



Code Cancer: preliminary results

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Abstract

Background: Delays in medical intervention for people living with cancer negatively impact the quality of life and increase costs to the healthcare system. **Objective:** To describe the “Code Cancer” project phases and their preliminary results. **Methods:** Seven research groups organized to: a) understand the causes of delays faced by people with cancer in Mexico, their trajectories, and associated costs; b) understand the formal and informal referral mechanisms that constitute their trajectory in the health system, and c) understand the existing and necessary infrastructure to respond to the epidemiological needs of the country. **Results:** These preliminary results lay the groundwork for implementing a rapid patient referral program. **Conclusions:** Evidence-based policies for early cancer diagnosis and treatment are essential to address delays in medical assistance. “Code Cancer” represents an innovative project to achieve this goal in Mexico.

Keywords: Cancer. Public health systems. Early medical intervention. Mexico.

Código Cáncer: resultados preliminares

Resumen

Antecedentes: Los retrasos en la atención de personas con cáncer impactan negativamente su calidad de vida y aumentan los costos al sistema de salud. **Objetivo:** Describir las fases del proyecto Código Cáncer y sus resultados preliminares. **Métodos:** Se organizaron siete grupos de investigación para: a) entender las causas de los retrasos que enfrentan las personas con cáncer en México, sus trayectorias y costos asociados; b) conocer los mecanismos de referencia formales e informales que constituyen su trayectoria en el sistema de salud, y c) entender la infraestructura existente y la necesaria para responder a las necesidades epidemiológicas del país. **Resultados:** Estos resultados sientan las bases para la implementación de un programa de referencia rápida de pacientes. **Conclusión:** Las políticas de diagnóstico y tratamiento oportuno del cáncer basadas en la evidencia son imprescindibles para atender los retrasos en la atención. Código Cáncer representa un proyecto innovador para lograr este objetivo en México.

Palabras clave: Cáncer. Sistemas públicos de salud. Intervención médica temprana. México.

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Date of reception: 16-06-2023
Date of acceptance: 21-07-2023
DOI: 10.24875/j.gamo.M23000253

Available online: 03-10-2023
Gac Mex Oncol. 2023;22(4):125-129
www.gamo-smeo.com

Background

In developing countries, one of the biggest problems in cancer care is the delay in the care of potentially curable tumors. For example, while in high-income countries breast cancer cases are detected at early stages, in Mexico, more than 60% of cases are identified at advanced stages. Therefore, coordinated efforts are required in order to achieve early diagnosis and timely treatment, incorporating strategies that include patient navigation, supportive care, and support to survivors¹⁻³.

In countries such as the United Kingdom, early diagnosis and timely treatment interventions have been implemented in order to reduce delays in cancer care. These programs have enabled to diagnose 80% of cancers in a two-week period and start treatment of 90% in less than 62 days, thus reducing cancer mortality by 12%⁴⁻⁶.

Code Cancer is a public policy proposal led by the Mexican Foundation for Health (FUNSALUD – *Fundación Mexicana para la Salud*) with participation of public and private actors. Based on the generation of empirical evidence, Code Cancer seeks to integrate policies for early diagnosis and timely treatment of cancer with the purpose to increase research into cancer patients delayed care, as well as to increase the survival of people with suspected or diagnosed cancer in a cost-effective manner. This article describes the global concept and presents preliminary results from phases I and II of the project.

Material and methods

The exploratory project is composed of three phases (Fig. 1). In phase I, a mixed methodological approach was used (Table 1) with the purpose to: a) know the circumstances in which people with suspected or diagnosed cancer navigate the health system; b) identify and recognize the delays patients are faced with (from cancer suspicion to treatment); c) know the mechanisms of formal and informal referrals that constitute patient trajectories; d) distinguish the existing infrastructure from that which is necessary to respond to the country's epidemiological needs, and e) understand the costs associated with delays and what type of savings a rapid patient referral program (Code Cancer) could entail.

Seven studies were carried out concurrently, and based on the triangulation of the qualitative and quantitative results of each research team, a single baseline diagnosis was integrated. Only two of the studies required evaluation by an ethics committee. These were approved by an independent committee and by

the ethics committee at each hospital. All information collected from patients, the origin of which is the electronic medical record or interviews, is anonymous. The information used for documentary and economic analysis is freely accessible.

In phase II, work sessions were carried out, in which the preliminary results were fed back to the internal research team. In addition, working groups will be convoked to integrate recommendations for the Code Cancer program implementation (Phase III).

Results

In 2021, all seven baseline diagnoses were established (phase I). Phase II will conclude in 2023 and, for 2024, it is projected to have final recommendations for implementation of a rapid patient reference program: Code Cancer.

During the documentary analysis, elements in patient referral and counter-referral in which there are areas of opportunity stood out^{6,7}. Outdated and poorly homogenized data on infrastructure and human resources were identified. The resources were subsequently classified according to the US National Comprehensive Cancer Network resource stratification⁸ (basic, extended and advanced). Said classification underscores the lack of advanced resources that increase patient survival in both public and private settings.

A methodology was developed for the study of care delays and patient trajectories. Preliminary results show a median of 184 days from the first symptom to the treatment of patients with lung cancer. In addition, the most common trajectories and social determinants of delays were identified.

During internal work sessions, FUNSALUD's experience during the COVID-19 pandemic for the transfer of surgical patients between public and private hospitals stood out. In addition, patient navigation was also pointed out as being useful for reducing delays. When the recommendations of the literature, experts and working groups were integrated, it was concluded that Code Cancer should promote expediting the suspicion, referral, diagnosis and treatment of the cancer patient in Mexico, making use of previous experience on patient transfer during COVID-19 and using similar technology, with the purpose to transfer the patient to the closest institution or hospital with available resources. In addition, a navigation program will be integrated to accompany the patient on his/her path towards treatment.

Subsequently, an analysis of the costs related to the program was carried out taking into account predictions about stage migrations and reduction in the number of

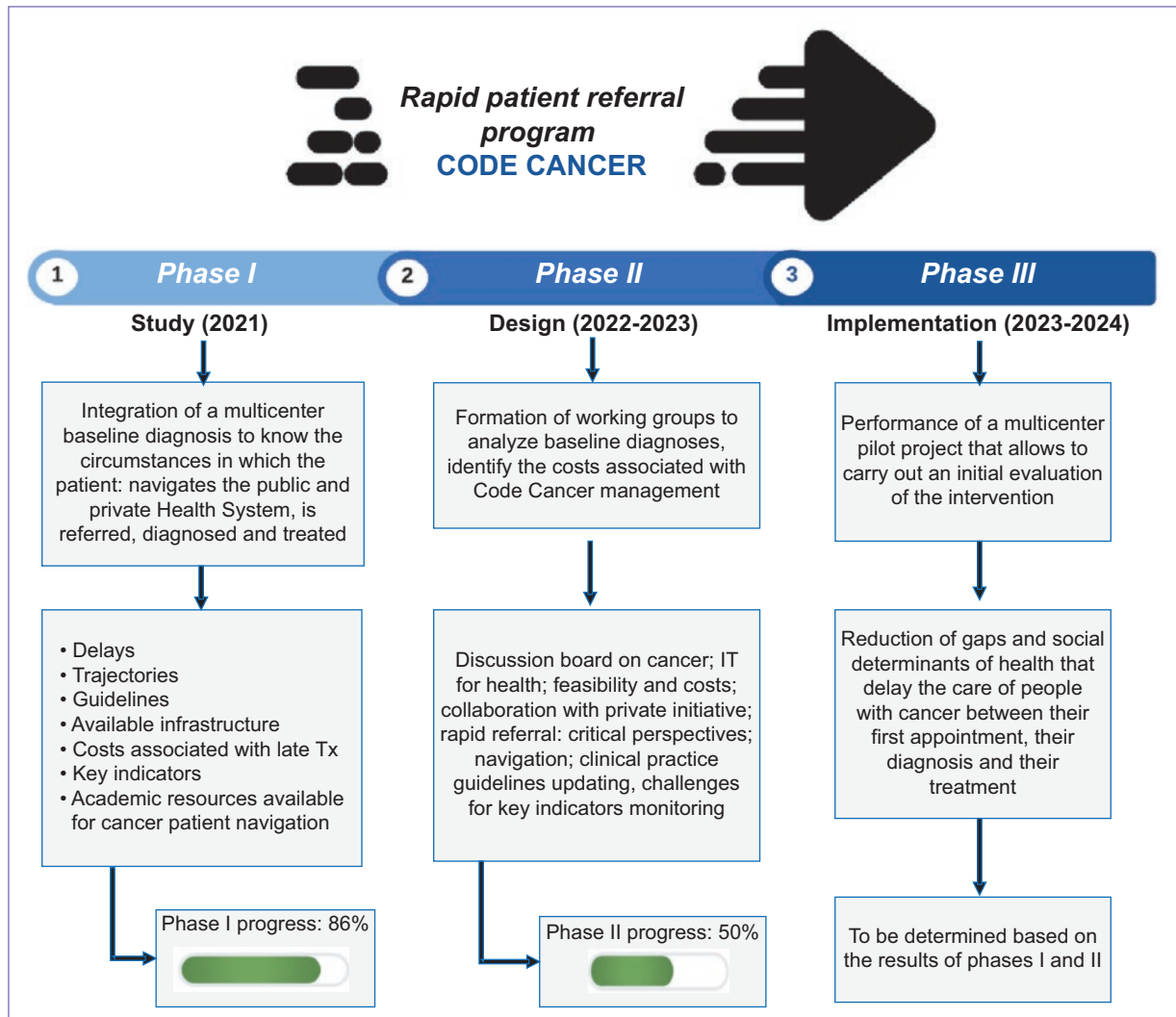


Figure 1. Code Cancer methodological phases.

advanced diagnoses. The results show a decrease in public expenditure on cancer of between \$84,125,187.30 and \$718,175,683.96, in addition to generating clinical benefits and improving the quality of life of patients and their caregivers.

Finally, patient navigation programs and academic resources available for staff training were identified in order to define the structure of a training program for health professionals who will be working on Cancer Code.

Discussion

Code Cancer arises to optimize the diagnosis and treatment of cancer at early stages, with the purpose to improve outcomes and reduce health expenses. To this end, a standardized methodology has been defined in

order to measure delays in the provision of care and to identify infrastructural requirements, referral strategies, patient navigation and potential economic impacts of Code Cancer implementation, laying the foundations for the subsequent phases.

As a result, the need to enrich the infrastructural database by means of surveys was determined. In addition, collaboration agreements with public and private hospitals were reached in order to start studies on cancer delays. However, there are still significant barriers to the performance of such measurements, including the difficulty to establish symptom identification exact times, biases related to the measurement of referrals, and lack of transparency within the health system.

An important progress achieved by the project is the integration of educational actions that will allow the

Table 1. Code Cancer key subjects and data collection mechanisms

Subject	Design	Data source	Sample	Collaborators	Analysis
Delays in the care of the cancer patient in Mexico	Retrospective, quantitative study	Patient electronic health records	2,061 breast 1,877 prostate 1,743 colon 1,488 cervix 1,205 lung /annual	FUNSALUD, and hospitals included in the agreement	Quantitative analysis (descriptive, inferential)
Patient trajectories inside and outside the Mexican health system	Retrospective study (mixed methods)	Structured patient interviews	Subsample	FUNSALUD, hospitals and institutions included in the agreement	Analysis of trajectories, thematic analysis, data triangulation typologies, qualitative data quantification
Formal and informal reference guidelines and health system reforms	Retrospective, qualitative study	Historical documents	N/A	FUNSALUD	Documentary analysis
Diagnostic and therapeutic infrastructure and human resources available for cancer management	Cross-sectional, quantitative study	Survey	Private CLUES Public CLUES	FUNSALUD	Quantitative (descriptive) analysis
Costs for delays in the management of cancer patient and costs for late treatment	Cross-sectional, quantitative study	Costs published in indexed articles	N/A	FUNSALUD	Economic analysis
Academic resources available for the management and navigation of the cancer patient	Cross-sectional, quantitative study	Semi-structured interviews (social work, navigators, program directors, etc.)	6 interviews	FUNSALUD	Thematic analysis, documentary analysis and triangulation
Technology applied to the monitoring of key indicators of efficacious and efficient cancer patient management	Cross-sectional, quantitative study	FUNSALUD historical documents and FUNSALUD Technology Council	10 interviews	FUNSALUD	Documentary analysis and triangulation

CLUES (*Clave Única de Establecimientos de Salud*): Unique Health Establishment Code; FUNSALUD (*Fundación Mexicana para la Salud*): Mexican Foundation for Health.

training of personnel specialized in patient navigation. However, to achieve sustainability of said interventions, it is necessary to formalize a funding mechanism that allows their continuity and dissemination.

Conclusion

Code Cancer will be aimed at coordinated efforts of rapid referral and patient navigation regardless of affiliation. This exploratory study provides baseline evidence for the creation of interventions according to the limited public resources, the infrastructure and personnel available in Mexico.

Acknowledgements

Thanks to FUNSALUD administrative team.

Funding

Funding was received from Novartis, Pfizer, MSD, Janssen, Roche, and MSD Oncology Grant for the preparation of the manuscript. However, our sponsors had no involvement in the study design; in the collection, analysis and interpretation of data; in the writing of the report and in the decision to submit the article for publication.

Conflicts of interest

The authors declare that they have no conflicts of interest.

Ethical disclosures

Protection of human and animal subjects. The authors declare that no experiments have been performed on humans or animals for this research.

Confidentiality of data. The authors declare that no patient data appear in this article.

Right to privacy and informed consent. The authors declare that no patient data appear in this article.

Use of artificial intelligence for text generation. The authors declare that they have not used any type of generative artificial intelligence for the writing of this manuscript, nor for the creation of images, graphics, tables, or their corresponding captions.

References

1. Andersen BL, Cacioppo JT. Delay in seeking a cancer diagnosis: delay stages and psychophysiological comparison processes. *Br J Soc Psychol.* 1995;34(Pt 1):33-52.
2. Arrieta O, Quintana-Carrillo RH, Ahumada-Curiel G, Corona-Cruz JF, Correa-Acevedo E, Zinser-Sierra J, et al. Medical care costs incurred by patients with smoking-related non-small cell lung cancer treated at the National Cancer Institute of Mexico. *Tob Induc Dis.* 2014;12:25.
3. Arroyo-Hernández M, Zinser-Sierra JW, Vázquez-García JC. Lung-cancer screening program in Mexico. *Salud Publica Mex.* 2019;61:347-51.
4. Whitehouse M. A policy framework for commissioning cancer services. *BMJ.* 1995;310:1425-6.
5. Richards MA. The size of the prize for earlier diagnosis of cancer in England. *Br J Cancer.* 2009;101(Suppl 2):S125-S129.
6. The Committee of Public Accounts, House of Commons, Great Britain Parliament. The NHS Cancer Plan: a progress report. Twentieth Report of Session 2005-06 [Internet]. The Committee of Public Accounts, House of Commons, Great Britain Parliament. Londres: The Stationery Office; 2006. Available at: <https://publications.parliament.uk/pa/cm200506/cmselect/cmpubacc/791/791.pdf>
7. Centro de Investigación Económica y Presupuestaria A. C. Fondo de Salud para el Bienestar (FSB): cobertura y costos [Internet]. Centro de Investigación Económica y Presupuestaria A. C. [consulted on april 25th, 2023]. Available at: <https://es.scribd.com/document/483756549/Fondo-de-Salud-para-el-Bienestar-FSB-cobertura-y-costos>
8. Carlson RW, Scavone JL, Koh W-J, McClure JS, Greer BE, Kumar R, et al. NCCN framework for resource stratification: A framework for providing and improving global quality oncology care. *J Natl Compr Canc Netw.* 2016;14:961-9.