

## RESEARCH ARTICLE

# Implementation Plans for the Korean Certified Tumor Registrar Qualification System

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### Abstract

**Background:** Cancer registration data is used to understand the nation's cancer burden, and to provide significant baseline data for cancer control efforts, as well as, research on cancer incidence, mortality, survival, and prevalence. A system that approves, assesses, and manages the qualification of specialists, responsible for performing cancer registration, has not been developed in Korea. This study presents ways to implement a certification system designed for the qualification of tumor registrars in Korea. **Materials and Methods:** Requirements for implementing a certified tumor registrar qualification system were determined by reviewing the system for establishing qualifications in Korea and the American qualification system via the National Cancer Registrars Association (NCRA). Moreover, a survey was conducted on Korean medical records administrators, who had taken the U.S. Certified Tumor Registrar (CTR) examination, in order to review their opinions regarding these requirements. **Results:** This study verified the feasibility of a qualification examination based on the opinions of CTR specialists by determining the following: items, and the associated ratings, of the qualifications necessary to register individuals as certified tumor registrars in a private qualification system; status of human resources required for the examination or training processes; plans regarding the organization needed for management, and operation of qualifications, examination standards, subject areas, examination methods, examination qualifications, or education and training programs. **Conclusions:** The implementation of a certified tumor registrar qualification system will lead to enhanced job competency for specialists and a qualitative improvement of cancer registration data. It will also reliably foster human resources that will lay the groundwork needed to establish scientific and reasonable national cancer management policies.

**Keywords:** Cancer - registries - registrars - qualification system

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### Introduction

Cancer incidence rates and the number of deaths caused by cancer are increasing constantly due to the rapid aging of the population and lifestyle changes in Korea, thereby leading to deterioration of individual's quality of life and increased socioeconomic expenses (National Cancer Center [NCC], 2013b). Accordingly, public interest in healthy lifestyles is increasing, also, due to the increasing incidence of cancer, the Korean government needs to establish and implement proactive and comprehensive cancer management policies for the betterment of the citizens.

To establish scientific and reasonable national cancer management policies, cancer statistics including precise cancer incidence data are vital. To this end, there is a need for more systematic management of cancer patients and their data. Hospitals, as well as, the regional and national cancer registries, are performing cancer registration for basic data collection on cancer patients. Cancer

registration data is used to understand a nation's cancer burden and to provide significant baseline data for cancer control efforts and research on cancer incidence, mortality, survival, and prevalence (Moore, 2013a; b).

Cancer registration in Korea first began as a way to calculate cancer statistics as the basis of a national cancer control program. Beginning with the voluntary participation of training hospitals in the 1980s, cancer registration is currently performed at the national level (Shin et al., 2005). Based on the Cancer Control Act of Korea (<http://www.law.go.kr>), medical records administrators working in hospitals annually report specific data about cancer patients to the Korea Central Cancer Registry (KCCR). Based on this data, the KCCR publishes an annual report which includes cancer incidence, survival and prevalence statistics (NCC, 2013a).

In the U.S., the National Cancer Registrars Association (NCRA) has been carrying out the Certified Tumor Registrar (CTR) credential examination since 1983;

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300-400 tumor registrars acquire qualifications every year (NCRA, 2007). Currently, there are approximately 7,500 CTRs working as key specialists in the collection and analysis of cancer baseline data all over the U.S. (Chapman et al., 2012; NCRA, 2012). Unlike in the U.S., a system used to approve, access, and manage the qualifications of cancer registration specialists has yet to be created in Korea.

The quality of cancer registration data is determined by conducting qualitative and quantitative assessments of comparability, completeness, accuracy, and timeliness (Bray and Parkin, 2009). Tumor registrars perform quality checks including searches for errors, inconsistencies, extreme values, and rechecks of unexpected outcomes, prior to analysis (Inger and Smastuen, 2008). Previous studies indicate that the key factors, which influence cancer registration data quality, are: a clinician's fidelity to proper medical record documentation, the tumor registrar's ability to extract information and codify the items, a medical institution's support system used for facilitating efficient cancer registration, and the medical record administrator's preference and responsibility level in cancer registration (Hsieh, Yu and Wu, 2012; Korea Medical Record Association [KMRA], 2012; Peterson, 2012).

Implementation of a qualification system to foster cancer registry specialists may lead to qualitative improvements of cancer registration data in Korea, as well as, enhance job satisfaction and responsibility of specialists. This study investigated the current status of other countries qualification programs, in order to implement a certified tumor registrar qualification system used to foster qualified cancer registry specialists in Korea.

## Materials and Methods

Requirements for implementing the certified tumor registrar qualification system were determined by reviewing the CTR examination system utilized by the NCRA in the U.S. Moreover, an interview and a written survey were conducted on medical records administrators in Korea who passed the CTR examination, or had taken the examination in the last five years in the U.S., in order to collect their opinions regarding the need for the CTR examination questions determined above; these were rated on a five-point scale importance (very high, high, medium, low, very low).

## Results

### Main content of the U.S. CTR credential

The CTR credential, which has been implemented by the U.S. NCRA, is a qualification system targeting individuals engaged in cancer registration in various environments such as: hospitals, regional and national cancer registries, nonprofit associations, private industries, and/or the federal government. The goal of implementing the CTR credential is to establish a standard of knowledge and to assess an applicant's professional registration experience, as well as, basic knowledge. To foster specialists, this system promotes a standardization of

data collection, and use of cancer data, by testing and certifying an individual's knowledge. To maintain the CTR examinations, the NCRA organizes and operates various committees and councils on certification. Table 1 shows the standards of examination needed to implement the qualification system (NCRA, 2014).

### Feasibility of implementing the certified tumor registrar qualification system

Opinions of Korean CTR specialists who had taken the U.S. CTR examination were collected. These opinions were in regards to the feasibility of implementing a certified tumor registrar qualification system. They agreed to conduct written and practical tests for the examination. Regarding question distribution of each test subject, some stated that it is necessary to increase the number of questions in anatomy and physiology to help cancer registration coding. Regarding data analysis and use, some specialists argued that it is necessary to include questions requiring an interpretation of the result tables for statistics or graphs. Furthermore, there were opinions that medical records administrators should not only register cancer data, but also have the opportunity to learn how their work outcomes affect the next generation of statistics on cancer incidence and survival rates, as well as, cancer-related policies. Thus, it would be desirable to increase relevant questions in that area. The specialists all agreed that questions on cancer registration and stage coding must be given for cancer registration practice. They also agreed that there must be questions which verify general cancer registration, and stage registration, using a summary chart or simulation chart, along with the questions on the basic cancer registration guidelines.

Most of the collected opinions, regarding the need for questions in each subject, showed importance ranging from "very high" to "medium." The subject that showed the highest need, among all of the theoretical and practical examination subjects, was "cancer registration data quality management" followed by "cancer registration practice," "management and operation of registries," "data collection," and "data analysis and interpretation" (Table 2).

### Review of the proposed korean certified tumor registrar qualification system

The system for providing qualifications in Korea can be divided into national qualification and private

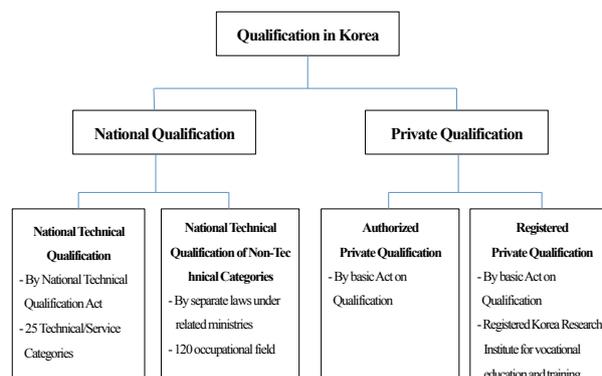


Figure 1. Qualification System in Korea

qualification, as shown in Figure 1 (Kang, 2002). National qualifications are divided into national technical qualifications in industry-related skills, functions, and services. National qualifications are given credentials by the head of a central administrative agency according to

each individual law. Private qualifications are divided into authorized private qualification and registered private qualification. In the case of authorized qualification, the relevant head of the associated government agency, known as a 'Minister' in Korea, may accredit private

**Table 1. Main Contents of the NCRA's CTR Credential**

Category	Main Contents				
Eligibility Requirements	Route A	Successful completion of 160 hours of work practicum in a CTR staffed Cancer Registry			
		1,950 hours(equal to one year full-time) experience in the cancer registry field			
	Route B	And education path: successful completion of a minimum of an associate degree or equivalent(60 college-level credits) including or in addition to specific coursework(two semesters of human anatomy and human physiology or equivalent; grade of C or better is required)			
Procedure	-Applicants can select the examination schedule only if they receive notification that they are qualified for the examination after submitting the application.				
	-The examination schedule is determined on a first-reply basis, and applicants can select the place and date for the examination.				
	-The examination is taken using a computer, but applicants in countries other than the U.S. can apply for a written form of examination if their residential district does not have a computer-based test center.				
Questions (2014)	A total of 225 multiple-choice questions (4 possible answers)				
	Category	Subject	Question	Percentage (%)	
	"Part 1: Written Test (closed book)"	Data collection - case identification, extraction, follow-up study, and treatment outcome		78	35
		Data quality management		23	10
		Data analysis and use		27	12
		Operation and management of cancer registries		18	8
		Cancer committees and conferences		23	10
		Distinct activities of the KCCR		11	5
Subtotal		180	80		
Part 2: Practical Test (open book)	Application of coding and staging		45	20	
	(bladder, breast, colon, lung and prostate gland)				
Time Required for Examination	A total of 4 hours (Part 1: 2 h 30 min. + Part 2: 1 h 30 min)				
Pass Criteria	At least 70% of correct answers out of 225 questions (at least 157 points)				
Period	Biannually (spring, fall)				
Test Method	Computer-based test				
Qualification Maintenance	Qualification managed by the NCRA committees				
	The CTR is maintained only if 20 hours of refresher training is received every year				
	The CEU program begins at two-year intervals on January 1 after the CTR examination				
Main Content of Each Subject	Organization and management of cancer registries	Type of registry, international cancer registries, special-purpose cancer registries, cancer registration standard developing organizations, legal and ethical issues, privacy and security, healthcare delivery system, organization and management of Central Cancer registry, regional cancer registry, data set, computerization			
	Data quality management	Data quality management of cancer registries, cancer control standard certification committee			
	Cancer registration extraction, coding and follow up management	Anatomy and physiology, principles of cancer case identification, principles of extraction and coding			
	Cancer registration data analysis and interpretation	Usage of data, research on performance improvement, statistics and research methodology, preparing report			
	Application of coding and staging	Case ascertainment, extent of disease			
	CS staging	CS staging guideline, CS staging registration			
Examination Fee	CTR registration fee: \$399 (\$299 for NCRA members) -electronic payment				
	The fee is for one examination and will not be refunded.				
	Applicants who did not take the examination within the fixed time period may request transference of the fee to the next examination period (\$215)				

**Table 2. Result of Collecting Opinions on the Need for Questions in the Key Areas of Each Subject**

Key Areas of Subject	Average	Standard Deviation
1. Data collection (case identification, extraction, follow-up study, survival and treatment outcome)	4.33	0.544
Anatomy and physiology	4.43	0.787
Cancer registration target identification, extraction, diagnosis and treatment, ICD-O-3 coding, staging	4.86	0.378
Follow-up study and management	3.71	0.756
2. Data analysis and interpretation	3.76	0.499
Definition of basic statistics and understanding of statistical analysis terminology	4	0.816
Dynamic statistics (mortality, incidence, specificity, sensitivity, etc.)	4	0.577
Research method and goals	3.29	0.488
3. Management and operation of registries	4.37	0.355
Type of cancer registry (national, regional, hospital cancer registries)	4.71	0.488
Standards of operation for cancer registries and characteristics and role of specialized institutes	4	0.816
Legal/ethical issues and solutions for operation of cancer registries	4.14	0.378
Privacy and security to protect cancer registration data	4.29	0.488
4. Data quality management	4.71	0.488
Cancer registration data quality management	4.71	0.488
5. Cancer registration practice (cancer registration coding and staging)	4.43	0.45
Primary site, histology, extent of disease and coding of stages	4.86	0.378
Registration of CS staging (tumor size/extension, lymph node, metastasis evaluation)	4	0.816

**Table 3. Plans for Certified Tumor Registrar Qualification System in Korea**

Category	Content	
Job	Cancer registration is a job that calculates cancer-related statistics such as, cancer incidence, survival, and prevalence by collecting, registering, and analyzing cancer patient data, and systematically manages cancer patient data to prevent and monitor cancer.	
Qualification Item	Certified Tumor Registrar	
Qualification Standard	Assessment of knowledge and skills related to cancer registration such as cancer case identification and extraction	
Qualification for Examination	The following among licensed medical records administrators that are subject to the Medical Technicians, Act:	
	- Those who performed the task of cancer registration for at least a year in a medical institution or relevant organization, or;	
	- Those who completed up to the intermediate level of the cancer registration curriculum provided by the KCCR	
Procedure	Written test: 150 questions (closed book) + practical test: 50 questions (open book)	
Time Required for Examination	A total of 3 hours (written test: 2 h + practical test: 1 h)	
Pass Criteria	At least 60% of correct answers out of a total of 200 questions in written and practical tests	
Subject	Written Test Subject (closed book)	Cancer case identification, abstraction, follow-up study, survival, and treatment outcome
		Data analysis and interpretation
		Data quality management
		Management and operation of cancer registries
	Practical Test Subject (open book)	Application of coding and staging
Qualification Maintenance and Training Institute	Korean Medical Record Association (KMRA)	The KMRA is in charge of supervising and conducting the examinations and managing qualifications and completes training programs to maintain the qualifications.
	Korea Central Cancer Registry (KCCR)	The KCCR revises the cancer registration guidelines, plans education programs to improve the job competency of certified tumor registrars, and supports feedback of data for quality management of cancer registration data.

qualifications in order to ensure the credibility of such private qualifications, as well as, to enhance their social applicability. For registered qualification, any person who institutes, manages, and operates a private qualification must register it to the associated competent Minister. In particular, an authorized private qualification that meets the standard prescribed by the Framework Act on Qualifications will be treated equally to a national technical qualification. To apply for an authorized private qualification, the registered private qualification must: have a record of at least three examinations taken for credentials over a minimum of one year, be managed and operated by a corporation, and be registered with the Korea Research Institute for Vocational Education and

Training(KRIVET). The operation of private qualification systems in Korea is based on the Framework Act on Qualifications. The applicants submit the application for registration to the competent Minister of each area of private qualification, and the competent Minister, if the qualification is not relevant to the prohibited area, registers and manages the qualification and submits the status of its registration to the Minister of Education (KRIVET, 2013).

#### *Strategic plans to implement the certified tumor registrar qualification system*

Requirements that must be fulfilled to institute private qualification systems involve the submission of documents applying for the qualification. These documents include

items and ratings of qualification, and the status of human resources required for examination or training process. Additional documents include plans regarding the organization for the management and operation of applicant qualification, examination standards, subject areas, examination methods and qualifications, subjects, training period, completion standard, evaluation criteria, and the assessment method in the training process. Considering the results of opinions collected from specialists, based on the requirements of the U.S. NCRA's CTR examination, this study proposed plans to implement the certified tumor registrar qualification system, using the procedures necessary for establishing a private qualification system (Table 3).

## Discussion

This study determined the requirements for implementing a certified tumor registrar qualification system by studying the CTR credential program that has produced approximately 7,500 certified tumor registrars in the U.S. Moreover, it examined plans to implement a certified tumor registrar qualification system by comparing legal basis, as well as, the types of qualification systems that currently exist in Korea.

Certified tumor registrars are specialists whose value, prior to now, has not been displayed clearly when establishing policies to treat cancer patients and prevent cancer. They are well-trained and highly skilled workers who build electronic databases by identifying cancer patients, extracting and coding cancer-related demographic and diagnostic information, as well as, staging, treatment, and follow-up data. The data they collect enables the building of databases regarding cancer incidence, treatment, and outcome, as well as, trends which all help to establish public health and medical facilities, develop cancer control programs, implement quality improvement programs and conduct research (Light et al., 2008). The main curricula of cancer registration training programs, presented by the European Network of Cancer Registries (ENCR) in 2003, included: history, purposes, and use of cancer registration; natural history of cancer and general pathology; data sources, definitions, and collection; classification and coding of collected data; quality control and completeness of cancer registration; computers, computer systems, and automation of cancer registration; statistical analysis and presentation of results; legal aspects; and confidentiality (Moore, 2008).

In Korea, in order to maintain the long-term use and expertise of cancer registration data, it is necessary to foster specialists in charge of cancer registration by implementing a certified tumor registrar qualification system. As can be seen in the U.S., the implementation of this system will lead to qualitative improvements of cancer registration data in Korea as well, and will foster specialists who successfully implement policies needed to prevent and control cancer. Thus, it may be a solution to enhancing certain aspects of job satisfaction and sense of responsibility, while displaying their expertise in practice. Taking part in programs to maintain their level of qualification is as important as obtaining the initial

qualification itself. This will enhance the value and continued relevance of the qualification. It is necessary to develop the expertise of certified tumor registrars by actively participating in oncology symposiums, and conferences based on education, to foster cancer registry specialists, research and publication of papers, and constant interaction with medical and health specialists (Hutchison, 2004).

By benchmarking the NCRA's CTR qualification system, in order to implement the certified tumor registrar qualification system in Korea, it is necessary to prepare the following matters: establish legal grounds for cancer registry specialists, organize examination and knowledge management agencies, formation of qualification areas, establishment of university curricula and related textbook authorization, determine the examination application requirements, set up application procedures, develop questions with discrimination capacity and feasibility, determine criterion for passing the examination, and managing details such as the examination period and time, as well as, license credentials and maintenance.

Opinions regarding examination questions from South Korean medical records administrators, who had taken the CTR examination, confirmed that there was a high demand for questions that involved "cancer registration data quality management," followed in importance by "cancer registration practice," "management and operation of registries," "data collection," and "data analysis and interpretation." The areas in which there was the lowest demand for the relevant questions were "follow-up study" and "establishment of research methods." This result indicates that follow-up study is not included in cancer registration items in Korea, or that tasks, such as establishing research plans using data, are not perceived as important tasks when performed by certified tumor registrars. However, the ability to complete these tasks is necessary knowledge and a skill that must be obtained by certified tumor registrars in order to improve their job opportunities or make better use of cancer registration data.

The result of reviewing the different qualification systems that exist in Korea verified that it is most suitable to apply the authorized private qualification system guidelines for certified tumor registrar qualifications. However, the authorized private qualifications must be accredited by the government after survey research is completed by KRIVET and, also, deliberation completed by the Qualification Policy Deliberation Council done on the relevant act and subordinate statute. Thus, since the certified tumor registrar qualification has no current record of examinations, the authorized private qualification system cannot apply. Therefore, it is recommended to begin operating this system as a registered private qualification, and later, switch to the authorized qualification system, after attaining examination records.

Medical records administrators must perform cancer registration as it is within the scope of their legal work, based on the Medical Technicians Act (<http://www.law.go.kr>). The curricula designed to foster medical records administrators at two, three, and four-year colleges, includes cancer-related courses such as anatomy, physiology,

pathology, nosology, cancer registration, and medical records management practice. The national examination for medical records administrators includes eight to ten cancer-related questions regarding medical records management among the theoretical courses. Moreover, questions related to cancer registration practice are included in practical courses, with at least one cancer case out of four medical records cases. However, the national examination for medical records administrators does not verify individual's capabilities in cancer registration, and also, not all medical records administrators perform cancer registration tasks. Therefore, it is valid to establish and operate the professional qualification system. This is to qualify only those people who have a certain period of practical experience, in cancer registration, from those who passed the national examination for medical records administrators, in order to apply for the certified tumor registrar qualification examination.

It would be optimal for the Korean Medical Record Association (KMRA) to be in responsible for registration and management of the qualification system, in order to maintain the continuity of job training for certified tumor registrars, and also to further their cancer registration careers, as well as, enhance their expertise. On the other hand, the KCCR will be in charge of cancer registration training programs, such as establishing long-term education plans and developing programs to foster educators. To increase their occupational stability and employment opportunities, both organizations can collaborate to seek development, and allocation of cancer registry specialists, as well as, qualitative improvement of cancer registration data.

This study confirmed the feasibility of implementing a qualification system for certified tumor registrars, who are essential human resources utilized to establish baseline data and assess the performance of national cancer control programs. Furthermore, the findings of this study can be used as baseline evidence for the implementation of a certified tumor registrar qualification system in Korea. This system will be vital in achieving qualitative improvements in cancer registration data and to foster cancer registry specialists.

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