An overview of Clinical Quality Registries (CQRs) on gynecological oncology worldwide

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Review Article

An overview of Clinical Quality Registries (CQRs) on gynecological oncology worldwide

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ABSTRACT

Introduction: Clinical Quality Registries (CQRs) were initiated in order to compare clinical outcomes between hospitals or regions within a country. To get an overview of these CQRs worldwide the aim of this study was to identify these CQRs for gynecological oncology and to summarize their characteristics, processes and QI's and to establish whether it is feasible to make an international comparison in the future.

Methods: To identify CQRs in gynecological oncology a literature search in Pubmed was performed. All papers describing the use of a CQR were included. Administrative, epidemiological and cancer registries were excluded as these registries do not primarily serve to measure quality of care through QI's. The taskforce or contact person of the included CQR were asked to participate and share information on registered items, processes and indicators.

Results: Five nations agreed to collaborate: Australia, Denmark, Italy, the Netherlands and Sweden. Denmark, Netherlands and Sweden established a nationwide registry, collecting data on multiple tumor types, and various QI's. Australia and Italy included patients with ovarian cancer only. All nations had a different process to report feedback results to participating hospitals.

Conclusion: CQRs serve the same purpose to improve quality of care but vary on different aspects. Although similarities are observed in the topics measured by the QI's, an international comparison was not feasible as numerators or denominators differ between registries. In order to compare on an international level it would be useful to harmonize these registries and to set an international standard to measure the quality of care with similar indicators.

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1. Introduction

Patients with a gynecological malignancy belong to a distinct patient population with a range of surgical risks after operative procedures [1]. These risks are unwanted, but so far quality measurement and improvement in gynecological oncology has received less attention compared to other surgical specialties [2]. This is all the more remarkable, as three gynecological malignancies are among the top seven most common malignancies around the world. In 2018, cervical, uterine, ovarian, and vulvar cancer accounted for 6.6%, 4.4%, 3.4% and 0,51% of all cancers among women worldwide, and as a result more than 600,000 women died from one of these four gynecological malignancies [3,4]. Because of this high contribution of gynecological cancers on mortality, assuring high quality of care in the field of gynecological oncology has a high priority.

Gynecological tumors include malignancies of the ovaries/fallopian tubes, cervix, endometrium, myometrium, vulva, and trophoblastic tumors. Each of these malignancies is different in terms of etiology, symptom presentation and treatment [5,6]. The majority of the patients with gynecological malignancies require extensive surgery combined with radiotherapy and/or chemotherapy and many papers reflected on postoperative morbidity and mortality [1,7–10]. However, most of these reports lack a comparison between hospitals, the so-called benchmarking that is essential to provide information to participating hospitals on how to improve outcome.

One way to improve quality of care can be achieved by monitoring performance using a CQR. CQRs have been acknowledged as an important tool to improve healthcare provision [11]. CQRs collect a defined dataset from patients who undergo a particular procedure and are diagnosed with a disease or make use of a healthcare resource [12]. The CQR is therefore based on a predefined set of QI's (QI) for which variables are collected to calculate these indicators. This pre-defined set of QI distinguishes a CQR from a national or administrative database. Another aspects which distinguishes a CQR from a national or administrative database is that the physicians approves the clinical information which supports the acceptance of any outcome when benchmarking the indicators with other hospitals. These quality-indicators may either be structural indicators, process indicators, or outcome indicators and give insight on various parts of the diagnostic process, treatment or follow-up. The pre-defined CQR with its QI's provide benchmarked feedback to the participating institutions [12]. As a result, reporting outcomes to the participating hospitals and by using a benchmark gives insight into one's own performance in relation to the result of other hospitals. The hospitals that don't perform as well, are challenged to review their practices in order to improve their results comparable to the higher achievers. Subsequently, this will decrease hospital variation and improve outcomes and will ultimately be more cost-effective [13,14].

Several countries have made steps into improving quality of care within the gynecological oncology field by measuring QI's. In 2018, a review was published on a set of proposed QI's measured for gynecological oncology [15]. To our knowledge, most countries use epidemiological or administrative registries to measure these QI's, which is different from a CQR. Usually, epidemiological or administrative databases are established with other objectives and may not record all the information needed to calculate valid QI results (e.g. case mix-factors) nor do the treating physicians validate the data. As a result, the QI's derived from these databases may not reflect the (differences in) quality of care that one would seek to measure and give insight in possible differences between hospitals within 1 region or country.

Apart from benchmarking within a region or country clinicians could also learn from comparisons between countries. Therefore, we present a description of CQRs for gynecological oncology worldwide which are currently used, assessing their characteristics, processes and QI's with the aim to identify whether it is feasible to make an international comparison. The results presented here could provide information for a blueprint for initiatives to commence a CQR for patients with a gynecological malignancy in other countries in the world but could also help in harmonize the existing CQRs to improve international benchmarking.

2. Methods

2.1. Literature search

A literature search in Pubmed was performed to identify studies, which used a CQR for gynecological malignancies. The search was performed on February 27, 2020 and all publications up until this date were included. The Pubmed search was set up together with the librarian of the allied university (Appendix 1) A search in Google Scholar was also performed in order to find websites of countries, which used a CQR. The terms in the search included "Quality registry" AND "Gynecology", pages 1–10 were screened.

A second approach made use of the website of the International Gynecologic Cancer Society (IGCS) to address nations' professional gynecologic oncology societies to make sure all existing CQRs were included in the analysis.

2.2. Paper selection, inclusion and exclusion

Papers were screened on title and abstract (first author: NBT). Articles were fully read if they mentioned the use of a CQR (defined as a registry based on a pre-defined set of QI's and its variables with the purpose to improve quality of care) or if the article used another registry to measure QI's such as an administrative/national cancer registry or if the article mentioned quality improvement. Articles were included if the used registry was qualified as a CQR and were then contacted for collaboration. If it was unclear whether a CQR was used, the registry or the lead author was contacted for further details. Exclusion was based on whether the registry was not defined as a CQR or served with a primary purpose for quality improvement and the use of predefined QI's. Duplicate registries were also excluded (Fig. 1 & Appendix 1). In particular, national cancer registries were excluded because they do not primarily serve as quality improvement tools rather than epidemiological databases.

2.3. Data collection

After agreement for collaboration, information on the CQR was collected through a Google Form with questions regarding background information on the CQR (Appendix 2). Included topics were: the origin of the CQR, the ownership, the development process of the indicators, and the feedback mechanism. Collaborating registries were asked to share their answers to the questionnaire and their most recent set on QI's. After the data were collected the collaborating authors verified the collected data and corrected it if necessary.

3. Results

Literature search revealed 304 papers of which 280 papers were excluded based on title and abstract.

Following evaluation of the remaining 24 full text versions, six CQRS were identified. These six CQRS were eligible for inclusion in our study. After reaching out to these CQRS, the CQRS from the Danish Gynecological Cancer Database (DGCD), the National

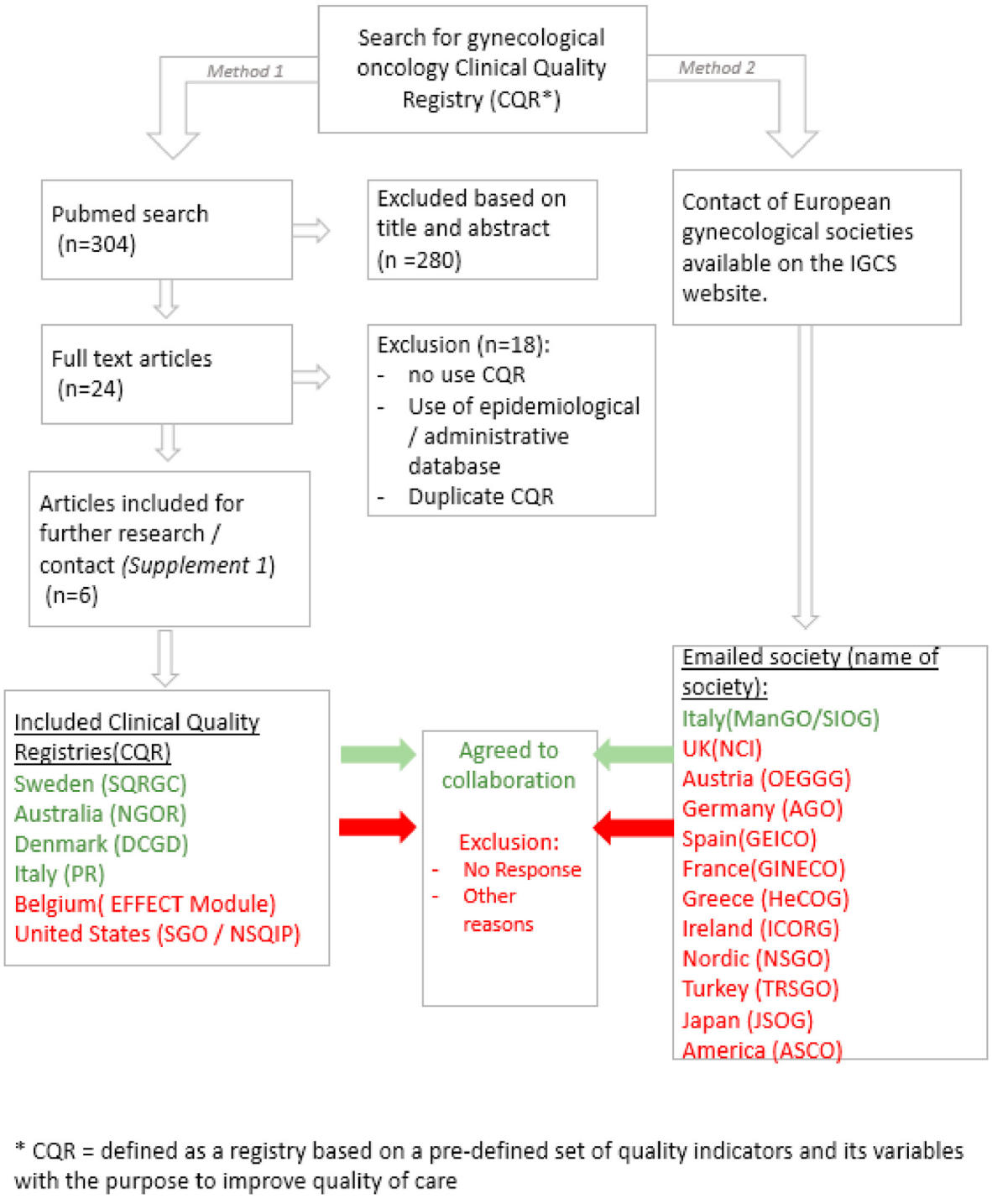

Fig. 1. Flowchart of selected Clinical Quality Resgistries.

Gynae-Oncology Registry Australia (NGOR), the Ovarian Audit from Piemonte Region (PR) Italy, and the Swedish Quality Registry of Gynecologic Cancer (SQRGC) agreed to collaborate. The Dutch Gynecological Oncology Audit (DGOA) was automatically included as they were the initiators of the study (Fig. 1). The registries from Belgium and the USA were excluded because they did not respond to our requests for cooperation. The request consisted of a letter to the authors and/or the national society of gynecologic oncology.

To increase the number of participating CQRs all gynecological oncology societies listed on the website of the International Gynecological Cancer Society (IGCS) (n = 10) were contacted through their information available on the website. Off these, the United Kingdom responded but was excluded after mutual agreement as it has many initiatives for quality improvement but none fitting the purpose of this study (Fig. 1). The other societies did not respond to our first and second request for information, and were excluded from the current study.

3.1. Background

All collaborating registries are currently active of which the DGCD, founded in 2005, was the oldest. The DGCD, the SQRGC

(founded in 2008) and the DGOA (founded in 2014) include all four gynecological tumor types on a national level. The NGOR includes indicators on ovarian, tubal and peritoneal cancers and was just like PR initiated in 2017. The PR only includes an audit for ovarian cancer. Both the NGOR and PR register data for a specific region/hospitals. The NGOR is currently developing indicators for the other gynecological tumors. The DGOA, the NGOR and SQRGC were initiated by the national society of gynecological oncologists. The DGCD was initiated by the Danish Gynecological Cancer group and PR was initiated by the regional cancer network.

3.2. Data collection

All registries include an online survey or data, which are extracted by hand directly from the electronic patient files. The data are either collected by gynecological oncologists, data managers or by trained registry workers. All registries report the data to the hospitals through online reports except for PR, which uses periodic meetings and reports. Data from the audit are used for benchmarking between hospitals or regions in all registries except for the NGOR, for whom benchmarking is planned in the near future.

3.3. QI set

Indicators can assess aspects of the structure, process, or outcome of health care. The process to decide which QI is included differs per registry. The DGOA has its own scientific committee with experts from the field. This committee defines, on a yearly basis and in collaboration with national health parties (hospitals, health insurers, patients advocates and governmental bodies) on the set of indicators. The SQRGC establishes indicators through a tumor specific national guideline committee in collaboration with a working group of statisticians. The DGCD, NGOR and PR have installed a specific working group for their respective registry. The working groups of all registries consist of at least several gynecological oncologists (when appropriate radiotherapist and/or medical oncologist) and a statistician or epidemiologist (see Table 1).

3.3.1. Ovarian cancer QI's

Most indicators were developed for ovarian cancer (Table 2) and although they differ in exact definitions some resemblance exists between the indicators of the participating registries (Appendix 3). All registries include a surgical/non-surgical count indicator; yet the DGOA does not exclude any specific stages of disease whereas DGCD include specific stages and surgical procedures. The DGCG, NGOR, SQRGC and PR report the number of patients discussed preoperatively in a multi-disciplinary team (MDT) meeting, but each have different denominators. In the DGOA this indicator was removed in 2017 since 100% of all patients were discussed in a MDT meeting.

In addition, almost all registries contain an indicator on time from diagnosis to start treatment; the DGOA and NGOR both use treatment within 28 days as a measure of quality, whereas SQRGC use 28 days from primary surgery to chemotherapy in FIGO stage II-IV. All registries report indicators on both the number and completeness of cytoreductive surgery. The DGOA has three sub-indicators on debulking; an indicator on number of (primary and interval) cytoreductive surgeries (CRS) per hospital, and the percentage of complete primary CRS. The NGOR registry specifies CRS indicators for primary and interval debulking with no macroscopic and <1 cm macroscopic residual tumor (complete and optimal result). Lastly, PR has a volume indicator for CRS per hospital and individual surgeon, as well as the completeness of CRS for advanced stage disease.

Postoperative events are also measured in various ways. The DGOA uses a composite measure for a complicated postoperative course: a Clavien Dindo grade ≥3 complication combined with a prolonged hospital stay of more than 14 days. The SQRGC registers surgical and medical complications with grading according to Clavien-Dindo, while the NGOR register complications with Clavien Dindo grade ≥3. The PR registers all complications separately without a classification according to Clavien Dindo.

Finally, a QI on survival is included in all included registries. The DGOA and DGCD report 1- and 2-year survival per stage of the disease, whereas the NGOR measure disease specific survival, but for the NGOR this is not included in their indicator set. PR includes a case-mix corrected survival and a crude survival indicator for the whole patient group. In SQRGC overall and relative survival curves with confidence intervals and point estimates can be generated in the on-line statistics module.

The NGOR and PR both include indicators on chemotherapy, yet the NGOR measures the proportion of patients receiving first line chemotherapy in combination with a platinum taxane doublet and chemotherapy with a platinum taxane doublet after incomplete CRS. In addition, the DGCD and PR looks at the frequency of neo-adjuvant chemotherapy (NACT) for all advanced stages.

All registries have indicators that are unique to their registry. For example, the DGOA has a separate indicator on 30-day mortality. The NGOR registers adverse intra-operative events. The NGOR and SQRGC register participation of patients in clinical studies. PR measures whether appropriate diagnostic procedures were used and if the medical reports were complete. Lastly, the SQRGC registers BRCA mutation status and the NGOR registers an indicator on the use of PARP inhibitors as maintenance treatment. Overall, the indicators for ovarian cancer contain similar themes for each registry, yet the definition of numerators and denominators vary, which makes it difficult to compare (Table 2).

3.3.2. QI's for endometrial-, cervical- and vulvar cancer

The DGCD, DGOA, SQRGC are the only registries that currently include the 4 most occurring gynecological tumors. The NGOR recently established a working group to develop QI for endometrial cancer and have started data collection in a pilot phase. For these three registries, the number of QI's for other gynecological tumor-types are less than for ovarian cancer. Between the registries there is no indicator that fully matches one another, which hampers international comparisons on QI results for these tumors.

The DGOA and SQRGC measure surgical volume and adverse postoperative outcomes for these tumors: complicated course and 30-day mortality. Currently the DGOA is developing more indicators for cervical, endometrial and vulvar cancer to gain insight on the distribution of therapy and for surgical technique (open surgery versus minimal invasive surgery for endometrial cancer).

The DGCD measures more detailed indicators such as pelvic lymph node removal in patients with stage II and III endometrial cancer, surgical approach (laparoscopic or robot surgery or open surgery), and a survival indicator for patients with stage I and for all patients combined (Table 2 2). For cervical cancer an indicator is present on tumor free resection margins and parametrial involvement after radical hysterectomy.

The SQRGC measures specific indicators for all 3 tumors such as number of reported patients per FIGO stage, median waiting time to start of therapy and the proportion of patients discussed in multidisciplinary team meetings. The timeliness indicators for these tumors are split in different phases, for example in endometrial cancer: “The proportion of patients from diagnosis to primary operation <32 days”, “The proportion of patients from primary operation to pathologic report <17 days”, and “The proportion of patients from primary operation to start chemotherapy <49 days”. Similar indicators are present for cervical cancer and vulvar cancer. The registry also has surgical procedure indicators for each tumor;

Table 1
Summary of characteristics of gynecological oncology CQR world wide.

	Denmark (DGCD)	Netherlands (DGOA)	Australia (NGOR)	PR (Italy)	Sweden (SQRGC)
Registry founded	2005	2014	2017	2017	2008
Coverage of included population	Nation wide	Nation wide	Regional/hospital based	Regional	Nation wide
Current status	Active	Active	Active	Active	Active
Responsibility/ initiator	The Danish Gynecological Cancer Group and Government	Society of gynecologists	Australian Society of Gynecologic Oncologists	Regional cancer network	Cooperation of Regional Cancer Centers/Societies of Obstetrics and Gynecology and Gynecologic Oncology.
Method of data collection					
Type of tumor	Ovary, vulva, endometrium, cervix trophoblast	Ovary, vulva, endometrium, cervix	Ovary	Ovary	Ovary, endometrium, cervix/vagina, and vulva
Collection of data	Online survey and directly from the electronic patient file	Online survey	Directly from electronic patient files, medical records or other electronic records	Online survey	Online survey
Collection of data by:	Medical specialists & Specialist nurses	Medical specialists & Specialist nurses & Specialized data managers	Medical specialists & Specialist nurses & Specialized data managers	Medical specialists	Medical specialists & Specialist nurses & Specialized data managers
Method of result viewing	Online	Online	Online	Meeting and reports	Online
Frequency of data upload	Daily	Daily	Daily	Daily	Daily
Benchmarking	Yes	Yes	Not yet	Yes	Yes
Usage of collected data by:	Specialists, patient organizations, government	Specialists, patient organizations, health insurance companies, government	Specialists in the first instance	Specialists, government, regional cancer network	Specialists, patient organizations, government
QI information					
QI's	Ovary, vulva, endometrium, cervix, nurse part	Ovary, vulva, endometrium, cervix	Ovary (tube and peritoneum)	Ovary	Ovary, endometrium, cervix/vagina, and vulva
Type of indicators	Process and outcome	Process, structure, outcome	Process, structure, outcome	Process, structure, outcome	Process, structure, outcome
Decision on QI's	DGCD working group	Scientific committee of the registry in combination with other parties (hospitals, health insurance, governmental bodies).	Expert working groups	Interdisciplinary groups settled by the Cancer Network	By national guideline groups for each diagnosis deciding on QI's with the registry working group and statisticians.
Frequency of QI adjustment	Yearly	Yearly	To be determined	At any time	At any time
Feedback to the field	Yes	Yes	Yes	Yes	Yes
Process of clinical audit	Annual reports and online reports establish the basis	Annual reports on QI's are available	Regular reports are planned	Definition of indicators within the specialists groups of the Cancer Network - data collection Quality of -Data revision and queries for errors and missing - data analysis - report distribution	Annual reports and online reports. Indicators are defined by Guideline groups for each diagnosis

DGCD = Danish Gynecological Cancer Group, DGOA = Dutch Gynecological Oncology Audit, NGOR= National Gynecological Oncology Registry, PR= Piemonte Region, SQRGC = Swedish Quality Register of Gynecologic Cancer.

i.e. whether lymphadenectomy was performed, number of removed lymph nodes, and whether the sentinel node technique was used, but no indicators specific to each stage. In addition, one indicator describes the coverage in the SQRGC in relation to the National Cancer Registry.

3.4. Benchmarking and feedback to the field

Benchmarking of outcome of the indicators and providing feedback information to hospitals is used in all registries. Benchmarked indicators show the individual results of hospitals in relation to the average result of all patients included in the dataset. This allows to identify hospitals that deviate significantly from the average. By analyzing the processes in the best performing hospitals and share this knowledge with less performing hospitals, the latter hospitals can adjust their routine which may lead to an improved outcome.

The Scientific committee of the DGOA (The Netherlands) discusses the results of the indicators yearly and the results are made publicly available to all interested parties such as the national health authorities. The hospitals have access to their own results and the database is updated weekly so that hospitals can act on their own results.

In Denmark (DGCD), during national yearly meetings, all participating hospitals have the possibility to comment on their results and indicators from the DGCD. They are given the possibility

Table 2
Summary of QI's per registry*.

Registry	DGCD	DGOA	NGOR	PR	SQRGC
Ovarian					
Surgical volume	x	x		x	x
Non- Surgical Volume	x	x	.		x
Timeliness of treatment		x	x	.	x
Histological diagnosis confirmation			x	x	x
Appropriate diagnostics before treatment			x	x	
Genetic testing			x	x	x
Complete imaging before treatment			x		
Participation in clinical studies			x	x	x
Multi-Disciplinary Team Meetings	x		x	x	x
Chemotherapy			x	x	x
Adequate Surgical staging		x	x	x	
Volume debulking surgery	x	x		x	x
Debulking surgery completeness	x	x	x	x	x
Intra operative events			x		
Postoperative complications		x	x	x	x
30-day mortality		x	x		x
Survival	x	x		x	x
Completeness of reporting			x	x	x
PROMS (patient reported outcome measurements)		x			
Endometrium					
Surgical volume		x			x
Non- Surgical Volume		x			x
Timeliness					x
Multi-Disciplinary Team Meetings	x				x
Histological diagnosis					x
Pelvic lymph node sampling	x				x
Surgical technique	x				x
Postoperative complications		x			x
30-day mortality					x
Survival	x				x
Cervix					
Surgical volume		x			x
Non- Surgical Volume		x			x
Histological diagnosis					x
Timeliness					x
Multi-Disciplinary Team Meetings					x
Surgical technique					x
Free resection margins after radical hysterectomy	x				
parametrical growth after radical hysterectomy	x				
Postoperative complications		x			x
30-day mortality		x			x
Survival	x				x
Vulva					
Surgical volume		x			x
Non-Surgical Volume		x			x
Timeliness					x
Multi-Disciplinary Team Meetings					x
Participation of specialist at primary surgery					x
Surgical technique					x
Postoperative complications		x			x
Survival	x			x	x

Details of all indicators can be found in Appendix 3.

to address how they could improve their results. In case of controversial results, a working group will be established to investigate results and indicators in more detail. The annual report is publicly available, and health authorities have access to these data providing the possibility to respond. During the year, results of indicators are available for the participating hospitals on a monthly basis so reflection on their own results is possible.

In Sweden (SQRGC), selected results are publicly available on an interactive data website of the Cooperation of Swedish Regional Cancer Centers. Data in this application are updated 1–2 times per year. There is also a special website for patients and relatives with information on gynecologic cancer and selected data from the registry which is updated yearly. After login to the registry a comprehensive interactive online statistics application is available using present data in the register. Two yearly meetings are held for participants in the registry and results and developments of the registry are discussed. There are also regular regional meetings with regional diagnosis coordinators and departments. Departmental results for the department are compared with regional and national results and improvements are considered.

In the Piemonte Region Italy (PR) the feedback was initiated very recently. In order to calculate indicators over a sufficient number of patients, indicators were calculated over a period of three and a half years (mid 2016–2019). A meeting was organized and a report was presented and discussed with all participating centers.

The NGOR (Australia) has been constantly providing feedback to the participating centers as the registration was developing and maturing. In the meantime, the NGOR developed modules for the four other gynecological cancers. The NGOR has provided two progress reports so far with aggregated data of ovarian, tubal, and peritoneal cancer to the participants. At the moment, a more detailed analysis is performed. The feedback will contain overall results for each QI and the performance of each participating institution. Participating centers are made anonymous so that the participating center can only see its own result.

3.5. QI's suggested by the European Society of Gynecological Oncology (ESGO)

Table 3 shows how the set of participating registries relate to the QI's initiated by ESGO. These indicators include process, structure and outcome indicators. All registries had QI's reporting on the rate of complete surgical resection and the number of cytoreductive procedure performed each year. Another process QI on multidisciplinary team meetings is registered in the NGOR, SQRGC and the Italian audit. One outcome indicator on postoperative outcomes is registered in the DGOA, NGOR, SQRGC and PR. None of the registries report indicators on preoperative workup, minimum requirements for pathology reports, specialized surgeons and minimal number of surgeries performed per surgeon.

4. Discussion

This overview on CQRs of gynecological malignancies shows that various methods and processes exist in different countries. These registries serve the same purpose but vary in reporting QI's for one or more tumor types and vary in level of detail. More specifically although similarities are observed throughout the measured topics of the QI's, an international comparison of these indicators would currently not be feasible as there is a lack of uniformity on what variables the nominators and denominators should include to measure the specific QI.

In 2018 a systematic review was performed by Bonte et al. comparing gynecologic oncology QI's worldwide and developing a QI set with the most important indicators for all four gynecologic tumors [16]. Indicators included were categorized into preoperative, perioperative, patient report and survival. Most indicators, measured by the included CQRs are outside the scope of the proposed indicator set from Bonte et al. Although this proposed set includes some topics addressed by the ESGO in 2020, the selection of important indicators was done by only two gynecological oncologists and may therefore lack broad support [16]. An alternative way for selecting a broadly supported indicator set would be to use a Delphi method involving gynecological oncologists, patients and other stakeholders or to follow standards set by the European Society of Gynecological Oncology (ESGO) [16]. In Table 3

Table 3
ESGO QI's for ovarian cancer 2020.

QI	DGOA	NGOR	DGCD	SQRGC	PR
Rate of complete surgical resection	x	x	x	x	x
Rate of primary debulking surgeries	x	x		x	x
Number of cytoreductive surgery performed per center per year	x	x	x	x	x
Surgeries supervised or performed by surgeons operating at least 20 patients a year					X
Surgery performed by a gynecologic oncologist or a trained surgeon specifically dedicated to gynecological cancers management				x	
Center participating in clinical trials in gynecologic oncology		x			X
Treatment planned and reviewed at a multidisciplinary team meeting		x		x	x
Required preoperative workup					
Preoperative, intraoperative, and postoperative management					
Minimum required elements in operative reports				x	x
Minimum required elements in pathology reports		x			
Structured prospective reporting of postoperative outcomes	x	x		x	x

showed how collaborating CQRs compare to the proposed set of the ESGO, and it is apparent that not all of the ESGO's QI set are adapted. For future perspectives and as the ESGO is a renowned organ that has gone through an extensive procedure, Table 3 can be kept as a blueprint for minimum set of QI in a CQR. This can of course, be expanded on country/regional specific QI. The second step for the ESGO is to decide how to define variables used in numerators and denominators so that an international comparison is possible in the future.

One example is the EURECCA project for colorectal cancer in 2012. The aim of this project was to design up-to-date support in multidisciplinary decision-making throughout Europe and to select items on CRC amenable for international quality improvement. EURECCA established a European committee consisting of several European and national audits in order to obtain consensus on these items. One of their successes is illustrated by improved survival for rectal cancer following previous rounds (2004 & 2008). In 2012 colon cancer was added to the rounds after it appeared that CRC survival increased but was more pronounced in rectal cancer compared to colon cancer [17]. In order to make an international comparison possible, the existing gynecological oncology CQRs could initiate a similar platform to that of EURRECA and establish minimum required items for each audit in order to improve care on an international level. This could be of importance as the EURECCA project showed increased survival on an international level and could lead to increased survival for gynecologic oncology patients as well [17].

One of the major limitations of this study is that more CQRs exist but not all taskforces have responded to our multiple invitations and therefore we might not give a full overview of all CQRs worldwide. In our study we have reached out to 17 possible CQR, but 4/17 agreed to collaborate. This could have introduced a bias regarding the conclusion whether it is possible to make international comparisons. Moreover, the focus of this paper was to compare registries used for auditing purposes excluding registries using epidemiological registries. For example, Japan proposed a set of QI's in 2018, yet they measured QI's from data of a hospital based cancer registry and health insurance registries and not from a CQR [18].

Strengths of this study include the approach of two methods to find CQRs. We performed an extensive literature search and we approached national gynecological oncology societies available on the IGCS website and have approached them at least two times by email to join in collaboration. Another strength is the active participation of the collaborating nations as they provided information themselves. Lastly, the main strength of this study is that it is the first overview describing the setup of CQRs and their feedback mechanism that can be useful for starting gynecological oncology taskforces to set up their own CQR.

5. Conclusion

In conclusion, this study shows the similarities and differences of gynecological oncology registries worldwide. They all function with the same purpose: to improve quality of care within their field. However, an international comparison of indicator results is not feasible yet, as the registries lack uniform QI's. In order to compare the care for patients with a gynecologic oncological malignancy on an international level, it would be useful to harmonize these quality registries. This also requires reaching consensus on an international standard set of QI's for all gynecological tumors to compare the quality of care, to learn from each other on an international level, with the ultimate aim to improve care across borders.

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CRediT authorship contribution statement

N. Baldewpersad Tewarie: Conceptualization, Methodology, Writing – original draft, Investigation. **W.J. van Driel:** Conceptualization, Methodology, Writing – review & editing, Supervision. **M.A.P.C. van Ham:** Conceptualization, Methodology, Writing – review & editing. **M.W. Wouters:** Conceptualization, Methodology, Writing – review & editing. **R.M. Rome:** Resources, Writing – review & editing. **C.K. Høgdall:** Resources, Writing – review & editing. **E. Pagano:** Resources, Writing – review & editing. **T. Hogberg:** Resources, Writing – review & editing. **R. Kruitwagen:** Conceptualization, Methodology, Writing – review & editing, Supervision.

Declaration of competing interest

There was no conflict of interest.

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None.

Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.ejso.2022.06.020.

Appendix 1. Search terms & Full text articles

(((“Genital Neoplasms, Female"[Mesh] OR gynecological cancer*[tiab] OR gynecologic cancer*[tiab] OR gynaecological cancer*[tiab] OR gynecologic cancer*[tiab] OR gynecological malignanc*

[tiab] OR gynecologic malignanc*[tiab] OR gynaecological malignanc*[tiab] OR gynecologic malignanc*[tiab] OR gynecological tumo*[tiab] OR gynecologic tumo*[tiab] OR gynaecological tumo*[tiab] OR gynecologic tumo*[tiab] OR gynecological oncolog*[tiab] OR gynecologic oncolog*[tiab] OR gynaecological oncolog*[tiab] OR gynecologic oncolog*[tiab] OR ovarian cancer*[tiab] OR ovarian tumo*[tiab] OR ovarian malignanc*[tiab] OR vulvar cancer*[tiab] OR vulvar tumo*[tiab] OR vulvar malignanc*[tiab] OR endometrium cancer*[tiab] OR endometrium tumo*[tiab] OR endometrium malignanc*[tiab] OR endometrial cancer*[tiab] OR endometrial tumo*[tiab] OR endometrial malignanc*[tiab] OR cervical cancer*[tiab] OR cervical tumo*[tiab] OR cervical malignanc*[tiab] OR uterine cancer*[tiab] OR uterine tumo*[tiab] OR uterine malignanc*[tiab])) AND ("Registries"[Mesh:NoExp] OR Registr*[tiab] OR database*[tiab])) AND ("Quality of Health Care"[Mesh:NoExp] OR "Quality Assurance, Health Care"[Mesh:NoExp] OR "Benchmarking"[Mesh] OR "Clinical Audit"[Mesh] OR "Quality Improvement"[Mesh] OR "QI's, Health Care"[Mesh] OR Quality[ti] OR quality[ot] OR Clinical audit*[tiab]).

Appendix 3. Indicators from participating nations.

NGOR [1]	
Ovarian, tubal, Peritoneal	Proportion of patients with clinically apparent early stage ovarian or tubal cancer who are adequately surgically staged. Proportion of patients with newly diagnosed OTP cancer who are presented at a Multidisciplinary Tumor Board Meeting at which a treatment plan was made. Proportion of patients with histological or cytological confirmation of an OTP cancer diagnosis prior to receiving chemotherapy. Proportion of patients with OTP cancer who receive first-line chemotherapy with a platinum and a taxane doublet. Proportion of patients with OTP cancer with suboptimal debulking (residual disease >1 cm) or Stage 4 OTP cancer who receive first-line chemotherapy with a platinum and a taxane doublet and bevacizumab (slight wording change). Proportion of patients with advanced OTP cancer who undergo primary cytoreductive surgery who have (i) no macroscopic residual cancer OR (ii) <1 cm macroscopic residual cancer. Proportion of patients with advanced OTP cancer who undergo interval cytoreductive surgery who have (i) no macroscopic residual cancer OR (ii) <1 cm macroscopic residual cancer. Proportion of patients undergoing primary or interval surgery for OTP cancer who suffer one or more unplanned or inadvertent significant intraoperative events Proportion of patients who suffer one or more serious adverse events which are Clavien-Dindo ≥ grade III severity during the first 30 days after primary or interval surgery for OTP cancer Proportion of eligible patients with OTP cancer who had germline testing for BRCA1, BRCA2 and other gene mutations (slight change) Proportion of patients with OTP cancer who commenced chemotherapy treatment within 28 days of diagnosis. Proportion of patients with newly diagnosed OTP cancer who had appropriate imaging to stage their cancer prior to commencing treatment. Proportion of women with germline or somatic mutations of BRCA1 or BRCA2 and pathogenic variants who commence maintenance PARPi therapy within 8 weeks of ceasing first-line chemotherapy. Proportion of patients with OTP cancer who are enrolled in an interventional clinical trial or translational research.
DGOA [2]	
Ovarian cancer	Percentage of patients with ovarian cancer with ≤28 days waiting time [2] till the start of the treatment process Percentage of patients with low stage ovarian cancer where surgical staging is complete at the primary surgery Percentage of patients with advanced ovarian cancer with primary cytoreductive surgery(%) Percentage of patients with advanced ovarian cancer with complete primary cytoreductive surgery(%) Percentage of patients with advanced ovarian cancer with complete interval cytoreductive surgery(%)
ovarian, cervical, endometrial, vulvar	Number of surgical procedures done for one of the gynecological tumors (ovarian [1], vulvar, endometrial, cervical) percentage of patients with a surgical complicated course [7] within 30 days after the procedure. percentage of patients who die within 30 days after surgery or during the hospital stay. Percentage of patients who receive treatment with curative intention for ovarian cancer that are alive after 5 years Percentage of patients who participated to the Patient Reported Outcome Measures (PROMs) survey.
DGCD [3]	
cervical cancer	Percentage of patients that are alive after 5 years of first seen for cervical cancer stage I Percentage of patients that are alive after 5 years of first seen for cervical cancer stage II- III Proportion of patients with free resection margins cervical cancer st. IB-IIA undergoing radical hysterectomy Proportion of patients with parametrial growth for cervical cancer st. IB-IIA undergoing radical hysterectomy
Ovarian cancer	Ovarian, tubal and peritoneal cancer with macro radical surgery, st. IIIC-IV at primary surgery Ovarian, tubal and peritoneal cancer with macro radical surgery after neoadjuvant chemotherapy st. IIIC-IV Ovarian, tubal and peritoneal cancer, without surgery operated on st. IIIC-IV Ovarian, tubal and peritoneal cancer with macroscopically radical surgery, st. IIIC-IV Ovarian, tubal and peritoneal cancers with primary surgery, st. IIICIV Ovarian, tubal and peritoneal cancer with lymphadenectomy, st. I-IIIA Proportion of patients with ovarian, tubal and peritoneal cancer, alive after 5 years , stage I Proportion of patients with ovarian, tubal and peritoneal cancer, alive after 2 years , stage IIC-IV Proportion of patients with ovarian, tubal and peritoneal cancer, alive after 5 years , stage IIIC-IV
Vulvar cancer	Removal of pelvic lymph nodes for medium-high-risk patients st. In, or st. II-III uterine cancer Laparoscopic or robotic assisted surgery for endometrial cancer in stage I, low- and medium-risk patients Proportion of endometrial cancer patients alive after 5 years. Proportion of endometrial cancer stage I patients alive after 5 years.
Endometrial cancer PR [4]	3-year disease-specific survival in patients with vulvar cancer stage IB,

(*continued*)

NGOR [1]	
Ovarian	Annual volume of debulking surgeries per center
	Annual volume of debulking surgeries per surgeon
	Completeness of reporting for treated cases
	Adherence to experimental protocol for ovarian cancer treatment
	Availability of the extemporaneous frozen section test
	CAS [6] patient management before the initial treatment
	Execution of an appropriate diagnostic assessment
	Presence of a GIC [7] assessment before the initial treatment
	Frequency of neo-adjuvant chemotherapy treatments
	Execution of a cytohistological assessment before the neo-adjuvant chemotherapy
	Frequency of the debulking surgical treatment
	Appropriateness of the debulking surgery, according to staging
	Presence of GIC assessment following the debulking surgical treatment
	Completeness of surgical resection for advanced stage cancer
	Frequency of post-operative complications
	Adjusted per case-mix and crude survival data
SQRGC [5]	
Ovarian cancer	Time from primary surgery to start of chemotherapy FIGO stage III-IV
	Number of cases per year of diagnosis
	Number of operations per year of diagnosis
	Distribution of FIGO main stage
	Participation of specialist in gynecologic tumor surgery at surgery
	Coverage relative the National Cancer Registry, and internal coverage for each form
	Number of patients primarily operated to no remaining macroscopic tumor FIGO stage II-IV
	Proportion of patients with stage II-IV or unknown stage evaluated at multidisciplinary conference
	Proportion of patients undergone primary operation with FIGO II-IV with number of days from operation to start of chemotherapy $\leq$ 28 days
	Number of cases per year of diagnosis
	Postoperative complications graded according to Clavien-Dindo
	30-day mortality
	Overall and relative survival
Vulvar	Time from diagnosis to primary operation
	Time from diagnosis to start of primary radiotherapy
	Participation of specialist in gynecologic tumor surgery at
	Number of cases per year of diagnosis
	Number of operations per year of diagnosis
	Distribution of FIGO main stage
	Surgical technique
	Coverage relative the National Cancer Registry, and internal coverage for each form
	Postoperative complications graded according to Clavien-Dindo
	30-day mortality
	Overall and relative survival
Endometrial	Proportion with time from diagnosis to primary operation $\leq$ 32 days
	Proportion with time from primary operation to pathologic report $\leq$ 17 days
	Proportion with time from primary operation to start chemotherapy $\leq$ 49 days
	Number of cases per year of diagnosis
	Number of operations per year of diagnosis
	Participation of specialist in gynecologic tumor surgery at surgery
	Distribution of FIGO main stage
	Distribution histology
	Surgical technique
	Extent of sampling from pelvic glands
	Extent of sampling from para aortic glands
	Whether LA was done in the pelvis, paraaortic region or both
	Coverage relative the National Cancer Registry, and internal coverage for each form
	Postoperative complications graded according to Clavien-Dindo
	30-day mortality
	Overall and relative survival
cervical	Proportion with time from diagnosis to primary operation $\leq$ 35 days
	Proportion with time from diagnosis to start of radiotherapy $\leq$ 35 days
	Proportion of patients treated with radical radiotherapy with treatment time $\leq$ 50 days
	Time from diagnosis to primary operation all stages
	Time from diagnosis to primary operation (excl FIGO stage 1A1
	Time to start radiation/chemo-radation
	Number of cases per year of diagnosis
	Surgical technique
	Participation of specialist in gynecologic tumor surgery at surgery
	Distribution of FIGO main stage
	Coverage relative the National Cancer Registry, and internal coverage for each form
	Postoperative complications graded according to Clavien-Dindo
	30-day mortality
	Overall and relative survival

1 = National Gynecological Oncology Registry (Australia), 2 = Dutch Gynecological Oncology Audit (Netherlands), 3 = Danish Gynecological Cancer Registry (Demark), 4 = Piemonte Region (Italy), 5 = Swedish Quality Resgistry Gynecological Cancer (Sweden).
6 = GIC (Gruppo Interdisciplinare di cure) = multidisciplinary teams of the Cancer Network, cancer specific.
7 = CAS (Centro Accoglienza Servizi) = Service of the Cancer Network to support patient diagnostic pattern and access to treatments.

References

[1] Kohut A, et al. Morbidity and mortality risk assessment in gynecologic oncology surgery using the American college of surgeons national surgical quality improvement program database. Int J Gynecol Cancer 2018;28:840–7.
[2] Chalas E. Gynecologic Oncology Gynecologic oncology quality measures : what really matters ?, vol. 130; 2013. p. 401–2.
[3] World Health Organization. Estimated number of new cases in. 2018.
[4] Bray F, et al. Global cancer statistics 2018: GLOBOCAN estimates of incidence and mortality worldwide for 36 cancers in 185 countries. CA A Cancer J Clin 2018;68:394–424.
[5] Dutch oncological oncology working group. Dutch guideline epithelial ovarian cancer. 2018. p. 5–12.
[6] Dutch gynaecological oncology working group. Dutch evidence based guideline cervical cancer. 2018.
[7] Ross MS, et al. Unplanned postoperative intensive care unit admission for ovarian cancer cytoreduction is associated with significant decrease in overall survival. Gynecol Oncol 2018;150:306–10.
[8] Kondalsamy-Chennakesavan S, et al. Clinical audit in gynecological cancer surgery: development of a risk scoring system to predict adverse events. Gynecol Oncol 2009;115:329–33.
[9] Dowdy SC, et al. Factors predictive of postoperative morbidity and cost in patients with endometrial cancer. Obstet Gynecol 2012;120:1419–27.
[10] Park SH, et al. Prediction of perioperative complications after robotic-assisted radical hysterectomy for cervical cancer using the modified surgical Apgar score. BMC Cancer 2018;18:1–7.
[11] Beck N, et al. The Dutch Institute for Clinical Auditing: achieving Codman's dream on a nationwide basis. Ann Surg 2020;271:627–31.
[12] Evans Sue M, Scott Ian A, Johnson Niall P, C PA, M JJ. Development of clinicalquality registries in Australia: the way forward. Med J Aust 2011;195:266.
[13] Spencer RJ, et al. Ninety-day mortality as a reporting parameter for high-grade serous ovarian cancer cytoreduction surgery. Obstet Gynecol 2017;130:305–14.
[14] Govaert JA, et al. Costs of complications after colorectal cancer surgery in The Netherlands: building the business case for hospitals. Eur J Surg Oncol 2015;41:1059–67.
[15] Steinberga I, Jansson K, Sorbe B. Quality indicators and survival outcome in stage IIIB-IVB Epithelial ovarian cancer treated at a single institution. *In* Vivo 2019;33:1521–30.
[16] Bonte A-S, Luyckx A, Wyckmans L, Trinh XB, van Dam PA. Quality indicators for the management of endometrial, cervical and ovarian cancer. Eur J Surg Oncol 2019;45:528–37.
[17] Van De Velde CJH, et al. EURECCA colorectal: multidisciplinary management: European consensus conference colon & rectum. Eur J Cancer 2014;50. 1.e1-1.e34.
[18] Watanabe T, et al. Quality indicators for cervical cancer care in Japan. J. Gynecol. Oncol. 2018;29:e83.

Further Reading

[19] Beesley VL, Alemayehu C, Webb PM. A systematic literature review of trials of survivorship interventions for women with gynaecological cancer and their caregivers. Eur J Cancer Care 2019;28(3):e13057. https://doi.org/10.1111/ecc.13057.
[20] Bonte A-S, Luyckx A, Wyckmans L, Trinh XB, van Dam PA. Quality indicators for the management of endometrial, cervical and ovarian cancer. Eur J Surg Oncol : J Eur Soc. Surg Oncal Br Assoc Surg Oncol 2019;45(4):528–37. https://doi.org/10.1016/j.ejso.2018.10.051.
[21] Cheng C-Y, Chiang C-J, Hsieh C-H, Chang Y-K, Lai M-S. Is quality of registry treatment data related to registrar experience and workload? A study of Taiwan cancer registry data. J Formos Med Assoc 2018;117(12):1093–100. https://doi.org/10.1016/j.jfma.2017.12.012.
[22] Dewdney SB, Dancisak AC, Lachance JA, Grendys ECJ, Dowdy SC, Powell M, et al. Society of gynecologic oncology clinical outcomes registry: from small beginnings come great things. Gynecol Oncol 2018, March. https://doi.org/10.1016/j.ygyno.2018.01.021. United *States*.
[23] Di Girolamo C, Walters S, Gildea C, Benitez Majano S, Coleman MP, Rachet B, et al. Which patients are not included in the English Cancer Waiting Times monitoring dataset, 2009-2013? Implications for use of the data in research. Br J Cancer 2018;118(5):733–7. https://doi.org/10.1038/bjc.2017.452.
[24] Eden M, Harrison S, Griffin M, Lambe M, Pettersson D, Gavin A, et al. Impact of variation in cancer registration practice on observed international cancer survival differences between International Cancer Benchmarking Partnership (ICBP) jurisdictions. Cancer Epidemiol 2019;58:184–92. https://doi.org/10.1016/j.canep.2018.10.019.
[25] El Naggar AC, Hade EM, O'Malley DM, Liang MI, Copeland LJ, Fowler JM, et al. Time to chemotherapy in ovarian cancer: compliance with ovarian cancer quality indicators at a national cancer institute-designated comprehensive cancer center. Gynecol Oncol 2018;151(3):501–5. https://doi.org/10.1016/j.ygyno.2018.09.014.
[26] Gamble CR, Huang Y, Tergas AI, Khoury-Collado F, Hou JY, St Clair CM, et al. Quality of care and outcomes of patients with gynecologic malignancies treated at safety-net hospitals. JNCI Cancer Spectr 2019;3(3). https://doi.org/10.1093/jncics/pkz039. pkz039.
[27] Klapheke AK, Keegan THM, Ruskin R, Cress RD. Depressive symptoms and health-related quality of life in older women with gynecologic Cancers. J Geriatr Oncol 2019. https://doi.org/10.1016/j.jgo.2019.10.001.
[28] Kohut A, Orfanelli T, Poggio JL, Gibbon D, Buckley De Meritens A, Richard S. Morbidity and mortality risk assessment in gynecologic oncology surgery using the American college of surgeons national surgical quality improvement program database. Int J Gynecol Cancer : Off J Int Gynecol Cancer Soc 2018;28(4):840–7. https://doi.org/10.1097/IGC.0000000000001234.
[29] Larouzee E, Phelippeau J, Roberti E, Koskas M. Evaluation of the French medical practices in endometrial cancer management by using quality indicators. Eur J Obstet Gynecol Reprod Biol 2019;236:198–204. https://doi.org/10.1016/j.ejogrb.2019.02.014.
[30] Marx C, Bendixen A, Hogdall C, Ottosen C, Kehlet H, Ottesen B. Organisation and quality of primary surgical intervention for ovarian cancer in Denmark. Acta Obstet Gynecol Scand 2007;86(12):1496–502. https://doi.org/10.1080/00016340701622294.
[31] Mikami M, Shida M, Shibata T, Katabuchi H, Kigawa J, Aoki D, et al. Impact of institutional accreditation by the Japan Society of Gynecologic Oncology on the treatment and survival of women with cervical cancer. J Gynecol Oncol 2018;29(2):e23. https://doi.org/10.3802/jgo.2018.29.e23.
[32] Narasimhulu DM, Bews KA, Hanson KT, Chang Y-HH, Dowdy SC, Cliby WA. Using evidence to direct quality improvement efforts: defining the highest impact complications after complex cytoreductive surgery for ovarian cancer. Gynecol Oncol 2020;156(2):278–83. https://doi.org/10.1016/j.ygyno.2019.11.007.
[33] Rauh-Hain JA, Hidrue MK, Gaccione P, Melamed A, Meyer LA, Keating NL, et al. Variation in resource utilization associated with the surgical management of ovarian cancer. Gynecol Oncol 2019;152(3):587–93. https://doi.org/10.1016/j.ygyno.2018.12.013.
[34] Rosenberg P, Kjølhede P, Staf C, Bjurberg M, Borgfeldt C, Dahm-Kähler P, et al. Data quality in the Swedish quality register of gynecologic cancer--a Swedish gynecologic cancer group (SweGCG) study. Acta Oncol 2018;57(3):346–53. https://doi.org/10.1080/0284186X.2017.1366048.
[35] Sobrero S, Pagano E, Piovano E, Bono L, Ceccarelli M, Ferrero A, et al. Is ovarian cancer being managed according to clinical guidelines? Evidence from a population-based clinical audit. Int J Gynecol Cancer : Off J Int Gynecol Cancer Soc 2016;26(9):1615–23. https://doi.org/10.1097/IGC.0000000000000830.
[36] Steinberga I, Jansson K, Sorbe B. Quality indicators and survival outcome in stage IIIB-IVB Epithelial ovarian cancer treated at a single institution. In Vivo 2019;33(5):1521–30. https://doi.org/10.21873/invivo.11632.
[37] Evans Sue M, Scott Ian A, Johnson Niall P, C PA, M JJ. Development of clinicalquality registries in Australia: the way forward. Med J Aust 2011;195(5):266. https://doi.org/10.5694/mja11.10779.
[38] Toboni MD, Smith HJ, Bae S, Straughn JMJ, Leath 3rd CA. Predictors of unplanned reoperation for ovarian cancer patients from the national surgical quality improvement program database. Int J Gynecol Cancer : Off J Int Gynecol Cancer Soc 2018;28(7):1427–31. https://doi.org/10.1097/IGC.0000000000001315.
[39] van Walree IC, Hamaker ME, van de Poll-Franse LV, Vos MC, Boll D, van Huis-Tanja LH, et al. Older ovarian cancer survivors report lower long-term health-related quality of life than younger survivors: a study from the population-based profiles registry. Gynecol Oncol 2019;153(2):391–8. https://doi.org/10.1016/j.ygyno.2019.02.001.
[40] Watanabe T, Mikami M, Katabuchi H, Kato S, Kaneuchi M, Takahashi M, et al. Quality indicators for cervical cancer care in Japan. J Gynecol Oncol 2018;29(6):e83. https://doi.org/10.3802/jgo.2018.29.e83.
[41] White KM, Seale H, Harrison R. Enhancing ovarian cancer care: a systematic review of guideline adherence and clinical variation. BMC Publ Health 2019;19(1):1–13. https://doi.org/10.1186/s12889-019-6633-4.
[42] Werbrouck J, Bouche G, de Jonge E, Jacomen G, D'Hondt V, Denys H, et al. Evaluation of the quality of the management of cancer of the corpus uteri–selection of relevant quality indicators and implementation in Belgium. Gynecol Oncol 2013;131(3):512–9. https://doi.org/10.1016/j.ygyno.2013.10.001.