

BMJ Open Quality Improving quality of care by standardising patient data collection in electronic medical records in an oncology department in Spain

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ABSTRACT

Background Evaluation of quality of care in oncology is key in ensuring patients receive adequate treatment. American Society of Clinical Oncology's (ASCO) Quality Oncology Practice Initiative (QOPI) Certification Program (QCP) is an international initiative that evaluates quality of care in outpatient oncology practices.

Methods We retrospectively reviewed free-text electronic medical records from patients with breast cancer (BR), colorectal cancer (CRC) or non-small cell lung cancer (NSCLC). In a baseline measurement, high scores were obtained for the nine disease-specific measures of QCP Track (2021 version had 26 measures); thus, they were not further analysed. We evaluated two sets of measures: the remaining 17 QCP Track measures, as well as these plus other 17 measures selected by us (combined measures). Review of data from 58 patients (26 BR; 18 CRC; 14 NSCLC) seen in June 2021 revealed low overall quality scores (OQS)—below ASCO's 75% threshold—for QCP Track measures (46%) and combined measures (58%). We developed a plan to improve OQS and monitored the impact of the intervention by abstracting data at subsequent time points.

Results We evaluated potential causes for the low OQS and developed a plan to improve it over time by educating oncologists at our hospital on the importance of improving collection of measures and highlighting the goal of applying for QOPI certification. We conducted seven plan-do-study-act cycles and evaluated the scores at seven subsequent data abstraction time points from November 2021 to December 2022, reviewing 404 patients (199 BR; 114 CRC; 91 NSCLC). All measures were improved. Four months after the intervention, OQS surpassed the quality threshold and was maintained for 10 months until the end of the study (range, 78–87% for QCP Track measures; 78–86% for combined measures).

Conclusions We developed an easy-to-implement intervention that achieved a fast improvement in OQS, enabling our Medical Oncology Department to aim for QOPI certification.

INTRODUCTION

Problem

Electronic medical records (EMRs) at our hospital are filled in using free text; this

WHAT IS ALREADY KNOWN ON THIS TOPIC

⇒ Incomplete electronic medical records (EMRs) can result in medication errors and, overall, negatively impact quality of care.

WHAT THIS STUDY ADDS

⇒ Simple interventions can quickly improve and maintain completeness of free-text EMRs, ultimately improving quality of care.

HOW THIS STUDY MIGHT AFFECT RESEARCH, PRACTICE OR POLICY

⇒ Medical Oncology Departments should regularly review their quality of care using internationally recognised measures. To ensure completeness of EMRs, checklists and compulsory fields should be encouraged instead of free text.

approach can lead to missing information, which in turn may result in medication errors and subpar quality of care. There was no information on the completeness of EMRs in the Medical Oncology Department at Complejo Hospitalario Universitario A Coruña; however, the medical staff believed that some key information was not being collected.

The Quality Oncology Practice Initiative (QOPI) Certification Program (QCP) developed by the American Society of Clinical Oncology (ASCO) consists of a set of measures that are used to provide a score and determine the quality of oncology practices. We evaluated EMRs of patients newly diagnosed with cancer at our hospital using QCP Track measures and obtained a low initial score, below ASCO's threshold for quality (75%).

Complejo Hospitalario Universitario A Coruña is a general public university hospital whose Medical Oncology Department comprises 18 medical oncologists, 1

general practitioner, 1 or 2 residents per residency year, 24 hospital beds and an outpatient clinic. At the time this study was developed, there were 42 000 consultations and 1800 new patients seen per year.

In light of the poor initial results on the quality of data collection in EMRs in our department, we developed an improvement plan, aiming to (1) obtain a score over 75% in under 6 months, (2) maintain a high score over time and (3) apply to obtain QOPI certification after surpassing the necessary QCP Track score.

Background

Quality of care in oncology plays a major role in patient outcomes, including survival.^{1–3} The quality of care can be evaluated following various systems that use measures and indicators. QCP is a standardised, internationally recognised approach developed by ASCO to evaluate quality of care. Individual oncology practices can use this programme to become QOPI-certified practices by first completing a round of data abstraction from medical records, evaluating QCP Track measures and achieving an overall quality score (OQS) over 75%.⁴ These tools enable benchmarking practices, identifying areas for improvement, evaluating the impact of initiatives and improving quality of care.⁵

EMRs collect patient information that is useful for their long-term care and improve communication between healthcare providers across specialties. In addition to improving access to patient data, EMRs reduce medication errors and, overall, lead to safer, more effective and more timely care.^{6–10} Incomplete information in EMRs can undermine patient safety and jeopardise achieving adequate care.^{11 12}

Here, we describe the intervention developed to improve the OQS at our Oncology Department and present the results obtained at subsequent time points. This initiative was backed by Fundación ECO (Excellence and Quality in Oncology), a Spanish foundation of senior oncologists from the main Spanish hospitals involved in cancer care, which has been involved in other QOPI projects.¹³

Baseline measurement

We evaluated the quality of care in September 2021 by retrospectively reviewing free-text EMRs of patients newly diagnosed with breast cancer (BR), colorectal cancer (CRC) or non-small cell lung cancer (NSCLC) in June 2021. Patients had to have initiated systemic treatment and not have enrolled in a clinical trial. In a first evaluation of the 26 measures of QCP Track (2021 version), high scores were obtained in the nine measures that were disease specific; since no improvement was needed in these, they were omitted from further evaluation. OQS using the remaining 17 measures was 46%, considerably below the 75% threshold that ASCO established to define quality of care. Additionally, we combined the QCP Track measures with other 17 measures selected by us (combined measures) (table 1). Some of the additional

measures we selected are used to obtain QOPI certification (eg, Eastern Cooperative Oncology Group, allergies), which we could aim for once we obtained a 75% OQS. We decided to include these measures before we were required to analyse them (ie, in a later stage, while aiming for certification) so as to obtain a wider picture of the current quality of care at our hospital. This would also help ensure that the initiative we were going to develop to improve quality of care would set the bases for success in the subsequent certification process, as we would have taken relevant measures for that stage into account.

DESIGN

A multidisciplinary team comprising one nurse, three oncology residents and three medical oncologists (including the head of the department) evaluated the results of the first quality evaluation. The team created a process map and a cause-and-effect diagram to determine the steps and processes that could be addressed. A priority matrix was also developed to select the areas of focus for the quality improvement project, and these were used to develop a plan–do–study–act (PDSA) strategy to increase OQS. The department's staff were very committed and motivated to improve the quality of care, and no issues with participation were anticipated.

The team that developed and implemented the intervention met every 2 weeks while designing the intervention and then after every PDSA cycle to discuss progress. During the intervention, all oncologists were educated on the ultimate goal and the steps needed to achieve it. Any new staff incorporated to the department during that time was informed about the project. Data abstraction was conducted at subsequent time points to monitor the impact of the intervention. Descriptive statistics were used to report OQS and individual scores per measure.

Strategy

Seven PDSA cycles were undertaken to achieve our goal of improving and maintaining a high OQS.

PDSA cycle 1 (October–November 2021)

Plan

In September 2021, with the active involvement of the head of the department, all oncologists were notified of the poor OQS obtained in the data abstraction conducted using data from patients whose first visit took place in June 2021 (problem statement). The goal of surpassing ASCO's quality threshold of 75% was presented to the department's staff (including residents) (aim statement) and the methodology used to develop the improvement plan was explained (process map, cause-and-effect diagram, priority matrix and PDSA cycles). We collected feedback from staff and conducted informative sessions. Then, the complete list of measures that needed to be collected in EMRs was shared electronically with all oncologists.

Table 1 List of measures used to evaluate quality of care

ASCO measure	Area	Measure
Core 1	Physical examination, cancer diagnosis & staging	Pathology report confirming malignancy
Core 2	Physical examination, cancer diagnosis & staging	Staging documented within 1 month of first office visit
Core 6	Medical history & current illness	Pain addressed appropriately
Core 6a	Medical history & current illness	Pain assessed on either of the two most recent office visits
Core 9	Cancer treatment	Documented plan for chemotherapy, including doses, route and time intervals
Core 10	Cancer treatment	Chemotherapy intent (curative vs non-curative) documented before or within 2 weeks after administration
Core 11	Cancer treatment	Chemotherapy intent discussion with patient documented
Core 13oc4a	Cancer treatment	Documented plan for oral chemotherapy: dose
Core 13oc4b	Cancer treatment	Documented plan for oral chemotherapy: administration schedule (start day, days of treatment/rest and planned duration)
Core 16	Cancer treatment	Patient consent for chemotherapy
Core 21aa	Medical history & current illness	Smoking status/tobacco use documented in past year
Core 24	Medical history & current illness	Patient emotional well-being assessed by the second office visit
Core 25	Medical history & current illness	Action taken to address problems with emotional well-being by the second office visit
Core 25b	Physical examination, cancer diagnosis & staging	Height, weight and BSA documented prior to chemotherapy
SMT 30	Cancer treatment	Appropriate antiemetic therapy for high and moderate emetic risk antineoplastic agents
SMT 31	Cancer treatment	Antiemetic therapy for low and minimal emetic risk antineoplastic agents—avoidance of overuse (lower score—better)
SMT 33	Cancer treatment	Infertility risks discussed prior to chemotherapy with patients of reproductive age
BR 53	Disease specific	Combination chemotherapy received within 4 months of diagnosis by women under 70 with AJCC stage IA (T1c) and IB–III ER/PR negative breast cancer
BR 54	Disease specific	Test for Her-2/neu overexpression or gene amplification
BR 59	Disease specific	Tamoxifen or AI received within 1 year of diagnosis by patients with AJCC stage IA (T1c) and IB–III ER or PR positive breast cancer
CRC 68	Disease specific	Adjuvant chemotherapy received within 4 months of diagnosis by patients with AJCC stage III colon cancer
CRC 73	Disease specific	Colonoscopy before or within 6 months of curative colorectal resection or completion of primary adjuvant chemotherapy
CRC 74	Disease specific	RAS (KRAS and NRAS) testing for patients with metastatic colorectal cancer who received anti-EGFR MoAb therapy
NSCLC 84	Disease specific	Performance status documented for patients with initial AJCC stage IV or distant metastatic NSCLC

Continued

**Table 1** Continued

ASCO measure	Area	Measure
NSCLC 88	Disease specific	Patients with stage IV NSCLC with adenocarcinoma histology with an activating EGFR mutation or ALK gene rearrangement who received first-line EGFR tyrosine kinase inhibitor or other targeted therapies
NSCLC 89a	Disease specific	GCSF administered to patients who received chemotherapy for metastatic NSCLC cancer (lower score—better)
NA	Medical history & current illness	Sex
NA	Medical history & current illness	Age
NA	Medical history & current illness	Civil status
NA	Medical history & current illness	Household members
NA	Medical history & current illness	Occupational risks
NA	Medical history & current illness	Employment & social situation
NA	Medical history & current illness	Allergies
NA	Medical history & current illness	Alcohol consumption
NA	Medical history & current illness	Medical & surgical history
NA	Medical history & current illness	Chronic medications
NA	Medical history & current illness	Symptoms
NA	Physical examination, cancer diagnosis & staging	Previous weight
NA	Physical examination, cancer diagnosis & staging	ECOG
NA	Physical examination, cancer diagnosis & staging	Physical examination
NA	Physical examination, cancer diagnosis & staging	Blood tests
NA	Physical examination, cancer diagnosis & staging	Radiology
NA	Cancer treatment	Information on continuity of care

AI, aromatase inhibitor; AJCC, American Joint Committee on Cancer; ASCO, American Society of Clinical Oncology; BR, breast cancer; BSA, body surface area; CRC, colorectal cancer; ECOG, Eastern Cooperative Oncology Group; ER, oestrogen receptor; GCSF, granulocyte colony-stimulating factor; MoAb, monoclonal antibody; NA, not applicable (measure selected by the authors); NSCLC, non-small cell lung cancer; PR, progesterone receptor; SMT, symptom/toxicity management.

Do

Every 2 weeks, at the department meetings, we restated the goal of the project (improve OQS to, ultimately, apply for QOPI certification) and responded to any potential challenges that staff encountered. In parallel, two oncologists were assigned to abstract data from EMRs of patients whose first visit took place in November 2021; the same oncologists abstracted data at all subsequent time points.

Study

OQS of QCP Track measures and combined measures were evaluated in November 2021, obtaining values of 80% and 81%, respectively.

Act

The good results obtained were shared with the department staff. The goal of the project was emphasised,

highlighting the need to maintain a high OQS over time. To this end, multiple PDSA cycles were planned.

PDSA cycles 2–3 (December 2021–January 2022)

Plan

New PDSA cycles were planned in consecutive months to reinforce continued education and change in habits regarding data collection in EMRs.

Do

Educational activities were maintained to remind staff of the key measures that required improvement, and feedback was collected to address any challenges that occurred while working towards improving data collection. The complete list of measures that needed to be collected in EMRs was again shared electronically with all oncologists.

Study

We evaluated OQS to track progress and found low scores in December and January, below ASCO's threshold of 75% for both QCP Track measures and combined measures.

Act

The department's oncologists were notified of the poor results obtained, which suggested that an additional step was needed to change habits in data collection. To address this, we developed a standard operating procedure (SOP) that was approved by the head of the Medical Oncology Department and the hospital's Department of Quality of Care. The SOP served to demonstrate the hospital's commitment to improving quality and stated the measures that needed to be collected for every patient with cancer on the first visit and every subsequent one. The SOP was shared with all the department's staff, including residents.

PDSA cycles 4–5 (February–March 2022)

Plan

With the SOP implemented, we continued conducting frequent PDSA cycles in consecutive months.

Do

Educational activities were maintained to remind staff of the SOP and the key measures that needed to be collected, reinforcing the goal of surpassing an OQS of 75% and maintaining high scores.

Study

OQS of QCP Track measures and combined measures surpassed the 75% threshold in February and March 2022.

Act

The aim statement was achieved. These successful results enabled us to register for QOPI certification (round 1, 2022) in May 2022; we achieved an OQS of 77%.

PDSA cycles 6–7 (September–December 2022)

Plan

The excellent results in OQS obtained in QOPI round 1 were shared with the department, notifying staff that the high OQS enabled initiating the process of QOPI certification. The purpose of these last two PDSA cycles was to evaluate whether the high OQS had been maintained and to decide if further action was needed.

Do

Educational activities were maintained.

Study

The OQS for both sets of measures continued to be $\geq 75\%$ in September and December 2022.

Act

We planned to continue evaluating OQS once per year to track progress. Reminders were sent to staff on the

measures, the progress achieved and the next steps for the department, including obtaining QOPI certification in April 2024. Additionally, we began working together with the information technology (IT) department to develop templates and checklists that could be added to the EMR software to help ensure that all important data are collected.

RESULTS

Assessment of needs and development of intervention

In the first evaluation (baseline measurement), OQS was 46% with QCP Track measures and 58% with combined measures. With tools and methods used for improvement plans, we evaluated the potential underlying causes for these poor initial results (except for disease-specific measures) with both sets of measures and designed ways to address them. We first developed a process map and cause-and-effect diagram to identify potential reasons for incompleteness of EMRs (online supplemental figure 1). The main causes we identified were as follows: (1) EMRs were created at the first patient visit by oncologists with varying expertise: a resident, a junior medical oncologist or a senior medical oncologist, which can impact the collection of clinically relevant patient data in free-text form; (2) there were considerable time constraints and high workload that affected both physicians and nurses; and (3) the use of free-text in EMRs and the lack of templates and checklists in the software complicated standardisation of clinical data collection. To ensure the success of the quality improvement project, we designed it considering interventions that could be implemented solely by the Medical Oncology Department. By developing a priority matrix, we prioritised measures with the highest impact and ease of implementation and selected the following: strengthen the involvement of the head of the department; assign a team responsible for overseeing the project; ensure participation of all medical staff of the Medical Oncology Department; conduct educational sessions on quality standards, requirements and procedures used in QOPI; give educational sessions on adequate EMR completion; develop an SOP to help standardise data collection on qualitative and quantitative variables of the patients and their treatment plan; gather feedback and ensure agreement among oncologists in the department; and continuously assess progress by communicating the results (OQS) obtained in every PDSA cycle, underscoring the measures that still required attention.

QCP Track scores after the intervention

We initiated the intervention in October 2021 and abstracted data at seven time points from November 2021 to December 2022 from 404 patients (199 with BR, 114 with CRC and 91 with NSCLC) (online supplemental table 1). OQS rapidly improved from 46% to 80% and from 58% to 81% when evaluating QCP Track measures or combined measures, respectively (figure 1). OQS

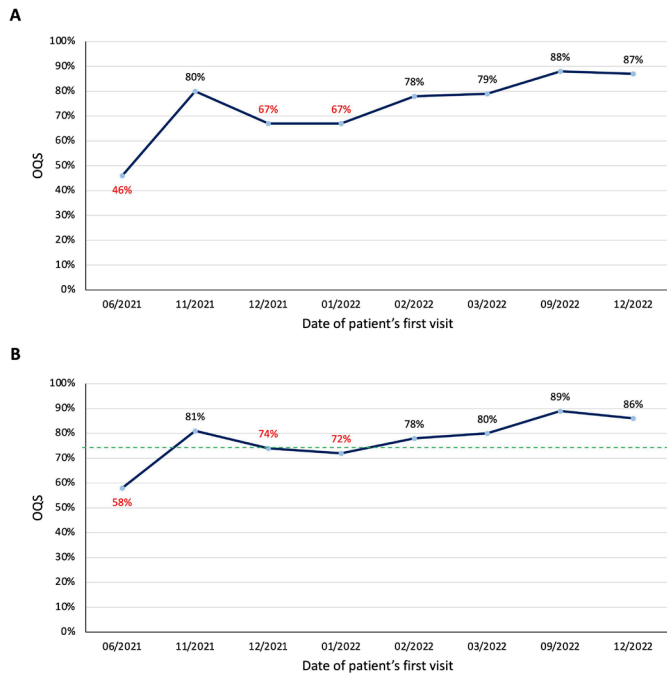


Figure 1 Change over time in OQS as a result of the intervention. (A) Change in QOPI Certification Track measures; and (B) change in QOPI Certification Track measures plus additional measures selected by us (combined measures). The green line marks the 75% threshold for OQS that is required by ASCO to be eligible for certification. Red font indicates an OQS below the 75% threshold. Time points represent the months in which patients were seen for the first time. ASCO, American Society of Clinical Oncology; OQS, overall quality score; QOPI, Quality in Oncology Practice Initiative.

surpassed the 75% threshold immediately after starting the intervention and decreased in the subsequent 2 months. Four months after the intervention, a high OQS was achieved and maintained for 10 months until the end of the study (range, 78–87% for QCP Track measures and 78–86% for combined measures). By December 2022, all measures had improved in score, including those with an original score below 75% (figure 2). The biggest improvement was achieved in the measures ‘infertility risks discussed’, ‘pain’, ‘emotional well-being’ and ‘chemotherapy plan documented’. In the case of combined measures, ‘previous weight’ and ‘information on continuity of care’ improved the least.

DISCUSSION

Summary

We report the successful improvement in quality of care at our Medical Oncology Department after developing an intervention to address the initial poor results in EMR data collection. We implemented an initiative that led to high scores in the span of 4 months, surpassing ASCO’s threshold for quality and maintaining high scores for 10 months. After seven PDSA cycles, OQS improved from an initial score of 46% to 87% in the case of QCP Track measures, and from 58% to 86% in the case of combined

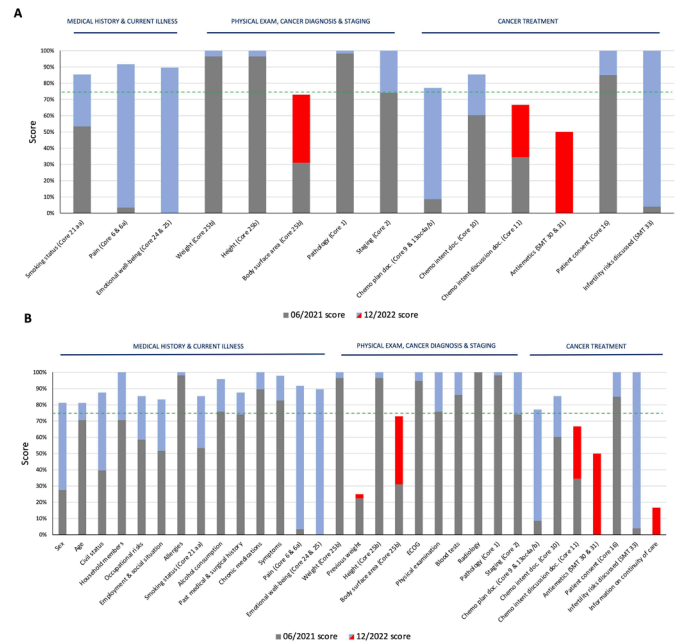


Figure 2 Final change in the score of individual measures by December 2022. (A) Change in QOPI Certification Track measures; and (B) change in QOPI Certification Track measures plus additional measures selected by us (combined measures). The green line marks the 75% threshold required by the American Society of Clinical Oncology to permit oncology practices to be eligible for certification. Grey bars show the baseline measurement (June 2021). Improvement from the baseline measurement to the last data abstraction (December 2022) is shown in red if it remained under the 75% threshold or in blue if it surpassed it. Chemo, chemotherapy; doc., documented; ECOG, Eastern Cooperative Oncology Group; QOPI, Quality in Oncology Practice Initiative; SMT, symptom/toxicity management.

measures. Notably, the nine disease-specific measures included in ASCO’s QCP Track (2021 version) obtained high scores initially and were omitted from these OQS, which further underscores the improvement achieved. Several measures had limited improvement or a score below the required threshold, likely as a result of their lack of relevance in drug dosage for some treatments (body surface area), redundancy with information present in other software (body surface area, antiemetics used), assumption that informed consent is sufficient (chemotherapy intent discussion documented) or potential unawareness of their importance (previous weight, information on continuity of care).

Interpretation

Although many oncology practices have reported achieving better QOPI results after implementing quality improvement projects, these have not been published.⁵ Some studies have found repeated participation in certification rounds led to improvement in quality of care,^{14 15} although there are exceptions.¹³ Our intervention consisted mainly of communication and continuous education of the oncologists in the Medical Oncology Department on the current needs and goals

of this project. We also developed an SOP to share with staff to help standardise clinical data collection. The approaches used in our study are among those suggested by others who improved QOPI scores in a short time frame by educating physicians on adequate documentation,¹⁶ namely analysing the root cause, developing a process map, explaining expectations and requirements, conducting education sessions, conducting rapid cycles of PDSA and communicating properly.

A study evaluating participation of Spanish practices in QOPI reported that measures with the lowest scores were related to documentation and not to cancer treatment,¹³ a finding that is in line with our results. A recent systematic literature review found that clinician burnout was associated with usability and functionality of EMRs.¹⁷ Moreover, optimising EMRs by using templates and replacing free-text fields with drop-down menus has shown to reduce the time spent taking notes, increase accuracy and improve provider satisfaction.^{18 19} A recent study in Spain reported that approximately half of the participating hospitals used free-text data fields to input patient information,²⁰ which is the case of our hospital. Although we achieved a notable improvement in scores, tailored software solutions that avoid unstructured data could help further improve EMR completeness.^{21 22} To this end, we are currently working with the IT department at our institution to complement the EMR system by including templates and checklists that will help to adequately collect data, making certain fields compulsory and minimising the use of free text.

Lessons and limitations

The main strength of this study is the use of an objective and standardised methodology to both develop an improvement plan (process map, cause-and-effect diagram, priority matrix and PDSA cycles) and evaluate the impact of its implementation (ASCO's QCP Track). Additionally, using QCP Track has enabled us to evaluate and improve our EMR data collection to apply for QOPI certification. Using additional measures to complement those of QCP Track expanded our view of the potential strengths and weaknesses of our department in terms of EMR completion and, by extension, quality of care. The limitation of this study is its potential applicability in other institutions. Our results regard the Medical Oncology Department at one hospital in Spain, and hospitals with a different organisation or using other EMR systems may face other challenges. However, the simple, easy-to-implement interventions conducted here led to a rapid improvement in quality of care that we believe could be replicated at other centres.

Hospitals or departments can be reluctant to develop initiatives that change clinical practice, partly because of a perceived increased workload and heavy use of resources. Our study demonstrates that simple changes implemented solely involving staff at our department were able to dramatically change the quality of data collection in EMRs and, thus, of quality of care. This change was also

maintained over time, as high scores were obtained 10 months after achieving the first sustained improvement. Notably, many hospitals use free-text EMRs, and certain IT tools (checklists, compulsory fields) may not be available to them; however, implementing simple steps and educating staff on the importance of collecting specific measures can be sufficient, as it was in our case. We hope that our work encourages other oncology practices to review their quality of care, with the understanding that a substantial change can be obtained with simple steps and limited use of resources.

CONCLUSION

We achieved a fast and sustained improvement in quality of care by focusing on educating oncologists, providing clear information on data that needed to be collected, developing an SOP and using rapid PDSA cycles. Ongoing education may be needed to ensure that improvement is maintained over a longer period of time, and an annual evaluation of OQS can help assess this need. With the intervention we implemented, we surpassed the threshold for quality defined by ASCO in QOPI round 1 2022, and we are now in the process of aiming to become QOPI certified in 2024.

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Contributors GA-JC, MIG-RR, BAAdC, SSD, IPV and RGC planned and/or implemented the quality improvement project. GA-JC and MIG-RR collected data. GA-JC and MIG-RR drafted the paper. RLL and PG advised on QOPI certification. All authors contributed to the manuscript and approved the final draft. GA-JC and RGC are the guarantors for this study.

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IMPROVING QUALITY OF CARE BY STANDARDIZING PATIENT DATA COLLECTION IN ELECTRONIC MEDICAL RECORDS IN A MEDICAL ONCOLOGY DEPARTMENT IN SPAIN

SUPPLEMENTARY MATERIAL

Supplementary Table 1. Abstracted patient electronic medical records.

Patients	Date of patient's first visit								Total
	06 2021	11 2021	12 2021	01 2022	02 2022	03 2022	09 2022	12 2022	
All patients	58	63	57	71	56	66	43	48	462
Breast cancer	26	29	26	35	32	31	23	23	225
Colorectal cancer	18	18	19	18	15	23	10	11	132
Non-small cell lung cancer	14	16	12	18	9	12	10	14	105

Supplementary Figure 1. Cause-and-effect diagram. Potential causes identified that underlie incomplete data collection. Items in bold were regarded as most important. EMRs, electronic medical records.

