



Proposal of a logical–conceptual structure for the preventive management of prostate cancer in the municipal context

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Citar como: Mena Díaz GF, Mena Lorenzo JL, Rodríguez López M, Ferro González B, Cabrera Albert JS. La estructura lógico-conceptual del proceso de gestión preventiva del cáncer de próstata. Rev Ciencias Médicas [Internet]. 2026 [citado: Fecha de Acceso]: 30(2026): e6945. Disponible en: <https://revcmpinar.sld.cu/index.php/publicaciones/article/view/6945>

Recibido: 16 de noviembre de 2025

Aceptado: 13 de febrero de 2026

Publicado: 30 de junio de 2026

ABSTRACT

Introduction: Prostate cancer shows a rising incidence and mortality trend in Cuba, demanding preventive management models in primary care that overcome operational.

Objective: to provide the theoretical-conceptual foundation for a logical structure for prostate cancer preventive management within the Primary Health Care (PHC) framework.

Methods: theoretical methods (historical-logical, systemic-structural, and modeling) and empirical methods (content analysis and surveys) were employed. The structure was validated using the Delphi method (two rounds) with a panel of 20 experts. Given the non-normal distribution of data (Shapiro-Wilk, $p < 0,05$), non-parametric statistics (Kendall's W) and Cronbach's Alpha were applied to assess consensus and internal consistency.

Results: a structure comprising five guiding ideas, four essential relationships, and structural regularities was established, integrating institutional, clinical-epidemiological, and community dimensions. Expert validation confirmed the model's relevance and coherence (CVI=0,92), with a robust consensus ($W=0,87$; $p < 0,001$) regarding its capacity to reduce the municipal diagnostic gap.

Conclusions: the logical-conceptual structure constitutes a transformative framework that provides systemic coherence to preventive management, integrating precision surveillance with social participation to optimize diagnostic opportunity at the local level.

Keywords: Prostatic Neoplasms; Primary Health Care; Community Participation; Epidemiological Monitoring.

INTRODUCTION

Worldwide, prostate cancer (PCa) constitutes a priority for organizations such as the WHO, PAHO, IARC, MINSAP, among others. In Cuba, specialists from the Institute of Oncology and Radiobiology have warned about the sustained increase in malignant tumors associated with population aging and the persistence of risk factors, with more than 57,000 new cases estimated by 2030. Nationally, in 2024, PCa was the second leading cause of death from malignant tumors, with a crude rate of 79,0 per 100,000 inhabitants and 3,861 deaths, and the province of Pinar del Río recorded a rate of 61,3 with 174 deaths, evidencing an upward trend over the last six-year period. However, at least 30% of these deaths are preventable.^(1,2)

Paradoxically, prevention continues to be a poorly explored area in Primary Health Care (PHC).^(3,4) As a systematic process of "anticipatory preparation for disease," prevention has lost effectiveness in mitigating risks and halting disease progression through the use of biomedical-epidemiological assessment and follow-up tools.

Despite the solid backing of international strategies^(5,6,7,8) and Cuban contributions,^(9,10,11,12) a critical gap persists between global scientific prescription and health praxis in the National Health System (NHS). The application of normative instruments such as the Comprehensive Program for Cancer Control (PICC) and the National Cancer Control Strategy (ENCC) proves insufficient when their implementation at the municipal level is mechanical and does not consider the variability of current biomedical and demographic contexts.^(13,14,15) Thus, the absence of a conception integrating risk stratification based on predictive indicators limits the real impact of these regulations on the epidemiological scenario, evidencing the need for a framework that contextualizes preventive management from the territorial reality.

Such limitation stems from the fact that these current management models prioritize standardized administrative surveillance that fails to capture the variability of territorial risk. Unlike international guidelines that promote stratification, in the Cuban municipal context a disarticulation persists between epidemiological norms and clinical resolution capacity, with traditional institutional structures, constituting an operational gap unresolved by current strategies.

Overcoming this fragmentation requires an approach that systemically articulates institutional management, standardization of clinical-epidemiological practice, and active social participation. The integration of these dimensions allows transforming epidemiological information into timely preventive behaviors, ensuring that health management responds coherently to the vulnerability of the local environment.

METHODS

A mixed-approach research (qualitative-quantitative) was conducted, under a sociocritical paradigm, between January 2024 and June 2025, to study the preventive management process of PCa (ICD-10: C61) in Consolación del Sur.

For the foundation of the logical-conceptual structure, theoretical methods such as historical-logical, systemic-structural, and modeling were applied, which allowed identifying the guiding ideas, essential relationships, structuring regularities, and guiding principles of the PCa preventive management process.

Table 1. Socioprofessional characterization of the expert panel (n=20)

Strata	n	Doctoral Degree	Master's Degree	Full Professor	Associate Professor	Experience (Years)
PHC	8	3	5	2	6	10 - 25
Epidemiology	5	4	1	1	4	12 - 28
Oncology / Urology	7	5	2	3	4	15 - 30
Total	20	12 (60 %)	8 (40 %)	6 (30 %)	14 (70 %)	Min. 10 Max. 28

Validation was carried out using the Delphi method, in two rounds. The qualitative suggestions from the first round were processed through content analysis to refine the structure. Quantitative processing was performed in SPSS v.24.

Given that the data did not meet normality criteria (Shapiro-Wilk test, $p < 0,05$), non-parametric statistics were applied, calculating Kendall's Coefficient of Concordance (W) to assess consensus among experts and Cronbach's Alpha (α) for internal consistency. The validity of each dimension was determined using the Content Validity Index (CVI).

The study adhered to the principles of the Declaration of Helsinki (2008), guaranteeing informed consent, confidentiality, and beneficence. It was approved by the Scientific Council and the Ethics Committee of the "1ro de Enero" Polyclinic.

RESULTS

Analysis of the regulatory and operational basis of PCa preventive management

The examination of the current normative framework (PICC and ENCC) ratifies the institutional priority of PCa as a priority disease for the NHS, supporting its control from the first level of care. However, contrasting these directives with the health reality of Consolación del Sur (ASIS, 2024) reveals a contradiction between strategic design and local execution.⁽¹⁶⁾

This disarticulation is manifested in the following gaps:

- Limitations in the local operationalization of national strategies, with persistent gaps in active screening and difficulties in ensuring systematic use of prostate-specific antigen (PSA).
- The preventive process shows insufficient articulation between institutional, clinical-epidemiological, and community components, compromising diagnostic opportunity and continuity in the follow-up of subjects at prostate risk.
- Current registry and database systems present inconsistencies that prevent effective monitoring of prostate risk and systematic evaluation of PCa preventive management indicators.

These problematic situations restrict adequate biomedical-epidemiological articulation, confirming the need for a theoretical redimensioning that provides systemic coherence to PCa preventive management.

Theoretical bases of the PCa preventive management process

The PCa preventive management process is based on a systemic theoretical body that confers epistemological solidity and operational viability to its implementation in PHC. Normatively, it is supported by the PICC and the ENCC, legal frameworks governing oncological control in the NHS.⁽³⁾ The ENCC grounds neoplasm control as a continuous and intersectoral process based on evidence, while the PICC operationalizes surveillance through protocols that standardize early detection and follow-up. These referents, aligned with the Latin American and Caribbean Code against Cancer,^(6,8) facilitate municipal management aimed at strengthening biological risk stratification and diagnostic opportunity.

From a philosophical perspective, dialectical materialism,⁽¹⁷⁾ supports the conception of the health-disease binomial as a dynamic totality determined by the interaction among biological, social, and organizational factors. Under this logic, PCa constitutes a synthesis of contradictions where biological damage, system structure, and social environment converge. This dialectic between the clinical and the epidemiological grounds risk management through social determination, validating interventions aimed at optimizing municipal health performance.

The sociopsychological basis conceives health as a phenomenon mediated by living conditions and representations of masculinity that condition the perception of risk and the acceptability of screening.⁽¹⁸⁾ Risk and diagnostic opportunity emerge from the interaction between social structures and service organization. Under the Health Belief Model, preventive behavior is modifiable through self-efficacy, positioning clinical communication and the physician-patient relationship as key devices for granting sustainability to surveillance in PHC.⁽¹³⁾

The epidemiological basis is supported by precision epidemiology for population control.^(2,9) It provides the framework to guide evidence-based decisions, overcoming passive surveillance through stratified models integrating biological and demographic variables. Consequently, prevention articulates biomedical indicators with organizational decisions, where risk is a dynamic construction between individual susceptibility and the system's resolution capacity.

Finally, the organizational and management basis conceives the system as interdependent processes. The contributions of Donabedian and Mintzberg support the redesign of flows to transform population data into concrete clinical action, prioritizing the quality of registries as a critical decisional factor.^(19,20) Health management optimizes normative flows, organizing prevention as a managed, measurable, and sustainable process.

Foundation of the logical-conceptual structure for preventive management

The proposed logical-conceptual structure responds to the limitations of normative coherence, functional articulation, and resolution capacity identified in PCa preventive management in PHC, through a reorientation of the process toward a biomedical-epidemiological dynamic centered on proactive risk management.

PCa preventive management is conceived as a systemic and organized process of decisions, actions, and feedback grounded in biomedical-epidemiological evidence, aimed at anticipating risk, optimizing diagnostic opportunity, and reducing avoidable mortality from PHC. This process is structured from the functional integration of the institutional, biomedical-epidemiological, and community dimensions. These dimensions articulate risk surveillance with care practice and municipal health management.

The process is based on the following guiding ideas, which emerge from the dialectical synthesis of the assumed theoretical bases:

Guiding idea 1. Coherence between the territorial epidemiological profile and institutional management conditions the effectiveness of the PCa preventive management process.

From population epidemiology, it is recognized that risk distribution, disease burden, and diagnostic opportunity vary according to demographic and organizational contexts. This relationship acquires special relevance at the municipal level, where PHC constitutes the operational space and guiding axis for translating national policies into contextualized decisions.

When preventive institutional management systematically integrates PCa epidemiological surveillance, risk stratification, and analysis of territorial indicators, conditions are generated for coherent planning, rational resource allocation, and greater system resolution capacity. Conversely, disarticulation between epidemiological information and institutional decisions produces operational fragmentation, diagnostic delays, and underutilization of PHC's resolution potential.

In this context, institutional-territorial resolution capacity is understood as the aptitude of the municipal health system to coherently articulate available clinical, organizational, and technological resources, so that PCa epidemiological information translates into timely, differentiated, and effective preventive decisions in the PHC setting. From this perspective, the institutional dimension expresses the strategic level of the process, where normative, organizational, and monitoring decisions that structure and regulate the functioning of the clinical and community dimensions are configured, acting as a structural cause of integrated, timely, and evaluable PCa preventive management.

Guiding idea 2. Functional integration between active epidemiological surveillance and preventive clinical management determines diagnostic opportunity and operational effectiveness of the PCa preventive management process.

From precision epidemiology, risk surveillance acquires preventive value only when operationally articulated with care practice, translating population information into timely, equitable, and territorially pertinent clinical decisions. This synergy is expressed through risk-based clinical decision capacity, being an attribute of professional performance that allows transforming epidemiological stratification into differentiated action protocols coherent with current national regulations.

When this capacity is developed, surveillance is functionally linked with clinical stratification, selective screening, and longitudinal follow-up, configuring a cycle between risk identification and outcome evaluation. This articulation reduces diagnostic latency, optimizes regionalization of care, strengthens care continuity, and avoids fragmented actions and underreporting. The biomedical-epidemiological dimension thus constitutes the operational level where epidemiological information acquires clinical value and institutional decisions materialize into concrete diagnostic actions.

To overcome intuitive or administrative-routine action models, a technological infrastructure supporting clinical decision-making is implemented that operationalizes this integration. This is articulated through: the Territorial Stratification and Management Atlas (AEGT), for georeferencing vulnerability; the Surveillance and Follow-up Technological System (SIT-CaP), as an inference engine for dynamic monitoring; and the Preventive Control Dashboard (TCP), for regulation and real-time performance feedback. These devices function as an oncological information system that articulates inputs (age ≥ 40 years, first-degree family history, PSA kinetics, physical findings) to generate predefined clinical outputs.

Guiding idea 3. PCa preventive management is optimized by redefining critical pathways as a system of integrated clinical-epidemiological processes.

In traditional models, fragmentation in referral and counter-referral flows among the CMF, the polyclinic, and the secondary level dilates diagnostic opportunity and weakens municipal risk management. Under a process-based management approach, preventive care is transformed into an interdependent functional value chain where the integration of clinical-epidemiological criteria governs patient flow according to risk stratification and not by episodic availability of services. This logic, supported by health intelligence, interprets PSA kinetics as a predictor of progression, converting the critical pathway into a predictive and longitudinal surveillance system.

In this framework, PHC consolidates itself as the coordinating node of the process, capable of regulating specialized referral, receiving feedback from specialized results, and adjusting active surveillance according to risk evolution. This conception replaces linear approaches with dynamic and evaluable care pathways that grant defined responsibility to all actors.

Guiding idea 4. Functional integration of community participation into epidemiological surveillance conditions the effectiveness and sociocultural sustainability of the PCa preventive management process at the municipal level.

From contemporary public health, oncological risk management is not limited to clinical identification of damage but incorporates the community dimension as an active component of the preventive process. The community is not only the scenario where risk manifests but a functional actor that provides information that modulates the perception of vulnerability and conditions adherence to preventive actions from PHC. This synergy requires a gender approach that shifts surveillance toward non-conventional trust environments, where the natural social interaction of men facilitates early capture and eliminates the masculinity barriers inherent to traditional clinical examination.

In this framework, the community dimension expresses the population plane of the preventive management process, where risk is identified, monitored, and fed back from the interaction between PHC teams and social actors (formal and informal community leaders). Thus, social risk management is configured as a structural mechanism connecting epidemiological surveillance with modifiable preventive behavior, contributing to more accessible, contextualized, and sustainable PCa prevention at the municipal level.

Guiding idea 5. Evaluation of PCa preventive performance depends on a system of biomedical-epidemiological indicators that functions as a clinical and management feedback mechanism in PHC.

This indicator system transcends episodic measurement to consolidate itself as a prospective regulation process, allowing early detection of operational deviations and correction of critical nodes in the care pathway. To operationalize this surveillance and guarantee the model's verifiability, strategic indicators were defined by dimensions (Table 2).

Table 2. Dimensions of the PCa preventive management process and their indicators

Dimension	Objective	Indicators	Verification Source
Institutional management (Guiding idea 1)	Guarantee coherence between the territorial risk profile and resource planning.	- % of CMFs with male population stratified by risk (Goal: $\geq 90\%$). - % of operational gaps identified and intervened semi-annually.	Municipal operational plans, management minutes, ASIS reports, Preventive Control Dashboard (TCP).
Clinical-epidemiological management (Guiding ideas 2 and 3)	Optimize diagnostic opportunity through risk-based decisions and critical pathways.	- % of medical adherence to the clinical decision algorithm (Goal: $\geq 90\%$). - % of critical pathways completed without interruption within standard times. - Rate of diagnoses in localized stages (T1-T2) vs. advanced.	SIT-CaP, clinical audits, registry systems, referral and counter-referral system.
Community management (Guiding idea 4)	Expand surveillance coverage in risk groups and trust environments.	- Capture rate of men in "epidemiological silence" zones. - Retention (adherence) index in active risk surveillance.	AEGT, community device registries, PHC reports.

The degree of maturity of PCa preventive management is categorized into three states: *initial* (fragmented use), *in development* (partial monitoring), and *consolidated* (indicators that systematically inform decision-making). Thus, the indicator system acts as a regulatory mechanism that allows adjusting interventions and sustaining adaptive, results-oriented preventive management.

Essential relationships of the PCa preventive management process

From an ontological and systemic perspective, PCa preventive management is structured from a set of essential relationships that order its internal dynamics and explain the functional transition from epidemiological information to effective clinical action, integrating the subject and the community as cross-cutting axes of the process in municipal PHC.

- a) Epidemiological-institutional relationship: expresses the functional link between PCa surveillance and normative management of the municipal system. Its adequate articulation guarantees strategic coherence between the territorial risk profile and resolution capacity, grounded in operational plans and the TCP.
- b) Epidemiological-clinical relationship: constitutes the biomedical core of the process by allowing the conversion of population risk into timely care decisions. This relationship is operationalized through the integration of active surveillance with clinical stratification and longitudinal follow-up, reducing diagnostic latency and optimizing care continuity.
- c) Clinical-institutional relationship: reflects the interdependence between preventive practice and organizational devices that regulate its execution. It allows clinical results to feed back into institutional management through diagnostic opportunity indicators, ensuring that decision-making is sustained by real evidence derived from audits and SIT-CaP registries.
- d) Community-epidemiological relationship: articulates information generated in trust environments with the formal surveillance system. This integration allows identifying risk in "epidemiological silence" zones, reducing underreporting, and strengthening coverage through georeferencing provided by the AEGT.

Structuring regularities of the PCa preventive management process

Under this logic, the structuring regularities of the process are patterns of behavior, trends, and functional sequences that repeat, reflecting the internal laws of the system and guiding its stability, sustainability, and continuous transformation.

- a) Regularity of risk centrality (*guiding axis*): biomedical-epidemiological risk constitutes the ontological category that regulates strategic planning, clinical intervention, and impact evaluation. It establishes the "what is managed," shifting the focus from installed disease to the probability of harm.
- b) Regularity of PHC stewardship (*coordinating scenario*): the first level of care acts as the articulating node that coordinates decision-making and regulates care continuity flows at the municipal level. It responds to "where it is managed," reaffirming local autonomy and resolution capacity.
- c) Regularity of functional integration (*systemic dynamic*): the effectiveness of the process emerges from the interdependence among surveillance, management, and clinical practice. The quality of feedback among these components determines global resolution capacity, responding to "how the intervention levels operate."
- d) Regularity of informational flow (*sustainability*): process permanence is conditioned by bidirectional information circulation between care levels and the community environment. It responds to "sustainability," ensuring that the system learns and adjusts over time.

These essential relationships and structuring regularities explain how the PCa preventive management process overcomes a linear administrative approach to become an intelligent, risk-centered health architecture.

Guiding principles of the PCa preventive management process

The guiding principles constitute the axiological and operational directives that guarantee the coherence of the process, reinterpreting PHC referents in Cuba under a biomedical-epidemiological perspective of active prostate risk management. They are structured at two hierarchical levels:

a) Strategic level (*they ground the being and the why of the process*)

- Principle of systemic and integrative approach: constitutes the pillar of the process. It defines management as a closed circuit where epidemiological information, regulations, and clinical practice interact dialectically.
- Principle of centrality on the subject and their context: establishes itself as a biopsychosocial axis that transcends administrative directives to focus on patient needs and their social determinants.
- Principle of risk-based proactivity: defines the essential mission of preventive management as active anticipation and detection of vulnerabilities before advanced clinical stages, guiding surveillance according to stratification.

b) Operational and tactical level (*they define the how and sustainability of the process*)

- Principle of cognitive pertinence and transformation of practice: ensures that scientific evidence translates into professional competencies that modify action protocols in PHC.
- Principle of intersectorality and community cohesion: validates sustainability through articulation of the health system with social sectors and subject participation in active PCa surveillance.
- Principle of evidence-based management and continuous improvement: requires systematic evaluation of indicators (Table 2) to feed back decisions and correct deviations in diagnostic opportunity.

The dialectical interaction between the ontological foundation and the system's regularities guarantees that preventive management evolves toward a high-resolution-capacity model (Figure 1).

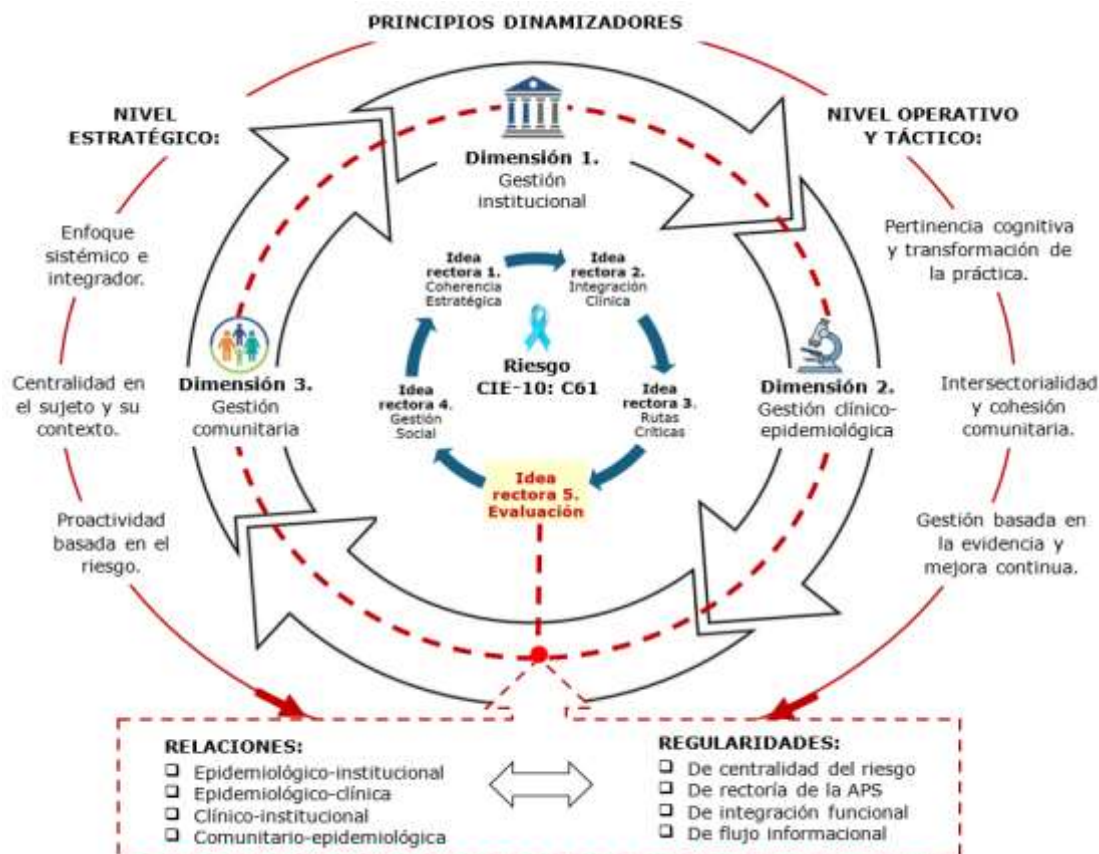


Fig. 1 Logical-conceptual structure of the PCa preventive management process.

Operational-instrumental component of the PCa preventive management process

The operational-instrumental component that allows the implementation of the PCa preventive management process functionally integrates the dimensions (institutional, clinical-epidemiological, and community) conceived in the logical-conceptual structure, and is constituted by the following phases and strategic actions:

Phase I. Operational diagnosis and territorial stratification of prostate risk

This phase responds to guiding idea 1, and its objective is: to mitigate fragmentation of epidemiological information through differentiated, integrated, and territorialized planning of PCa risk at the municipal level, in coherence with institutional management of the health system. Its strategic actions include:

- Stratified epidemiological characterization and territorial modeling of prostate risk.
- Evaluation of institutional resolution capacity and PCa management flows.

Expected results: implementation of the AEGT to identify risk clusters and epidemiological silence zones, migrating from static to proactive dispensarization.

Phase II. Planning and integrated clinical intervention based on competencies

This phase responds to guiding idea 2, and its objective is: to transform stratified epidemiological risk into precise and timely care decisions, through operational standardization of critical pathways and strengthening of clinical and communication competencies of PHC personnel. Its strategic actions include:

- Standardization of differentiated screening and critical pathways through clinical decision algorithms.
- Strengthening and certification of technical-clinical and communication competencies.

Expected results: implementation of the clinical decision algorithm to unify behaviors, optimize PSA use, and strengthen competencies in PHC.

Phase III. Care execution and dynamic community surveillance

This phase operationalizes guiding ideas 3 and 4, and its objective is: to guarantee assistance and timely detection of risk progression through a community and clinical surveillance model based on events, trends, and territorial contexts. Its strategic actions include:

- Male interaction devices and capture in trust environments.
- Longitudinal surveillance and kinetic management of prostate risk (SIT-CaP).

Expected results: activation of the SIT-CaP for longitudinal follow-up based on PSA kinetics and capture in trust environments.

Phase IV. Monitoring, auditing, and real-time operational regulation

This phase responds to guiding idea 4, and its objective is: to dynamically regulate the preventive and care flow to eliminate delays, ensure continuity of critical pathways, and sustain process quality. Its strategic actions include:

- Implementation of the Preventive Control Dashboard (TCP).
- Regulation of care flow and supervision of critical pathways.
- Comprehensive evaluation of effectiveness and health impact.
- Systemic feedback, institutionalization, and strategic projection.
- Expected results: deployment of the TCP to detect critical nodes in less than 72 hours and adjust care flows.

Assessment of validity by expert criteria

The logical-conceptual structure was submitted to assessment by the expert panel, whose composition and high competence ($0,80 \leq K \leq 0,90$) guaranteed a transdisciplinary vision between clinical practice in PHC and oncological management (Table 3). The high level of expertise of the group allowed validation to transcend statistical consensus, providing critical judgment based on the operational feasibility of the model in the municipal context.

Table 3. Dimensions for the theoretical validation of the proposed structure.

Dimensions	Indicators	CVI	W*	α
Theoretical validity	Correspondence among guiding ideas, essential relationships, structuring regularities, and guiding principles.	0,91	0,87	0,89
Internal coherence	Logical articulation between phases-strategic actions and theoretical components.	0,93	0,87	0,89
Scientific pertinence	Capacity of the proposed structure to resolve the PCa diagnostic gap in the PHC context.	0,90	0,87	0,89
Total (%)		0,92	0,87	0,89

In the initial round, specialists validated the triad of institutional, clinical-epidemiological, and community management, recommending optimizing TCP interoperability and specifying referral flows according to risk stratum. After integrating these suggestions, Kendall's concordance coefficient (W) reached a value of 0,87 ($X^2 = 124,5$; $p < 0,001$), which ratifies a solid consensus and statistically significant concordance among expert judgments on the refined version of the structure.

Final results confirmed the high acceptability of the model: 95 % of indicators were rated as "Very Adequate," with an average CVI of 0,92 and an $\alpha = 0,89$ ensuring the instrument's internal consistency. This level of convergence, higher than 90 %, validates the methodological soundness of the theoretical-conceptual structure and its capacity to transform PCa preventive management, which contributes to resolving the diagnostic gap in the municipal scenario.

DISCUSSION

The proposed logical-conceptual structure responds to the disarticulation identified between national regulations and local execution of the PCa preventive management process.

Systemic integration versus normative fragmentation

A contradiction is evident between the NHS regulatory framework and its operational execution in the municipal scenario. While instruments such as the PICC,⁽³⁾ and the National Strategy⁽¹⁰⁾ establish macro directives for oncological control, the ASIS (2024) of Consolación del Sur,⁽¹⁶⁾ confirms that disarticulation persists in care praxis. This gap coincides with what was raised by Cabezas et al.,⁽²⁾ who maintain that prevention in PHC often faces the dilemma of fragmented implementation that sacrifices the synergy necessary for epidemiological impact.

Unlike traditional approaches operating through vertical programs, the logical-conceptual structure proposes functional interdependence as a response to this fragmentation. This finding expands Donabedian's theory of quality,⁽¹⁹⁾ by demonstrating that effectiveness does not depend univocally on the existence of resources or regulations, but on the dialectical coherence between institutional management and the territorial epidemiological profile. In this sense, a solution is proposed to the need to transform PICC directives into dynamic municipal decision flows, overcoming the mechanical application that Santana,⁽¹⁰⁾ identifies as a limitation in the control of non-communicable diseases in Cuba. Therefore, systemic integration is an operational necessity for PCa surveillance to cease being a descriptive exercise and become a managed and sustainable process, as suggested by Mintzberg's management theories,⁽²⁰⁾ applied to complex health systems.

Precision epidemiology and the role of PHC as guiding axis

The proposed logical-conceptual structure positions PHC not only as an entry door but as the coordinating node of territorial precision epidemiology. This approach aligns with the vision of Reyes et al.,⁽¹³⁾ who postulate that PHC should be the transforming axis of the health system; however, it transcends passive surveillance by incorporating technological devices such as the AEGT and SIT-CaP. While screening in the European Union, analyzed by Gómez et al.,⁽⁶⁾ evolves toward stratified risk-based models, the present proposal adapts this global trend to the Cuban municipal context, integrating PSA kinetics with georeferencing of vulnerability.

This risk-based decision capacity marks a substantial difference with respect to conventional clinical practice described by Verdecia Rodríguez et al.,⁽⁴⁾ where screening tends to be episodic. By applying Mintzberg's process management principles,⁽²⁰⁾ the critical pathway of the patient at risk of PCa is transformed into a continuous information flow that minimizes diagnostic latency. Consequently, TCP implementation allows real-time feedback that, unlike the models analyzed by Cuzick et al.,⁽⁷⁾ does not depend exclusively on large hospital infrastructures, but on health intelligence distributed in the CMF and polyclinic,⁽¹⁾ guaranteeing the operational sustainability demanded by the current epidemiological scenario.

Social determination and the challenge of masculinity in PCa preventive management

A fundamental finding of this structure is the integration of the community dimension as a functional actor and not merely a receiving scenario. This social risk management approach finds support in the thesis of Reyes et al.,⁽¹⁴⁾ who argue that PCa prevention in PHC is mediated by the social construction of masculinity. The logical-conceptual structure expands this notion by proposing that surveillance should shift toward non-conventional trust environments, breaking with the hegemony of the biologicist paradigm that Diéguez,⁽¹⁷⁾ and the WHO,⁽¹⁸⁾ identify as a historical limitation in medical training and practice.

When contrasting the proposal with the findings of Paredes et al.,⁽¹⁵⁾ who report low acceptability rates of digital rectal examination due to cultural barriers, the logical-conceptual structure presented here offers an operational way out through self-efficacy and differentiated clinical communication. This vision coincides with the need for a "preventive culture" raised by Hernández et al.,⁽⁹⁾ but adds the value of social co-responsibility as a mechanism to reduce the epidemiological silence zones detected in the ASIS (2024).⁽¹⁶⁾ Thus, the community dimension becomes an active surveillance device that, when articulated with clinical practice, guarantees that early capture is sensitive to the sociodemographic and gender realities of the male population in Consolación del Sur.

Implications for practice, policy, and research

The logical-conceptual structure offers a theoretical body applicable to the transformation of municipal health performance. For managers and policy planners, the results imply the need to move toward a process-based management model that, as Bermejo et al.,⁽¹²⁾ suggest, breaks with administrative linearity and prioritizes efficient allocation of resources (such as PSA) based on stratified risk. TCP implementation suggests a change in MINSAP's monitoring policy, allowing quality evaluation to cease being retrospective and become prospective real-time regulation.

For care practice in PHC, the model provides the family physician with a technological support infrastructure (AEGT and SIT-CaP) that reduces clinical uncertainty. This reinforces the synergy between primary care and prevention defended by Cabezas et al.,⁽²⁾ by facilitating that longitudinal follow-up does not depend on the professional's memory, but on a predictive surveillance system. Finally, research implications point to the validation of health impact indicators, fundamental for sustaining health promotion in the 21st century.

Limitations and future perspectives

Despite the consensus achieved, this study presents limitations that must be considered. First, validation focused on the judgment of academic and clinical experts, without including at this stage the perspective of administrative managers or the users themselves (male population), whose perception is vital to evaluate total operational feasibility. Second, the logical-conceptual structure requires being submitted to a pilot implementation phase to measure its real effectiveness on morbidity and mortality indicators for PCa in the field. Finally, the validation context could limit direct transferability of results to health systems with a different PHC organization than the Cuban NHS.

CONCLUSIONS

The designed logical-conceptual structure constitutes a systemic response to operational fragmentation in PCa preventive management in PHC. By articulating the institutional, biomedical-epidemiological, and community dimensions, it is possible to transcend the traditional administrative approach, positioning risk management and social determination as guiding axes of municipal oncological surveillance. The validity of the proposal is supported by its internal coherence and scientific pertinence, confirmed by a high level of expert consensus and its statistical consistency. The integration of technological devices supporting clinical decision-making (AEGT, SIT-CaP, and TCP) represents the main novelty of the model, allowing the transformation of territorial epidemiological data into proactive and evaluable care actions in real time. Finally, the implementation of this logical structure offers a critical route to reduce diagnostic latency and optimize the resolution capacity of the health system at the local level. Its adoption not only strengthens professional competencies in PHC but also guarantees more equitable, sustainable PCa preventive management centered on the realities of the municipal context.

Acknowledgments

To the specialists who evaluated the proposal and to the management of the "Primero de Enero" Community Teaching Polyclinic, in Consolación del Sur, for supporting the implementation of the study.

Funding

The authors did not receive funding for the development of this research.

Conflict of interests

The authors declare that no conflict of interests exists.

Authors' contributions

GFMD: conceptualization; formal analysis, project administration, methodology, data curation, writing – original draft, writing – review and editing.

JLML: conceptualization; formal analysis, methodology; writing – original draft, writing – review and editing.

MRL: formal analysis, methodology, supervision, writing – original draft, writing – review and editing.

BFG: formal analysis, methodology, supervision, writing – original draft, writing – review and editing.

JSCA: formal analysis, data curation, writing – original draft, writing – review and editing.

Declaration on the use of artificial intelligence

The authors declare that they have not used generative artificial intelligence technologies or AI-assisted tools during the research or writing of this article.

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