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High Cancer Risk Screening & Preventive Oncology Clinic

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***Abstract*— A comprehensive overview of the mission, services, patient pathways, and clinical framework of a dedicated high-risk cancer screening and prevention programme.**

I. INTRODUCTION

Cancer remains one of the leading causes of morbidity and mortality worldwide, with an estimated 20 million new cases and nearly 10 million deaths recorded globally in 2022 alone.[1] However, a significant proportion of cancers can be prevented, detected at an earlier and more treatable stage, or substantially reduced in risk through systematic, evidence-based intervention — particularly in individuals identified as being at elevated genetic or environmental risk.

The High Cancer Risk Screening & Preventive Oncology Clinic represents a paradigm shift in oncological care: from reactive treatment of established disease to proactive, personalised risk management. By stratifying individuals according to their lifetime cancer risk and applying tailored surveillance and prevention strategies, the clinic aims to reduce cancer incidence, shift diagnoses to earlier stages, and ultimately improve survival outcomes.[18][28]

This report provides a comprehensive introduction to the clinic's rationale, structure, services, and patient pathways for clinical staff, referrers, and health service administrators.

II. MISSION & CORE OBJECTIVES

The clinic operates with the following overarching mission:

"To identify individuals at high risk of cancer and deliver personalised, evidence-based prevention and early detection strategies that reduce cancer burden and improve quality of life."

Core Objectives

- Risk stratification: Accurately classify individuals according to their hereditary, clinical, and lifestyle risk factors.
- Personalised surveillance: Design and implement monitoring programmes tailored to each patient's risk profile.
- Cancer prevention: Apply pharmacological, surgical, and lifestyle interventions to reduce cancer incidence.
- Genetic counselling: Provide expert guidance for patients with hereditary cancer syndromes and their families.
- Education & support: Empower patients with knowledge and psychological support throughout their care journey.
- Research integration: Contribute to and draw upon cutting-edge clinical research in cancer prevention.

III. WHO THE CLINIC SERVES

The clinic accepts referrals for individuals who meet one or more of the following high-risk criteria:

3.1. Hereditary & Genetic Risk

- Confirmed or suspected BRCA1 / BRCA2 pathogenic variant carriers: associated with up to 72% lifetime breast cancer risk and up to 44% ovarian cancer risk.[8][30]
- Lynch syndrome (MLH1, MSH2, MSH6, PMS2, EPCAM mutations): 40–80% lifetime colorectal cancer risk depending on gene.[7][17]
- Familial adenomatous polyposis (FAP) and attenuated FAP
- Li-Fraumeni syndrome (TP53 mutation), PALB2, ATM, CHEK2, CDH1, PTEN, STK11, and other high/moderate -risk gene variants.[19][29]
- Individuals undergoing cascade genetic testing following a family diagnosis

3.2. Family History

- First-degree relatives with early-onset cancer (e.g. breast cancer under age 40, colorectal cancer under age 50).[2]
- Multiple relatives on the same side of the family with the same or related cancers
- Rare cancer types with known hereditary associations (e.g. male breast cancer, ovarian cancer)

3.3. Clinical & Medical Risk Factors

- Prior history of cancer with risk of second primary malignancy
- Precancerous conditions: Barrett's oesophagus, colonic adenomas, cervical dysplasia, endometrial hyperplasia

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- Immunosuppression (transplant recipients, HIV-positive individuals), history of therapeutic chest radiation in childhood or young adulthood.[29]

3.4. Lifestyle & Environmental Exposure

- Long-term heavy tobacco exposure, occupational carcinogen exposure (asbestos, benzene, radon), and significant cumulative UV or ionising radiation exposure.[23][24]

IV. CLINICAL SERVICES OFFERED

Service	Description
Risk Assessment	Comprehensive evaluation using validated models (BOADICEA [5], Tyrer-Cuzick [6], MMRpro) to estimate lifetime and 10-year cancer risk.
Genetic Testing & Counselling	Germline genetic testing with pre- and post-test counselling [4]. Cascade testing coordination for at-risk family members [27].
Tailored Surveillance Imaging	High-risk MRI, mammography, low-dose CT, colonoscopy, upper GI endoscopy — scheduled at evidence-based intervals [2, 21, 22].
Biomarker Screening	Blood- and tissue-based biomarker tests including CA-125, PSA, CEA, and emerging multi-cancer early detection assays.
Chemoprevention	Tamoxifen and anastrozole (breast) [9, 10]; aspirin (colorectal, Lynch syndrome) [11]; 5-alpha reductase inhibitors (prostate).
Risk-Reducing Surgery	Prophylactic mastectomy (risk reduction ~90%) [13], bilateral salpingo-oophorectomy [14], and colectomy for appropriate candidates [12].
Lifestyle Modification	Structured advice on smoking cessation, alcohol reduction, physical activity, weight management, and diet [23, 24].
Psycho-oncology Support	Psychological assessment and ongoing mental health support for patients managing cancer anxiety and uncertainty [25, 26].
Clinical Trial Access	Identification and enrolment into prevention and early detection research studies.

V. PATIENT PATHWAY

The clinic operates a structured five-stage patient journey designed to ensure comprehensive, individualised care:

Stage 1 — Referral & Intake

Referrals are accepted from GPs, hospital specialists, genetic services, and self-referral through primary care. On referral, patients complete a comprehensive risk intake questionnaire capturing personal medical history, family cancer history (three generations), current medications, lifestyle factors, and prior genetic testing results.[4]

Stage 2 — Multidisciplinary Risk Assessment

Each patient's case is reviewed by the clinic's multidisciplinary team (MDT), comprising a preventive oncologist, clinical geneticist, radiologist, and specialist nurse. Risk models including BOADICEA [5] and Tyrer-Cuzick [6] are applied to generate a personalised risk estimate.

Stage 3 — Personalised Consultation

The patient attends an in-depth consultation (typically 60-90 minutes) to discuss their risk profile, understand their options, ask questions, and make informed decisions about surveillance, prevention strategies, and genetic testing where appropriate.

Stage 4 — Individualised Care Plan

A written, personalised care plan is produced outlining:

- Surveillance schedule with specific modalities and frequency
- Prevention interventions recommended and their expected benefit
- Genetic testing plan if not already undertaken
- Lifestyle recommendations and psychological and family support resources
- GP communication letter

Stage 5 — Ongoing Follow-Up & Review

Patients are followed up annually (or more frequently as clinically indicated). Plans are updated in response to new genetic results, surveillance findings, changes in evidence, or life events such as pregnancy or menopause.[3] [19]

VI. MULTIDISCIPLINARY TEAM

The clinic is staffed by a dedicated multidisciplinary team with specialist expertise in cancer prevention and risk management, consistent with NICE guidance on service configuration.[2] [3]

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Role	Specialty	Function
Preventive Oncologist	Medical Oncology	Clinical lead; coordinates risk assessment and prevention plans
Clinical Geneticist	Cancer Genetics	Hereditary syndrome diagnosis; variant interpretation
Genetic Counsellor	Counselling / Genetics	Pre/post-test counselling; family communication support
Specialist Radiologist	Oncological Imaging	High-risk surveillance imaging review and reporting
Specialist Nurse	Oncology Nursing	Care coordination; patient education; follow-up
Psycho-oncologist	Clinical Psychology	Psychological support; anxiety management
Gastroenterologist	Gastroenterology	GI cancer surveillance; polypectomy
Gynaecological Oncologist	Gynaecology	Ovarian / endometrial risk management

VII. EVIDENCE BASE & CLINICAL GUIDELINES

The clinic's protocols are developed in accordance with the latest national and international clinical guidelines:

- NICE Guideline CG164: Familial breast cancer — classification, care and managing breast cancer and related risks.[2]
- NICE Guideline NG151: Lynch syndrome — surveillance and management recommendations.[3]
- NCCN Guidelines: Genetic/Familial High-Risk Assessment (Breast, Ovarian, and Pancreatic).[19]
- ESMO Clinical Practice Guidelines on Hereditary Cancers.[29]
- US Preventive Services Task Force recommendations on colorectal cancer screening.[22]

Protocols are reviewed annually and updated to reflect emerging evidence, including landmark trials: IBIS-I[10], IBIS-II[9], CAPP2 (aspirin and Lynch syndrome) [11], and the PROSE Study on prophylactic surgery outcomes.[12] [14]

VIII. OUTCOMES & QUALITY METRICS

The clinic measures and reports on the following key performance indicators on a quarterly basis:

Outcome Metric	Target / Benchmark
Time to first appointment (urgent referrals)	≤ 4 weeks
Cancer detection rate — stage at detection	Stage I/II detection > 70%
Patient satisfaction score	≥ 90% satisfied or very satisfied
Genetic testing completion (eligible patients)	> 85% of eligible patients
Surveillance protocol adherence	> 90% of patients on schedule
Chemoprevention uptake (eligible patients)	> 40% acceptance rate [9, 10]

IX. HOW TO REFER

Clinicians may refer patients through the following pathways, consistent with NICE referral guidance.[2][3]

- Electronic referral via the hospital's patient administration system (PAS) — select 'Preventive Oncology / High Cancer Risk Clinic'
- Written referral letter with relevant history, three-generation family history, and reason for referral
- Internal MDT referral from cancer genetics, gynaecology, gastroenterology, or breast services
- Patient self-referral via GP with the high-risk screening information leaflet

Referrals are triaged within five working days and allocated to urgent (within 4 weeks), routine (within 8 weeks), or low-priority (within 13 weeks) pathways based on clinical need.

X. CONCLUSION

The High Cancer Risk Screening & Preventive Oncology Clinic offers a vital service for individuals at elevated cancer risk. By combining state-of-the-art risk modelling,[5][6] genetic expertise,[4][27] personalised surveillance, and targeted prevention strategies,[9][11] the clinic delivers a care model that is both scientifically rigorous and deeply patient-centred.

The ultimate ambition of the clinic is not simply to detect cancer earlier, but to prevent it from occurring in the first place — representing the highest aspiration of modern oncological medicine.

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