The past, present and future of interdisciplinary teams in student training methods

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Dedication

I would like to thank my fiancée Matt, my parents Mary Jo and Ron, and my friend Sarah for without all of your suggestions, continued encouragement, and unwavering faith I could not have completed this work.
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Dr. Barbara Kopp Miller, thank you for the endless hours of proofreading, discussions, and advice you gave to help me create a comprehensive scholarly project which helped me learn how to overcome whatever barriers I might face in interactions with teams in the future. Interdisciplinary training is key for geriatric care of the future, hopefully others will learn from this. This work would not be the same without your help, thank you so much. To all others who have contributed to this work, thank you I could not have done it without you.
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Introduction

The American population is increasing in age with each passing decade. Consequently, citizens are living with a greater number of health problems for a longer period of time. This creates chaos and medical mistakes when trying to coordinate care between multiple providers that specialize in different areas of medicine. Interdisciplinary teams are integral in establishing and fulfilling the quality of care needed for the geriatric population. The purpose of this paper is to review the past, present and future of interdisciplinary teams both in student training methods and clinical application. Evidence will demonstrate why interdisciplinary teams are needed, what exactly an interdisciplinary team is and how health care professionals are trained for interdisciplinary teams through schooling, online learning, clinical experiences and simulation labs. Barriers to the success of interdisciplinary teams will be discussed as well as the efficiency and efficacy of successful interdisciplinary teams.

Statistics of elderly populations

The United States of America was once the melting pot, where many different ethnic races converged. Not only is the nation made up of different ethnicities, but different age groups as well. As the nation once worked to make a place for each race in the community, it must now work to care for each age group. In 2000, the United States Census showed 12% of the population was 65 years or older, equaling 35 million people (U.S. Census Bureau Population Division, 2008). Compare this to 2008 where 12.8% of the population was accounted for by persons 65 years and older (Greenberg, 2009). This accounts for 38.9 million persons in the population, comparable to one in every eight citizens. The subset of the population aged 65 and older is increasing in
number more so than the other subsets. It is estimated that by 2030, 19% of the population will be 65 or older, numbering 72 million. By 2050 the estimate is 20% equaling 88.5 million persons. Not only is the geriatric population getting larger but statistics show it is getting older as well. Life expectancy for those older than 65 years increased by only 2.5 years from 1900-1960. However, from 1960-2007 the life expectancy increased 4.2 years. This increase in the number of elderly as well as increased life expectancy carries numerous consequences for the health care system.

Caring for individuals greater than 65 years old in the United States becomes more complicated and more taxing on the health care system each year. According to Wolff, Starfield, and Anderson (2002), of those older than 65, 82% have been diagnosed with one or more chronic condition with 43% having three or more chronic conditions. Increasing age over 50, according to Alliance for Aging Research, doubles the chances of having lasting repercussions from an illness every 5-7 years (2005; as cited in Mion, Odegard, Resnick & Segal-Gidan, 2006). The number of persons living with co-morbid conditions increases as the population ages. This can often lead to increased need for personal care and assistance with activities of daily living. This increased need for service may lead to placement in a facility where full time help can be assured.

As chronic conditions persist and co-morbid conditions develop the number of prescriptions clinicians prescribe increases. The expenditure for prescription medications consumed by those 65 and older has more than doubled between 1995 and 2005 (Center for Disease Control and Prevention, 2010). The percentage of these individuals using medications has also gradually increased in the preceding years.
Combining different medications leads to drug interactions and can be fatal if the medications are not monitored by one provider or communication is inadequate.

There is an increased rate of emergency room visits for those greater than 65 compared to those 55-64, with 4,612 yearly visits and 3,006 yearly visits per 10,000 population, respectively (Center for Disease Control and Prevention, 2010). The number of individuals with a diagnosis after an emergency room visit of heart disease, heart attack, pneumonia or urinary tract infection is largely increased in those 65 and older as well. Not only is this age group diagnosed with serious conditions more but they also have an increased rate of adverse effects and complications from medical treatment received compared to their younger counterparts.

As medicine advances and the availability of technology increases, care for patients becomes more complex. Imaging, as well as laboratory, testing has become more widely available leading to increased need for interpretation skills for these modalities. Pharmaceutical companies produce more drugs requiring increased knowledge of a vast array of drug interactions and mechanisms of action. As technology increases the availability and outcomes of medicine technology also increases the challenge to mastering the art of medicine.

The increasing number of persons aged 65 and older with increased life expectancy, the increased use of prescriptions, as well as the rising rates of co-morbid and chronic medical conditions in the elderly populations are reasons why multiple providers are needed in the care of the geriatric patient. Without coordination between these providers care will be substandard and the patient will suffer. Competent interdisciplinary teams are needed to ensure the quality of care our older generations
deserve. Interdisciplinary care sounds promising, so now a deeper investigation of what interdisciplinary teams are will follow.
Details of Interdisciplinary Teams

What is an interdisciplinary team?

An interdisciplinary team is defined as “a group that consists of specialists from several fields combining skills and resources to present guidance and information” (Interdisciplinary team, 2008). An interdisciplinary team requires members from more than one profession and these individuals must work together to solve a goal. Interdisciplinary team members may come from a wide variety of professions such as: medicine, physician assistant studies, nursing, occupational therapy, physical therapy, recreational therapy, pharmacy, speech therapy, respiratory therapy, social work or other disciplines. Competencies are established in order to provide accountability and a means of assessing practitioners in the clinical setting. Each of these professions has different strengths, weaknesses and competencies to bring to the team which will be discussed below.

A physician is a medical professional who diagnoses and treats patients with medical disorders. Competencies required as a physician are medical expert, communicator, collaborator, manager, health advocate, scholar and professional (Verma, Paterson & Medves, 2006). Physicians will be honest and compassionate when dealing with patients, have appropriate relationships with patients and co-workers as well as appropriately deal with ethical issues involving consent, conflicts of interest and end of life issues.

A physician assistant is a health professional that is licensed to practice medicine under the supervision of a physician (“Becoming a physician assistant”, n.d.). As a physician assistant one is expected to maintain the established competencies no matter
what specialty area is pursued. A physician assistant must demonstrate proficiency in the areas of effective and appropriate application of medical knowledge, interpersonal and communication skills, patient care, professionalism, practice-based learning and improvement, system-based practice, a commitment to continual learning, professional growth and growth of the physician-physician assistant team as well as advocate for the benefit of the patients and the community (National Commission on Certification of Physician Assistant, 2003). A physician assistant interviews the patient, obtains a history and physical, creates a differential diagnosis, establishes a treatment plan and enacts the interventions needed to care for the patient such as ordering laboratory or other imaging tests as well as prescribing pharmaceutical management.

A nurse works with other healthcare professionals to educate patients and provide emotional support, along with recording patient histories, assisting with diagnostic tests and administering treatments and medications prescribed to the patient (“Health care careers directory”, n.d.). Competencies for nursing include professional service to the public, knowledge and application of it, ethics, continued competence and professional behavior, accountability and responsibility (Verma et al., 2006). Nurses are valuable in advocating for the patient and his/her rights during care. A nurse may be the main coordinator between many different healthcare professionals.

An occupational therapist is a professional that uses everyday life activities to address a limitation through physical, sensory, cognitive and social performances to increase quality of life for patients (American Occupational Therapy Association, 2004). Competencies related to occupational therapy are assumption of professional responsibility, demonstration of practice knowledge, utilization of practice processes,
critical thinking skills, effective communication, engagement in professional
development and management of practice environment (Verma et al., 2006). An
occupational therapist evaluates activities of daily living (ADLs) and instrumental
activities of daily living (IADLs) involving education, work, play and social participation.
The practitioner then creates interventions by adapting processes and modifying
environments and materials to make activities easier (Accreditation Council for
Occupational Therapy Education, 2006). These interventions assist patients with self
care and management as well as life in the community and at work.

A physical therapist is a healthcare professional that treats patients that have
medical or other health related conditions that affect their mobility and functioning for
activities in daily life (Guide to Physical Therapy Practice, 2003). Competencies
required for physical therapists are professional accountability, client assessment,
physical therapy diagnosis and planning, implementation and evaluation of physical
therapy intervention, communication and interdisciplinary practice and organization and
delivery of physiotherapy services (Verma et al., 2006). Contributions to an
interdisciplinary team might include: diagnostic test selection and performance for
postural alignment, gait, locomotion, balance, range of motion and strength; observance
of activities of daily living (ADL) and instrumental activities of daily living (IADL) as well
as instructing and educating patients and caregivers (American Physical Therapy
Association, 2005). Physical therapists seek to identify and prioritize the impairments of
the patient to perform interventions for improvement in physical dysfunctions.

A pharmacist is a professional who provides medications to patients that have
been prescribed by doctors or other qualified practitioners (“Health care careers
Pharmacists provide information about the drugs and their use to the patients. A pharmacist may also counsel practitioners on the selection of appropriate drugs for specific diseases and the interactions, side effects profiles, and dosages that are relevant.

A speech-language pathologist is a professional who works with patients that have a speech or language disorder which inhibits their ability to talk, understand, read or write (“Speech language disorders”, 2010). Speech-language pathologists evaluate speech, language, cognitive-communication and swallowing skills of patients, determine what problem exists and formulate a plan for treatment (Knowledge and Skills Acquisition, 2005). These professionals focus on articulation, fluency, voice and resonance, phonation and the cognitive and social aspects of communication for patients with communication disorders.

A dietician is a nutritionist that uses the science of food, biochemistry, physiology and the behavior of people to incorporate healthful eating into the patient (“Health care careers directory”, n.d.). A dietician uses medical nutrition therapy to treat patients that have chronic conditions to increase their health status. A dietician may specialize in needed areas such as diabetes, heart disease or pediatrics.

Many of the professions previously noted hold similar values and required competencies such as professionalism, ethics, critical thinking and communication. A statement released in 2003 by the Institute of Medicine suggested five core competencies which should be included in the education of health professionals (as cited in Burning et al., 2009). These competencies included: patient centered care, membership to an interprofessional team, evidence based practice, quality improvement
and informatics. Teaching all professions these skills could increase the success of interdisciplinary teams. The specific skill set and scope of practice are what creates the boundaries for different professions and each member of the team.

Interdisciplinary practice is defined as “a partnership between a team of health professionals and a client in a participatory, collaborative and coordinated approach to shared decision-making around health issues” (Orchard, Curran & Kabene, 2005). Being a member of an interdisciplinary team requires unique skills and knowledge to be able to perform a more comprehensive evaluation of the patient and to collaborate care with others (Mion et al., 2006). Interdisciplinary teams are referred to by many different names. An investigation of the terminology will enhance understanding of the topic.

**Terminology**

As interdisciplinary teams become more well understood, more important and therefore more common place, the terminology used becomes more complex. Like many other medical terms there are multiple words that can be used to describe an interdisciplinary team. In reference to interdisciplinary terminology these words address similar issues and are often used interchangeably: interprofessional, multidisciplinary, transdisciplinary and interdisciplinary.

Multidisciplinary and interdisciplinary are terms that have similar but different meanings. They both incorporate different professions into the coordinated care of an individual; however, multidisciplinary care suggestions are made by all involved but the decision for the care plan and such is made by one individual, usually the physician (Siegler, Fulmer & Mezey 1998). Contrast this with interdisciplinary care teams where the decisions are made by more than one discipline. Multidisciplinary team members
are thought to work in parallel or sequentially while interdisciplinary teams work jointly or
together to care for the patient (Mitchell, 2005).

Transdisciplinary care extends the roles of each discipline further into the role of
another. Each team member is called to understand the other disciplines competencies,
strengths and weakness and sometimes fulfill another’s role in transdisciplinary teams
(Hinton Walker et al., 1998). Nowotny (2005) implied that in transdisciplinary teams the
traditional role boundaries do not apply (as cited in Mitchell, 2005).

Interprofessional teams can be thought of most similarly to interdisciplinary
teams. Interprofessionality is defined as “the development of a cohesive practice
between professionals from different disciplines” (D’Amour & Oandasan, 2005). This
involves professional reflection on and development of ways of practicing that provides
an integrated and cohesive answer to the needs of the client. D’Amour and Oandasan
(2005) suggested that interdisciplinary matters focus on the cohesion of fragmented
knowledge that exists between disciplines where as interprofessional matters facilitate
more collaborative interaction between professionals.

The key to each type of team is that respect is given to each member and the
team as a whole is able to facilitate their specific services and competencies.
Throughout this work, the term interdisciplinary will be used. Now that understanding of
interdisciplinary teams has been established, the subject of why interdisciplinary teams
are needed will be more completely explained.

**Why interdisciplinary teams are needed**

The geriatric population is the keynote example of a group in which
interdisciplinary care may benefit the patient most significantly (Siegler et al., 1998). As
the population trend of elderly persons is exponentially increasing, it is important to learn how to better care for the geriatric patient. As the older generations begin to live longer they develop more co-morbid diseases which complicate the treatments of all disease states within that individual. As the number of individuals living with co-morbid conditions rises, complexity of care increases leading to a need for more in depth specialization in medicine (Lary, Lavigne, Muma, Jones & Hoeft, 1997).

Conditions such as end stage renal disease, cancer, and even diabetes need specialized clinicians to incorporate communication and interdisciplinary management into the care plan (Hyer, Fairchild, Abraham, Mezey & Fulmer, 2000). The complexity of medicine interactions as well as the chronic nature of these disorders requires special attention and frequent follow-ups.

The clinical assessment as well as delivering quality care becomes more challenging in these individuals (Mion et al., 2006). With a team of individuals working together interactions between medications, the risk of causing delirium, or even falls may be decreased.

It has been found that 43% of errors which occurred in the emergency department were due to team communication problems (Shapiro et al., 2004) Decreased mortality, fewer nursing home placements, and more precise diagnoses have been found when interdisciplinary teams were used (Rubenstein, Josephson, Wieland, English, Sayre & Kane, 1984).

As stated above there are many reasons for interdisciplinary teams. The increasing number of older adults with increasing co-morbid conditions and a greater life expectancy leads to a more challenging clinical assessment. This as well as more
specialized medicine leads to more medical errors which can be decreased by interdisciplinary teams. Interactions among and between health care professionals through interdisciplinary teams coordinates every aspect of an individual's medical care to increase satisfaction and outcomes. The skills to accomplish efficiency and precision are gained through many different pathways of interdisciplinary team training which will be reviewed next.
How Healthcare Professionals are Trained for Interdisciplinary Teams

Now that it has been demonstrated that interdisciplinary teams are important to the care received by the population, especially those aged 65 and older, it is time to explore how the members of these teams are trained to bring their competencies together and fulfill practice requirements. The interdisciplinary approach that can be so necessary and valuable to a patient’s care is taught in school through the curriculum, in the workplace/facility providing care or sometimes both. Does the manner in which this care is taught or the timing of the teaching effect the outcome? What does the future of interdisciplinary team teaching look like? These issues will be discussed further.

College Curriculum

There are many different examples of how students have been taught interdisciplinary skills in school throughout the past fifteen years. These experiences encompass service learning experiences involving the community, problem based learning, and e-learning experiences. Service learning is a way for students to increase knowledge as well as apply previous knowledge through experience in the community. Service learning benefits the students, the community, and the faculty (Sternas, O’Hare, Lehman & Milligan, 1999). E-learning, according to Tella, Vahtivuori, Vuorento and Wager, uses computers and information networks to assist students in gaining knowledge (as cited in Juntunen & Heikkinen, 2004). A review of the methods of this literature will follow.

Service learning

Service learning is a technique that has been used in college learning for many different purposes in the past and continues to be used presently. It is an effective
means of teaching as well as a method that benefits the community in which the students learn.

In one service learning study the purpose was to provide a service learning experience to prepare medical and nursing students to work together in the future while currently helping the local community (Sternas et al., 1999). Four planning sessions to develop health promotion activities lasting around an hour each allowed students to connect and share ideas. These students created health education sessions on nutrition, high blood pressure, and exercise as well as providing blood pressure screenings for elderly parishioners of a community church (Sternas et al., 1999). During the planning sessions the students discussed the differences in education between nurses and medical students as well as the professional skills which could be provided by each group. After this experience was completed the participating students expressed a better understanding and appreciation of each other’s roles as future professionals. They also expressed confidence in working as a team. The results of this experience showed benefits to the students and the elderly parishioners of the church and the activity was continued after the study (Sternas et al., 1999). Exposure to other cultures and professions is the easiest way to increase knowledge of and comfort with other people. This study showed this principle was a success.

Another service learning activity, the Gerontological Initiatives for Visionary Education (GIVE) Project, was undertaken to give occupational therapy and physical therapy students the ability to enter the community and provide service to underserved older adults while advancing clinical skills (Kopp Miller, Ishler, & Heater, 1999). During phase I of the project thirty-nine occupational therapy students and eighty-four physical
therapy students from the Medical College of Ohio were gathered at mini-conferences throughout their didactic training to enhance knowledge of health promotion and disease prevention as well as instruction on implementation of interdisciplinary programs. This provided approximately twenty-five hours of training. A post-test survey was completed by 67% of these students after this portion of the study. This survey found gains in knowledge related to older adults and health assessments, development of skills and team work as well as a change in attitudes towards older adults and team members.

During phase II of the study thirteen of the one hundred twenty-three students applied and then were selected to participate in a program that would assess the needs of a community and from this information implement health promotion programs to fill these needs. These thirteen students also participated in a seminar which expanded their knowledge of interdisciplinary collaboration along with assessment methodologies and program development. The four occupational therapy and nine physical therapy student participants completed a post test survey for this phase to aid in the ability to determine the success of the project. The post-test surveys completed by 100% of phase II students showed that participants in this phase of the study had gained knowledge and skills about interdisciplinary teams and experienced a positive change in attitude related to older adults. The survey showed a gain and understanding of working with members of rural communities and a greater ability in conducting needs assessments and interpreting and analyzing assessment results. The increases in these domains were found to be higher in those who participated in phase II with implementation of a community needed promotion project compared to those who only
participated in phase I with the didactic training. Students who participated in phase II were more likely to work in underserved areas with a large percentage of older adults post graduation. Students from this project admitted to an increase in their abilities to function as members of an interdisciplinary team (Kopp Miller et al., 1999). This project helped to increase the success of interdisciplinary teams in the workplace by allowing students to learn team skills and be exposed to interdisciplinary teams during schooling.

Expanding from the GIVE Project was a similar endeavor, the Rural Elderly Assessment Project (REAP). This study aimed to help students from different disciplines to be able to work together as a team for geriatric health assessments in the rural communities of Ohio (Kopp Miller & Ishler, 2001). This service learning experience included nine occupational therapy, nine physical therapy, one public health and six physician assistant students from the Medical College of Ohio. The twenty-five student participants were broken into teams consisting of at least one member from each discipline and were lead by an interdisciplinary faculty member. Prior to beginning the experience student participants completed a pre-test questionnaire to gain a base-line understanding of self-reported skills and knowledge of older adults as well as rural culture and health promotion and assessment. The student members of the team from each discipline developed an assessment tool specific to their discipline. Then, after joining with the members from the other disciplines, community exposure allowed the students to observe the different disciplines’ assessment tools in action. After the experience the student participants took a twenty item Team Skills Scale post-test questionnaire to measure the perception of their own abilities in interdisciplinary team work. The results of this study based on the pre and post test measurements showed
an increase in knowledge of other disciplines and skills for working with an interdisciplinary team. Clinical and interviewing skills were increased in these participants as well as sensitivity to older adults and their specific issues. Participants noted an increase in confidence and communication skills from this experience (Kopp Miller & Ishler, 2001). The REAP project allowed students from four disciplines to interact as a successful interdisciplinary team encouraging interaction as a unit in the future and allowing the students to develop skills while in school that will contribute to success in teams for the future. This project stressed the importance of the faculty role modeling the interdisciplinary vision to facilitate learning by students. This is an important tactic that can be used in the workplace in the future to increase the success of interdisciplinary teams.

Another example of service learning for interdisciplinary teams occurred through The PROMISE Institute (Thomas & Kopp Miller, 2005). PROMISE stands for Providing Resources, Opportunities, and Mentorship in Interdisciplinary Service and Education. A federal grant was obtained, similarly to the GIVE and REAP projects, and knowledge of GIVE and REAP were expanded on to develop an institute that could offer education to students and faculty to increase abilities in interdisciplinary and culturally competent care. The interdisciplinary team certificate program was developed and instituted over three years. Participants included seven physician assistant students, seven physical therapy students, two public health students and eight occupational therapy students. Seminar classes for cultural competence and interdisciplinary service were undertaken to provide care for underserved communities. As the course progressed students used the knowledge gained through the seminars to develop health promotion assessments
for the underserved population. Students then followed up with community clients and gave recommendations and education. From this experience students learned how to interact with older adults while making treatment plans to fit the financial and cultural aspects of the clients and increasing skills for communication with different professionals. Interdisciplinary team workshops involved one hundred students from four local colleges and twelve different professions who gathered to discuss cases and falsify myths about different professions. Representatives from each area informed others about how their respective professions would contribute in the geriatric cases presented. Students admitted increased knowledge and comfort with other disciplines because of these workshops and stated increased desire to consult with other services because of a greater understanding. The last goal of the PROMISE institute created a tool to determine the usefulness of the above mentioned study components. Participants were followed after graduation and information was gathered on the practicality of the experience as well as the influence it had on future career decisions. Further results of this study have not yet been published. This study was successful in allowing students to learn about other disciplines and participate in interdisciplinary teams while serving the underserved community around them. 

Service learning exercises provide one method of teaching interdisciplinary team training but require immense planning and coordination of schedules which can often be difficult. E-learning is another method of interdisciplinary team training that has been used to overcome these barriers.

E-learning
Electronic learning (e-learning) is another avenue through which interdisciplinary teaching can occur. One e-learning study aimed to increase common knowledge about the elderly and develop interdisciplinary ways to support this population (Juntunen & Heikkinen, 2004). In this experience one hundred twelve students of nursing, social studies and physiotherapy of four Finnish polytechnics used self motivation and direction to fulfill an e-module on the care of the elderly. The goals of this study were achieved by an interdisciplinary faculty directing students to create material for the web on a certain topic, observe this issue in daily practice and analyze observations with peers of different disciplines. Students completed an electronic post test evaluation questionnaire as well as open comments to allow analysis of the results for the study. The analysis showed the study to be successful as students from different disciplines displayed interprofessional planning abilities as well as techniques to asses and implement content on the web. Students from this experience stated that their knowledge of the elderly was increased from the many different points of view that were expressed and experienced (Juntunen & Heikkinen, 2004). The study demonstrated that using e-learning is an acceptable method to teach interdisciplinary skills to students of different disciplines.

E-learning and interdisciplinary training allows individuals separated by distance or schedule conflicts to partake in the expanding of knowledge and increase in interdisciplinary team skills. In interdisciplinary e-learning, it has been demonstrated that students are willing to seek answers to questions they would not explore in a face to face meeting (Skorga, 2002). As our society becomes more technology based the upcoming generations may feel more comfortable with e-learning instead of a face to
face method. However, since this is not a true model of all real life interdisciplinary interaction it should not be relied on as the sole means of interdisciplinary teaching.

E-learning allows non-traditional students to increase knowledge and participation with interdisciplinary teams using an “anytime, anywhere” approach (Skorga, 2002). Communication through the internet simulates group interaction. Use of small groups through problem based learning and case studies are another pathway to interdisciplinary team training.

**Problem Based Learning (PBL)**

Problem based learning is a strategy of teaching that helps solidify knowledge that has been previously gained. Students from different disciplines gather and operate in small groups to work through the process of care that could be delivered to a patient based on a scenario and case presentation that is distributed (Lary et al., 1997). Problem based learning helps students enact knowledge learned during the didactic year into clinical solutions for case presentations (Bruhn, 1992). When completed in a small group setting problem based learning enables students to learn how to appreciate other’s views as well as listen to incorporate their suggestions to create a diagnosis or care plan as an interdisciplinary team (Makaram, 1995). Problem based learning is a wonderful teaching tool that can easily be transformed from a unidisciplinary setting into an interdisciplinary experience. Gathering medical, physician assistant, nursing, occupational therapy and physical therapy students to create care plans together would simulate the real life interdisciplinary team in action.

One study used problem based learning to aid students in understanding and providing comprehensive assessments for underserved populations (Lary et al., 1997).
These participants included forty-three physician assistant students, thirty-four physical therapy students and thirty-two dental hygiene students. Interdisciplinary problem based learning was used to expand knowledge about other disciplines and the skills needed for each individual profession while increasing personal clinical skills. The one hundred nine students took pre and post tests measuring the knowledge of the other professions before and after discipline specific presentations. Fifteen students, five from each discipline, continued with the study participating in the problem based learning portion. Students from each discipline were given a case presentation to discuss and analyze and were provided with more detailed case information as time progressed. These students then performed a discipline specific examination of a mock patient, then assisted and observed the other team members’ assessments. At the conclusion of the later phases of this project the remaining fifteen students completed a final questionnaire evaluating problem-based teaching methods. This study did not see a significant difference in pre and post test scores after presentation of discipline specific material. However, the fifteen students who completed the study and were involved in the problem based learning activities noted increased problem solving skills as well as increased ability to work in groups as an interdisciplinary team. The study demonstrated problem based learning helped the students to learn about other disciplines and their roles as a profession (Lary et al., 1997).

In another problem based learning exercise medical students were gathered to be educated about other members of an interdisciplinary team and the importance of communication and collaboration with these members (Heuer, Geisler, Kamienski, Langevin & O'Sullivan Maillet, 2010). This project was undertaken to increase
awareness of the scope of practice of other professions, increase appreciation for communication within an interdisciplinary team and to educate about when to refer to another profession. One hundred sixteen third year medical students were introduced to eight other professions before departure for their clinical rotations. These professions included: medical imaging, dietetics/nutrition, laboratory technology, nursing, physical therapy, physician assistant, respiratory therapy and social work. The students attended one 60 minute session which included a video displaying the interaction of these eight professions during an interdisciplinary care meeting. This was followed by a complex case presentation requiring the service of each profession in some way, discussion followed. Then a brief presentation of each profession discussing the scope of practice, expertise and other pertinent information along with a handout about each was provided for the medical students. A twelve question post test survey was completed by all one hundred sixteen students. This study showed an increase in awareness of other professions as well as an enhanced appreciation for communication. The students felt this was a relevant experience to being a medical student. Students specifically mentioned an increased understanding of when to refer patients to other professions. This study was successful at increasing the knowledge of medical students about interdisciplinary communication.

Interdisciplinary team training taught throughout the didactic portion of schooling in service learning experiences, e-learning, or problem based learning can be the first exposure to interdisciplinary teams. Further training for interdisciplinary teams, or often times even the first exposure, can occur in the clinical portion of schooling for many students.
Clinical Experience

Interdisciplinary skills can be taught in the college curriculum or may be delayed until a student’s clinical experience. Many factors contribute to the difference in timing for different institutions. A few clinical sites that offer interdisciplinary team training will be discussed including multidisciplinary rounds in a hospital and a geriatric evaluation unit.

One of the first studies undertaken in the workplace demonstrated the many benefits of a successful interdisciplinary team (Rubenstein et al., 1984). The establishment of a geriatric evaluation unit in an intermediate-care facility allowed the procurement of this data. An interdisciplinary team was employed including: a physician, a geriatric fellow, a physician assistant, a social worker, nurses, nursing assistants, a clinical psychologist, a dietician, occupational therapists, physical therapists, a fellow of geriatric dentistry, an audiologist and a public health nurse. New patients to this unit were evaluated by the individual professionals as needed per case. A weekly meeting of the interdisciplinary team was used to discuss treatment options and finalize a care plan for each patient. Progress of each patient was then reviewed weekly at the interdisciplinary team meeting. Patients in this unit were compared to a control group who returned home or were moved into a long term care facility. Patients who resided on the geriatric unit had a decreased mortality rate compared to the control group, 23.8% and 48.3% respectively. Patients leaving the geriatric evaluation unit were discharged home at a significantly higher rate than the control group; 73% compare to 53.3% respectively. Functional status increased in unit patients compared to the control group. The cost of the unit, although initially more expensive, was equal to the control
groups costs by the twelve month time period (Rubenstein et al., 1984). This study demonstrated that successful use of interdisciplinary teams can increase functional status of patients, decrease mortality rates, decrease use of nursing homes and still be cost effective.

A study was conducted to determine if multidisciplinary teams had an effect on competencies required by the Joint Commission on Accreditation of Healthcare Organizations, JCAHO (O'Mahony, Mazur, Charney, Wang & Fine, 2007). These competencies assess quality core measure performance in specific conditions such as: congestive heart failure, pneumonia and acute myocardial infarctions. Length of stay and education of the residents involved in patient care were also followed. The multidisciplinary team met three times a week for one hour and was led by the chief of medicine and a clinician educator. The team included: case managers, nurse coordinators, a dietician, pharmacists, residents and a physician assistant. After presentation of data by the nurses, the residents would discuss the cases and incorporate aspects of care from the entire multidisciplinary team. Tasks to carry out these new care plans were divided appropriately among the members. The results of the data showed a statistically significant increase in the core measures required by JCAHO for pneumonia, congestive heart failure and acute myocardial infarctions. There was also a decrease in length of stay for patients with congestive heart failure, acute myocardial infarctions and pneumonia. After the completion of these multidisciplinary team rounds the residents reported an increase in communication with the other disciplines that had been involved. In contrast to the financial obligation that must be surpassed to achieve an interdisciplinary program in a school, these multidisciplinary
rounds were without financial obligation and only cost the participants three hours a week (O’Mahony et al., 2007). This study demonstrated that multidisciplinary rounds in a hospital setting can be a beneficial place to teach and incorporate interdisciplinary teams and training without a large monetary obligation to a university. The success of the interdisciplinary team was shown to provide better care to the patient through decreased length of stay in the hospital as well as an increase in standards required by the accrediting body of hospitals.

Implementing the knowledge learned from school on patients can be intimidating and confusing for students. The complexity of co-morbid conditions makes medicine more challenging and can often lead to mistakes by students. Simulation is one method available for increasing the comfort of students with patient care scenarios as well as training, exposure and familiarization of interdisciplinary teams.

**Simulation: Interdisciplinary training of the future**

There are many different types of simulation currently available. Simulation ranges from a group of students using a pre-produced CD ROM to answer prompted questions (Rodehorst, Wilhelm, & Jensen, 2005), to actors or other students portraying patients or to virtual reality based human patient simulators (Fernandez, Parker, Kalus, Miller, & Compton, 2007). Simulation allows students to use their critical thinking abilities to solve clinical problems and implement care without harming a patient. Simulation experiences allow students to interact with students of other professions to develop teamwork skills and to improve competency of skills needed to succeed in each profession. Simulation may give students the confidence to be assertive and attempt procedures and treatment for complicated patients. This type of experience might
otherwise be without practice until late into the clinical experience when trust and
proficiency have been gained by the clinical supervisor.

Simulation is an important student learning technique. A learning cycle has been
suggested by Dennison: do-review-learn-apply (as cited in Fernandez et al., 2007).
Simulation allows for this process to be carried out when the students participate in the
experience, followed by the debriefing session which helps them review and learn new
techniques. To solidify the knowledge another simulation should be performed so the
students can apply the new knowledge. Simulation is unlike other teaching techniques
which often don’t allow this cycle.

In one simulation experience study students were gathered to determine if CD
ROM technology could aid students in clarifying the roles of different disciplines in an
interdisciplinary team when providing care for patients with asthma (Rodehorst et al.,
2005). The twenty-six participants in this study included twelve nursing students, six
medical students, one respiratory therapy student and seven pharmacy students.
Students spent approximately one hour viewing the CD and discussing and answering
the prompted questions. After answering the questions, verbal and video feedback was
provided to the students. The CD experience was followed by a thirty minute semi-
structured interview discussing the use of the CD and the experience. The results of the
study revealed that using a CD ROM to help teach interdisciplinary roles may be
beneficial. This experience supported student gains in homophily, seeing similarities yet
knowing differences, by helping students see the similarities between disciplines and
also to clarify the roles each plays in the interdisciplinary team through professional
orientation. Students felt that interdisciplinary teams would help lessen the differences
among teams while building a community feeling. Students also expressed the positive aspects of this experience occurring early in training (Rodehorst et al., 2005).

In another simulation experience a human patient simulation was used to determine the effectiveness of, as well as, the acceptance of students to interdisciplinary teamwork skills and training (Fernandez et al., 2007). Seventy-three pharmacy students from Wayne State University were exposed to an emergency cardiac scenario and were asked to make recommendations to the physician and nursing teams about medications needed for the scenario. The simulator was able to display realistic vitals and other physical findings like heart and lung sounds. The simulator was able to respond to questions through a radio transmitter and faculty in an adjoining room. Following this experience, students gathered with an advisor and were debriefed about the experience and were given feedback about performance. Students were asked to discuss how better to meet the patients needs after hearing the expectations from the interdisciplinary training team which included a nurse, a pharmacy student and a physician. The students then immediately completed a post-test survey. The authors concluded that the human patient simulation experience allowed students to better understand their role in an interdisciplinary team and increased the level of comfort with patient care. Students' comments were positive including requests to incorporate more experiences similar to the simulation into their learning experiences. Students also expressed a feeling of more confidence for future clinical practice.

Simulation has been found to be helpful in all different settings. Students who participated in the human patient simulator study expressed a greater amount of
learning throughout the experience compared to being taught during a lecture (Fernandez et al., 2007). Simulation allows a realistic experience with environmental hurdles and patient and other health care professional encounters to challenge the application of material learned by each student. This allows students a more realistic way to determine their knowledge level and comfort with patient care. However, as technology increases in interdisciplinary team training, from the use of a CD ROM to a human patient simulator, so does the cost of the program. Therefore, this is often the limiting factor in simulation experience. Not only is technology expensive but this type of experience requires faculty supervision as well, increasing the cost further.

**How simulation should be taught**

The purpose of the LeFlore and Anderson (2009) study was to determine which type of simulation, self-directed, instructor cued or expert modeled, produced better outcomes. Each approach leaves students with a different experience and knowledge gain. Involved in this experience were ninety-one individuals consisting of thirteen nurse practitioner students, thirteen registered nursing students, thirteen social work students and thirteen respiratory therapy students. These students were divided into thirteen teams consisting of one person from each discipline and were randomized into the self-directed or instructor modeled group. In the self-directed experience students were told to perform an assessment and initiate care for the patient based on presenting symptoms. No further cues or prompts were given to the students by the facilitator. In another group the students observed the facilitator performing the assessment and care and then participated in the same experience themselves. Participants took a pre and post discipline specific knowledge assessment test, completed a post test satisfaction
survey measuring the satisfaction to the approach used during simulation, and were evaluated on time to intervention. There was no statistical difference for the pre and post knowledge test for any discipline. After analyzing a satisfaction survey it was found that students who participated in the expert modeled experience had higher rates of satisfaction with the experience along with feeling more comfortable in performing the assessment and care. Time to intervention was decreased in the instructor modeled group in the majority of techniques evaluated. Also, a leader more commonly emerged from the expert modeled experience than when the group was self directed. Expert modeling may help to decrease role confusion among the interdisciplinary team as well as lead to faster care for the patient and higher satisfaction for student learning. Students may benefit from expert modeled simulation experiences in the early learning of simulation and might be challenged to become self-directed after a few experiences as this would more closely reflect actual patient care.

Interdisciplinary team training is important for students to be exposed to. This training can occur in many different manners such as throughout the college curriculum with service learning, e-learning or problem based learning. Experiences also manifest during clinical experience through multidisciplinary rounds or exposure to a geriatric evaluation unit. Simulation is another option available for interdisciplinary team training through the use of CD ROMs or human patient simulators. Simulation opportunities may increase in number and variety as technology continues to be incorporated into medicine and healthcare training. Even though interdisciplinary team training is very important to the success of teams in the clinical arena there are many barriers which
exist decreasing the availability of training for students. These barriers will be discussed in detail.
Barriers to Interdisciplinary Team Training Success

Barriers to interdisciplinary team training can be encountered in the school curriculum as well as in the clinical arena and work environment. Barriers should not preclude the exposure to training but do exist and must be managed. Barriers to interdisciplinary team training in general as well as specifics for schooling and work environments will be discussed.

Barriers to successful interdisciplinary team interactions can broadly be categorized into three topics: organizational structuralism, power relationships, and role socialization (Orchard et al., 2005). First, organizational structuralism is composed of the regulations placed by the institution, insurance agencies and the government that may take away decision making abilities from the team. This can be a source of conflict among members when procedures cannot be obtained for a patient and different methods are suggested by members to alleviate the problem.

Next, when clinicians do not know the competencies of other team members, anxiety may result and a power struggle may ensue (Hall & Weaver, 2001). Likewise, members may feel resentful or underutilized which may lead to unproductive behaviors. Some members of the team may believe they are entitled to lead or overtake the team without founded reasoning (Orchard et al., 2005).

Finally, role socialization is developed from the very beginning of training for a particular profession (Orchard et al., 2005). During school one is introduced to his/her respective professional organization. Affiliation and emotional ties are established through scholarship opportunities, conferences and other outside events. This affiliation
only strengthens the unidisciplinary thought process and loyalty that students feel, hampering the development of future interdisciplinary team success (Jansen, 2008).

Outwardly, most professional organizations encourage interdisciplinary interaction; however, the strong ties that have already been developed throughout schooling may not supersede this mild encouragement, especially when the fear of litigation arises if something were to go wrong in a team setting (Jansen, 2008). In this way, professional organizations which are built to protect ones’ own can be seen as a barrier.

As specialization increases in medicine a new vocabulary develops among each group of specialized practitioners (Hall & Weaver, 2001). This new vocabulary can make reading other practitioners’ notes and deciphering orders more difficult. This brings an added challenge in caring for patients who see other practitioners when there is no communication which can create resentment toward other practitioners.

The most significant reasons interdisciplinary training is not occurring in all institutions is linked to a lack of funding and logistical issues (Jansen, 2008). It often takes years to underwrite and develop a program, and recruit faculty members willing to make interdisciplinary training a success. This is then followed by more time to enact the program, determine if it is a success and remodel the aspects that have failed. This leaves funders with a drastic amount of time without assurance that the money has been allocated to the best use. If faculty are not convinced of the importance of interdisciplinary education this can be the largest barrier to training for students as it requires increased work without a surplus of time (Buring et al., 2009). Scheduling interdisciplinary classes to align with the different timelines and plans of study for
different professional programs and universities can create a logistical nightmare, also decreasing the chance for implementations of interdisciplinary learning.

Another barrier to the implementation of interdisciplinary teams through education is the lack of interdisciplinary teams in the field (Burning et al., 2009). Not all health settings have adopted the use of interdisciplinary teams to facilitate quality care for patients. This decreases the amount of pressure a school may receive to prompt the beginning of interdisciplinary training in the curriculum. Also, without a universal tool to assess the outcomes of interdisciplinary education there is no clear cut way to demonstrate to programs if they are being successful with the interdisciplinary education. These barriers must be overcome in order to provide patients with quality care and to ensure the success of interdisciplinary teams in the future.

**How to Break the Barriers**

The barriers to a successful interdisciplinary team can be broken down through role clarification, role valuing, developing trusting relationships and power sharing (Orchard et al., 2005). First, role clarification requires each team member and discipline to: understand their own roles, expertise and responsibilities; establish confidence in skill; set boundaries for practice standards and become committed to the ethics established by the discipline. Then, once clarification has been established role valuing can begin where members of the team share the clarified information with others and respect develops for the different members and their skills (Orchard et al., 2005).

As respect develops trust will follow when there is a true understanding and appreciation of the others’ roles for the team (Orchard et al., 2005). Without respect and trust there is no opportunity for more than one individual to work together. Therefore,
these traits must be established for a successful team (Mion et al., 2006). Team building workshops and out of office activities can foster respectful and trusting relationships.

Finally, power sharing will eventually follow when decision making is joint which can only occur if trust has been established (Orchard et al., 2005). When team leaders can efficiently direct a team, satisfaction is greater and members feel they are wasting less time. Structuring meetings, communicating well with the other members of the team, and being effective at conflict resolution will help increase satisfaction with team interactions and create more efficient gatherings leading to successful interdisciplinary teams (Hyer et al., 2000).

Often, roles of medical professions blur and conflicts result from a feeling that someone else has overstepped a boundary. This can be averted by having concrete rules and roles for each member of the team (Mion et al., 2006). This information can be gained through many of the different experiences discussed above in interdisciplinary team training.

Determining all team members' attitudes toward the interdisciplinary team may help to decrease barriers to success and increase satisfaction when working in a team. A twenty-one item scale was developed by to measure attitudes and was called 'Attitudes Toward Health Care Teams' Scale (ATHCTS) (Heinemann, Schmitt, Farrell & Brallier, 1999). This validated and reliable scale uses three factors found to be important in determining the attitudes and effectiveness of members of the team: team value, team efficacy, and shared leadership. Ascertaining the team members responses to this questionnaire can help the team leader to implement changes to better suit the
personalities found within each team. The authors of the scale recommend its use as a pre and posttest assessment tool for evaluating team training.

Another means of breaking barriers and evaluating the successful nature of an interdisciplinary team is observation of willing participation in the group as well as the sharing of power. When barriers have been broken, these characteristics will be determined by expertise in a certain area and not the professional title behind a name. This demonstrates that a successful interdisciplinary team can result (Heinemann et al., 1999).

It is believed that the timing of interdisciplinary team training may have an effect on the barriers that inhibit team successes. Currently there are differing opinions on the time frame in which interdisciplinary teaching should occur. One thought process promotes interdisciplinary team training as early into the educational process as possible. Horak, O’Leary and Carlson (1998) believe this will help to decrease the formation of barriers that may limit success in the future. This may help students to fully benefit from their educational curriculum. Others, like Petrie (1976), believe that for interdisciplinary teams to be a success the members must master their own discipline first in order to fully appreciate the skills and contributions of others. There are many barriers to team work; however, the potential of breaking these barriers may be increased if approached earlier in the training of medical professionals instead of waiting until they are in the workplace.

Barriers which inhibit the success of interdisciplinary teams can be broken through role clarification, role valuing, developing trusting relationships, power sharing, learning the attitudes of all the team members and receiving interdisciplinary training.
early in the educational process. When the barriers to interdisciplinary team training are successfully overcome positive result for students, patients and the healthcare system can be achieved.
Outcomes of Interdisciplinary Training

A review of the literature to assess the effectiveness and outcomes of interprofessional education versus those who learn in unidisciplinary ways was completed and published by the Cochrane Review Collaboration (Reeves et al., 2009). Six studies were included. Four of those studies showed positive outcomes of interprofessional education. The areas of improvement were emergency department culture and patient satisfaction, reduction of clinical error rates for teams in the emergency department, care of domestic violence victims, and delivery of care and competencies for mental health professionals. These studies were either randomized control studies or controlled before and after studies. These studies addressed the topic of interdisciplinary teams but did not incorporate the training of students for interdisciplinary teams and therefore are not addressed in the previous sections.

There are many benefits that have been discovered throughout the different methods of interdisciplinary training as discussed previously. The beneficial outcomes of interdisciplinary teams demonstrate why interdisciplinary team training is so important. Benefits have been noted for patients, students and health care professionals.

Benefits for Patients

Multidisciplinary team rounds in one hospital lead to a decreased length of stay for patients with congestive heart failure, pneumonia and acute myocardial infarction (O’Mahony et al., 2007). In addition, the core measures by which the Joint Commission on Accreditation of Healthcare Organizations regulates a hospital were more fully executed during the year of multidisciplinary rounds.
Benefits of interdisciplinary teams have been demonstrated as far back as 1984 with more accurate diagnosis for patients evaluated by an interdisciplinary team (Rubenstein et al., 1984). Decreased placement in nursing facilities was found for elders whose care was interdisciplinary instead of unidisciplinary. Mortality was decreased and functional status increased for patients with an interdisciplinary team versus a single provider.

Interdisciplinary service learning experiences give underserved populations much needed medical care and social stimulation while providing educational programs for the community (Sternas et al., 1999). Access to medical care in service learning experiences can be easier than transportation to another facility.

When medical professionals work together there is a greater chance for reducing the costs of service therefore benefiting the entire healthcare system. With decreased duplication of services and better communication to other providers and patients, efficiency and quality of service can be increased (Mion et al., 2006). Interdisciplinary team service can lead to a reduction in the number of medical errors which affect patients’ lives and financial well being (as cited in Burning et al., 2009). The above mentioned benefits lead to increased patient satisfaction.

**Benefits for Students**

Exposure to interdisciplinary teams allows students to gain the knowledge to be skillful at working in a collaborative environment (Burning et al., 2009). This exposure to other health professionals and team work leads to an early change in attitudes and perceptions about other professions. This also facilitates confidence for students to
understand the roles of each team member, enabling better communication and understanding of when to refer patients to another discipline (Heuer et al., 2010).

E-learning with interdisciplinary teams allows students separated by distance to experience other health professions and occasionally be more aggressive in pursuing unknown topics because self identity to the group is hidden (Skorga, 2002). Understanding and clarifying roles of self and others while changing attitudes, promoting teamwork and improving effectiveness are all outcomes from an interdisciplinary training session of first year medical profession students (Cameron et al., 2009).

Service learning experiences allow students to be immersed into the community around them encouraging understanding of different cultures and socioeconomic areas (Sternas et al., 1999). The exposure to different economic and social groups helps shape the treatments a student may use in the future to accommodate patients of different groups. This leads to clinicians who facilitate change while abiding by the patients needs and demands.

Interdisciplinary problem based learning sessions allow students to learn to listen to one another and appreciate the thought process of other professionals while implementing complex interdisciplinary care plans (Lary et al., 1997). These problem based learning sessions also help students understand other professions more fully.

Students are often shaped by their experiences during school such as interdisciplinary education and exposure to team dynamics through service learning. This can have such an impact that future employment and career desires may change; this was demonstrated by the students who participated in the GIVE Project (Kopp
Students believe that having an interdisciplinary experience may give them an advantage when interviewing for future positions (Kopp Miller & Ishler, 2001).

**Benefits for Health Care Professionals**

Increased job satisfaction and better communication between nurses and physicians results from service learning training in school (Sternas et al., 1999). This allows for the power struggle between different professions to be reduced leading to greater collaboration, less competition and a better team dynamic. Interdisciplinary training leading to effective collaboration can foster a more satisfying work environment for employees while reducing absenteeism and demonstrating increased retention of employees (Cameron et al., 2009). Increased competencies have been shown for professionals when taught with an interdisciplinary method (Reeves et al., 2009 and O'Mahony et al., 2007).

Although many benefits for health care professionals have not been stated in studies of interdisciplinary training there are many stated benefits for patients. The reason most health care professionals have chosen the health field career is to help others. So the benefits to the patients are also a benefit for health care professionals.
Conclusion

The American population is increasing in age with each passing year. As this occurs the geriatric population increases as well as the amount of people living with chronic conditions, and the number of co-morbid diseases. Prescription usage by elders is increasing complicating medical care further. Interdisciplinary care is needed to provide seamless quality care to the elders of America.

An interdisciplinary team is composed of many healthcare providers from different disciplines. Each professional has a certain role to carry out; however, there are many values and competencies that overlap creating challenge for the team. Interdisciplinary teams require communication between providers as the geriatric assessments gets more complicated and many chronic conditions require multiple providers to deliver precise care. Medical errors can be decreased by good team communication.

Students are trained for interdisciplinary teams through many avenues including: service learning, e-learning, problem based learning, experiences in the clinical arena and through simulation experiences. As students are exposed to interdisciplinary teams their attitudes about other professions and the comfort with team interactions and communications increases. These experiences allow students to practice their clinical skills while facilitating an interdisciplinary mindset instead of a unidisciplinary thought process.

Multiple barriers exist for the advancement of interdisciplinary teams. The lack of knowledge about other professions and role socialization leads individuals to over value their own profession while minimizing the importance of others. The cost of
implementation and lack of support for interdisciplinary teams also creates a barrier for success. These barriers can be overcome in a number of ways through role socialization, role valuing and power sharing to create successful interdisciplinary teams.

Positive outcomes of interdisciplinary teams have been noted in many studies in the past for patients, students and healthcare professionals. Interdisciplinary teams have been shown to decrease the length of hospital stay for certain conditions, increase functional ability as well as decrease nursing home placement. Decreasing the amount of duplicated services also decreases the cost of service for patients and the healthcare system. Increased job satisfaction and a better working environment lead to retention of employees and less absenteeism for healthcare professionals.

Although there are multiple studies which show positive outcomes of interdisciplinary teams the latest Cochrane review found only six articles that met inclusion criteria. Even with these articles generalizeable conclusions are not available for the outcomes of interdisciplinary team. There needs to be more studies with randomization and larger sample sizes to ensure that interdisciplinary education has positive effects on patients, students and healthcare professionals (Reeves et al., 2009).
References


Findings from an evaluation of an interprofessional education experience for 1,000 first-year health science students. *Journal of Allied Health* 38(4), 220-226.


Abstract

**Objective:** The purpose of this paper is to review the past, present and future of interdisciplinary teams both in student training methods and clinical application.

**Method:** Terms including “Interdisciplinary education”, “Interdisciplinary teams”, “Interprofessional” and “outcomes of interdisciplinary teams” were searched using PubMed, CINHAL, ERIC and Google Scholar. Search results were limited from the years 1984-2010. **Results:** Positive benefits of interdisciplinary teams are noted for students (more positive attitudes about teams, increased understanding of other professions), patients (decreased length of stay, more accurate diagnosis) and health care professionals (increased job satisfaction and retention of employees).

**Conclusion:** The increasing age and therefore co-morbidities of our population requires an interdisciplinary team of various professionals to provide quality care. Students are trained for interdisciplinary teams through service learning, e-learning and problem based learning in the curriculum as well as in clinical rotations and through simulation to help break existing barriers and produce beneficial outcomes.