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Using Generative AI to Support Patient Information Leaflet Development: A Descriptive Implementation Study

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Abstract

Generative artificial intelligence (AI) is increasingly being evaluated for patient education, but published accounts of incorporating AI-assisted leaflet development into institutional approval processes remain limited. In this descriptive implementation report, the free tier of ChatGPT (OpenAI, San Francisco, CA) was used to draft patient-facing text about lymphoedema, and the free tier of Canvas, including AI-assisted functionality, supported visual design. Human review involved medical corrections, simplification of terminology, additional information, and formatting revisions. The completed patient information leaflet (PIL) underwent the established approval process at Imperial College Healthcare NHS Trust. Initial drafting and visual design took approximately one hour, excluding formal institutional review. The leaflet was approved for clinical use; no specific further changes were requested during governance review. Successful implementation was described by completion, progression through governance review, and approval of this single leaflet. This case documents an AI-assisted development and approval pathway, but does not establish comparative efficiency, generalisable feasibility, patient comprehension, or clinical effectiveness.

Categories: Plastic Surgery, Other, Public Health
Keywords: artificial intelligence, digital health, health communication, medical education, patient education

Introduction

Patient information leaflets (PILs) support communication about diagnoses, treatment, and self-management. Developing a patient-facing resource involves clinical content preparation, review for accuracy and readability, visual design, and local governance approval. These activities may require input from several professional groups, although their duration and cost were not measured in the present study.

Natural language processing has developed into an important area of medical informatics, with applications extending across clinical and non-clinical settings [1]. Beyond language processing, AI has also been applied to visual design: Lin et al. described AutoPoster, an automated content-aware advertising poster generation system [2]. Although not developed for healthcare, this work illustrates a separate application of AI-assisted design. AI applications in clinical practice have been reviewed by Alowais et al. [3]. Generative AI can produce text or visual content, while large language models (LLMs) are a class of generative AI focused on language tasks; ChatGPT (OpenAI, San Francisco, CA) is an LLM-based application.

Previous work has explored AI for dental patient education and communication [4]. Sudharshan et al. assessed ChatGPT for simplifying patient educational text [5]; Tukur Jido et al. evaluated readability of AI-generated leaflets on dementia-related conditions [6]; and Naufal et al. compared ChatGPT- and Gemini-generated brochures on breast cancer surgical management [7]. AI applications in public health have also been discussed in a case study [8]. Together, these publications establish a broader context for investigating AI-supported patient information development.

Lymphoedema is a common, clinically important chronic condition for which understandable information about symptoms, management and self-care is valuable [9,10]. Broader reviews have identified both opportunities and concerns regarding ChatGPT in healthcare education and practice [11]. Studies of ChatGPT performance in medical examinations demonstrate another educational application of LLMs, although examination performance is not evidence of patient-leaflet quality [12]. The benefits, limits, and risks of GPT-4 in medicine have also been discussed [13], while World Health Organization guidance emphasises ethical oversight and governance of AI for health [14].

More directly relevant to patient-facing materials, Nasra et al. synthesised studies of AI and patient educational material readability [15]. Sridharan et al. assessed LLM-generated patient instructions and educational materials using measures including understandability and actionability [16]. Sivaramakrishnan et al. compared LLM-generated dental patient education materials across readability, understandability, actionability and reliability outcomes [17]. These evaluations examine properties of generated content; the

practical sequence of drafting, clinical revision, visual design, and approval through an NHS patient-information governance pathway remains less well documented.

The aim of this report was to describe the AI-assisted development of one lymphoedema PIL and its progression through the Trust's institutional governance process, with successful implementation defined by leaflet completion and formal approval for clinical use.

Technical Report

Study design and implementation outcomes

This was a descriptive, single-resource, proof-of-concept implementation report at Imperial College Healthcare NHS Trust. For this report, successful implementation was defined as (i) completion of an AI-assisted PIL, (ii) submission through the existing governance process, and (iii) approval for clinical use. These outcomes were described narratively; no validated feasibility scale, conventional development comparator, economic evaluation, or patient outcome assessment was used.

AI-assisted text generation and clinical review

The free tier of ChatGPT (OpenAI) was used to generate initial patient-facing text. The precise underlying model version and date of the original interaction could not be verified retrospectively. Initial prompts requested plain-language explanations of lymphoedema, its causes, symptoms and signs, diagnosis, management and prevention, and commonly asked questions. After review of the initial responses, ChatGPT was asked to consolidate the material into a shorter, accessible PIL. Exact prompt wording is retained in the Appendix. The prompts were not formally validated.

The generated draft was reviewed by the authors before institutional submission. Review addressed clinical accuracy, completeness, appropriate patient-facing terminology, and relevance. Revisions included medical corrections, simplification of wording, addition of relevant information, and editorial changes. The source documents currently available do not identify the exact medical statements corrected; accordingly, no particular ChatGPT error is attributed without a verified comparison of the initial and approved versions.

Visual design using Canva

The reviewed text was transferred into Canva for visual development. Canva templates, icons, layout functions, and AI-assisted design functionality were used to support presentation; manual changes were made to formatting and visual arrangement to align the leaflet with the Trust's patient-information standards. ChatGPT was used for text drafting, whereas Canva supported the visual design workflow.

Institutional governance and approval

The leaflet was submitted under the established Imperial College Healthcare NHS Trust process for patient information materials. As documented in the original manuscript, the review pathway included the Patient Editor, Divisional Quality and Safety Department, Trauma Q&A meeting, and Consultative Expert Working Group on Research and Development (CEWG). No specific changes were requested during the formal governance review. This should be distinguished from the clinical and editorial revisions undertaken before submission.

Results

A complete initial text and visually formatted PIL were developed in approximately one hour. This estimate refers to the drafting and design stage and excludes the subsequent formal governance process; it is not a measure of time saved relative to conventional leaflet development.

The ChatGPT-generated draft is shown in Figures *1*-*2*. Clinical and editorial review resulted in medical corrections, simplified terminology, additional patient-facing information, and formatting modifications. These changes demonstrate that human input was not restricted to applying an institutional template.

Understanding Lymphedema

A Guide for Patients and Families

What Is Lymphedema?

Lymphedema is a condition that causes swelling in parts of the body—often the arm or leg. It happens when the lymphatic system (your body's drainage system) isn't working properly. Fluid builds up, and that's what causes the swelling.

Why Does It Happen?

The most common causes include:
- Treatment for cancer (like surgery or radiotherapy that affects lymph nodes).
- Infections or injuries that damage the lymph system.
- Some people are born with a weaker lymph system (primary lymphedema).

What Are the Signs and Symptoms?

You might notice:
- Swelling in your arm, leg, hand, or foot.
- A feeling of heaviness or tightness.
- Hard, thick, or tight skin.
- Clothes, shoes, or rings feel tighter.
- Less movement in the area.
- Aching or discomfort.
- Skin infections (like redness or warmth).

How Is It Diagnosed?

Your doctor or nurse may:
- Examine the area that's swollen.
- Ask about your medical history.
- Use scans (like ultrasound or MRI) to see how your lymph system is working.

How Can You Manage It?

There's no cure yet—but you can manage it with the right care:
- Wear compression garments (like sleeves or stockings).
- Stay active with gentle exercises.
- Try special massage called Manual Lymphatic Drainage (MLD).
- Take care of your skin to avoid infections.
- Eat well and stay healthy—keeping a healthy weight helps.

FIGURE 1: AI-generated draft patient information leaflet produced using ChatGPT (OpenAI, San Francisco, CA) before institutional formatting (1 out of 2).

How Can You Prevent It (or Stop It Getting Worse)?

- Avoid cuts, insect bites, or burns on the swollen area.
- Keep the skin clean and moisturized.
- Don't wear tight clothes or jewelry on that part.
- Avoid extreme heat (hot baths, saunas) and cold.
- Wear your compression garments if advised.
- Avoid blood tests or injections in the swollen limb.

Your Most Common Questions, Answered

Q: Is lymphedema dangerous?
Not usually, but it can lead to infections if not treated.

Q: Will it ever go away?
There's no permanent cure yet—but many people control their symptoms well.

Q: Will people notice the swelling?
Possibly, especially if it's significant. But many people manage their swelling well with treatment and compression garments can help reduce it.

Q: When should I see a doctor?
If the swelling increases suddenly, if the area becomes red, painful, or hot, or if you feel unwell – these could be signs of infection.

You're Not Alone

Many people live with lymphedema—and support is available. You can talk to:

- Your doctor or nurse

UK: Lymphoedema Support Network – www.lymphoedema.org

FIGURE 2: AI-generated draft patient information leaflet produced using ChatGPT before institutional formatting (2 out of 2).

The final approved leaflet is represented by Figure *3*. Following review through the Trust's governance process, approval was granted for clinical use without specific additional amendments being requested. The three descriptive implementation outcomes-completion, submission through governance, and approval-were achieved for this single resource. No formal patient usability, readability, comprehension, or clinical outcome assessment was performed.



NHS
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Plastic and reconstructive surgery

Understanding lymphoedema

Information for patients, relatives and carers

What is lymphoedema?

Lymphoedema is a condition that causes swelling in parts of your body. It happens when the lymphatic system (your body's drainage system) isn't working properly. Fluid builds up, and that's what causes the swelling.

Why does it happen?

The most common causes include:

- surgery or radiotherapy that affects lymph nodes
- infections or injuries that damage the lymph system
- some people are born with a weaker lymph system (called primary lymphoedema)

What are the signs?

You might notice:

- swelling in your arm or leg
- a feeling of heaviness or tightness
- hard, thick, or tight skin
- clothes, shoes, or rings feel tighter
- aching or discomfort

How is it diagnosed?

Your doctor may:

- examine the area that's swollen
- ask about your medical history
- use scans to see how your lymph system is working

How can you manage it?

1

NHS
Imperial College Healthcare
NHS Trust

Your most common questions, answered

Is lymphoedema dangerous?
It's not usually life-threatening, but it can lead to serious infections if not managed properly. Early treatment helps prevent complications.

Can lymphoedema go away?
There's no cure, but with the right care, you can manage symptoms.

Will people notice the swelling?
Possibly, especially if it's significant. But many people manage it well with treatment and compression garments.

When should I see a doctor?
If swelling increases suddenly, becomes red, painful, or hot, or if you feel unwell—these could be signs of infection.

You're not alone

Many people live with lymphoedema — and support is available.

Contact the Lymphoedema Support Network:
www.lymphoedema.org

How do I make a comment about my visit?

We aim to provide the best possible service and staff will be happy to answer any of the questions you may have. If you have any suggestions or comments about your visit, please either speak to a member of staff or contact the patient advice and liaison service (PALS) on **020 3312 7777** (10.00 – 16.00, Monday to Friday). You can also email PALS at imperial.pals@nhs.net. The PALS team will listen to your concerns, suggestions or queries and is often able to help solve problems on your behalf.

Alternatively, you may wish to complain by contacting our complaints department:

Complaints department, fourth floor, Salton House, St Mary's Hospital, Praed Street, London W2 1NY

Email: ICHC-tr.Complaints@hhs.net

Telephone: **020 3312 1337 / 1349**

Alternative formats

This leaflet can be provided on request in large print or easy read, as a sound recording, in Braille or in alternative languages. Please email the communications team:
imperial.communications@nhs.net

Wi-fi

Wi-fi is available at our Trust. For more information visit our website:
www.imperial.nhs.uk

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FIGURE 3: Final patient information leaflet approved for clinical use following adaptation to Imperial College Healthcare NHS Trust standards.

Discussion

This report documents the creation and approval of one lymphoedema PIL through an AI-assisted text-and-design workflow embedded in an existing NHS governance pathway. Its contribution is a transparent account of the implementation sequence, rather than evidence that the approach is more effective or efficient than conventional leaflet development.

The wider evidence base supports cautious interest in this application. Sudharshan et al. examined simplification of patient educational materials using ChatGPT [5], while Tukur Jido et al. and Naufal et al. evaluated different characteristics of AI-generated leaflets or brochures [6,7]. Nasra et al. synthesised evidence concerning AI and the readability of patient educational materials [15]. Comparative work using structured patient education assessment instruments has also evaluated understandability and actionability [16,17]. These studies address output quality rather than the specific governance implementation outcome reported here.

The workflow required substantive human intervention. The authors made medical corrections, simplified language, added relevant content, and revised presentation before governance submission. The nature of these changes is important: a fluent draft is not equivalent to a clinically validated patient resource. However, because exact original-versus-final clinical edits were not documented in the available text, this report cannot quantify the number or severity of AI-generated errors. Future implementations should maintain a structured change log.

ChatGPT and Canva served distinct functions. ChatGPT supported the initial textual draft; Canva, including AI-assisted features, supported visual formatting and design, followed by manual adaptation.

The reported one-hour drafting/design period should not be interpreted as an efficiency gain. Neither conventional drafting time nor cost was measured, and the governance process took place separately. Similarly, institutional approval demonstrates completion of a local quality-assurance process, not measured improvement in patient understanding, accessibility, actionability, or health outcomes.

Healthcare applications of generative AI raise issues of accuracy, transparency, accountability, and professional oversight. Broader clinical literature discusses benefits and risks of language models [11,13], and WHO guidance emphasises appropriate governance for AI in health [14]. The present project retained human responsibility for reviewing and approving patient-facing content rather than relying on unverified AI output.

Limitations include the development of only one leaflet for one NHS Trust, no conventional comparator or cost analysis, no formal prompt validation, uncertain retrospective ChatGPT model identification, incomplete documentation of Canva AI features, and the absence of formal readability, patient usability, or clinical outcome evaluation. Further work should prospectively record prompt and model versions, time spent at each stage, the clinical changes made, and patient-centred evaluation using established instruments.

Conclusions

This descriptive implementation report documents the successful development and governance approval of one lymphoedema PIL using ChatGPT-assisted drafting and Canva-assisted visual design within an NHS Trust. Human clinical and editorial review remained integral to the process. The findings establish successful completion of the workflow in this setting, but do not demonstrate comparative time or cost savings, generalisable feasibility, or improved patient outcomes. Further comparative and patient-centered evaluation is warranted.

Appendices

Complete prompts provided to ChatGPT

During the initial content assessment, ChatGPT was asked: “What is the definition of lymphoedema without using medical terminology?”, “What are the main causes of lymphoedema without using medical terminology?”, “What are the most common symptoms and signs of lymphoedema?”, “How can we diagnose lymphoedema? Explain it without using medical terminology.”, “What is the management and prevention of lymphoedema? Explain it without using medical terminology.”, and “What are the most common questions of patients with lymphoedema?”

Following review of these responses, ChatGPT was instructed: “Write a patient information leaflet about lymphoedema including the following information: definition, main cause, symptoms, signs, diagnosis, management and prevention without using medical terminology.” It was then asked to “Include answers to the most common questions of patients with lymphoedema” and to “Make it shorter and more appealing to read.”

Additional Information

Author Contributions

All authors have reviewed the final version to be published and agreed to be accountable for all aspects of the work.

Concept and design: Eleni Kostidou, Vimal Gokani

Acquisition, analysis, or interpretation of data: Eleni Kostidou, Vimal Gokani

Drafting of the manuscript: Eleni Kostidou

Critical review of the manuscript for important intellectual content: Eleni Kostidou, Vimal Gokani

Supervision: Eleni Kostidou, Vimal Gokani

Disclosures

Human subjects: All authors have confirmed that this study did not involve human participants or tissue. **Animal subjects:** All authors have confirmed that this study did not involve animal subjects or tissue. **Conflicts of interest:** In compliance with the ICMJE uniform disclosure form, all authors declare the following: **Payment/services info:** All authors have declared that no financial support was received from any organization for the submitted work. **Financial relationships:** All authors have declared that they have no financial relationships at present or within the previous three years with any organizations that might have an interest in the submitted work. **Other relationships:** All authors have declared that there are no other relationships or activities that could appear to have influenced the submitted work.

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