I like that they have interactive parts to them to keep you interested and involved.’</p>
Helpful for learning about cancer and cancer care	<p>‘I liked that they provided lots of useful information surrounding the topic’</p> <p>‘It increased my knowledge around cancer vastly and I found it an effective way of learning.’</p> <p>‘They cover cancer care in all aspects and the assessment section is very helpful in recounting what you've learnt.’</p> <p>‘I enjoyed learning about cancer care.’</p>
Perceived link and continuity with post-registration resources	<p>‘Provides good basic overall grounding of context. I also feel that if the post-reg training is similar then it would be very useful to review again once qualified and working in practice.’</p>
Pitched correctly at learner’s level	<p>‘I liked that they were written in a way that allowed me to understand the science and complexity of cancer in the body but also explained in a way that made it easy to follow.’</p> <p>‘I thought the content was well laid out. It provided a lot of information which was all broken down making it easier to comprehend as a pre-reg nurse. I also really liked how there was a good chunk of detail on each subject, not just a one-line definition.’</p>

Areas of improvement were identified by students in the free text comments. These include (1) reinforce on-line learning with live lectures, (2) simplify the science of cancer module, (3) a lot of new information to learn and (4) improve navigation of virtual platform. These are listed on Table 4 with exemplar quotes provided.

Table 4. Areas of improvement identified by students

Area	Exemplar quotes
Reinforce on-line learning with live lectures	'I think the e-learning modules are useful, but I also feel that some of that content should be taught in the live teaching sessions..... As for someone who's not had any experience with cancer care, it would have been nice to have this information at the start.'
Simplify the science of cancer module	'The scientific side was a lot to learn in a short period of time although it was well explained.' 'The science of cancer module was exceptional, rich in medical information; it was quite hard to fully take in.'
A lot of new information to learn	'Unsure if I will remember any of this content before being able to use it within practice.' 'I thought it was quite hard to remember a range of difficult information.' 'There is a lot of information to take in, so if this was given as an optional module with no credits assigned to it students may find it overwhelming.'
Improve navigation of virtual platform	'The registering of the answers didn't always work, but the modules were very good.' 'Key words or important information should be in bold or colour.' 'Maybe make it a bit easier to navigate.' 'Reflections and typing answers took too long'

Health care professional survey

In total, six HCP participants *i.e.*, four allied health professionals (AHP) and two nurses, completed the evaluation questionnaire (table 5).

Table 5. HCP participant characteristics

Descriptors		n
Role of HCP	Nurse	2

	Allied Health Professional	4
Percentage of role involving patients living with and beyond cancer	More than 75%	3
	Between 50 and 75%	1
	About 50%	1
	Between 25% and 50%	1
	Less than 25%	0
Length of experience working with people who may be living with or beyond cancer	Up to a year	0
	Between one and five years	1
	Between one and ten years	1
	Between 11 and 20 years	2
	Over 20 years	2

Overall, HCP participants found the modules either very good (n=5) or good (n=1). All healthcare professionals agreed or strongly agreed the learning objectives were relevant to pre-registration healthcare students and written at the right level (table 3). All agreed or strongly agreed the modules could: increase pre-registration healthcare students' knowledge and understanding of cancer and its treatment, increase confidence about cancer care in practice, support students to describe the biological basis of cancer, support students to examine the range of support for people living with and beyond cancer, analyse models of communication and psychological support and examine own professional role (table 2).

HCPs particularly liked the '*interactive nature*' of the module with '*work activities*' for the learner. They also highlighted the importance of providing a '*range of relevant resources*' with links for '*further evidence searching*'. They particularly found the '*workplace questions*' and '*overview of policy context*' very good and useful for students. They mentioned that the module was an '*excellent resource*' that was '*logical and easy to follow*'.

Areas for improvement included:

- to simplify the science of cancer module
- to improve site navigation
- to review representation e.g., genders of case examples
- to include an assessment at the end of the personalised treatment section
- to ensure acronyms are spelled out or avoided
- to ensure links and data are recent

Actions from evaluations

Actions taken following the review are highlighted in Box 1.

Box 1: Modifications following evaluation and peer review

Suggestion	Actions taken
Some content too advanced for pre-registration students	All content reviewed to ensure appropriate for pre-registration audience. The Science of Cancer module was simplified.
Include self-assessment within each module	Self-assessment and reflective questions have been included in all modules
Review gender representation	All representation reviewed by team and by Technology enhanced learning Quality Assurance Team
Avoid acronyms	All acronyms removed where appropriate or full explanations given
Ensure links and references are up to date	All links checked to ensure accuracy and relevance. All references updated to within five years unless seminal work.
Improve site navigation	Digital platform has migrated to a revised platform with improved navigation

Final online modules

From Spring 2023, the Foundations of Cancer Care online modules will be able on the UK NHS Learning Hub (<https://learninghub.nhs.uk/>) and will be freely accessible to all those with an NHS, UK university email address, or with an Open Athens account. Modules include:

- The context of cancer
- The science of cancer
- Personalised treatment and care for cancer
- Understanding the impact of cancer on the individual, families and healthcare professionals
- Living with and beyond cancer
- Palliative and end of life care
- Selfcare, ethics and clinical leadership in cancer

- Communication and team working in cancer care
- Evidenced based practice and applied research in cancer care

Modules include factual content which is supported by suggested workplace activities, reflective practices and self-assessments. Each incorporates text, figures, diagrams, links to patient experience videos, podcasts, policies and charity websites. Every module summarises the key points and students are signposted to additional e-learning opportunities and further reading.

Discussion

Over a third of students in this review had no cancer experience at all and almost two thirds had not experienced a clinical placement in a cancer setting. Lack of clinical placements is a recognised issue and novel approaches, such as simulation and virtual placements have been adopted in cancer with good effect (Croxford *et al.*, 2021). However, access to such placements remains limited. In addition, due to pressures to meet all standards set out by Professional Regulatory and Statutory Bodies (PSRB's) pre-registration curricula can include limited opportunity for in-depth study of any speciality (Collier-Sewell *et al.*, 2023), including cancer. This lack of exposure to cancer during pre-registration programmes can lead to students feeling ill prepared to care for people affected by cancer. This reinforces the need for resources such as the Foundations of Cancer Care.

Feedback from both students and the healthcare professionals suggested simplifying the Science of Cancer module. Globally, there are recognised challenges of teaching biosciences and pathophysiology in healthcare. Whilst nursing students recognise the need to understand bioscience (Taylor *et al.*, 2015, Barton *et al.*, 2021) it can be perceived as harder and more difficult to learn and apply than other aspects of healthcare knowledge (Barton *et al.*, 2021; Craft *et al.*, 2013). Further, education providers can find it challenging to convey the significance of learning about anatomy and physiology (Satoh, Fujimura and Miyagawa, 2023). However, bioscience knowledge can help to contextualise and tailor holistic nursing care to individual patient needs (Montayre *et al.*, 2021). In response to the feedback on Science of Cancer module, we felt it was appropriate to simplify the content, especially as the module may be used as stand-alone learning by students and students may not have opportunity to ask questions to deepen their understanding.

Conclusions

Peer review has demonstrated the Foundations of Cancer Care e-learning provides a useful resource for pre-registration healthcare students to learn about cancer care. The review was limited by the small number of student participants and, if repeated, it would be advantageous to include allied

health professionals and students from more than one HEI. However, it provided opportunity for the modules to be modified in response to the feedback ahead to final release to students.

Whilst these modules provide a comprehensive foundation for cancer education, students would benefit if they were used in conjunction with additional reading, face to face sessions, and specialist cancer education to facilitate their learning and understanding. Guidelines to support HEIs to increase cancer education into their programmes would be helpful. Evaluation of the impact of the modules on students' learning and clinical practice is underway.

Reflective questions

Please supply 3–5 questions based on your article that readers can use for reflective notes or discussion, which may be used to count towards their NMC revalidation. These should be open-ended questions.

- How is cancer education delivered in your pre-registration programme and how does this align to the Foundations of Cancer Care module in the ACCEND Framework?
- How can this learning enhance your practice to support the care you deliver to people affected by cancer?
- What are the challenges of integrating this learning in your delivery of cancer care education?
- How could this eLearning support experiential and/or reflective learning for students?
- How can awareness of the ACCEND Career pathway, core capabilities in practice and education framework be introduced as a development framework for those students considering a career in cancer care?

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