

**Tearing Down the Wall:
Identification of Biases as a First Step in Building a Team Mentality and Preparing
Physician Assistant, Social Work, Nursing, and Medical Students to Participate in
Interprofessional Education and Practice**

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Abstract

The Institute of Medicine's landmark study on patient care outcomes, *A Bridge to Quality*, called for interprofessional education and practice that prepares healthcare students from different healthcare professions to collaborate for optimal patient safety. Additional benefits of interprofessional education include increased patient satisfaction and provider job satisfaction. Despite this knowledge, IPE interventions are not widely instituted in health professions education. In July of 2013, the Liaison Committee on Medical Education released a common standard for IPE in the US due to the realization that collaboration will play a large role in the careers of students across the health professions. More research is needed to demonstrate what components, sequencing, and frequency of interprofessional education contributes the greatest value to the competency goals established by the Interprofessional Education Collaborative.

This study aims to determine if a novel curricular component, a program entitled, the "Medical Wall," is able to demonstrate a positive impact on students' interest and value for interprofessional education, and if the activity has a significant effect on student's knowledge of barriers to effective team communication and collaboration, and their attitudes regarding the values and ethics of interprofessional collaboration as it relates to patient care. 196 MD, BSN and PA students were randomized into intervention and control groups. All students randomized into the intervention group were further randomized into mixed-professions small groups who participated in the Medical Wall program, while their peers in the control group completed an alternate and unrelated activity. All participants took the validated pre- and post Readiness for Interprofessional Learning Scale survey to determine if there was significant intervention impact. The learning scale assessed four categories: Teamwork, Negative Professional Identity, Positive Professional Identity and Roles and Responsibilities.

The "The Medical Wall" IPE intervention resulted in significant improvement in two out of four categories of the Readiness for Interprofessional Learning Scale compared to controls (p value set at <0.05). These results indicate that participation in a brief interprofessional education

intervention is effective for enhancing Nursing, Physician Assistant, and Medical students' perceptions of teamwork, and sense of professional identity.

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Introduction/Significance

The Institute of Medicine (IOM) initiated the Quality of Health Care in America project in 1998 with the goal of increasing the quality of health care in America over the course of the next 10 years. The IOM found that between 44,000 and 98,000 Americans die each year as a direct result of hospital adverse events. Nationwide, there is an annual cost of between 8 and 15 billion dollars lost as a direct result of healthcare-related preventable adverse events. The IOM's recommendation list from this project is long, but includes one key factor: "establish interdisciplinary team training programs for providers that incorporate proven methods of team training."¹

An extensive review of the literature shows that across medical specialties, interprofessional education (IPE) can increase patient satisfaction, provider job satisfaction, and patient outcomes.²⁻⁴ A recent Cochrane review identifies interprofessional collaboration as a critical element in effective and efficient health care, especially in the face of the ever-increasing complexity of patient presentations and their health care needs.⁴ This review examined 15 IPE interventions. Out of these 15 studies, six showed that IPE may lead to improved patient outcomes, and two showed that IPE may improve patient's satisfaction with their providers.⁴ In 2009, the Center for Organizational and Occupational Sciences out of Zurich, Switzerland did a comprehensive literature review on teamwork and patient safety in healthcare.⁵ They looked at 277 articles, and found that teamwork plays a crucial role in causation and prevention of adverse events, and that the quality and safety of patient care was associated with provider's perceptions of teamwork, as was staff well being. They also performed an analysis of teams who were identified as having high clinical performance, and found patterns of good communication and coordination throughout the team, as well as leadership that supports teamwork.⁵ In May of 2015, the Joint Commission Journal on Quality and Patient Safety published an initiative undertaken at 11 acute care hospitals in the greater New York metropolitan area. This study was aimed at reducing sepsis mortality in emergency departments and inpatient hospital units. Through several methods, including collaboration between institutions, promotion of leadership, and building a culture of collaboration between the many members of acute care teams, they were able to reduce overall sepsis mortality by

50%. This study highlights the fact that fostering interprofessional collaboration is a crucial element in reducing mortality.⁶

Although the importance and benefits of Interprofessional patient care are well documented, there is a significant gap in the literature regarding how best to educate healthcare students to achieve these outcomes. Furthermore, while it is well known that IPE has the aforementioned positive effects, IPE interventions are not widely instituted in health professions education. There is a significant lack of IPE-related competencies and curricula integrated into healthcare profession education. Where IPE curricula do exist, there is a lack of studies and data documenting efficacy.

In 2010, a panel of experts was created representing six national associations of schools of health professions, including the AAMC to “encourage and promote meaningful interprofessional education.”⁷ This panel created four core competencies for IPE in the US. Those competencies are defined as follows:

1. Values/ethics for interprofessional practice: Work with individuals of other professions to maintain a climate of mutual respect and shared values.
2. Roles/responsibilities: Use the knowledge of one’s own role and of other professions’ roles to appropriately assess and address the health care needs of the patients and populations served.
3. Interprofessional communication: Communicate with patients, families, communities, and other health professionals in a responsive and responsible manner that supports a team approach to the maintenance of health and the treatment of disease.
4. Teams and teamwork: Apply relationship-building values and the principles of team dynamics to perform effectively in different team roles to plan and deliver patient/population-centered care that is safe, timely, efficient, effective, and equitable.⁷

On the heels of the creation of these competencies, the Liaison Committee on Medical Education (LCME) has developed an objective for medical education that they have instituted as a new element in the accreditation standards for US medical schools. This objective states: “The core curriculum of a medical education program must prepare medical students to function collaboratively on health care teams that include health professionals from other disciplines as they provide coordinated services to patients. These curricular experiences include practitioners and/or students from other health professions.”⁸

Early in health professions education, students have a high strength of professional identity and a high willingness to engage in IPE. Both of these factors have been shown to decrease over time.⁹⁻¹¹ Therefore, IPE that is encountered early-on in health professions education can help promote positive attitudes of the various members of the health care team, and has a significant positive effect on how students view other health professions.^{12,13} Both extended-time experiences and short, one-time experiences have been shown to significantly improve knowledge of health care team roles, the value of interprofessional collaboration, and general attitudes towards IPE.^{12,14}

In consideration of the impact unique cultures of various healthcare professions may have on team dynamics, the proposed project will examine the effectiveness of a brief, one-time IPE experience to affect the perceptions of M.D., Nursing, and P.A. students as they relate to the IPE competencies as measured by the Readiness for Interprofessional Learning Scale (RIPLS).¹⁵

Methods

A planning committee was assembled, with representatives from each of the programs to be involved. The programs included were: the University of Arizona College of Medicine - Phoenix (UA COM-Phx) Doctor of Medicine (MD) program, the Arizona State University (ASU) Bachelors of Science in Nursing program (BSN), and the Northern Arizona University (NAU) Masters of Physician Assistant Studies (MPAS) program. Students from the NAU Masters of Social Work (MSW) program were initially included in the program, however these students were excluded from the analysis due to insufficient student participation. This committee was responsible for creation of the Medical Wall intervention methods as well as recruitment of students from each representative's respective program. Committee members also later served as facilitators for the intervention. Approval for the study was granted by the University of Arizona College of Medicine-Phoenix Internal Review Board.

Subjects

Inclusion criteria were defined as healthcare students in their pre-clinical curriculum, including early first year MD and PA students, and early third year BSN students. This was done in an attempt to ensure that participants had similar levels of health professions education and exposure to healthcare culture. All three participating programs chose to integrate the intervention into their pre-existing curriculum regarding IPE and curriculum. Students who were originally randomized to the control group went through the intervention at a later date to fulfill the curricular requirement. All students were required to participate in the intervention, however were given the option to opt-out of participating in the study. All students consented to participate in the research study, and data from students who chose not to participate was not included.

Data was collected in October 2014 from students in the UA COM-Phoenix Doctor of Medicine (MD) program, the Arizona State University (ASU) Nursing program (BSN), and the Northern Arizona University (NAU) Physician Assistant (PA) program. Data was collected from a total of 196 students (133 female, 63 male). This group included 72 MD students (35 female, 37 male), 76 BSN students (66 female, 10 male), and 47 PA students (31 female, 16 male), and one female student who did not indicate program affiliation. Students were asked four demographics

questions in addition to the 19 questions included in the RIPLS survey. These questions included; gender, program of study, previous completion of the RIPLS survey, and previous experience in IPE (Table 1).

Program	Female	Male	All Participants	Previous Completion of the RIPLS Survey Number, % of Total	Previous Participation in IPE Number, % of Total
BSN	66	10	76	0, 0.0%	3, 3.9%
MD	10	76	86	3, 4.2%	50, 69.4%
PA	37	72	109	0, 0.0%	11, 23.4%
Did Not Indicate	1	0	1	0, 0.0%	1, 100.0%
All Participants	133	63	196	3, 1.5%	65, 33.2%

Table 1: Overall demographics of study participants

Data Collection

Subjects were randomized in to intervention and control groups. All subjects completed the RIPLS survey (Attachment 1) prior to participation in the intervention or control activity.

Subjects who were randomized into the control group were directed towards a lecture hall where they were asked to read a short healthcare-associated article that was not related to IPE, teamwork, or biases in healthcare. After reading the article, subjects again completed the RIPLS survey, which marked conclusion of their participation for the day. Subjects who were randomized into the intervention group were further randomized into mixed-professions small groups to ensure balanced representation of professions. The subjects then participated in the Medical Wall IPE intervention, which consisted of a two-hour activity aimed at identification of concepts, misperceptions, and stereotypes in healthcare (Table 2). Upon conclusion of the intervention, subjects once again completed the RIPLS survey.

Activity	Description
Entry and seating of students	Students are directed into their respective pre-randomized groups (6-8 students).
Pre-Survey	Students are instructed to complete the pre-survey, which were then collected.
Welcome/Introduction	Brief introduction to the nature of the activity – with emphasis on making students aware that while the nature of the subject matter is sensitive, they are in a safe environment to explore perceptions and biases that exist in medicine.
Small group exploration of labels	<p>Student groups are given a large poster paper with a random, pre-determined label on it and a box of colored markers. They are asked to explore any and all associations that they have to the label by writing them on the paper in no order or organization. Facilitators move between groups offering support and encouragement to leave no thought un-represented.</p> <p>(For complete list of labels, see Appendix 2)</p>
Creation of the Medical Wall	The lead facilitator asks one student from each group to bring their completed poster to the front of the room, and tape them on the wall side by side, creating the physical “wall” that the intervention is centered around. The lead facilitator then delivers an interactive talk regarding the bias and stereotypes in medicine that are represented by the Medical Wall, and the effect that they can have on patient and provider satisfaction, quality of patient care, and patient outcomes.
Faculty experiences	Faculty members are invited to share narratives of instances where bias and stereotypes in the medical culture have negatively impacted aspects of inter-professional collaboration or patient care in their careers.
Tearing down the Medical Wall	The Medical Wall intervention concludes with the lead facilitator inviting the students to come to the front of the room and tear down the wall, committing to themselves and their future colleagues that they will take an active roll in interprofessional education and team-based healthcare, and in affecting the current medical culture.

Table 2: *The Medical Wall*

Data Analysis

Surveys were coded in a de-identified manner such that each student's pre- and post- surveys could later be compared and analyzed for effect of the intervention. The RIPLS survey data was input into Excel (2011) and then integrated into SPSS (version 20.0; IBM Corporation, Armonk, NY) to be analyzed. The 19 questions of the RIPLS scale were stratified into 4 sub-scales based on the 2006 McFadyen model^{16,17}: Teamwork and Collaboration (questions 1-9), Negative Professional Identity (questions 10-12), Positive Professional Identity (questions 13-16), and Roles and Responsibilities (questions 17-19). Four mixed model ANOVAs were used to examine the main and interaction effects of the time (pre-test vs post-test) and group (intervention vs control) for each sub-scale with significance set at 0.05.

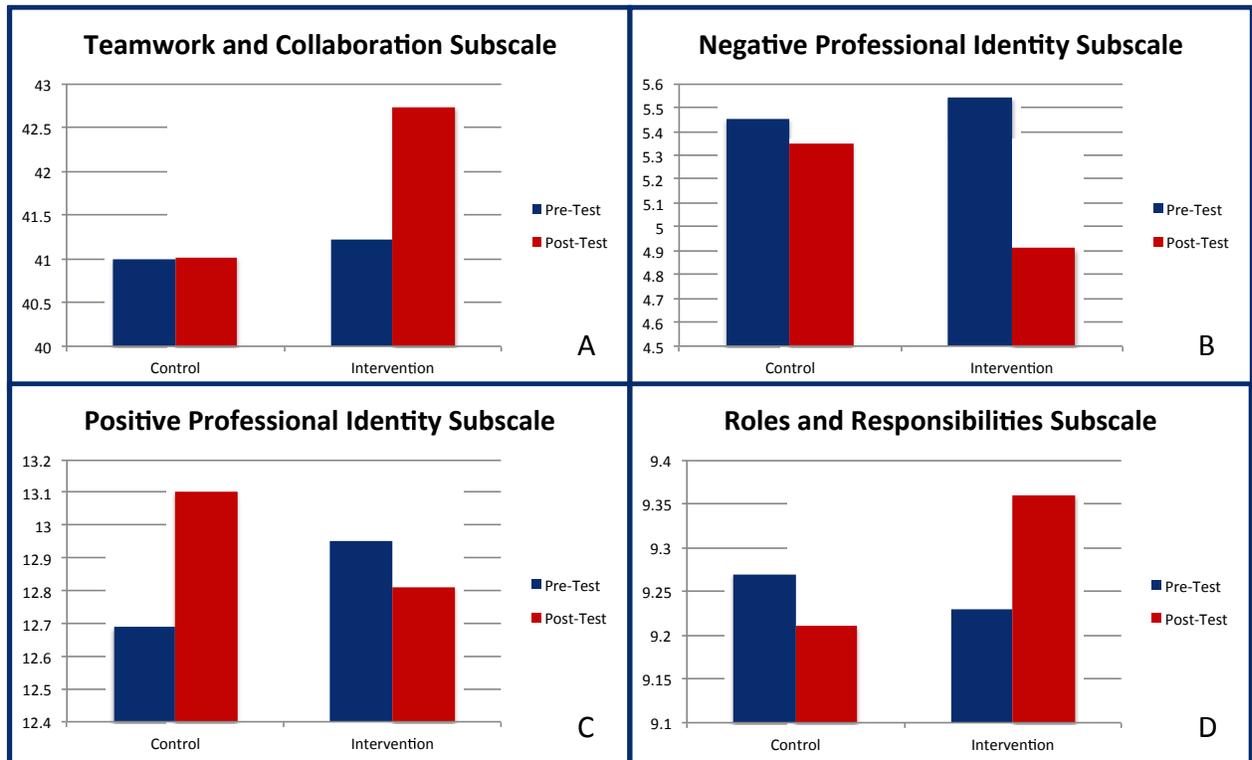


Figure 1: RIPLS Subscale Pretest and Posttest Scores for intervention and control groups. A. Teamwork and Collaboration; B. Negative Professional Identity; C. Positive Professional Identity; D. Roles and Responsibilities.

Results

A total of 196 participants participated in the study, consisting of 86 MD (10 female, 76 male), 76 BSN (66 female, 10 male), and 109 PA (37 female, 72 male) students (see Table 1). 68% of the participants were female, and 32% were male. Due to a survey misprint, some students were not asked question #13 of the RIPLS scale. For this reason, it was excluded from data analysis.

A synopsis of results is depicted in Figure 1 and summarized in Table 3. Significant differences were found between the pre-test and post-test scores for all participants in the Teamwork ($F(1, 191) = 16.46, p < 0.000$), Negative Professional Identity ($F(1, 191) = 9.21, p = 0.003$), and Positive Professional Identity ($F(1, 191) = 36.43, p < 0.000$) subscales. When analyzed for differences between control and intervention groups, significant differences were only found for the Teamwork ($F(1, 191) = 15.19, p < 0.000$) and Negative Professional Identity ($F(1, 191) = 4.81, p = 0.029$) subscales. There was no significant difference between the pre-test and post-test scores for the Roles and Responsibilities subscale ($F(1, 191) = 0.08, p = 0.776$); nor was there a difference between the control and intervention groups for the Positive Professional Identity ($F(1, 191) = 2.70, p = 0.102$) or Roles and Responsibilities ($F(1, 191) = 0.64, p = 0.424$) subscales.

Subscale	F Score	Significance
Teamwork		
Time	16.46	0.000
Interaction	15.19	0.000
Negative Professional Identity		
Time	9.21	0.003
Interaction	4.81	0.029
Positive Professional Identity		
Time	36.46	0.000
Interaction	2.7	0.102
Roles and Responsibilities		
Time	0.08	0.776
Interaction	0.64	0.424

Table 3: Mixed model ANOVA Results for RIPLS subscale scores, main and interaction effects

Discussion

In this study, we have shown that a brief, one-time intervention can have a significant effect on MD, BSN, and PA students' perceptions of teamwork and negative professional identity as measured by the RIPLS survey (Table 3). In an ever more-complicated clinical environment, increasing amounts of weight are being put on how to improve efficiency while not only maintaining, but improving the care that we are providing to our patients. An increasing amount of emphasis is also being put on our patient's satisfaction with the care that they receive. Many studies are uncovering the importance that teamwork and coordination play in these pursuits, and the barriers that currently exist to improving these factors through interprofessional collaboration.^{3,4,5,6} Communication and coordination between team members has been found to be crucial not only to improving the quality of patient care, but to preventing adverse events and improving both patient and provider levels of satisfaction.^{1,2,4,5,13}

The results of The Medical Wall show that a brief, one time IPE intervention is able to change student's pre-existing perceptions of these concepts. Accrediting organizations for healthcare professions training programs are not only recognizing the importance of IPE early in training, they are beginning to make it a requirement.^{8,14,18} This intervention offers a low-cost, and potentially high-impact option for health professions educators to institute as an element of their curriculum regarding interprofessional collaboration.

The Medical Wall IPE intervention resulted in significant improvement in the Teamwork and Negative Professional Identity subscales compared to controls. These results imply that this intervention was an effective method of decreasing student's negative perceptions of IPE, teamwork, and collaboration, and indicates that it was successful in positively affecting student's perspectives of team dynamics and the value of interprofessional collaboration in medicine.

The fact that significant effect was not seen regarding the Positive Professional Identity subscale brings up several interesting points. The first of these is that due to a survey misprint, question #13 of the RIPLS scale was left out of our data analysis. This question would have been

included in the Positive Professional Identity subscale per the McFayden et. al., subscale model.¹⁷ This error likely contributed to the fact that we did not see a significant change in student's perceptions regarding this subscale despite the fact that the intervention did aim to affect students' sense of professional identity, and showed a significant effect on the Negative Professional Identity subscale. When analyzing the data, we found that there was significance for the main effect (pretest vs posttest) regarding this subscale, however we did not see a significant interaction between time and intervention. It is interesting to note that although the numbers are not significant, there seems to be a large change in the scores for the control group; and that the change is in the opposite direction of the change displayed in the intervention group. This may have been influenced by an unforeseen reaction to the article that the control group was directed to read as their alternate activity. The article was a short piece published in the Journal of the American Medical Association in 2014 giving a brief explanation of some of the larger changes coming with the Affordable Care Act.¹⁹ This article was chosen because it was an important point in current healthcare that was unrelated to IPE, teamwork, or bias. It is possible that the article had unanticipated effects on the control group results due to its political nature, and that this contributed to the lack of significant effect found.

No significant improvement was found in the Positive Professional Identity or Roles and Responsibilities subscales as compared to controls. As this intervention does not address the various roles and responsibilities of different health care providers, it was expected that we would not see significant change in student's scores on the Roles and Responsibilities subscale. Education on the roles and responsibilities of the various healthcare professions was purposefully left out of this intervention for several reasons. The first is that one of the main goals of this study was to create a brief intervention that could be entirely completed within a few hours in recognition of the busy schedules of healthcare students and providers. Discussion on the specific roles and responsibilities would necessitate lengthening the intervention, which was not desired. In addition, this intervention is targeted at recognizing the bias that exists in healthcare in an attempt to tear down some of the differences between professions that are built up by the existing culture. In that respect, we felt that pointing out the differences in roles at this early stage in IPE could be counter-productive to our main goal.

Question #13 of the RIPLS scale was left out of our data analysis due to a survey misprint. It is impossible to say if analysis and significance would have differed if this question had been included. Repetition of the study including this question in analysis is necessary to improve the data supporting the use of this intervention in healthcare education curriculum. Repeating the study on a larger scale would also improve the strength of the data through increasing the power of the analysis.

Future Directions

There are several avenues for future research regarding the results discussed in this study. Longitudinal studies are needed to assess students for extinction of initial effect, and follow up research is needed to assess for impact of clinical training on student's perceptions regarding IPE and collaboration. Repetition of The Medical Wall intervention with students in added health professions training would add a valuable fund of knowledge regarding the initial perceptions of students across the spectrum of healthcare providers. Possible training programs for future inclusion include, but are not limited to; Nurse Practitioner, Social Work, Occupational/Physical Therapy, Paramedic, and Pharmacy. Lastly, there are several other scales that have been developed to assess the effects that IPE has on healthcare students. Future research should include repetition of The Medical Wall intervention using these scales, and validating the results among the various available tools.

Conclusions

As has been demonstrated repeatedly across many studies, IPE is a necessary component for all health professions.^{1-3,5,7,14,20} While the research in this area is growing, there are clearly still many unanswered questions about the most effective and efficient ways to develop and deliver IPE. Our novel IPE intervention, “The Medical Wall”, resulted in significant improvement in two out of four categories of the Readiness for Interprofessional Learning Scale compared to controls. These results indicate that participation in a brief IPE intervention is effective for enhancing Nursing, Physician Assistant, and Medical students’ perceptions of teamwork, and sense of professional identity. The addition of this IPE intervention as a component of didactic curriculum has the potential to enhance interprofessional collaboration among healthcare professionals, and ultimately improve patient care, patient and provider satisfaction, and overall outcomes.

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Attachment 1

Readiness for Interprofessional Learning Scale (RIPLS) Questionnaire

The purpose of this questionnaire is to examine the attitude of health and social care students and professionals towards interprofessional learning.

Your name: (develop your own 'personal code' by using the following formula):

First 3 letters from your middle name: **Day of birth (from your DOB):** XX//X

XXX **Your discipline/program of study:** _____ **Gender:** M F

Have you completed the RIPLS questionnaire before? Yes No

If you answered yes to the previous question please indicate how long ago you last completed the questionnaire:

- 1 - 3 months 3 - 6 months 6 - 12 months
 1 - 2 years 2-3 years 3+ years
-

Have you had previous experience in interprofessional education (IPE)? Yes No

If you answered yes to the previous question please give a very brief statement of what this IPE teaching was and any impact it may have had.

Please complete the following questionnaire.		Strongly agree	Agree	Undecided	Disagree	Strongly disagree
1.	Learning with other students / professionals will make me a more effective member of a health and social care team					
2.	Patients would ultimately benefit if health and social care students / professionals worked together					
3.	Shared learning with other health and social care					

	students students / professionals will increase my ability to understand clinical problems					
4.	Communications skills should be learned with other health and social care students students / professionals					
5.	Team-working skills are vital for all health and social care students students / professionals to learn					
6.	Shared learning will help me to understand my own professional limitations					
7.	Learning between health and social care students students before qualification and for professionals after qualification would improve working relationships after qualification / collaborative practice.					
		Strongly agree	Agree	Undecided	Disagree	Strongly disagree
8.	Shared learning will help me think positively about other health and social care professionals					
9.	For small-group learning to work, students / professionals need to respect and trust each other					
10.	I don't want to waste time learning with other health and social care students / professionals					
11.	It is not necessary for undergraduate / postgraduate health and social care students / professionals to learn together					

12.	Clinical problem solving can only be learnt effectively with students / professionals from my own school / organisation					
13.	Shared learning with other health and social care professionals will help me to communicate better with patients and other professionals					
14.	I would welcome the opportunity to work on small group projects with other health and social care students / professionals					
15.	I would welcome the opportunity to share some generic lectures, tutorials or workshops with other health and social care students / professionals					
16.	Shared learning and practice will help me clarify the nature of patients' or clients' problems					
17.	Shared learning before and after qualification will help me become a better team worker					
18.	I am not sure what my professional role will be / is					
19.	I have to acquire much more knowledge and skill than other students / professionals in my own faculty / organisation					