

Developing a Model of Advanced Training to Promote Career Advancement for Certified Genetic Counselors: An Investigation of Expanded Skills, Advanced Training Paths, and Professional Opportunities

Bonnie J. Baty¹ · Angela Trepanier² · Robin L. Bennett³ · Claire Davis⁴ · Lori Erby⁵ ·
Catriona Hippman^{6,7} · Barbara Lerner⁸ · Anne Matthews⁹ · Melanie F. Myers¹⁰ ·
Carol B. Robbins¹¹ · Claire N. Singletary¹²

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Abstract There are currently multiple paths through which genetic counselors can acquire advanced knowledge and skills. However, outside of continuing education opportunities, there are few formal training programs designed specifically for the advanced training of genetic counselors. In the genetic counseling profession, there is currently considerable debate about the paths that should be available to attain advanced skills, as well as the skills that might be needed for practice in the future. The Association of Genetic Counseling Program Directors (AGCPD) convened a national committee, the Committee on Advanced Training for Certified Genetic Counselors (CATCGC), to investigate varied paths to post-master's training and career development. The committee be-

gan its work by developing three related grids that view career advancement from the viewpoints of the skills needed to advance (skills), ways to obtain these skills (paths), and existing genetic counselor positions that offer career change or advancement (positions). Here we describe previous work related to genetic counselor career advancement, the charge of the CATCGC, our preliminary work in developing a model through which to view genetic counselor advanced training and career advancement opportunities, and our next steps in further developing and disseminating the model.

Keywords Advanced training · Genetic counselors · Career development · Career advancement

✉ Bonnie J. Baty
bonnie.baty@hsc.utah.edu

¹ Division of Medical Genetics, Department of Pediatrics, SOM 2C454, University of Utah Health Sciences Center, Salt Lake City, UT 84132, USA

² Center for Molecular Medicine and Genetics, Wayne State University, Detroit, MI, USA

³ Division of Medical Genetics, Department of Medicine, University of Washington, Seattle, WA, USA

⁴ Joan H. Marks Graduate Program in Human Genetics, Sarah Lawrence College, Bronxville, NY, USA

⁵ Social and Behavioral Research Branch, National Human Genome Research Institute, Bethesda, MD, USA

⁶ Department of Psychiatry, University of British Columbia, Vancouver, BC, Canada

⁷ Women's Health Research Institute, BC Women's Hospital and Health Centre, Vancouver, BC, Canada

⁸ Center for Healthcare Organization and Implementation Research, VA Boston Healthcare System, Boston, MA, USA

⁹ Department of Genetics & Genome Sciences, Case Western Reserve University, Cleveland, OH, USA

¹⁰ Department of Pediatrics, Cincinnati Children's Hospital Medical Center, Cincinnati, OH, USA

¹¹ Faculty Development and Adult Learning Consultant, New York, NY, USA

¹² Departments of Pediatrics and of Obstetrics, Gynecology, and Reproductive Sciences, University of Texas Health, Houston, TX, USA

Introduction

Review of Earlier Work

Discussions about career advancement and advanced degrees in genetic counseling have been ongoing for almost three decades. Scott et al. (1988), in reviewing genetic counselor training, identified three important professional goals for genetic counselors: 1) the ability to formally establish skill competence, 2) to maintain their expertise, and 3) to advance professionally. Board certification of genetic counselors, one measure of competence, became available in 1981 through the American Board of Medical Genetics. Continuing education, as a means of maintaining expertise, was strengthened in 1979 when the National Society of Genetic Counselors (NSGC) began offering national and regional professional meetings. In 1988, Kloza proposed exploring the feasibility of a doctorate (PhD) in genetic counseling as one potential means of advancement (Kloza 1988). A 1989 survey of full members of the NSGC showed that a little more than half of 337 respondents felt there was a need for a PhD in genetic counseling; 44 % said they would be interested in pursuing such a degree, 33 % said they would not pursue a PhD, and 23 % were not sure (Gaupman et al. 1991). Respondents thought that having a PhD would lead to better professional recognition, allow for specialization, result in increased knowledge, and improve compensation. For those who said they would not pursue a PhD, the reasons listed included inability to relocate to attend a training program, lack of perceived need or satisfaction with present job, cost, and family responsibilities (Gaupman et al. 1991).

At the 1989 Asilomar Meeting on Education in Genetic Counseling, attendees discussed post-master's training pathways in genetic counseling and the potential advantages and disadvantages of a PhD in genetic counseling (Walker et al. 1990). The 35 attendees included representatives from genetic counselor and genetics nurse specialist programs, employers from university and state genetics programs, counselors from a variety of work settings, graduate administrators, the Council of Regional Networks (CORN), the Bureau of Maternal and Child Health, the March of Dimes, the Alliance of Genetic Support groups, American Board of Medical Genetics, and individuals with cross-cultural genetics service expertise. The group evaluated the possibility of certificate programs as a means of gaining expertise in specialized areas. They also noted that genetic counselors could avail themselves of existing degrees or certificate programs in other areas of interest such as family therapy and health administration. But it was unclear whether certificate and/or degree programs would achieve genetic counselors' goals for career advancement (e.g., better professional recognition or improved compensation). In evaluating the possibility of a genetic counseling PhD, the group concluded the degree should be geared

towards a genetic counselor with an interest in research, particularly in genetic counseling. The group did not think that obtaining a PhD in order to sit for the existing PhD medical genetics certification exam would be of additional value to genetic counselors (Walker et al. 1990).

Some of the identified benefits of a PhD program in genetic counseling included enhanced stature at academic institutions, greater infrastructure to support the growing research base in genetic counseling, and the potential for individual genetic counselors to not only advance in their own careers, but to support the advancement of many more genetic counselors through mentorship and supervision. Identified benefits on an individual level for genetic counselors having a PhD included enhanced opportunity to apply for grants as a principal investigator, and improved research skills. Some of the concerns expressed at this meeting were that having a doctoral training track would establish a two-tiered system of genetic counselors that could devalue the master's degree, would result in replacing the master's degree as the terminal clinical degree, and would reduce the workforce if genetic counselors leave clinical practice to obtain a PhD. There were also practical considerations identified such as whether there would be institutional support to develop a PhD program in genetic counseling and who would have the qualifications to teach in the program. Having identified these areas of uncertainty, the recommendation at the end of the Asilomar conference was to defer making a decision about whether the creation of a PhD in genetic counseling would be advantageous to the profession as a whole until after exploring these issues further (Walker et al. 1990).

It was not until almost two decades later that Atzinger and colleagues (Atzinger et al. 2007) explored the impact of having a PhD on genetic counseling practice. In the intervening time, the profession had grown significantly. The number of genetic counseling programs had expanded from 15 to 29 and the number of certified genetic counselors quadrupled from 495 in 1993 to 2177 in 2007 (Walker et al. 1990; ABGC 2015a). Atzinger and colleagues interviewed 31 genetic counselors who had PhDs in various fields, most commonly genetics (human, molecular or medical). At the time of the survey about 3 % of genetic counselors had a doctoral degree (Farmer and Chittmas 2000; Parrott et al. 2002). Some earned the degree before and some after their graduate degree in a genetic counseling program. Whereas some respondents did not think their practice was any different than master's-trained genetic counselors, others indicated that they have less patient contact, perform more research, and have more autonomy. The perceived advantages of having a PhD included having greater knowledge and skills, greater recognition and respect from colleagues and patients, and greater autonomy. With regard to enhanced knowledge and skills, respondents indicated that their PhD training gave them broader perspective on both clinical practice and research, the ability to think about things

differently, and the ability to do research-related activities (e.g., develop protocols, write grants). Many respondents did not identify any disadvantages of having a PhD. However, those who did identified increased work time and decreased patient contact. Respondents were also asked what impact developing a PhD in genetic counseling would have on the profession (positive, negative, or neutral). A majority said that a PhD in genetic counseling would have a positive impact. The themes related to positive impact were research skills, counselor knowledge, moving the profession forward, creating additional opportunities, and generating respect. Themes for those who thought the impact would be neutral were that it would depend on the curriculum or that there was no benefit, especially for a clinical genetic counselor. The concern raised by those who thought a PhD would have a negative impact on the profession was that it would minimize opportunities for master's level genetic counselors (Atzinger et al. 2007).

A qualitative study of 30 genetic counselor employers found that the majority envisioned different rather than competing roles for PhD versus master's-trained genetic counselors (Wallace et al. 2008). Primarily these were roles with an academic focus such as research. But roles in industry (marketing or in the laboratory), senior management, and public health were also mentioned. When specifically asked about the impact developing a PhD would have on master's-trained genetic counselors, responses were mixed. Those who thought it would have a positive impact (13/30) mentioned that it would create a career ladder and enhance research in the genetic counseling process. Those who thought it would have a negative impact (10/30) were concerned it would limit advancement opportunities for master's-trained genetic counselors. Those who thought the impact would be neutral (7/30) did not think there would be overlap between PhD versus master's level positions (Wallace et al. 2008).

In 2011, a new discussion about advanced training in genetic counseling began when the American Board of Genetic Counseling, which was at the time the accrediting agency for genetic counseling programs, received a request to develop accreditation standards for an entry level clinical doctorate (ClinD) program. Whereas a PhD is typically intended to enhance knowledge and skills in research, a clinical doctorate is focused on building clinical knowledge and skills. Since the development of such programs could have a significant impact on the genetic counseling profession, the ABGC convened the Genetic Counseling Advanced Degree Task Force (GCADTF) to investigate the issue (ABGC 2015b). The task force was comprised of one representative from each of the following genetic counseling organizations: the ABGC, the NSGC, the Canadian Association of Genetic Counselors (CAGC), the Accreditation Council for Genetic Counseling (ACGC, the accrediting body for genetic counseling programs since 2012), and the AGCPD. The task force also included three members at large (all genetic counselors).

From 2011 to 2013, the GCADTF reviewed the literature, interviewed genetic counselors, genetics professionals, and representatives from a variety of allied health professions, and educated the members of the represented organizations about the differences between ClinD and PhD degrees. The Task Force met in person at the 2012 NSGC Annual Education Conference at which time they concluded they had sufficient information to make a decision about the entry level clinical doctorate but not the advanced practice clinical doctorate (Reiser et al. 2015). The GCADTF then held a summit in January 2013 at which time they were charged with deciding whether to change the entry level genetic counseling degree to a clinical doctorate degree (Reiser et al. 2015).

As part of the evaluation process, the GCADTF surveyed practicing genetic counselors and genetic counseling students to gain their perspectives (Nagy et al. 2014). An online survey was emailed to genetic counselors who were members of the NSGC, members of the CAGC, or diplomats of the ABGC, and to the current students (at that time) in genetic counseling programs in the US and Canada. The survey results showed that when asked to select between two choices, "maintaining the master's degree as the current entry level and terminal degree at this time" versus "moving towards the clinical doctorate as the required entry level degree for new trainees," 81.1 % of 2181 respondents endorsed the master's degree option. Through open-ended responses, participants identified potential benefits, concerns, and barriers of transitioning to an entry level ClinD. These responses showed an overlap with benefits and concerns surrounding the PhD option, but also identified additional issues. Perceived benefits included increased recognition and respect, an increase in clinical skills, and development of a career ladder in genetic counseling. Concerns included that the ClinD would not result in increased recognition or increased salaries, that it could harm current legislative efforts (state licensure and federal recognition), that it would create a two-tiered system that would devalue the master's degree, and the potential that experienced genetic counselors might choose to leave the profession rather than obtain the advanced degree. Barriers that could prevent a successful transition to an entry level ClinD included the expense associated with creating the ClinD programs and for individual genetic counselors to pay for an additional degree, and personal challenges of pursuing an additional degree (Nagy et al. 2014).

As key stakeholders in any decision to alter entry-level genetic counselor training, the AGCPD conducted its own evaluation of the feasibility of an entry level ClinD. Part of the evaluation included a telephone survey of genetic counseling program directors (PD's) (Reiser et al. 2015). When asked whether their program could transition to a clinical doctorate, 13 of 34 responding programs indicated they could probably transition, 2 said they definitely could transition, 14 indicated they would be at risk of closing, 4 said they would close, and 1

responded “other”. When asked whether transitioning to a clinical doctorate would affect the number of students admitted annually, programs projected they would be able to accept a total of 189 students, a 26.2 % decrease from the 256 students admitted into master’s genetic counseling programs in 2012. Key concerns regarding the transition, which were identified through open-ended responses, included limited numbers of clinical training sites, increased student tuition costs, lack of justification of the need for additional training, administrative challenges of starting a new degree program, and program funding (Reiser et al. 2015).

The GCADTF ultimately voted in early 2013 to maintain the master’s degree as the entry-level degree in genetic counseling (CAGC-ACCG Annual Newsletter 2013; National Society of Genetic Counselors 2013; Reiser et al. 2015). However, the data collected in evaluating the clinical doctorate showed what previous discussions have shown - genetic counselors are looking for increased opportunities for career advancement. Furthermore, the concern remains that the lack of advancement opportunities may jeopardize retention and the continued growth of the profession. The NSGC’s 2014 Professional Status Survey showed that when asked about satisfaction with genetic counseling, 57 % of the 1416 responding clinical counselors and 39 % of 344 responding non-clinical counselors were dissatisfied with opportunities for advancement. Likewise 59 and 39 % of clinical and non-clinical counselors respectively were dissatisfied with earning potential (NSGC 2014). For those who had left the field or were considering leaving, 40 % indicated that one of the reasons was limited earning potential, while 42 % cited limited opportunity for professional growth (NSGC 2014). Thus, there seems to be a clear need to develop and implement mechanisms for career advancement in genetic counseling. In particular, the GCADTF recommended that the profession further explore opportunities for advanced training, including but not limited to the ClinD, determine what specific types of knowledge and training might benefit genetic counselors and how this training might be offered, and identify ways to support genetic counselors to recognize and pursue career advancement opportunities, such as through the development of career ladders (Nagy et al. 2014).

Other Professions

The desire for career advancement opportunities, including advanced degrees, is not unique to the genetic counseling field. For instance, the nursing profession, which numbers 2.8 million RNs (Department of Health and Human Services, U.S.A., 2013), supports a number of degrees and certifications that promote advancement and acquisition of new knowledge and skills (allNursingSchools 2015). Advanced degrees (those beyond the Bachelor degree in nursing) include Master of Science in Nursing degrees, 3-year clinical doctorate

programs, doctor of nursing science programs (DNSc), and doctor of philosophy (PhD) programs. Within the master’s degree level there are a number of career options including nurse practitioner and clinical nurse specialist. Within doctorate programs there are different degree options including a doctorate of nursing education and doctorate of nursing practice.

However, advanced degrees are not the only way to obtain additional knowledge and skills. Certificate programs, continuing education opportunities and on-the-job training can also promote career advancement. Another method of career advancement is the development of career ladders. Career ladders in nursing were developed in the late seventies-early eighties and have since been widely implemented. The goals of the ladder system are to increase retention of experienced nurses, incentivize long-term careers in the clinical setting, improve nurse job satisfaction, and ultimately improve patient care by maintaining a workforce of experienced practitioners (Benner 1982; Huey 1982). Other professions, such as pharmacy, have also recognized the value of career ladders in job satisfaction and improving patient care (Goodwin et al. 2010a, b; Smith and Shane 1989). More recently, a task force of the American Association of Respiratory Care, in evaluating the bigger picture of developing the respiratory therapy workforce for practice in 2015 and beyond, recommended developing and promoting career ladder programs. These programs would include educational offerings to help existing members of the workforce develop advanced competencies and to obtain baccalaureate degrees (Barnes et al. 2011). Investigating what other professions have done to create advancement opportunities, with and without advanced degree options, may be useful in fully exploring and developing opportunities for genetic counselors.

Formation of the CATCGC

In response to the recommendation of the GCADTF and the evidence that genetic counselors want professional advancement opportunities, the AGCPD approved the formation of the Committee on Advanced Training for Certified Genetic Counselors (CATCGC) in the summer of 2012. The committee was charged with the following:

- *Illuminate all and varied avenues of continuing education that professionals use to enhance skills and/or increase their knowledge base. This includes but is not limited to a description of these avenues, and their tangible benefits and disadvantages.*
- *Develop a diverse committee membership by inviting appropriate non-PD members (e.g., industry counselors), non-clinical members, and representatives of relevant organizations. Member characteristics (e.g., number,*

background etc.) will be determined by the Committee Chair and the initial committee membership.

- *Distribute findings and recommendations to the profession in a manner determined by the committee.* (Baty 2014)

The intent was to explore needs for advanced training and possible training paths. Advanced training includes training beyond the attainment of genetic counseling competencies provided in all master's genetic counseling programs (Accreditation Council of Genetic Counseling 2014).

The AGCPD appointed Bonnie Baty as the committee chair. The AGCPD and CATCGC chair developed a diverse committee membership by using an application process that took into account current and prior professional positions and career paths; experience and expertise in some combination of education, leadership, diverse clinical practice areas, industry/laboratory and research; and the ability to commit time to the committee. Rather than seek formal representation from stakeholder organizations (ABGC, ACGC, CAGC, and NSGC), the group asked these organizations for recommendations of individuals who were then invited to apply for committee membership. An effort was made to attain balance among the characteristics mentioned above, as well as geographical diversity. Five additional program director committee members were chosen after an application process administered by the chair and the AGCPD Executive Committee. Six additional committee members were chosen, using the same application process, from a pool of recommendations made by stakeholder organizations (ABGC, ACGC and CAGC). Interested NSGC members were also invited by NSGC to self-identify and submit an application. In addition to the Committee Chair, the final committee included four program director committee members from the AGCPD, six additional committee members chosen from the pool of applicants, and the AGCPD President at that time, who was an *ex officio* member. Committee members represent expertise in education (genetic counseling, medicine, allied health, advance practice nursing, research techniques, faculty development, adult learning, on-line education, continuing education, certificate programs); leadership in numerous national and regional organizations; various genetic counseling practice areas (pediatric genetics, adult genetics, cancer genetics, prenatal genetics, neuromuscular disease); research (psychosocial, psychiatric, genetic counseling, and genetic services delivery); and industry settings (laboratory). Degrees held by committee members included MS (Genetic Counseling); PhD (nursing, public health, health services research, genetics); EdD; and MBA (Baty 2014).

The purpose of this article is to present the initial work of the CATCGC, the committee's preliminary work in developing a model of advanced training for certified genetic counselors, and future directions.

Methods

The CATCGC met by conference call and initially formed two sub-committees, one to examine skills that genetic counselors have developed or might want to develop, and the second to examine possible educational/training paths to obtain skills. This work was initially conceptualized in two grids, each developed by separate subcommittees. The CATCGC later added the Positions Grid, to examine job positions that genetic counselors might hold or aspire to hold, and formed a third sub-committee to develop this grid. All CATCGC members served on one of the sub-committees and contributed to the development of the grid structure and content. The content of the grids was developed through subcommittee member discussion, review of the literature, web-based review of degree requirements, and informal interviews with genetic counselors who had advanced training in the target skills domains, had pursued a particular degree path, and/or who held a particular position. The sub-committees and overall CATCGC did most of their work by conference calls supported by the AGCPD and by email.

The committee's work was presented at a meeting of the AGCPD in July 2014. The AGCPD has been supportive of the committee's progress, and encouraged dissemination of preliminary findings. Partly based on encouragement from the AGCPD, and partly in fulfillment of the committee's mandate, the CATCGC held a Pre-Conference Symposium (PCS) at the 2014 NSGC Annual Education Conference. The PCS was entitled "Career Trajectories in Genetic Counseling," and was attended by 32 conference attendees and 8 facilitators. This PCS was related to, but separate from, the work of the CATCGC, and focused on the concept of creating one's own career path.

This article presents our preliminary work in developing a model of advanced training for certified genetic counselors. We present the overall structure of the three grids and some examples of content.

Results: Skills, Paths and Positions

Figure 1 summarizes the categories of information included in each of the three grids and shows the connections between grids. The Skills Domain connects the Skills and Paths Grids. Skills – Specific connects the Positions and Skills Grids. Paths connects all three grids.

The Skills Grid includes overall domains of skills sets that are used by genetic counselors currently (e.g., education, research, laboratory), as well as domains that are less common, but have growth potential for the field of genetic counseling (e.g., health education, public health, leadership). For each domain, there are columns for the rationale or motivation for seeking these skills, individual skills or knowledge that

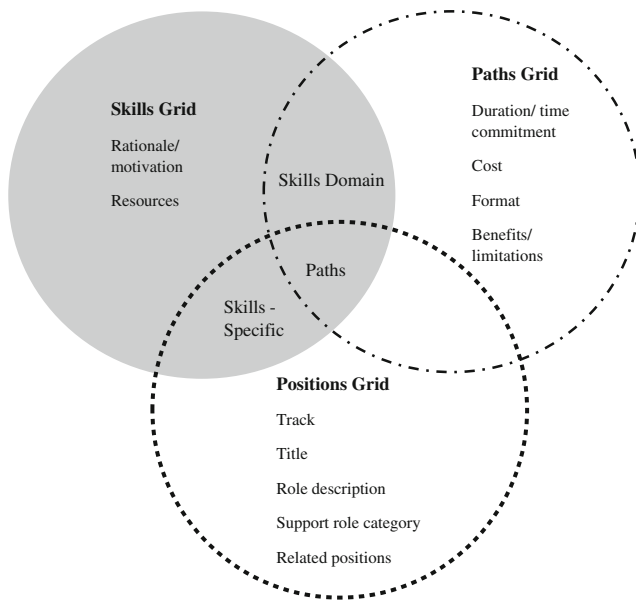


Fig. 1 Advanced training for certified genetic counselors: An overview highlighting interconnections between grids

comprise the skills set, resources to help obtain skills or knowledge, and the most relevant paths to obtain these skills/knowledge. Table 1 illustrates the structure of the Skills Grid and uses the example domain of advanced psychosocial counseling to show details of how the Skills Grid was completed.

The Paths Grid includes training paths to obtain new skills and/or knowledge (e.g., putative and existing degree programs, certificate programs, CEUs, institutional or industry courses or other educational offerings). For each path, there is information about time required, cost, format, benefits and limitations, and the related skills domains. Table 2 illustrates

the structure of the Paths Grid and provides some selected details within the Paths Grid, using the examples of a master’s degree in public health (MPH) and certificate programs.

The Positions Grid (Table 3) shows the types of positions that genetic counselors hold or may aspire to hold, organized into tracks (related positions) (e.g., clinical genetic counselor, research genetic counselor, genetic counseling program director, industry/laboratory genetic counselor). For each position, there are columns that include position title, role description, support role category (e.g., direct clinical work, research support, laboratory support), related positions, required degrees or training, additional useful degrees or training, and specific skills needed to obtain the position or advance in a current position. The Positions Grid also includes career ladders, where available, that might connect specific job tracks. Table 3 illustrates the structure of the Positions Grid and shows some selected details within the Positions Grid, using the example of clinical genetic counselor.

Discussion

The content of the grids can serve as a starting point for envisioning and developing a model of advanced training and career development for genetic counselors. As genomic discoveries continue to expand into clinical care there will be new opportunities for genetic counselors to integrate into routine healthcare. New opportunities may require new or expanded competencies. As such, there is a need to strategically develop educational and training opportunities geared towards current and future roles and responsibilities. The three grids provide a potential framework for individual genetic counselors

Table 1 Skills Grid, with example detail from the advanced psychosocial/Long-term counseling domain

Skills Domain ^b	Rationale/Motivation	Skills-Specific ^a	Resources	Paths
Advanced psychosocial/Long-term counseling	Grief setting -perinatal hospice, life-limiting conditions)	Grief counseling	Am Academy of Grief Counseling programs	CEUs CR CD PhD
	Chronic illness - help to communicate/adapt	Family systems therapy	Marriage & Family Therapy certificate	
	Health promotion - metabolic patients, pregnant women with substance abuse	Motivational interviewing	Motivational Interviewing courses	
	Genetics patients with co-existing mental health conditions	Psycho-therapeutic approaches	Mental health counselor website	
	Evaluate value of the psychosocial aspects of genetic counseling	Psychosocial outcomes research	NSGC analysis of GC outcomes literature	

Overlap between grids is indicated by shading or outlines (i.e., Paths and Skills are in all 3 grids). Shading=Skills; Dot/Dash – Paths; Round dot=Positions

CEUs Continuing Education Units, CR certificate, CD Clinical Doctorate, PhD Doctor of Philosophy

^a Skills include both skills & knowledge

^b Other Domains included in the grid: research, public health/health disparities, communication/health education, laboratory, education, leadership, business, and public policy

Table 2 Paths Grid, with example detail for the advanced training options of a Master’s degree in Public Health (MPH) and certificate programs

Paths ¹	Duration/Time Commitment	Cost	Format	Benefits/Limitations	Skills Domains
MPH	FT/PT; 2-3 yrs; 50+ contact hrs, 20-40+ hours/wk; may require work experience	\$14,000 to \$60,000 annual tuition	Can be online, PT; usually has project	Recognized, available degree; late or early career; can specialize in business of healthcare; expense, time	<ul style="list-style-type: none"> • Research Skills • Public Health • Public Policy • MPH focuses on clinical practice; MSPH geared toward teaching/research
Certificate	Typically four 3-credit courses	\$1200 per course	1 day per week; Can be online, PT	Can work FT; flexible scheduling/cost, time; not a degree	<ul style="list-style-type: none"> • Psychosocial • Business • Communication • Education • Public Health • Laboratory • Leadership • Public Policy • Research

Overlap between grids is indicated by shading or outlines (i.e., Paths and Skills are in all 3 grids). Shading=Skills; Dot/Dash – Paths; Round dot=Positions

MPH Master’s in Public Health, FT Full time, PT Part time, yrs years, hrs hours, wk week, MSPH Master’s of Science in Public Health

^a Other advanced training options included as Paths in the grid: MBA, Master’s, PhD, Fellowship/mentorship (including preceptorship/apprenticeship), dual degrees, Advanced Clinical Doctorate, continuing education units/modules, and institutional/industry educational offerings

considering how they might prepare for a specific, desired career opportunity; by institutions considering educational programs to develop for employees or students; and by employers considering the skills helpful in preparing genetic counselors for advanced job opportunities. Moreover, we hope that the grids and the model we intend to develop from them will stimulate research in the field of genetic counseling education and workforce issues.

Expanded opportunities and competencies also have implications for recruitment and certification. From 2010 to 2014, there was an 18 % increase in applicants to genetic counseling programs nationally (Association of Genetic Counseling Program Directors, 2015). Although the pool of potential genetic counseling applicants has been slowly expanding, future skills, possibilities for new and/or expanded positions, and new or enhanced paths to advanced education may increase the attractiveness of the genetic counseling field to future applicants. This could help expand and diversify the workforce, while enabling the continued spread of genetic counseling roles into new areas. In the last few years, we have seen an increase in jobs in industry, in medical subspecialties such as ophthalmology, and in new settings (e.g., insurance utilization, directing non-profit organizations). There is also a need for accrediting and certifying organizations to consider developing and or updating standards as programs change some of their educational practices or offer new degrees.

The following are some examples of potential uses of the grids.

1. Individuals considering their career trajectory could use the Skills Grid to consider what skill domain best fits their interests and abilities (current and projected), the Paths

Grid to assess the best educational path to develop these skills, and/or the Positions Grid to consider a new position as a personal goal, perhaps one that allows the implementation of new skills identified in the Skills Grid and attained through a path in the Paths Grid.

2. Institutions considering the development of a new educational program might use the Paths Grid to consider what educational paths best fit their educational capabilities and resources (present and future) and the Positions and Skills Grids to determine what content would be necessary to provide and to which applicants they could be marketing. In our example, an institution might see from the Paths Grid that genetic counselors would benefit from formal supervision instruction and might develop an online course to provide such instruction.
3. Institutions hiring genetic counselors, or contemplating hiring genetic counselors, could use all three grids to consider the range of skills that genetic counselors might bring to their institution, resources to enhance current and future employee skills, or information about designing a career ladder to promote retention and quality services.
4. Individuals or groups contemplating research could use all three grids as a foundation in the design of their projects. For example, research could be conducted to compile a list of existing educational programs mapped to the Paths Grid. One could use the Paths Grid to select educational paths and compare outcomes for individuals who have chosen those paths. Did they experience professional advancement and satisfaction, or possibly unintended consequences, as a result of their additional training?

Table 3 Positions grid, with example detail of existing structure for a career ladder (Personal communication from Catherine Reiser, 2014) within the track of clinical genetic counselor

Track ^a	Title	Role Description	Support Role Category	Related Positions	Required Degrees/ Training (Paths)	Additional Useful Degrees/ Training (Paths)	Skills-Specific
*Clinical Genetic Counselor	Genetic Counselor I	<ul style="list-style-type: none"> Provides clinical care, contributes to clinical research, and/or support clinical laboratory services by using basic genetic counseling skills and competencies. Recognizes need for professional growth; takes steps to meet educational needs. Implements clinical practice, research and education in genetics under the direct supervision of the medical director and/or attending physician. 	Direct Clinical Work	Entry Level Genetic Counselor; Associate Level	MS in Genetic Counseling, ABGC eligibility or certification, State licensure	Institutional Review Board Training	<ul style="list-style-type: none"> Core genetic counseling skills & competencies Implement programs; monitor & recommend integration of new technologies into practice.
	Genetic Counselor II	<ul style="list-style-type: none"> Provides clinical care, contributes to clinical research, and/or support clinical laboratory services by using genetic counseling skills and competencies. Demonstrates advanced level of clinical practice skills. Works independently. Serves as role model. Assists in planning, development, & implementation of clinical practice, research and education under clinical supervision of Medical Director. 	Direct Clinical Work	Experienced Genetic Counselor	MS in Genetic Counseling, ABGC certification, State Licensure	Institutional Review Board Training, formal training in clinical supervision	<ul style="list-style-type: none"> Core genetic counseling skills & competencies; proficiency in ACGC practice-based competencies, Ability to supervise students and serve as a role model, Initiate, design, & conduct education; plan & implement programs & procedures; monitor & integrate new technologies, theories, & community resources.
	Genetic Counselor III	<ul style="list-style-type: none"> Provides clinical care, contributes to clinical research, and/or supports clinical laboratory services by using basic genetic counseling skills & competencies. Demonstrates advanced level of clinical practice skills. Performs leadership role in clinical care, education, research or other related area. Contributes ongoing academic output through grant writing, publication, and/or presentation on a regional and/or national level. Supervises planning, development, & implementation of clinical practice, research & education under clinical supervision of medical director. Maintains clinical & professional competency as appropriate to the age, developmental stages & special needs of patients. 	Direct Clinical Work	Senior Genetic Counselor	MS in Genetic Counseling, ABGC Certification, State Licensure	Institutional Review Board Training, formal training in clinical supervision, advanced training in public health genetics such as newborn screening.	<ul style="list-style-type: none"> Core genetic counseling skills & competencies; proficiency in practice-based competencies; ability to provide student supervision & serve as role model. Core skills in genetic counseling; management (staffing, evaluation, training); leadership; administration skills; liaison with entities outside department; initiate, design & conduct education; monitor & recommend integration of technology, resources; develop & implement genetic counseling practice policies.
	Genetic Counselor IV	Similar to the above except includes that individual is recognized by his or her peers and through a reputation which extends beyond his/her work unit.	Direct Clinical Work	Distinguished			Same as Genetic Counselor III

Overlap between grids is indicated by shading or outlines (i.e., Paths and Skills are in all 3 grids). Shading=Skills; Dot/Dash – Paths; Round dot=Positions

^a Other Tracks included in the Grid: Research, Public Health/Executive Positions, Genetic Counseling Training Program Director, Industry/Laboratory, Counseling (more broadly than genetic counseling)

Future Directions

Developing a Model of Advanced Training for Certified Genetic Counselors

The Committee views the development of the grids as the first step in developing a model for advanced training and career advancement for genetic counselors. To further develop the model, the CATCGC is initiating an IRB-approved research study, with plans to interview individuals with relevant expertise in the skills domains, obtained through a variety of paths, and using the skills in a variety of positions. Data from this study (anticipated to be available in 2016) will enable the Committee to enhance the content of the grids and make any necessary alterations in their structure. This information will then be used to develop the model.

Developing a Career Lattice for the Genetic Counseling Profession

The CATGC also plans to explore the use of the grids in constructing a career lattice or ladder for conceptualizing the roles that genetic counselors may fill. As part of our developing model, we have constructed a career lattice, with plans to develop it further in the future.

Career lattices, as defined by the U.S. Department of Labor, are a group of jobs that all together comprise a career. Whereas career ladders only show vertical movement between jobs in a career, career lattices show both vertical and horizontal movement. Career lattices/ ladders can be organization specific (e.g., a hospital's career ladder for nurses or pharmacists), but they can also span across organizations when used to represent all options in career paths. The purpose of such all-inclusive career lattices is ... "to create materials to assist businesses, educators, and workforce professionals in outlining careers and the critical experiences individuals should acquire in order to progress through careers in an industry" (Competency Model Clearinghouse 2015).

Building a comprehensive career lattice/ladder that accurately reflects the opportunities available to people in a given career requires collaboration between a variety of partners including professional organizations, educators, individuals working in the career, employers and others. The CATGC plans to use the data we have collected in the grids, the data we will be collecting in interviews, and input from key stakeholders to construct a career lattice/ ladder for genetic counseling. The U.S. Department of Labor's CareerOneStop website (Competency Model Clearinghouse 2015) provides general

instructions and resources to guide the process. The benefit of using such a resource is that it provides direct linkages to descriptions of jobs included in the lattice. We are exploring the feasibility of using this resource in our efforts to develop an accessible and easily usable career lattice that accurately reflects opportunities for advancement in genetic counseling.

Summary

The CATCGC has completed preliminary work towards developing a model of advanced training and career advancement for certified genetic counselors, part of which will consist of the three linked grids presented here. The Skills Grid describes skills being sought; the Paths Grid describes possible paths to develop those skills; and the Positions Grid enables institutions and individuals seeking specific career paths to visualize necessary skills, paths to attain those skills, and examples of career ladders in specific genetic counseling tracks. Together the completed grids will meet the CATCGC's goal to illuminate various mechanisms for advanced training and career advancement. Genetic counselors can use the grids to plan their own career trajectories and institutions can use the grids to help plan educational strategies and employment practices.

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Compliance with ethical standards

Conflict of Interest Bonnie Baty, Angela Trepanier, Robin Bennett, Claire Davis, Lori Erby, Catriona Hippman, Barbara Lerner, Anne Matthews, Melanie Myers, Carol Robbins, and Claire Singletary declare that they have no conflict of interest. No human or animal studies were carried out by the authors for this article.

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