Original Paper

# Electronic Health Record–Integrated Quality Dashboard for Diabetes Care in Public Primary Health Care: Development and Usability Study

Maria Victoria López[1*], BSc, MSc; Vilma Irazola[1*], MD, MSc, PhD; Analia Nejamis[1*], MD, MSc; Laura Gutierrez[1*], BSc, MSc; Christian Gimenez[1*], MD, MSc; Tomas Baliña[2*], MD, PhD; Luciano Gimenez[2*], BSc; Karina Larsen[2*], BSc; Carolina Prado[1*], MD, MSc; Andrea Beratarrechea[3*], MD, MSc

[1]Instituto de Efectividad Clínica y Sanitaria, Buenos Aires, Argentina

[2]Sistema Integrado de Salud Pública, Tandil, Argentina

[3]Hospital Italiano de Buenos Aires (HIBA), Instituto Universitario Hospital Italiano (IUHI), Instituto de Medicina Traslacional e Ingeniería Biomédica (CONICET), Buenos Aires, Argentina

*all authors contributed equally

**Corresponding Author:**

Maria Victoria López, BSc, MSc
Instituto de Efectividad Clínica y Sanitaria
Lavalleja 856
Buenos Aires C1414CPV
Argentina
Phone: 54 1138248597
Email: mvlopez@iecs.org.ar

## Abstract

**Background:** Quality dashboards are essential tools in health care, providing integrated and visualized data to support decision-making. Continuous monitoring of key indicators is crucial for managing chronic diseases such as diabetes mellitus and improving outcomes.

**Objective:** This study aimed to develop and evaluate an interactive diabetes quality dashboard integrated within the public health care system of Tandil, Argentina, to support monitoring and decision-making in primary care.

**Methods:** A participatory and multidisciplinary approach was used to design and implement the dashboard. Development consisted of two phases: (1) indicator selection and visualization design and (2) dashboard development and iterative testing. This study was conducted between October 2024 and May 2025. Indicators were initially identified from national clinical practice guidelines and Healthcare Effectiveness Data and Information Set standards and refined through 2 in-person workshops with 10 stakeholders (a health system decision-maker, primary care physicians, nurses, researchers, and IT specialists) who were purposively selected by the research team and local primary health care authorities based on their institutional role and involvement in diabetes care, chronic disease management, or health information systems and were personally invited to participate. Six virtual group sessions were then conducted with the same stakeholders to iteratively refine the dashboard based on their feedback. The dashboard was integrated into an existing electronic health record system and developed using Apache Superset. Usability was assessed using the System Usability Scale following an exploratory evaluation in which participants independently explored the dashboard without predefined tasks.

**Results:** Stakeholder workshops and iterative testing informed the dashboard's content and design. The final dashboard integrated 29 indicators across 6 tabs in 3 sections for population-level monitoring of adults with diabetes. Among 9 health care professionals participating in the usability assessment, the mean System Usability Scale score was 78.7 (SD 9.4), and 8 (88.9%) scored above the standard benchmark of 68. All participants considered the dashboard useful for health decision-making, 7 suggested further data disaggregation, and 3 recommended benchmarking capabilities.

**Conclusions:** The dashboard received favorable usability scores and may support population-level monitoring of diabetes care in public health settings. Its integration into an existing electronic health record system and participatory development were key strengths. Future research should assess its impact on care processes and clinical outcomes and explore its adaptation to other health care systems.

*JMIR Form Res 2026;10:e90234;* doi: 10.2196/90234

**Keywords:** diabetes care; electronic health records; quality indicators; quality dashboard; primary health care; clinical decision support system; health information systems

## Introduction

A quality dashboard is a tool designed to provide summarized and integrated information on key performance metrics within a systematic organization using data visualization techniques (such as graph reports) to assist with operational decision-making. The dashboard provides graphical reports that consolidate and monitor a large number of clinical and health performance measures relevant to a specific objective or process [1].

In the health care field, dashboards have increasingly been used to obtain relevant and timely information on patient population health indicators to measure and improve the quality of care provided by different health care organizations. When providing care to populations with chronic diseases, particularly in the case of diabetes mellitus, longitudinal monitoring of disease indicators—such as hemoglobin $A_{1c}$ ($HbA_{1c}$), blood pressure (BP), or lipid profile—is essential as changes in these indicators occur gradually over time. Tracking indicators across multiple thresholds provides valuable insights into long-term disease management.

Despite the growing use of dashboards in health care, most reported experiences have been developed in high-income countries and integrated health systems, with limited evidence from low- and middle-income countries and public primary care settings. In Latin America, fragmented health information systems, heterogeneous electronic health record (EHR) implementation, and limited availability of integrated monitoring tools continue to challenge the use of routinely collected data for quality improvement in chronic disease care. Although some experiences with health care dashboards have been reported in private health care institutions [2], evidence regarding the development and implementation of locally adapted dashboards embedded within routine public health care systems remains scarce, particularly in primary health care settings.

Tandil, a medium-sized city in Argentina with a population of 150,162 located in the Buenos Aires province [3], has seen a rising prevalence of diabetes mellitus, which has increased from 8.6% in 2005 to 13.1% in 2018 [4] in accordance with both global and national trends. Approximately 40% of the population in Tandil uses the public health system for health care, and most of the patient follow-up is carried out at primary health care centers [3].

Between 2021 and 2024, a multicomponent implementation research project aimed at strengthening diabetes prevention and care was conducted within Argentina's public health system in low-income areas of Salta, San Juan, and Tandil. One of the project components focused on the development and implementation of digital health tools to improve monitoring, follow-up, and quality of care for people with diabetes in primary health care settings.

In this context, the availability of a web-based EHR system within the public primary health care network created an opportunity to develop a locally adapted dashboard integrated into routine care processes. Given the demonstrated usefulness of dashboards in other health care settings, a local diabetes quality dashboard was developed within the public health system to support monitoring and decision-making.

In the primary care setting of the public health system, where resources and staffing are limited, dashboards may support quality improvement and operational efficiency [5]. By facilitating access to real-time data and visualization of quality indicators, these tools can help health care providers and health authorities identify care gaps, monitor trends over time, and support decision-making processes [1,6-10].

To our knowledge, no study has described the development of an EHR-integrated diabetes quality dashboard designed through a multidisciplinary and participatory process within the Argentine public health care system. The objective of this study was to develop a quality dashboard within the public health care system in a city in Argentina as a tool to support health authorities involved in organizing care for people with diabetes mellitus in the primary care setting.

## Methods

As part of the health IT component of a local diabetes prevention and care program implemented in Tandil, Argentina, a Diabetes Prevention and Care Program implementation science project, a diabetes quality control dashboard was developed to integrate key metrics related to the care of people with diabetes. The dashboard was designed to serve as a tool to track program activities and monitor changes in key indicators of diabetes care over time. This study was conducted between October 2024 and May 2025.

### Setting

This study was conducted in Tandil, Argentina, within the Health Informatics System (SISA), a web-based EHR system developed and implemented in the public health system. SISA Tandil has been in operation since 2004 and integrates clinical and administrative information of patients from all municipal hospitals and primary health care centers. The system operates a shared relational database in PostgreSQL, enabling advanced queries and data extraction for analysis. Through its EHR system, SISA Tandil provides centralized access to comprehensive patient information, including health records, diagnoses, treatments, and medication dispensing.

## Dashboard Design

### Overview

We used a comprehensive, interdisciplinary, and collaborative approach to design, develop, and test a digital quality dashboard for visualizing key indicators of diabetes care. The dashboard was designed to support multiple users within the public primary health care system, including health system managers, directors of primary care centers, and health care professionals such as physicians and nurses. It enables these users to monitor population-level quality indicators, identify critical gaps in diabetes care, and evaluate the impact of strategies implemented to improve care processes and outcomes. The development process integrated expert input and stakeholder feedback to ensure the dashboard's relevance, usability, and alignment with the needs of health care decision-makers.

The process involved 2 main phases.

### Preliminary Selection of Indicators and Visualization Design

To identify relevant clinical and patient-centered indicators, we relied on national clinical practice guidelines [11] and the standards proposed by the Healthcare Effectiveness Data and Information Set (HEDIS) [12]. To refine and prioritize the selected outcomes, 2 in-person stakeholder workshops were conducted. The workshops lasted approximately 90 to 120 minutes each. Sessions explored the perceived relevance, interpretability, and potential utility of each proposed indicator for clinical care, quality improvement, and health system management. Stakeholders were selected through purposive sampling to ensure that the clinical, managerial, and technical perspectives relevant to the dashboard's design and intended use were represented. Potential participants were identified by the research team together with local primary health care authorities based on two criteria: (1) their institutional role (clinical, managerial, or technical) and (2) their direct involvement in diabetes care, chronic disease management, or health information systems. Identified individuals were personally invited by a member of the study team from the local public health system. A total of 10 stakeholders participated: 1 health system decision-maker, 2 primary care physicians, 2 nurses, 2 IT specialists, and 3 researchers. Meetings were held to gather feedback on both the selection of indicators and the proposed visualization formats, such as tables and graphs, to ensure meaningful and actionable data presentation. During the stakeholder workshops, participants reviewed preliminary lists of indicators and visualization prototypes and discussed their applicability within the local health care context. Detailed notes were taken during each session, and the research team reviewed feedback collaboratively to identify recurring suggestions, concerns, and priorities. At the end of each meeting, indicators and visualization formats were refined through discussion and consensus among researchers, stakeholders, and developers, considering both technical feasibility and clinical relevance.

### Dashboard Development and Iterative Testing

Using the selected indicators, we created structured SQL views within the existing PostgreSQL database of the EHR. These views organized patient data into formats suitable for visualization, ensuring accuracy and consistency in the extraction and aggregation of information.

The dashboard was developed using Apache Superset [13], an open-source data visualization platform selected for its ability to integrate seamlessly with SQL databases, its customizability, and its user-friendly interface for nontechnical users. Development followed a participatory design and iterative process in collaboration with IT developers, during which multiple prototypes were created and refined based on participants' feedback. Six virtual group sessions organized into 3 refinement rounds were conducted with the same 10 stakeholders who participated in the workshops; each session lasted approximately 60 minutes. Feedback from these sessions was reviewed using the same approach as the indicator selection workshops, focusing on recurring suggestions and priorities to inform subsequent dashboard refinements. During these sessions, participants reviewed successive dashboard prototypes and explored predefined clinical and management scenarios to assess the functionality of indicators, clarity and interpretability of visualizations, operability of filters and navigation tools, completeness of displayed information, and overall alignment with clinical workflows and decision-making needs. The iterative process continued until participants and the development team agreed that the dashboard adequately met the predefined functional and visualization requirements and no further modifications were considered necessary.

Both the in-person workshops and the virtual sessions were facilitated by a member of the research team, a public health researcher with experience in qualitative methods and in facilitating group discussions. No formal written discussion guide was used; instead, sessions were structured around the review of preliminary indicator lists and successive dashboard prototypes.

These validation sessions enabled comparisons between dashboard outputs and independently conducted analyses using the R software environment (R Foundation for Statistical Computing) [14]. Discrepancies were identified, discussed, and resolved through adjustments to SQL queries and calculation logic, ensuring that the final indicators were robust and trustworthy.

### Final Dashboard Structure

#### Overview

An interactive quality dashboard was developed with 3 sections, allowing for the organization and visualization of clinical and administrative data related to patients with type 1 and type 2 diabetes aged 18 years or older who had at least one contact with the public health care system. The dashboard is linked to the EHR system and is continuously fed with real-time data, enabling up-to-date information retrieval and monitoring. Additionally, it enables the display

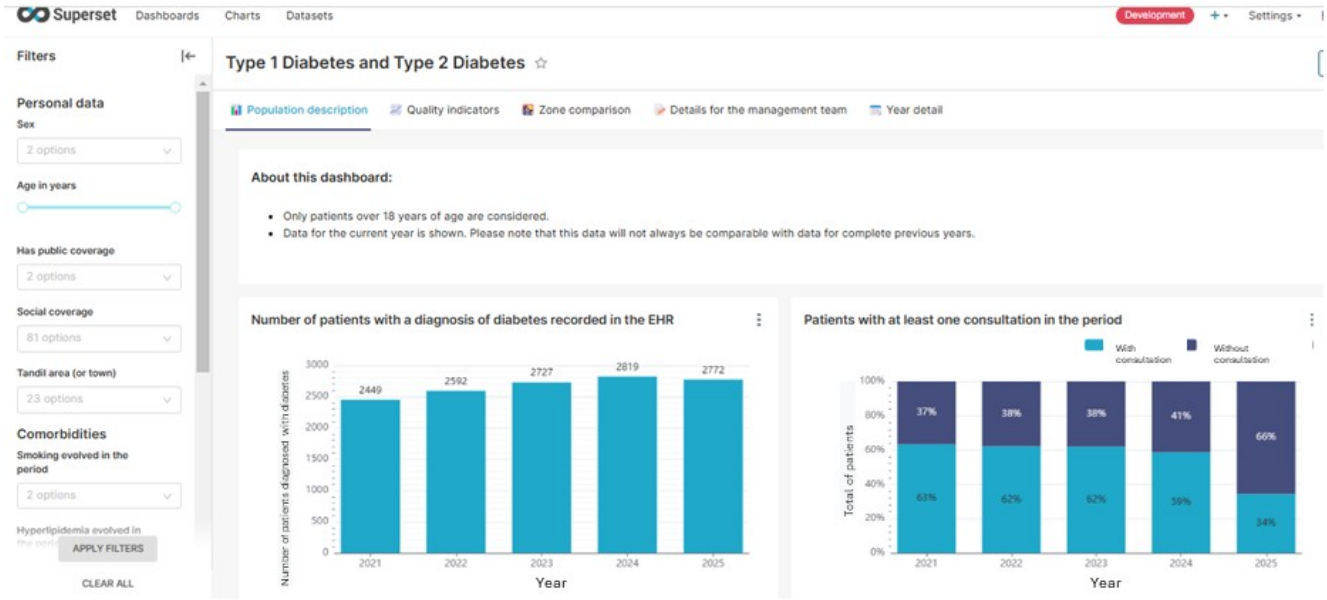
of longitudinal data and facilitates comparative analysis between different population subgroups or periods. To present the information clearly, the dashboard uses various visualization formats, including plots, pie charts, bar charts, and tables.

The diabetes quality dashboard was organized into 3 core sections displayed across 6 primary tabs and integrated 29 indicators covering both process and outcome measures.

## Population Description

The home page of the dashboard (Figure 1) presents an overview of the population with diabetes, including key demographic and clinical characteristics such as age distribution, sex, and other relevant variables. Specific definitions were applied to standardize indicators as follows: (1) area of residence is determined by the address listed on the patient's national ID, (2) type of health coverage refers to the status as of December 31 of the reference year, and (3) inclusion criteria for each year include patients diagnosed with diabetes prior to that year and who were alive for at least one day during the year in question.

**Figure 1.** Main interface of the interactive electronic health record–based diabetes quality dashboard developed for the public primary health care system in Tandil, Argentina, showing navigation tabs, filtering options, and access to quality of care indicators for adults with type 1 and type 2 diabetes.




## Comorbidities

This section displays the prevalence of major comorbid conditions, including obesity (both recorded as such or calculated based on BMI), hypertension, dyslipidemia, and smoking status.

## Quality Indicators

This section includes process, outcome, and treatment indicators to evaluate the quality of diabetes care, as detailed in the following sections.

### Process Indicators

These indicators reflect the extent to which recommended clinical assessments are performed:

- Proportion of patients with recorded anthropometric measurements per year
- Proportion of patients with at least one BP measurement per year
- Proportion of patients with at least one $HbA_{1c}$ test per year
- Proportion of patients with at least one cholesterol or low-density lipoprotein cholesterol test per year
- Proportion of patients with at least one microalbuminuria test per year
- Proportion of patients who had at least one ophthalmologic consultation per year
- Proportion of patients who underwent a foot examination during the year

### Outcome Indicators

These indicators assess health outcomes based on available clinical measurements:

- Proportion of patients with poorly controlled BP: the percentage of patients with systolic BP of 140 mm Hg or higher and/or diastolic BP of 90 mm Hg or higher
- Metabolic control: defined by $HbA_{1c}$ levels (<7% indicates good control, 7%-8% indicates acceptable control, >8% indicates poor control, and >9% indicates very poor control with a high risk of complications)
- Distribution of foot examination results: classifies patients based on the recommended frequency of foot examinations using color-coded visualizations to represent the severity of complications

### Treatment Indicators

These indicators capture medication uptake:

- Proportion of people with diabetes who received oral hypoglycemic medication per year
- Proportion of people with diabetes who received insulin per year
- Proportion of people with diabetes and hypertension who received antihypertensive medication per year
- Number of patients receiving antihypertensive treatment by type of medication

## *Additional Dashboard Features*

### Comparison by Zones

This tab visualizes the distribution of people with diabetes across the 23 geographic zones that correspond to Tandil's operational health areas, enabling spatial analysis and regional comparisons.

### Details for the Management Team

This section provides administrative insights for health system managers, including the distribution of patients by type of health coverage (exclusive public coverage, social security, or private coverage).

### Detail by Year

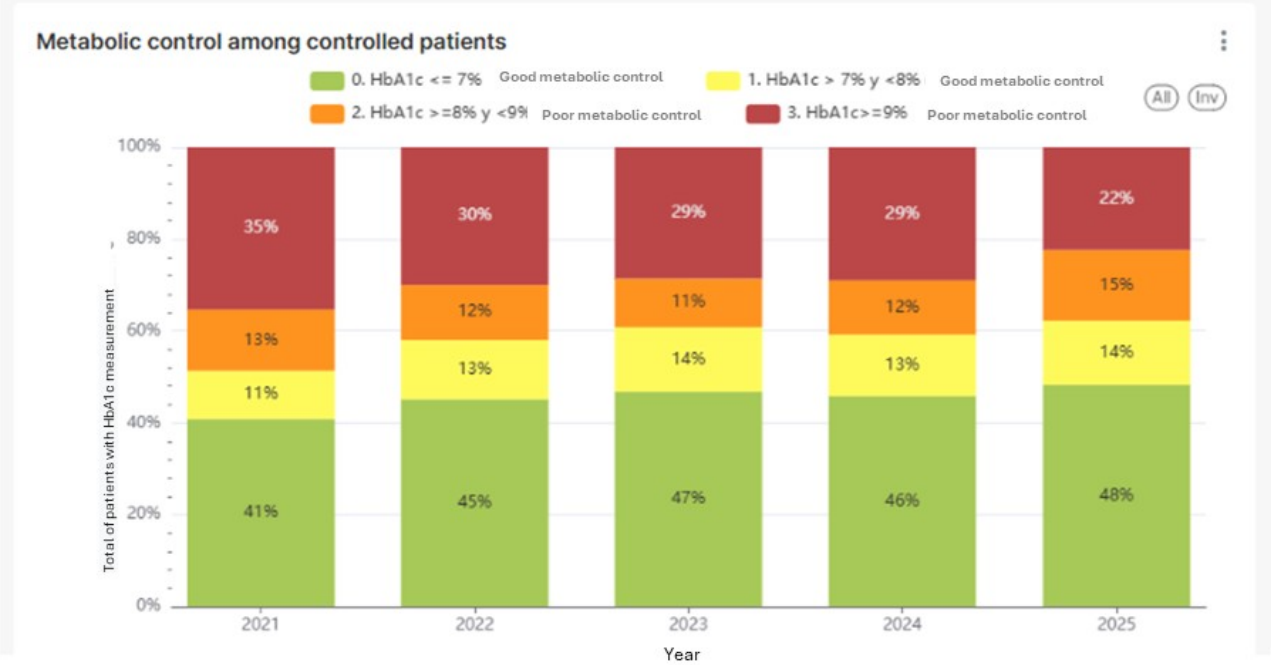
This section provides a year-by-year breakdown of indicators that allows users to observe trends and identify changes in care quality and outcomes over time.

## *Dashboard Control Panel*

The control panel is a key feature that enhances the dashboard's utility for evaluating and monitoring the quality of care. It facilitates data-driven decision-making by enabling users to filter and interact with the indicators described above.

Located on the left side of the screen (Figure 1), the filter panel allows users to customize the data view based on patient characteristics such as sex, type of health coverage, area of residence, and associated comorbidities. Filters can be applied directly by selecting options from the panel or by clicking on the visual elements within the dashboard. For example, users can isolate data for adults aged 65 years and older and assess the proportion with poor metabolic control, as illustrated in Figure 2.

**Figure 2.** Visualization of metabolic control indicators in adults with diabetes within the public primary health care system of Tandil, Argentina. Hemoglobin $A_{1c}$ ($HbA_{1c}$) categories are displayed using a traffic light color-coding scheme to facilitate interpretation of glycemic control and identification of patients requiring additional follow-up.



While the dashboard is not designed to track individual patient trajectories, the data table on the main page enables filtering by individual patients, allowing for a more detailed exploration of specific cases when needed.

### Usability Evaluation

We conducted a usability evaluation using the System Usability Scale (SUS), a validated and widely used instrument in the field of health informatics. The SUS comprises 10 items scored on a 5-point Likert scale, yielding a total score ranging from 0 to 100. Scores above 68 are generally considered indicative of acceptable usability [15].

A convenience sample of end users—including physicians, nurses, and health care decision-makers from participating health centers—was recruited to assess the usability of the dashboard. Participants were invited through institutional contacts based on their involvement in diabetes care, chronic disease management, or health care coordination activities within participating health centers. Eligible participants were health care professionals familiar with the local EHR system. Usability testing took place remotely in May 2025. The sample size was determined pragmatically based on the availability of eligible end users involved in diabetes care within the study setting. This evaluation was intended as a formative, exploratory assessment aimed at obtaining feedback from end users across these different roles rather than producing a statistically generalizable usability estimate [16]. Participants were granted access to the dashboard and attended a brief guided session introducing its purpose and main functionalities. They then had 1 week to independently explore the visualizations and indicators under routine practice conditions according to their professional needs and interests without predefined tasks, simulating routine use of the dashboard in real-world practice. No systematic log of feature use, frequency, or duration of interaction was collected during this period. At the end of this period, they completed the SUS to assess the perceived usability of the dashboard.

### Data Analysis

Qualitative feedback collected during the indicator selection workshops and iterative dashboard development sessions was reviewed using a pragmatic qualitative analytic approach focused on identifying recurring suggestions, concerns, and priorities to inform successive refinements rather than conducting formal line-by-line coding [17]. Feedback was reviewed collaboratively across the 3 rounds rather than analyzed separately for each round as suggestions were incorporated cumulatively into successive prototypes. Quantitative usability data (SUS scores) were summarized using descriptive statistics (mean, SD, range, and proportion of participants above the standard acceptability threshold of 68); given the small, exploratory sample, no inferential analyses were planned.

### Ethical Considerations

All professionals who participated in the usability assessment and stakeholder meetings were staff members from health centers involved in the study. The implementation of the program and the associated research activities were reviewed and approved by the Institutional Review Board for Research Studies (Consejo Institucional de Revisión de Estudios de Investigación) in Mar del Plata, Buenos Aires, Argentina (date of approval of protocol WDF19-1724: July 7, 2022).

## Results

### Dashboard Design

#### Selection of Indicators and Visualization Design

The preliminary selection of indicators was based on clinical guidelines, including national clinical practice guidelines and HEDIS standards. This process enabled the identification of key demographic, clinical, process, outcome, and treatment indicators relevant to diabetes care quality and population management. Feedback from workshops with stakeholders emphasized the importance of including indicators that supported longitudinal follow-up rather than baseline assessments only, identifying patients at higher risk of complications, and facilitating population-level monitoring across primary health care centers. Stakeholders also highlighted the importance of incorporating information useful for care planning and quality improvement activities, including the identification of patients with poor metabolic control and indicators related to follow-up and care processes. These discussions informed the prioritization and refinement of indicators according to both evidence-based recommendations and local health care needs.

#### Dashboard Development and Iterative Testing

The dashboard development process followed an iterative participatory design approach and included 3 refinement rounds involving stakeholders, researchers, and IT developers. The users reviewed prototypes and provided feedback regarding usability and information display. Suggestions focused primarily on improving the clarity and interpretability of visualizations by aligning graph titles with displayed content, improving legends and labels, reorganizing dashboard sections, and enhancing the readability of graphical elements. Participants also emphasized the need to display absolute values together with percentages to facilitate interpretation and requested improvements in navigation and filtering functionalities. Additional recommendations included reorganizing indicators according to clinical relevance, improving visual consistency across charts, and optimizing data presentation to better support decision-making and data exploration. These iterative modifications informed successive refinements to dashboard structure, visualization formats, and interface organization.

Feedback collected during the sessions was reviewed collaboratively by the research and development teams to identify recurrent suggestions and areas requiring refinement. This iterative process informed successive changes to dashboard structure, visualization formats, filtering options, navigation features, and indicator presentation. Because suggestions were incorporated cumulatively into successive

prototypes, feedback was consolidated across rounds and could not be attributed to individual rounds; it is therefore reported in aggregate. The changes introduced to the dashboard during the iterative development process are summarized in Table 1 grouped by type of modification.

**Table 1.** Summary of dashboard modifications implemented during the iterative development process.

| Category | Changes included |
|---|---|
| Formatting and visualization improvement | • Titles and legends were modified to improve the visibility and readability of the indicators.<br>• Tables were reorganized to separate the population description from the quality indicators.<br>• Colors, labels, and chart layout were adjusted to avoid misinterpretation. |
| Information presentation | • The recommendation to display absolute numbers in addition to percentages was incorporated. |
| Content | • Incorporation of poor metabolic control defined according to PRODIABA[a] criteria as hemoglobin of >9%<br>• New functionalities: individual-level data |

[a]PRODIABA: Provincial Program for the Prevention, Diagnosis, and Treatment of Patients with Diabetes (Programa de Prevención, Diagnóstico y Tratamiento del Paciente Diabético).

Sessions were documented through detailed field notes rather than audio recordings; therefore, verbatim participant quotes are not available.

### Usability Results

Ten health care professionals were invited to participate in the usability evaluation. The response rate was 90% (n=9). A total of 9 professionals participated, including primary care physicians (n=4), nurses (n=2), a psychologist member of the primary care team, an administrative staff member, and a primary health care manager. The mean SUS score was 78.7 (SD 9.4), with individual scores ranging from 67.5 to 100. Overall, 88.9% (8/9) of the participants rated the dashboard above the standard acceptability threshold of 68, indicating good usability [18]. Only 1 participant assigned a score below this threshold.

All participants agreed that the dashboard was useful for health decision-making. Regarding suggestions for improvement, the most frequently mentioned was the need for more disaggregated data. Specifically, 7 out of 9 participants highlighted that it would be highly valuable to have data disaggregated by health center and/or neighborhood of patient residence. Additionally, 3 out of 9 participants suggested incorporating benchmark indicators to enable the evaluation of the local situation in comparison with population-based data. The results support the dashboard's potential for implementation in clinical practice.

## Discussion

### Principal Findings

This study describes the development and implementation of an interactive, EHR-based quality dashboard to support diabetes care in the public primary health care system of Tandil, Argentina, through a participatory, multidisciplinary process. The usability evaluation reflected favorable perceptions of the dashboard among the participating end users, who viewed it as a potentially useful tool to support health system performance in this resource-constrained setting. Given the small, self-selected sample, these findings should be interpreted as preliminary rather than generalizable. A key strength of this work lies in its integration within an existing EHR system and its development through a real-world participatory process involving decision-makers, clinicians, and IT developers.

There is evidence on clinical and quality dashboards suggesting that these tools may support improvements in care processes when relevant information is readily accessible and integrated into clinical workflows, although the evidence remains heterogeneous and further rigorous evaluation is needed [5]. Studies evaluating dashboards for chronic disease management have highlighted their potential to improve access to clinical information and support quality monitoring. For example, Koopman et al [19] found that a diabetes dashboard improved the speed and accuracy with which primary care physicians retrieved information from the EHR. Similarly, Adediran et al [14] described the development and usability evaluation of an EHR-integrated hypertension disparity dashboard in primary care, illustrating how dashboards can be designed to support the identification of disparities and quality improvement priorities. More recently, Ackermann et al [20] reported that general practitioners valued the visualizations and benchmarking features of a prototype dashboard for monitoring type 2 diabetes care quality while also identifying challenges related to integration into existing clinical information systems and routine practice. In this context, the dashboard developed in Tandil benefits from its integration into a shared EHR database covering municipal primary health care centers, providing a basis for system-wide monitoring. However, usability evaluation in our study differed from task-based approaches as participants explored the dashboard without predefined tasks over a 1-week period. Although the SUS provided a standardized measure of perceived usability, the findings should be interpreted in light of this exploratory evaluation approach [21].

Our findings also highlight that the value of a dashboard depends not only on the information displayed but also on how its content and functionality align with users' needs and quality improvement priorities. Previous work has emphasized the importance of considering the dashboard's purpose, target users, data infrastructure, indicators, and presentation formats when designing tools to support evidence-informed

decision-making [1,7,22]. Reviews of health care visualization dashboards have identified potential benefits related to information access, usability, and clinicians' engagement with relevant information while also highlighting the need for further evaluation of their effects in practice [23,24]. Consistent with this literature, participants in our study valued the dashboard as a tool for health system monitoring and identified additional needs, particularly the disaggregation of indicators by primary health care center or neighborhood and the inclusion of benchmarking features. These preferences suggest that users require not only an overview of system-wide performance but also information that allows them to identify variation across settings and recognize local priorities for improvement. The participatory and multidisciplinary approach used in this study helped identify these needs and inform successive dashboard refinements, consistent with previous work emphasizing interdisciplinary and user-centered design in dashboard development [10]. Nevertheless, the availability of disaggregated indicators and benchmarking features does not in itself ensure that the information will lead to changes in practice. Their potential contribution to quality improvement depends on data completeness, the relevance of the indicators to local priorities, and the capacity of health care teams and decision-makers to translate findings into improvement activities. Although previous research has reported improvements in care processes and, in some settings, patient outcomes following dashboard implementation [5], the impact of the dashboard developed in Tandil on care quality and health outcomes remains to be evaluated.

Beyond the usability evaluation, the dashboard has been used by the Community Health Directorate to monitor the population living with noncommunicable diseases and inform quality improvement and local planning activities. Dashboard indicators have also been used to generate annual performance reports for primary health care centers and ad hoc reports upon request. In addition, health care professionals, including physicians and nurses, have accessed the dashboard independently. However, the effects of dashboard use on organizational workflows, staffing decisions, and clinical practice were not formally evaluated in this study.

## Limitations

This study has certain limitations. The usability evaluation was conducted with a small convenience sample of health care professionals from participating primary care centers. Although participants represented different professional roles, the sample size was limited (n=9) and may have been subject to selection bias as participation was voluntary. The usability testing was based on unstructured exploration of the dashboard without predefined tasks. While this approach was intended to simulate routine use, it may have introduced variability in how participants interacted with the tool. Beyond the 1-week access period, no systematic logs of feature use, frequency, or duration of interaction were collected. Participants explored the dashboard according to their own professional needs and under their own device and access conditions; therefore, specific use patterns and differences in the intensity of interaction could not be characterized in detail. In addition, feedback from the stakeholder workshops and iterative development sessions was reviewed using a pragmatic qualitative analytic approach rather than a structured qualitative analysis method with formal coding, and verbatim quotes were not recorded, which may limit the systematicity and reproducibility of the categories identified. The dashboard retrieves information from the EHR system of the city of Tandil in real time. However, this does not guarantee that the underlying records are complete or up-to-date, which could reduce the validity of the information presented on the dashboard. In addition, while this dashboard includes individual-level data and could theoretically be used to support clinical decision-making, it was not specifically designed for that purpose. Consequently, its graphs and indicators may not be the most appropriate for guiding clinical decisions. Its current structure, visualizations, and indicators are optimized for population-level monitoring and public health decision-making rather than for individual follow-up or treatment decisions such as the monitoring of kidney function (eg, estimated glomerular filtration rate) or the use of lipid-lowering therapies, which may further limit its applicability for individual patient management.

## Implications

Beyond its immediate utility, implementing the dashboard may provide a foundation for strengthening a culture of continuous quality improvement. Its sustained use could support local capacity for monitoring health care quality and inform the adaptation of evidence-based health policies. Future research should assess whether and how dashboard use translates into changes in care processes and, ultimately, improvements in the quality of care for people living with diabetes.

## Conclusions

This study describes the development of an interactive quality dashboard tailored to support diabetes care within the public health system of Tandil, Argentina. By integrating data from the local EHR, the dashboard enables real-time monitoring of key process and outcome indicators. Usability findings among the diverse group of participating health care professionals were favorable, suggesting potential for effective integration into routine practice, although this should be confirmed in larger, more representative samples. The dashboard serves as a valuable tool for informing decision-making, optimizing resource allocation, and promoting continuous quality improvement. Future research should evaluate its impact on clinical outcomes and explore its scalability and adaptation to other health systems, particularly in resource-constrained settings. This experience may serve as a model for other public health systems seeking to leverage routinely collected EHR data for quality improvement in chronic disease management.

## Acknowledgments

The authors thank all the users who participated in the usability surveys and shared their valuable input for improving the dashboard. They also thank Milagros Gracia Díaz for her input and feedback on the dashboard's visualization.

## Generative AI Use

The authors declare the use of generative AI (GenAI) in the research and writing process. According to the Generative AI Delegation Taxonomy (2025), the following tasks were delegated to GenAI tools under full human supervision: proofreading and editing, translation, and reformatting. The GenAI tool used was GPT-4.5 (OpenAI). Responsibility for the final manuscript lies entirely with the authors. GenAI tools are not listed as authors and do not bear responsibility for the final outcomes.

## Funding

This project was funded by the World Diabetes Foundation (grant WDF19-1724).

## Data Availability

The datasets analyzed during the current study are available from the corresponding author on reasonable request.

## Authors' Contributions

MVL, VI, and AB contributed to conception, drafting, data analysis, and interpretation of the study results. L Gutierrez contributed to the development of indicators and data analysis. L Gimenez and KL contributed to the programming of the dashboard. MVL, AN, CG, and CP contributed to document review, dashboard review, development, and implementation. CP and TB contributed to the evaluation and interpretation of the usability surveys. All authors approved the final version of the manuscript and are responsible for the accuracy and integrity of the work.

## Conflicts of Interest

None declared.

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## Abbreviations

**BP:** blood pressure
**EHR:** electronic health record
**$HbA_{1c}$:** hemoglobin $A_{1c}$
**HEDIS:** Healthcare Effectiveness Data and Information Set
**SISA:** Health Informatics System
**SUS:** System Usability Scale

*Edited by Stephanie Law; peer-reviewed by Julia L Jones, Neti Juniarti; submitted 23.Dec.2025; final revised version received 14.Oct.2026; accepted 14.Oct.2026; published 16.Nov.2026*

*Please cite as:*
*López MV, Irazola V, Nejamis A, Gutierrez L, Gimenez C, Baliña T, Gimenez L, Larsen K, Prado C, Beratarrechea A Electronic Health Record–Integrated Quality Dashboard for Diabetes Care in Public Primary Health Care: Development and Usability Study*
*JMIR Form Res 2026;10:e90234*
*URL: https://formative.jmir.org/2026/1/e90234*
*doi: 10.2196/90234*

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