

# Coloctreral cancer management and prevention policies in Greece

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**Abstract** Despite lower cancer mortality rates in Greece compared to other European countries, colorectal cancer (CRC) is the third most important cause of cancer mortality. Given the significant economic and societal impact of CRC in Greece, this paper focuses on CRC data resources, disease management and the existing prevention policies. Numerous initiatives have taken place for the collection of data and the creation of cancer registries, however, they currently remain incomplete. Despite universal access of the Greek population to health services provision, structural problems of the national health system have imposed organisational barriers to the geographical distribution of health resources. National invitational CRC screening programmes focusing on early detection of the disease as well as guidelines for its management are missing. All novel cancer treatments are fully reimbursed. Post-treatment surveillance guidelines for high-risk patients are very limited and depend solely on health providers' decisions. A National Cancer Plan (NCP) had been announced during the 2008–2012, but is still in the planning phases. Under the proposed NCP, the longevity of cancer data collection seems to be the critical step in monitoring and improving the performance of the health system. Detailed epidemiological data will give the possibility of constructing an effective prevention policy, will

reduce socio-economic inequalities in the access to CRC treatment and lighten the differences observed in health outcomes. The full implementation of the NCP constitutes the most significant investment in cancer management that has ever taken place in Greece.

**Keywords** Colorectal cancer · Screening programmes · National Cancer Plan · Cancer registries · Greece

**JEL Classification** I11 · I12 · I18

## Background and objectives

Over the past two decades, lung, prostate and coloctreral cancer (CRC) have been observed to be the greatest causes of cancer mortality among men in Greece, while breast, lung and CRC are the greatest causes mortality in women [1]. On the other hand, cancer mortality rates in Greece are lower compared to those of other Western and Central European countries [2]. In 2004, its cancer mortality was classified 19th in men (age standardised rate 209/100,000 population) and 23rd in women (age standardised rate 108/100,000 population) among 27 OECD countries. However, epidemiological data show this overall cancer mortality has increased during the past decades, reaching 22.59% in 2000 and 24.44% in 2007 of all causes mortality. The increase in CRC mortality rates is presented in Table 1 and data concerning incidence, mortality and prevalence rates are presented in Table 2.

The World Health Organisation (WHO) estimates that premature mortality and disability related to cancer in Greece accounted for approximately 214,000 Disability Adjusted Life Years (DALYs) in 2002 [3]. In 2008, given the significant societal burden of cancer in Greece [1, 4, 5]

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**Table 1** Age-standardised deaths per 100,000 population from CRC (1961–2004) [2]

Deaths	Years									
	1961	1965	1970	1975	1980	1985	1990	1995	2000	2004
Colorectal cancer										
Females	7.2	7.4	8	9.2	7.2	7.7	8.5	8.9	10	9.9
Males	6.3	7.1	7.9	9.4	7.8	8	10.7	12.5	13.6	15.5
Total deaths	6.8	7.3	8	9.3	7.5	7.9	9.6	10.5	11.6	12.4

**Table 2** Colorectal cancer epidemiological data in 2002 (GLOBOCAN 2002 database, IARC)

Country	Incidence			Mortality			Prevalence	
	Cases	Crude <sup>a</sup> rate	ASR	Deaths	Crude rate	ASR	1-year	5-year
Greece								
Males	1,937	37.1	19.4	1,025	19.6	9.7	1,493	5,069
Females	1,832	34.0	15.6	1,006	18.7	88.0	1,423	5,184
Total population (age 15–75+)	3,769	35.6	17.5	2,031	19.2	8.9	2,916	10,253

<sup>a</sup> Crude and age-standardised rates, per 100,000

as well as the lack of targeted preventive national programmes [6–8], the Ministry of Health and Social Solidarity proposed the National Cancer Plan (NCP) [9]. Its aim is to prioritize cancer diagnosis and treatment and to implement a national funding cancer management programme for the period 2008–2012. The NCP includes six strategic axes with 31 supplementary specific actions focused on improvement of the existing policies and health services provision, as well as introduction of primary and secondary cancer national screening programmes. Specifically, the six strategic axes of the NCP refer to: cancer-related research and epidemiology; prevention according to WHO guidelines regarding cancer-related avoided mortality [1]; early diagnosis and detection of disease; the quality accreditation and provision of health services; disease management and awareness of cancer patients; and health professionals' continuing education. Briefly, most initiatives and changes introduced in cancer-related policies and in provision of health care are mainly focused on the implementation of a national prevention programme. Additionally, a network of health providers and stakeholders will be created and all these will collectively promote patients' awareness of their rights and of risk factors.

In the international literature, only a few studies refer to the social and economic burden of different types of cancer in Greece. These studies report significant regional variations in cancer mortality [10, 11] and in manpower and health resources distribution [12]. They also report an increase in the number of cancer hospitalised patients, especially of CRC patients in the Athens area due to the flow of patients from other regions, and failures in the classification and registration of causes of death [12, 13]. As a result, both incidence and mortality rates are

underestimated and targeted preventive national programmes in the country are missing [9].

Given these factors and, mainly, the lack of CRC studies referring to its financial or societal impact in Greece, the aim of this paper is to give an overview of the current CRC data resources and treatment pathways by exploring their accessibility, availability and resource allocation processes. It is believed that the experience obtained from similar comparative studies and the variations observed could lead to the adoption of national guidance regarding CRC patients' management and prevention policies currently not adequately implemented in our country.

### Cancer registries and data sources

The National Statistical Service of Greece (ESYE) is the oldest cancer registry in Greece; it started registering cancer incidence in 1969. Since then, ESYE has remained the official national registry for hospitalised patients. Mortality and morbidity rates are categorised according to the ICD-9 disease classification by patient's age, sex, residence, family status, type of employment and the geographical region of the hospital. In addition, discharges are categorised by the disease outcome (cured, improved, unchanged, aggravated or died). However, data collected by ESYE are based only on an annual, not systematic, basis of cancer morbidity and mortality registries, as well as limited epidemiological vigilance of the disease.

In 1990, the Ministry of Health and Social Solidarity established the National Cancer Registry (NCR) which focuses on collection of national data and creation of a relevant data base. Even though the creation of a National Cancer Registry initially appeared to be very useful, the

**Table 3** Causes of malignant neoplasm deaths in 2007 in Greece (National Statistical Service of Greece and OECD Health Data 2008)

Type of cancer	Number of deaths	Cancer deaths as % total deaths
Malignant neoplasm of lip, oral cavity and pharynx	264	0.24
Malignant neoplasm of digestive organs and peritoneum	7,609	6.92
Malignant neoplasm of respiratory and intrathoracic organs	6,662	6.07
Malignant neoplasm of bone, connective tissue, skin and breast	2,618	2.38
Malignant neoplasm of genitourinary organs	4,495	4.09
Malignant neoplasm of other and unspecified sites	3,166	2.88
Malignant neoplasm of lymphatic and haemopoietic tissue	2,048	1.86
Total deaths (all causes)	109,895	24.44

database did not actually work in practice due to limited resources and lack of political support, thus stopped in 2005. It should be mentioned that this is not the first time that such an important initiative has remained incomplete in Greece.

Another cancer registry, the Cancer Registry of Crete, was the initiative of the University of Crete aiming to collect local data [14]. According to this registry, median age of mortality differed widely between neoplasm types. In men, prostate (79.5 years), stomach (77.5) and CRC (77); in women, liver (78), bladder (77.5) and pancreas (75). The most common malignant neoplasms in 1992 and 1993 were lung cancer (33.8%) for all male cancer deaths and breast cancer (20.3%) for all female cancer deaths [14].

At the national level and according to the ICD 9 classification, the 2007 distribution of all types of cancer deaths is presented in Table 3. Due to the aforementioned data issues, the only available national incidence and mortality data are extrapolated from the Italian and Spanish registries, as shown in Table 2 [15]. Thus, the primal action of the first strategic research axis of the recently implemented 5-years NCP (2008–2012) is the re-structuring and re-operating of the National Cancer Registry, re-named the National Registry of Neoplasms (NRN). The aim of the NRN is the systematic collection of cancer incidence, prevalence and standardised death rates. In addition to create a patient and public-private health providers' network co-operating with the European networks of EUROCHIP and EUROCARE. The NRN implementation will take place in two phases. In the first phase (2008–2010), a few major public and private oncology departments from metropolitan Athens and Thessaloniki will participate, during which patients' electronic records will be linked with mortality and morbidity registries of the National Statistical Service of Greece, creating a preliminary database with reliable and easily accessible information. In the second phase (2010–2012), the operation of the NRN will be expanded throughout Greece.

Despite the fact there is no availability of data on cancer expenditure in Greece, it is useful to present some macro-

economic aggregates on health care expenditure. In 2007, health expenditure was € 21 billion accounting for 9.2% of GDP. The mean annual growth rate (MAGR) for the period 2000–2007 was 10.3%. Public health expenditure accounts for 63% of total health-care expenditure. In addition, pharmaceutical expenditure in 2007 was € 4.5 billion, accounting for 21.6% of total health care expenditure and 2% of GDP, an increase over the period 2000–2007 at a MAGR of 13.4%.

### CRC screening

In Greece, organised national invitational screening programmes for all cancers are at very early stage. National Insurance Schemes, Regional Health Authorities and Municipalities are running and funding occasional opportunistic screening programmes such as the cervical, breast and prostate cancer screening tests and CRC screening. There is also a growing number of pilot screening initiatives undertaken by various scientific societies, associations or bodies, financed by EU resources and donations. For example, the Hellenic Cancer Society has conducted cervical screening tests in some regional areas. Other projects taking place regionally are mostly led by cancer patients' associations, such as the Hellenic Association of Women with Breast Cancer, the Parents' Association of Children with Neoplastic Disease, the Association of Friends for Children with Cancer and other regional cancer patients' groups.

Numerous campaigns regarding cancer prevention have been organised by the Ministry of Health and Social Solidarity in collaboration with NGOs and other volunteers' associations against cancer in order to increase patient awareness. The most successful and well-known campaigns were the "Prevention-in-time diagnosis" (2005), the "Breast Cancer Awareness Month", the "Breast friends" (2006), the "Awareness of and fighting against cancer" organized in 2006, Campaign against melanoma (2007) as well as the 2009 CRC "agaliazo" (embrace) campaign and screening programme [5]. In 2007, the Hellenic Society of

Gastro-intestinal Oncology ran a CRC campaign promoting information on the causes of CRC, such as smoking and nutrition, as well as knowledge on gastro-intestinal tumours. Its aim was to increase general public awareness of prevention of gastro-intestinal cancer, specifically stomach and oesophageal cancer. In addition, the Hellenic Society of Gastro-enterology primarily focuses on health professionals' training and on their awareness of the international guidelines.

There is currently a regional study, the Panhellenic Association for Continual Medical Research (PACMeR), whose aim is to explore overall cancer screening activities, including CRC. Its recent exploration of over 5,000 adults eligible for CRC screening found that, although 90% indicated interest in cancer screening, less than 2% sought out CRC screening via faecal occult blood testing or endoscopy [16]. Further analysis of physician behaviour found that only a quarter of GPs routinely recommended CRC screening to their patients, and only half felt CRC screening was a valuable tool [17].

Given the lack of a national invitational CRC screening programme as well as lack of national guidelines, the third strategic axis of the NCP introduces secondary prevention programmes for the first time in Greece. The most significant actions planned are the introduction of a national screening policy, mainly regarding breast, cervical and colorectal cancers. National guidelines will be created based on international guidelines which focus on specific population, age, sex, cancer family history and also on the clinical and technical audit of all screening processes. Overall costs of the screening programmes and related diagnostic tests will be reimbursed by the social insurance funds. It is expected that the introduction of national coverage will result in fair, easy and universal coverage of the Greek population with hoped-for decreases in morbidity and mortality rates due to early detection. By end of 2009, all population and health professionals should be informed about the necessity and value of these proposed guidelines. Furthermore, the creation of regional autonomous screening centres has been planned, focusing on early diagnosis and consequently on the rational distribution of endoscopists and pathologists to meet demand of screening diagnostic tests.

### **CRC treatment (non-pharmaceutical)**

After the establishment of the National Health Service (NHS) in 1983, it was expected that adequate and fair allocation of health services resources would be promoted nationally. A cancer resource allocation mechanism was never created, resulting in regional inequalities in oncology access and provision that are still observed today.

Simultaneously in 1983, the Ministry of Health and Social Solidarity established the National Board of Health (KESY), responsible for the formation of national health policies and their co-ordination, evaluation and regional resources' allocation. Further responsibilities related to specific diseases and population groups are given to various committees, such as the Oncology Committee of KESY, controlling overall decision-making and cancer patients' management. Since 2003, there are Oncology Committees in each public and private hospital responsible for the implementation of anti-cancer policy as well as medical and technical audit responsibilities of hospitalised cancer patients' health-care provision. Although the afore-mentioned oncology committees, together with official organisations of physicians' oncology groups, have major central and local responsibilities for treating specific cancer types (Hellenic Society of Medical Oncology, Hellenic Society of Gastrointestinal Oncology), there is still a lack of national guidelines for treating CRC patients in the country. The current common practice for the majority of medical oncology treatment is based on the European Society for Medical Oncology (ESMO) guidelines as well as the American National Comprehensive Cancer Network (NCCN).

Oncology health services are provided by the NHS through outpatient units and clinical departments of oncology, pathology and surgery-oncology. There are oncology departments in 17 public (NHS and University) hospitals in Athens, departments in 13 regional hospitals in the rest of Greece and 9 private hospitals providing oncology health care mainly in metropolitan areas of Greece (Athens and Thessaloniki). There is an obvious regional inequality in the distribution of oncology departments and health personnel trained to treat cancer patients, in favour of the greater metropolitan areas of Greece. The facilities cited in both areas are better equipped to treat cancer patients than the oncology departments in the other regions, whereas lack in the availability of dedicated local endoscopic services discourages physicians from recommending screening tests. So far, there are marked disparities between rural and urban areas in the distribution of doctors, with a heavy over-concentration in the metropolitan areas. In addition, there are significant shortages of endoscopy nurses specialised in oncology [17].

Despite the universal coverage and access of the Greek population to health care provision, existing structural problems of the Greek health system have inherent organizational barriers. The lack of a well-managed referral system and free patient choice of public hospital care have contributed to the existence of long waiting lists for specialised cancer hospitals as well as for specific diagnostic and surgical interventions. Strict waiting lists exist for oncology services in the metropolitan areas, since such

services are mainly provided in urban areas, resulting in reported 3–6 months waiting for first outpatient care appointments in the sole three specialised oncology hospitals. In 2006, due to the creation of one-day clinics in these hospitals, waiting lists for surgical and pathology oncology cases were significantly reduced to 2–3 weeks, while priority is given to hospitalisation for emergencies and young people with cancer.

Often long waiting lists are bypassed by informal payments for access to hospital care, surgeons and specialised oncologists. This phenomenon places vulnerable populations, who cannot afford these payments in order to ensure a better quality of service, at a disadvantage.

According to OECD data, the annual cost of treating patients with cancer in Greece is approximately 6.5% of the total health expenditure; this is similar to the OECD average [2], below the UK (10.6%) while above France (5.3%) and Germany (5.4%). Significant variations among OECD countries are observed regarding per capita spending for cancer. Greece, with € 101 per capita spending for cancer, lies behind the average (€ 120), while per capita spending for the UK is € 182, Germany (€ 150), Norway (€ 191), Sweden (€ 140), France (€ 119) and Italy (€ 114). It is worth mentioning that the variations observed among OECD countries – placing Greece with high cancer expenditure and low per capita cancer spending – are mainly due to the absolute differences in per capita income among those countries.

Finally, apart from public and private health sector providers, there are also numerous cancer patient-led groups aiming to offer organised mutual help, encouragement, support and psychosocial rehabilitation to their members. The best-known associations are the Alma Zois, Hellenic Association of Women with Breast Cancer, Flame for Parents' Association of Children with Neoplastic Disease, Hope – Association of Friends for Children with Cancer – and similar associations from different geographical regions of the country. In addition, screening programmes for early detection and prevention of CRC are mainly run by the Hellenic Society of Gastro-intestinal Oncology and the Hellenic Society of Gastro-enterology, which are both led by health professionals.

### Pharmaceutical CRC treatment

Prior to the 2006 law (3457), market access delays for new drugs were observed in Greece due to the current pricing and reimbursement system as well as existing bureaucracy. This law abolished the positive reimbursement list and the established commitment of the Ministry of Development to issue a Price Bulletin every 3 months aiming to reduce delays for innovative high-cost medicines.

There are four approval procedures for market authorisation. For the national procedure, the responsible authority is the National Organisation for Medicines (EOF). For all other procedures, such as the mutual recognition and centralised and decentralised procedures, the EU legislation is followed. Irrespective of the procedure, once a product has been approved, the EOF assigns a registration number which is labelled on the product. The same procedures hold for cancer pharmaceutical products.

Moreover, if a product is considered necessary for public health and is not yet marketed in Greece, the EOF is eligible to import it through the Institute of Pharmaceutical Research and Technology. Also, in the case of non-availability of cancer-approved medicines on the Greek pharmaceutical market, the same process takes place.

In general, all novel/targeted treatments are fully reimbursed by the Social Insurance or the NHS with no copayment, (in 2008 the new vaccine for cervical cancer was fully reimbursed). There are no regional differences in access to novel treatments for cancer, since if a product is granted marketing authorization, then it is immediately available across the country. Cancer drugs can be dispensed at local hospital pharmacies and private pharmacies to avoid regional differences in access to novel drugs. There are no out-of-pocket payments or copayments, ensuring equal access of pharmaceuticals to the entire population, even to uninsured ones, such as illegal economic immigrants. Consequently, full access to all cancer treatments for the Greek populations is achieved; the more advanced CRC drugs are fully reimbursed by the social funds for the insured population, and by the NHS for the insured only if they are prescribed by specialists. Given that health care financing is quite complicated and that there is no specific budget limit for cancer treatments, the Ministry of Health as well as the social insurance funds reimburse any added costs without being able to exercise any budgeting controls. Furthermore, there are no cancer budget limits at the NHS hospitals.

Obviously, this combination of abolishment of the positive reimbursement list plus limited budget controls and full access to all innovative drugs resulted in increased pharmaceutical expenditure. Public pharmaceutical expenditure increased from 17.8% of total health expenditure in 2004 to 21.6% in 2007, and public pharmaceutical expenditure from 92.5% of total pharmaceutical expenditure in 2004 to 94.6% in 2007. This has resulted in huge deficits for social insurance funds and NHS hospitals have enormous debts to pharmaceutical companies of € 2.66 billion in December 2008. Consequently, the burden to cover any additional expenses falls on the Ministry of Health and Social Solidarity.

**Table 4** National cancer plan budget and resources allocation (Ministry of Health and Social Solidarity, 2008)

Strategic axes	Actions	Total cost [€]	Distribution of expenses [%]
1	Research	4,650,792	4.4
2	Prevention	2,150,000	2
3	Early diagnosis/detection	40,799,141	38
4	Health services' quality accreditation	41,030,000	38
5	Patients' and disease management	14,763,617	13
6	Patients' awareness and continuing education	5,000,000	4.6
Total Cost	National Cancer Plan	108,393,549	100

### Post-treatment surveillance

Post-treatment surveillance for high-risk CRC patients is provided by public and private oncology departments and specialists. Its provision depends on the health providers' decision, since national guidelines for postcurative treatment surveillance do not exist in Greece. This situation, combined with the lack of CRC patient' data registration, makes evaluation of the quality of post-treatment surveillance in CRC and all cancers very limited. However, common practice for the majority of medical oncologists regarding post-treatment surveillance guidelines is based on unofficial adoption of the ESMO and the American NCCN guidelines.

Post-treatment surveillance funding is allocated by social security organisations and the NHS. As seen in Table 4, the 5th strategic axis of the NCP for Patient and Disease Management dedicates 13% of its budget to the creation of cancer treatment and postcurative surveillance guidelines as well as to patient information. It is very encouraging that the majority of NCP financial resources will be allocated to the introduction of national screening programmes and quality accreditation in cancer patients' health-care provision.

### Concluding remarks

The issues underlined in this paper mainly refer to the management of cancer in general, and to CRC specifically. The current state of CRC management will change with full implementation of the NCP over the 5-year period (2008–2012, although currently little has been done on that front). The longevity of cancer data collection seems to be the critical step in monitoring and improving the health system's performance within all areas of cancer management. Detailed incidence and prevalence data will give the possibility of constructing an effective prevention policy, reduce socio-economic inequalities in access to CRC treatment, and diminish the differences observed in health outcomes. Principal NCP actions target at bridging the gap

between increasing hospital care and the provision of diagnostic care for the establishment of a national cancer prevention programme focused on early CRC detection. These initiatives constitute the most significant investment in cancer management that has ever taken place in Greece. Taking into consideration that one third of diagnosed cancers could be avoided [18], it is expected that implementation of the NCP should result in positive clinical benefits to the patients, monetary savings to third-party payers and, obviously, in reduction of the total burden of CRC.

**Conflict of interest** The authors do not report any conflict of interest associated with this paper.

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