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Brief Report

Innovations in Midwifery Education: The Academic Medical Center Model

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Workforce analyses project a need for women's health care providers, especially in maternity care. With a stagnant number of certified nurse-midwife/certified midwife (CNM/CM) education programs, the present production of new CNMs/CMs is not robust enough to meet the growing demand. This article describes an existing but underutilized model for CNM/CM education programs, based in an academic medical center with an existing academic affiliation. Advantages include a federal funding source through the Centers for Medicare and Medicaid Services, lower tuition costs than most current programs, and expanded job satisfaction for CNMs/CMs in clinical practice.
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INTRODUCTION

The number of women needing health care in the United States is projected to increase by 18% by 2035, from 130 million to 154 million women.[1] All will potentially seek gynecologic health care screening and care in their lifetime. Seven million of these women will be of childbearing age (15-49 years).[1,2] Births are expected to increase by 6.3% during this same timeframe, from just under 4 million to over 4.2 million per year.[1,2] Hospital discharges related to pregnancy and newborn care together now total over 8 million per year, far outnumbering discharges for any other diagnostic category.[2,3]

The adequacy of the workforce needed to provide midwifery, obstetric, and gynecologic care to US women is of increasing concern. There are presently about 11,800 certified nurse-midwives/certified midwives (CNMs/CMs) and 41,000 obstetrician-gynecologists in the United States, not all in clinical practice.[4] Of 3142 US counties, 56% presently have no CNMs/CMs, and 46% have no obstetrician-gynecologists; overall, 40% of counties have neither.[2] The American Congress of Obstetricians and Gynecologists reports no significant increase in the number of medical school graduates entering obstetrics and gynecology residency over the last 3 decades and projects a shortage of 6000 to 8000 obstetrician-gynecologists by 2020 and up to 22,000 by 2050.[5] The American Midwifery Certification Board reports an increasing number of new certificants since 2011, but the total number of certified CNMs/CMs has not changed significantly since 2014, most probably because of an aging workforce.[6,7] In August 2014, there were 11,447 certificant CNMs/CMs, and in August 2017, there were 11,885. This represents a net gain of only 438 CNMs/CMs despite 2455 CNM/CM new graduates becoming certified.[8,9]

Fundamental changes in attitudes and expectations of younger generations of workers also contribute to a decreased women's health care workforce: more physicians are pursuing subspecialty training, there is increased emphasis on work-life integration, more physicians and midwives are in part-time practice, and increasing numbers are leaving obstetric practice earlier in their career.[5,7,10,11]

The net result of these components—more women needing care, and proportionally fewer CNMs/CMs and obstetrician-gynecologists to provide that care—is a higher number of women per women's health care provider, with more geographic areas lacking any health care provider.[5] Realizing that more CNMs/CMs would significantly enhance the ability to provide adequate women's health care in the United States, especially for childbearing women, the American College of Nurse-Midwives set a goal of educating 1000 new CNMs/CMs every year.[12] However, the present capacity to educate more CNMs/CMs is limited. In 1997, there were 50 accredited or preaccredited CNM/CM education programs in the United States; in 2017, there were 37.[6,13] Although some of these programs have increased their capacity for students, as evidenced by the increased number of new certificants, about a third of qualified applicants are not admitted because of space restrictions.[14] Even though distance learning programs have students in many states, 33 states do not have any CNM/CM programs based in them.[15]

Increasing the national capacity to educate more CNMs/CMs is therefore essential to meet women's health workforce needs. This article discusses an underutilized model for CNM/CM education, which is based in an academic medical center affiliated with a degree-granting graduate program. Utilization of these existing sites could

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Quick Points

- Women's health care workforce projections demonstrate an increasing need for certified nurse-midwives/certified midwives (CNMs/CMs).
- The number of CNM/CM education programs has not changed in 20 years.
- Academic medical centers with obstetrics and gynecology residency programs are underutilized potential sites for CNM/CM education programs.
- There is an existing federal funding source for CNM/CM education programs located in academic medical centers.

increase the number of CNM/CM graduates and provide part of a solution to the women's health workforce gap.

BARRIERS TO EDUCATING MORE CNMs/CMs

CNM/CM education in the United States is based mostly in schools of nursing. Thirty-five of the current 37 programs are in schools of nursing; 10 of these are doctor of nursing practice (DNP) programs, and the remaining are master's degree programs.[15] Tuition and fee costs for these graduate level programs range from $37,000 to $100,000, with DNP programs costing about 50% to 100% more than master's programs because of program length.[16–18] Cost is a significant barrier to many prospective students.

There has been no net increase in programs based in schools of nursing in more than 20 years.[19] Sustaining such programs has inherent difficulties, including recruiting experienced faculty, balancing clinical and faculty responsibilities, finding adequate clinical sites for students, and funding for program maintenance.[12] The creation of distance learning models for midwifery education has been an important component for workforce maintenance for the profession,[19] but many learners do not find this model workable for their learning styles and needs.[20] And these programs alone cannot meet the projected women's health workforce needs.[12]

Given the lack of growth of school of nursing–based programs, consideration should be given to other places to house programs to educate CNMs/CMs. Historically, CNM/CM accredited programs have been based in several settings outside of schools of nursing, including schools of medicine, allied health, and public health, and in academic medical centers with university affiliation.[21] For example, several certificate-granting programs were based in academic medical centers, including the San Francisco General Hospital program, the Parkland Hospital School of Nurse-Midwifery, and the Los Angeles County–University of Southern California program.[21] Most of these programs moved into schools of nursing as the profession moved toward requiring a graduate degree in the early 2000s. This move into schools of nursing decreased the number of potential education program sites and the diversity of education program designs.

AN EVOLVED MODEL OF CNM/CM EDUCATION IN AN ACADEMIC MEDICAL CENTER

There are several requirements for potential midwifery education program sites. They must have an academic foundation and affiliation, with health care teaching and training as a primary mission. There should be access to women needing midwifery care, especially for birth. The environment should be one of collaborative practice and education, where midwives are respected as an integral part of the faculty and health care team. Ideally, CNMs/CMs should already be practicing and teaching at the site. And, very importantly, there should be sources of funding to implement and sustain the program.

Such settings already exist, and in abundant numbers. There are 255 residency programs in obstetrics and gynecology, and most of them are housed in academic medical centers.[22] These institutions have existing academic affiliations with a medical school or other institution of higher learning, and a pathway for faculty appointments that would meet requirements for Accreditation Commission for Midwifery Education (ACME) accreditation.[23] There is an established learning environment with a focus on educating not only resident physicians, but also medical, advanced practice, and nursing students. In many of these centers, midwives are already involved in teaching and precepting residents and students and thus have the foundation of knowledge and skills needed to teach in a basic midwifery education program. Furthermore, these academic medical centers have the administrative structure already in place to support an academic program.

Accreditation Requirements for a Midwifery Education Program in an Academic Medical Center

ACME sets standards for the accreditation of CNM/CM basic education programs.[23] These standards must be met by all programs, regardless of the type of institutional setting in which the program is located. ACME Program Preaccreditation and Accreditation Criterion I states, "The midwifery program will reside within or be affiliated with an institution that will be currently accredited by an agency recognized by the United Stated Department of Education . . ."[23] Academic medical centers must have academic affiliations with a medical school in order to meet accreditation requirements for their residency programs. That existing affiliation meets ACME accreditation requirements.

ACME requires that a midwifery education program grant a "degree or certificate" upon completion.[23] Academic medical centers may grant certificates for midwifery education program graduates. However, a master's degree in a health-related field is required by the American Midwifery Certification Board in order to sit for the certification

examination,[24] so programs based in academic medical centers must have an affiliation or articulation with an institution of higher learning. This could be accomplished in one of 2 ways. The academic affiliate of the academic medical center could grant the master's degree, or another program articulation could be developed. Such a program articulation would consist of another institution accepting the academic medical center program's academic credits in transfer, adding their own required courses for master's completion, and granting a master's degree. A master's degree in nursing is not required for certification, although certificate programs may choose to develop this arrangement with a school of nursing graduate program. A midwifery education program in an academic medical center can also confer a post-master's certificate in midwifery to graduates who have already earned a health-related master's degree.

ACME has several additional accreditation requirements related to faculty appointments, faculty development, student administration, curriculum development, and educational resources such as a medical library and learning laboratory facilities.[23] Because academic medical centers provide these for support of resident and medical education, the infrastructure is in place to support a midwifery education program. An additional advantage is ready-made opportunities for interprofessional education. Table 1 briefly outlines how an academic medical center–based midwifery education program can meet accreditation requirements.

Funding a Midwifery Education Program Within an Academic Medical Center

Academic medical centers receive funding to support postgraduate medical education residency programs from the Centers for Medicare and Medicaid Services (CMS), and this funding comes through 2 mechanisms. The first is funding to cover the direct costs associated with a residency training program, including salaries and benefits for resident physicians and faculty, administrative costs, and overhead. This funding does not come from billing for patient care services but is determined based on the cost of the residency programs to the academic medical center. This funding is commonly referred to as *pass through* money. The funding amount is based on several criteria such as number of learners, amount of space utilized for education, and associated expenses. The second funding mechanism is indirect medical education funding, referred to as *enhanced reimbursement*. Indirect funding comes from a CMS-specified formula that provides an upward adjustment of patient care reimbursement rates paid to academic medical centers to defray the costs associated with training physicians.[25]

Direct pass through funding is also available to CMS-determined allied health education programs that are located within academic medical centers. These programs cannot reside in the academic affiliate or a university. To qualify for reimbursement, a program must be recognized by a national accrediting body, and the costs of the program must be entirely the responsibility of the academic medical center. Additionally, the program must prepare a student for employment within a specialty in which they could not otherwise have been employed.[26,27] A midwifery education program based in an academic medical center meets this definition. This direct pass through funding provides a stable annual income, separate from tuition income, to support program costs, including faculty salaries.

Determining Program Size

Of the 37 accredited CNM/CM education programs in the United States, 13 (35%) are campus based or predominantly campus based, meaning the curriculum is presented in person rather than by distance modality. These programs graduate an average of 11 students a year, with a range of 2 to 27.[28] Midwifery education programs in academic medical centers are campus based, and student class size is determined primarily by the interplay of 3 factors: the volume of women cared for by CNMs/CMs in the academic medical center, the amount of CMS funding, and the availability of other CNM/CM practices in the area able to host basic students.

Because the amount of CMS funding for program support will be based on the volume of care in which midwifery students participate in the academic medical center, the significant majority of student clinical experience must be at the academic medical center and its outpatient sites. And because accreditation requirements stipulate that most student midwife clinical experience must be with CNMs/CMs, the basic number of students is determined by the number of women CNMs/CMs care for in the academic medical center.

Given these basic principles, an academic medical center considering a midwifery education program should analyze its CNM/CM care volume. The CNM/CM patient volume should first be categorized by encounter type as detailed in the ACME program requirements for minimum number of student experiences.[23] For example, ACME requires that a program demonstrate student access to a minimum of 15 new antepartum visits and 20 births. If a program were to have 4 students, then the existing or planned midwifery services must be able to demonstrate a minimum of 60 new antepartum visits and 80 births in which students could participate. Because students are not in clinical training every day, and they do different clinical rotations at different times in the program, the midwifery services must determine that it can provide these experiences at the requisite times. In the above example, a midwifery service would need to be providing care to about 300 women giving birth a year.

Minimum reasonable faculty size is another important consideration. Running an entire curriculum and the administrative components of an education program in an academic medical center requires 1.5 to 2.0 full-time equivalent CNMs/CMs and a 0.5 to 1.0 full-time equivalent administrative assistant. A minimum class size of 4 to 6 students a year would provide enough CMS funding that, when combined with tuition income, would support this number of staff (S.A. Krause, CNM, MSN, Baystate Midwifery Education Program, data on file, 2017).

Programs may use CNM/CM clinical sites outside of the academic medical center for student experiences, but this student clinical time would not be used in calculation of CMS direct funding. However, these sites may allow for increasing

Table 1. How Baystate Midwifery Education Program Meets ACME Accreditation Criteria

ACME Criterion[23]	Baystate Midwifery Education Program
I. Organization and Administration Describes requirements for the institutional environment where a program resides. Program must be identifiable from other programs, have a direct relationship with the academic affiliate, be directed by a midwife, and be supported by key administrators.	Midwifery Education resides within Department of Obstetrics and Gynecology. Chair of the department reports to the Senior Vice President of Hospital Operations, who is responsible to the President and Chief Executive Officer of Baystate Health Systems. The Director of the Midwifery Education Program is supported by the CEO of Baystate Health and Dean of Education of University of Massachusetts Medical School-Baystate. The CEO reports to the Chief Academic Officer for Baystate Health, who is responsible to the Dean of University of Massachusetts Medical School. A memorandum of understanding exists with the Midwifery Institute of Thomas Jefferson University.
II. Faculty and Faculty Organization Incorporates requirements of faculty for preparation for teaching in the classroom and clinical setting. Requires that instruction, supervision, and evaluation of students be by CNM/CMs and that faculty will maintain clinical expertise and participate in scholarly activities.	All CNMs practice full scope in Baystate Midwifery and Women's Health. All CNMs have faculty appointments with UMass Medical School. Faculty development opportunities through UMass Medical School. Baystate Midwifery Education Program. Baystate Medical Center: Academic Affairs. Continuing education activities.
III. Students Incorporates admission criteria and policies, recruitment materials, student policies that address evaluation, progression, retention, dismissal, and graduation. Provides for students' rights and responsibilities.	CNM faculty recruit, interview, and admit all students; develop student, faculty, and administrative policies; and act as student advisors. Certificate from Baystate; master's degree through program articulation with Thomas Jefferson University.
IV. Curriculum and Student Learning Curriculum is based on statements of philosophy, purpose and mission, and objectives and outcomes. Curriculum is consistent with ACNM Core Competencies for Basic Midwifery Practice and contains the most up-to-date evidence base of midwifery practice. The program must provide access to a specific minimum number of full-scope clinical experiences.	Midwifery faculty develops and presents all curriculum. Courses and clinical occur concurrently. All nonclinical courses are midwifery focused. All CNMs are knowledgeable about curriculum flow. SNM clinical learning is with Division CNMs. Preceptors given designated time for beginning students.
V. Resources Program must provide adequate number of qualified faculty and secretarial, technical, and student support. Physical facility must be adequate to meet program objectives. Learning resources must be current, available, accessible, and adequate.	Funding through student tuition and CMS. Program space is on Baystate Medical Center campus and includes classroom, learning labs, Simulation Center, medical library, student space, and administrative offices.
VI. Assessment and Outcomes A comprehensive plan for ongoing assessment is required, including evaluation of program by students and graduates and from external constituents. Enrollment, graduation, and attrition numbers as well as certification pass rates are required.	Student, graduate, and employer satisfaction surveyed regularly. 113 graduates since 1991. 100% pass rate on AMCB examination. 25% students of color. Accredited until February 2028. Financially profitable since inception.

Abbreviations: ACME, Accreditation Commission for Midwifery Education; ACNM, American College of Nurse-Midwives; AMCB, American Midwifery Certification Board; CEO, Chief Education Officer; CMS, Centers for Medicare and Medicaid Services; CNM, certified nurse-midwife; CNM/CN, certified nurse-midwife/certified midwife; SNM, student nurse-midwife; UMass, University of Massachusetts.
Source: Accreditation Commission for Midwifery Education.[23]

Table 2. Advantages of an Academic Medical Center–Based Midwifery Education Program

For Students	For CNMs/CMs	For Others
Some learners prefer a campus-based environment, smaller class size, and classroom and clinical learning with the same faculty	Addition of faculty role to clinical role, with opportunity for academic track career development	Opportunities for interprofessional education with residents and other learners
Program in a clinical environment focused on learners, with a community of learners	Teach midwifery students	Presence of program enhances CNM/CM recruitment, reduces recruitment costs
Opportunities for interprofessional education	Preferred site for CNMs/CMs who want to remain in a clinical rather than university environment	Program has access to medical faculty to augment curriculum
Less costly than university-based program	Protected time for teaching and precepting	Residency programs have access to CNM/CM faculty expertise to augment their curricula
	Increased job satisfaction	Midwifery education program adds to prestige of academic medical center
	Contribute to the growth of the profession; increased visibility of midwifery in the institution and community	
	Access to CMS funding enhances program fiscal stability and longevity	

Abbreviations: CMS, Centers for Medicare and Medicaid Services; CNM/CM, certified nurse-midwife/certified midwife.

class size by 1 to 2 students a year, which would not significantly increase faculty nonclinical workload.

ADVANTAGES OF AN ACADEMIC MEDICAL CENTER–BASED PROGRAM

There are several advantages to housing a midwifery education program in an academic medical center (Table 2). The first is financial. Funding from CMS, plus tuition income, ensures that programs with even small numbers of student midwives can be self-supporting. These programs are also very affordable. Costs are lower and therefore tuition and fees are much less. Smaller brick and mortar programs attract and support different learners than large university or distance programs. This may be advantageous for first-generation college students and for those confined by family and financial responsibilities to a limited geographic area. Recruitment of students from local communities will also foster development of new or expanded midwifery practices and may enhance the numbers of midwives of color and those practicing in rural areas.

Midwifery education programs in academic medical centers may also provide increased job satisfaction among midwives already practicing or teaching in these sites. The ability to increase their faculty roles, develop academically, and teach midwifery is an attractive career component for many midwives. This enhanced role may facilitate recruitment and retention of midwives, as it has in our organization. Certainly, having a consistent pool of new graduate midwives is highly advantageous for any area as we face national shortages of maternity care providers.

Having midwifery students and faculty in the same environment as medical students and residents also creates many opportunities for interprofessional education. This is advantageous not only to the midwifery education program but also to medical school and residency programs, as they move toward curricula that foster collaborative learning and models of collaborative practice.

WHAT IT TAKES: ELEMENTS OF SUCCESS IN DEVELOPING A MIDWIFERY EDUCATION PROGRAM IN AN ACADEMIC MEDICAL CENTER

The first essential element needed to establish a midwifery education program in an academic medical center is for all stakeholders—midwives, physicians, nurses, and administrators—to appreciate a need for more midwifery care providers in their health care system and geographic area and have the desire and willingness to explore the possibility of a new program. This will take some time and effort. Table 3 lists elements of readiness that could serve as a starting point for discussion.

Next, there must be an adequate volume of women seeking care to support the clinical education needs of midwifery students. These clinical opportunities may already be available in existing nearby midwifery practices, in women cared for by physicians with excessive patient panels, or in new volume, serving women who presently cannot access care. It is helpful to have CNMs/CMs already in practice in the academic medical center. Although it is not impossible, it is certainly a more daunting process to establish both midwifery care and midwifery education at the same time.

A collaborative and respectful practice and education environment is required. All clinicians must be open to objective, dispassionate discussions of different evidence-based care approaches and be willing to acknowledge the many right ways that exist to deliver care. Midwifery and medical practice and education have much in common and also some differences. Negotiating these differences can be a valuable source of learning for faculty clinicians and also serves as a way to model professional behavior for learners.

Finally, some initial funding is necessary. Midwifery education program development takes 12 to 18 months, requiring CNM/CM faculty time and administrative support. Although tuition monies will provide some support once students are admitted, CMS reimbursement will not begin to accrue until the second year of the program. Possible sources of support include institutional startup or seed funding and

Table 3. Elements that Demonstrate Readiness to Start a Midwifery Education Program

There is a CNM/CM practice and/or a strong CNM/CM teaching presence
There in an obstetrics-gynecology residency program based in the academic medical center
The academic medical center has a formal affiliation with a degree-granting institution, or can develop one, to allow students to obtain the master's degree required to sit for the AMCB certification examination
Midwives and midwifery practice are supported
Good collaborative working relationships exist
Physicians, nurses, and administrators are supportive of the concept of a midwifery education program
CNMs/CMs are interested in teaching in a midwifery education program
There are area nurses interested in becoming midwives
There are local midwifery leaders interested in expanding midwifery and midwifery education

Abbreviations: AMCB, American Midwifery Certification Board; CNM/CM, certified nurse-midwife/certified midwife.

grant or legislative funding, such as workforce development money.

AN EXISTING MIDWIFERY EDUCATION PROGRAM IN AN ACADEMIC MEDICAL CENTER

Implementation and Master's Articulation

Established in 1991, Baystate Midwifery Education Program is an ACME-accredited basic nurse-midwifery education program based in an academic medical center in Massachusetts. The medical center, and hence the Midwifery Education Program, is an academic affiliate of the University of Massachusetts School of Medicine.

The program began as a basic certificate program. The American Midwifery Certification Board changed its requirements in 2005, requiring all new CNM/CM graduates to have a master's degree in order to take the board examination. The Baystate program was thus presented with an opportunity to evolve. The program partnered first with the University of Massachusetts Amherst School of Nursing to create a master's core curriculum of 5 courses that student midwives would take concurrently with the Baystate curriculum. Upon completion of both curricula, students were granted a certificate in midwifery from Baystate Medical Center and a master's in nursing from the University. This structure met requirements for program accreditation and entrance to the board examination.

In 2007, the School of Nursing announced plans to convert its clinical master's tracks to doctoral level. Concerned that a doctoral program would not meet the needs of its applicants, Baystate and the Midwifery Institute at Philadelphia University, now Thomas Jefferson College of Health Professions (Jefferson), developed an articulation agreement. Jefferson accepts all Baystate academic credit for midwifery coursework. Student midwives enroll in 4 master's midwifery courses online at Jefferson concurrently with their Baystate coursework, and at the completion of both programs are granted a certificate in midwifery from Baystate and a Master's of Science in Midwifery from Jefferson.

Funding

Funding to establish and support the program in its first years was obtained through 2 sources: a state workforce development grant and a Health Resource and Services Administration Division of Nursing (now Bureau of Health Workforce) grant. When this funding lapsed, the program was able to receive direct funding support from CMS. These direct funds support approximately half of all program expenses. The remainder is covered by tuition, which comes directly to the program. This funding supports 2.0 full-time equivalent CNM faculty, including a director, and a 1.0 full-time administrative assistant. The program has continued to be financially self-sustaining through a combination of CMS support and tuition.

Students and Curriculum

Each class matriculates in September and progresses through 21 consecutive months (5 semesters), earning 38 credits from Baystate and 12 credits from Jefferson. All Baystate classes are on site. CNM classroom teaching is supplemented with seminars presented by faculty physicians, lactation consultants, nutritionists, and community health partners. The majority of students' basic clinical experience is with CNMs in the Baystate Division of Midwifery, specifically the full-scope clinical practice, Baystate Midwifery and Women's Health. During the last semester of the program, students are placed with community midwifery practices for an integrated, off-site experience.

Class size is presently limited to 6 full-time students, based on available clinical volume. The Baystate Midwifery Education Program has graduated 113 midwives, all of whom have passed the national certification examination. Ninety-two percent of recent graduates have entered midwifery practice.

Faculty

Faculty in the program are all CNMs, and students are all registered nurses, as CMs are not authorized to practice in Massachusetts. Academic appointments for all faculty are granted by the academic affiliate. Midwifery faculty responsibilities include recruitment and admission of students; curriculum development and presentation; evaluation, mentoring, and advising students; clinical precepting; and program planning and evaluation. Opportunities for faculty professional development and scholarly work are built into the program, with many resources available through the larger Baystate and University of Massachusetts academic communities.

All midwives in the Division have precepting responsibilities and the opportunity to teach in the classroom. All faculty spend part of their time in clinical practice. This combination of supported time in teaching and clinical practice is a major

professional satisfier for the CNMs. CNMs also have the opportunity to do more or less teaching in any given year. The program also has supported time for preceptors in outpatient sites, so that clinical midwives with a panel of women to see do not have the additional responsibility of supervising a basic student.

CONCLUSION

The number of women needing health care in the United States is projected to increase significantly in the next 15 years, especially in the area of maternity care. The projected women's health care provider workforce will not be adequate to meet the demand. The midwifery profession should take advantage of all growth opportunities for educating more CNMs/CMs in order to meet the demand and grow the profession. Academic medical centers with obstetrics and gynecology residency programs are a largely untapped resource for establishing CNM/CM education programs. Our physician colleagues are increasingly supportive of collaborative practice and education models that include nonphysician clinicians such as midwives. And CNMs/CMs contribute positively to the value equation for both clinical education and practice, bringing expertise in the support of physiologic birth and improved birth outcomes. Midwives have historically shown creativity, dedication, and persistence in improving care for women and their families, and now must apply that energy and resolve to establish more midwifery education programs.

CONFLICT OF INTEREST

Susan Krause and Susan DeJoy are business partners in Midwifery Education Design and Development, LLC. They provide consultative services to health care and educational organizations to develop and sustain CNM/CM education programs.

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