

**Exploring Physician Assistant (PA) Autonomy and the Relationship between
PAs and Supervising Physician(s) in Canada**

Capstone Project: a requirement of the University of Manitoba
Master of Physician Assistant Studies Program

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ABSTRACT

INTRODUCTION: Currently, 530 PAs are working in Canada. The progression of the role of each PA depends on their relationship with their supervising physician(s). **Purpose:** to gain insight into PA autonomy and physician-PA structure/relationship from the perspective of PAs working in Canada. **METHODS:** A cross-sectional online survey was distributed to all PAs in Canada. It included questions probing 3 topics: demographics, PA autonomy/physician-PA relationship structure, and stage of the Tuckman Model of group development. Data analysis consisted of measures of central tendency, non-parametric tests, and post-hoc pairwise comparisons. **RESULTS:** 168 PAs responded. Most PAs (47.3%) work as a single PA with a team of up to 25 physicians. Most (96%) of PAs were confident at their job by 1.5 years. The majority of PAs had been employed for less than 5 years and spend most of the day working autonomously. The time a PA spends consulting with their supervising physician(s) decreases and their perceived autonomy increases with years of experience, with a significant improvement noted after 5 years. Differences were observed between the different specialty groups. **CONCLUSIONS:** In general, autonomy increased with time and experience, while the frequency of consulting decreased. PAs in larger teams feel less autonomous and consult with their supervising physician(s) more frequently. Three quarters of respondents identified with the highest functioning 'Performing' stage of the Tuckman Model.

INTRODUCTION

Background and Rational

Physician Assistant Profession

Physician assistants (PAs) have practiced in Manitoba since 1993, and in the Canadian Armed Forces since 1984. They are proposed as part of the solution to physician shortages in a population with growing medical needs (1). Compared to physicians, PAs take less time to train (106 weeks versus 135

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for physicians) and a fraction of the cost to employ. PAs practice medicine in collaboration with their formally-appointed supervising physician(s)(2). PAs supplement physician care and provide patients access to physician care when needed. The PA profession is well-established in the United States of America (USA) with the first graduates entering the workforce in 1967. Many US-based studies have involved PAs (1). Alternatively, there has been limited research on PAs in Canada and other countries, such as the Netherlands and the UK (3), which may be due to relatively recent introduction and small population of PAs.

Canadian PAs are educated as medical generalists who acquire knowledge of a medical specialty upon entering the workforce (4). When a PA is hired, his or her contract includes a “contract of supervision” and a “practice description” (2). These define the scope of practice expected of the PA (2), allowing for increasing autonomy as the supervising physician(s) become(s) comfortable with the knowledge and skills of the PA. This concept has been coined “negotiated performance autonomy”(5). The physician is responsible for the actions and patient care performed by the PA (2). As such, the duties and role of the PA will evolve with the PA’s increasing experience on the job and are dependent on the evolution of this physician-PA relationship(6). Supervisory structures range from one PA and one physician to multiple of either position. The 2015 CAPA National Census indicated that of 212 total respondents, 70 PAs had 1 primary supervising physician, 30 PAs had 2, 22 PAs had 3-9, and 36 PAs had 10-38 (7).

Similar to years of experience, autonomy may also vary by factors such as specialty, academic/career background, and PA program curriculum. PAs decrease the amount of time spent consulting with their supervising physician as experience with that physician increases, especially in their first few years(5). By 4 years, a general one third of PAs spend less than 10% of their time consulting; by 20 years, over half of PAs spend less than 10% of their time consulting(5). PAs were

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noted to have the greatest autonomy in primary care, followed by unspecified ‘other specialties’, emergency medicine, internal medicine, then surgical subspecialties(5). In primary care specifically, half of PAs working for 4 or more years spent less than 10% of their time consulting(5). This is compared to only about 12 percent of surgical PAs(5). By 15 years of experience, the proportion that consults less than 10% of their time rises to 75% for primary care and to 28% for surgical subspecialties(5).

The success of the PA profession as well as of patient care rely on establishing and maintaining relationships with supervising physicians(8)(9). Although literature addressing this working relationship is lacking (10), there are a few articles describing the importance of the relationship and some studies referencing team dynamics. In an article by Summers, he documented three key aspects to foster an effective environment and establish an effective physician-PA relationship: structure, support, and communication(8). Structure should be one where the physician allows the PA to accept patients as their own, and decision making processes can be improved through discussion(8). Support creates an environment where failure is accepted and mistakes are expected, which fosters more autonomous PAs and a feeling of success also for the physician(8). Good communication, including openness and availability, allows asking questions to be seen as a strength and patient-affecting errors to be avoided(8). Good MD-PA relationships involve support and open communication to extend the PA to be the best patient-care provider that they can be (8) – optimizing PA autonomy.

PAs can be an integral part of a physician’s practice; one in which PAs and physicians learn from each other(9). In an article by Gradison, similarities were drawn between the needs of the physician-PA relationship and a relationship between any two or more people: mutual respect, and in agreement with Summers, support and continual honest, open communication(9). Mutual respect included appreciating each other as knowledgeable and hard-working individuals who have valuable

contributions to the team and whom can be learned from(9). Gradison suggested that these relationships require compromises between parties to mature and grow over time(9). Ultimately, the physician-PA team is most effective when united by the common priority of the wellbeing of the patient(9).

Ineffective physician-PA teams may evolve due to inappropriate attitudes or practices by any member of the physician-PA team. Examples are physicians who are “dictatorial, hierarchical, unsupportive, or use PAs as medical assistants”, or PAs who do not ask for advice when needed, “operate beyond the scope of practice of their collaborating physician, or fail to be an active team member”(9). Differences in personality or expectations, and systemic or financial issues also limit effective dynamics (9).

Tuckman Group Development Model

Bruce C. Tuckman’s Group Development Model, first published in 1965 (11), is the most referenced group development model in human resource development and may be a useful tool for evaluating physician-PA relationships. The Tuckman Model is globally recognized throughout a variety of disciplines and is well-established as a simple and widely applicable model (11). The model was originally based on observations of group dynamics from a literature review and had the goal of addressing team development in small vessels for the US Navy(11). The sample of literature overrepresented therapy-group settings, which may have limited the applicability of the model. The model was revised by Tuckman and Jensen in 1977 to consider its limitations and to add an optional adjourning stage (11)(12). It has continued to be used in many settings due to its simplicity and ability to be a guiding framework. Its popularity can also be attributed to its validation in a number of specific contexts, such as in the classroom (11). More specifically, this model has been used in healthcare research as a measure of improvement in team dynamics, including studies of nursing(13), dentistry(14),

health care students (15)(16), and research carried out by health education practitioners (17). It appears that the Tuckman Model has not yet been applied to Physician Assistant populations.

The Tuckman model is a linear model describing the four stages of team development, progressing to a well-functioning team. The four main stages are forming, storming, norming, and performing(11). The fifth stage, adjourning, does not apply to this study. The Tuckman team development stages are described below:

- 1) *Forming*: Individual responsibilities and roles are not yet clear, and there is a significant amount of dependence on the leader for direction and mentorship. Members are testing the system, and are not yet in agreement on goals other than those stated by the leader (11). The leader needs to be able to answer questions and direct members of the group. *Leader-led*.
- 2) *Storming*: Purpose becomes clearer but there are still many uncertainties, and decisions within the group are not always easy. There are power struggles as cliques may form and the members vie for their position within the group. There may be some polarization around interpersonal issues or emotional response to the task. The leader needs to direct the team to stay focused on the objectives. *Intergroup conflict, learning to function together* (11).
- 3) *Norming*: The roles and responsibilities of individual members are now clear and the role of the leader is able to shift towards facilitator. The team is usually able to agree and group decisions can be made by the team. The team may engage in social activities. Team discussions shift towards the team's internal processes and working style. *Unity and cohesion* (11).
- 4) *Performing*: The team is strategically aware, has a shared vision, and the members can function independently from the leader based on criteria agreed with the leader. Roles are flexible and functional. The leader delegates tasks and supervises; the team needs minimal instruction. Disagreements may still occur, but are resolved appropriately within the team. The team

members help each other as they all work towards the same goal, while working on team function (11). *Autonomy and flow*.

- 5) *Adjourning*: This stage completes the lifecycle of team development, used for teams that split to become team leaders of their own groups (11). *Team members scatter as seeds for new teams*.

Purpose and Goals

The primary purpose of this study is to gain insight into physician-PA structure, PA autonomy and factors that influence them, from the perspective of PAs working in Canada. Secondary goals are to evaluate the Tuckman Model for use with PAs and to obtain PA population demographics. The following areas are addressed:

- 1) Descriptive information on PAs in Canada
- 2) PA autonomy
- 3) PA work experience
- 4) Physician-PA relationship structure
- 5) Tuckman stage of team development

This is likely the first Canadian study to describe the physician-PA relationship and the only PA study to employ the Tuckman Team Development Model. It is also expected to be one of the first studies to assess the timeframe for achieving autonomy. Consequently, the results of this study will inform expectations for autonomy and relationship structure for both PAs and employers. Further, it will offer a starting point for improving and maintaining healthy, positive and productive physician-PA relationships.

METHODS

This study consisted of a cross-sectional survey design and was approved by the institutional research ethics board at the University of Manitoba. All PAs registered with the Canadian Association of Physician Assistants (CAPA) or the Physician and Clinical Assistants of Manitoba (PCAM) union

were invited to participate in the online survey via an email from PCAM and CAPA. PAs employed in Canada at the time the survey was administered were eligible to participate, whether trained in Canada or the USA. Clinical assistants, retired PAs, and unemployed PAs were excluded. Respondents were screened by a survey question that asked what type of certification they held.

At the time of survey administration, 89 Manitoban PAs were registered members of the PCAM union and 441 non-Manitoban Canadian PAs were registered with the CAPA. Thus, 530 PAs were eligible for recruitment. Based on a predicted response rate of approximately 30%, it was estimated that 159 responses would be received.

Apparatus and Materials

Questionnaire

The primary outcome was to comment on supervisory relationships experienced by PAs in Canada. This included 1) the structure of supervision, 2) the frequency of consult with their supervising physician(s), 3) the daily proportion of autonomy, and 4) the applicability of the Tuckman Model. A secondary outcome was to obtain demographic data for PAs in Canada.

The questionnaire consisted of 50 closed-ended questions and 1 open-ended question. No previous questionnaire on this specific topic was located. Thus, the investigators developed a questionnaire from three primary sources.

1. Demographic Questionnaire items: There are 12 questions: 11 multiple choice and 1 thermometer scale item. The demographic items are based on the demographic data used by Doan et al. (18).
2. Team Work Survey: The survey was developed by Clark to assess the Tuckman stages of group functioning: forming, storming, norming, or performing (19)(20)(21). It consists of 32 likert-type scale questions anchored accordingly: 1 – almost never, 2 – seldom, 3 –

occasionally, 4 – frequently, 5 – almost always. The questionnaire was scored using a manual; the lowest possible score for a stage was 8 and the highest was 40. A score of 32 or higher is a strong indication of the current stage of team work. *Clark, D. (2004).*

<http://www.nwlink.com/~donclark/leader/teamsuv.html>

3. PA Autonomy and PA-Physician Relationship Structure: Five of the questionnaire items were also developed by the investigators for the expressed purpose of this study. This includes 1 thermometer scale, 2 multiple choice, and 2 5-point likert-type scale questions. The likert-type scale questions inquired about frequency of consulting their supervising physicians, and were anchored accordingly: 1 - One time or less per day (ie. summary at the end of the day), 2, 3, 4, 5 - Multiple times per day (ie. after every case).

Procedure

Questionnaires were administered via email utilizing online survey software SurveyMonkey. Participants were sent reminder emails at two and three weeks. The survey closed four weeks after the initial invitation.

Statistical Analysis

Data analysis consisted of measures of central tendency (means, median, range, and frequencies), correlations, and non-parametric tests of significance (Kruskal-Wallis, Mann-Whitney U, Chi Square Analysis). Bonferroni correction was applied for post-hoc pairwise comparisons. The level of significance was set at $p \leq 0.05$.

RESULTS

Five hundred and thirty PAs were contacted to participate in the survey. One hundred and sixty eight PAs (31.7%) responded. All respondents were included in the analysis.

Demographic Data

All participants were presently working in Canada. One hundred and sixty six of the 168 participants were CCPA or PA-C certified. Respondents were primarily trained in Canada (94.6%). Respondents trained outside of Canada were entirely done so in the United States (5.4%). The vast majority of respondents (83.6%) were under age 50 (Figure 1). The number of male and female respondents were fairly equally distributed at 43.9% and 56.1% respectively. Nearly all respondents have completed a bachelor (45.5%) or graduate degree (48.5%) (Table 1). Before training to be a PA, study participants had various academic and professional backgrounds as seen in Table 2.

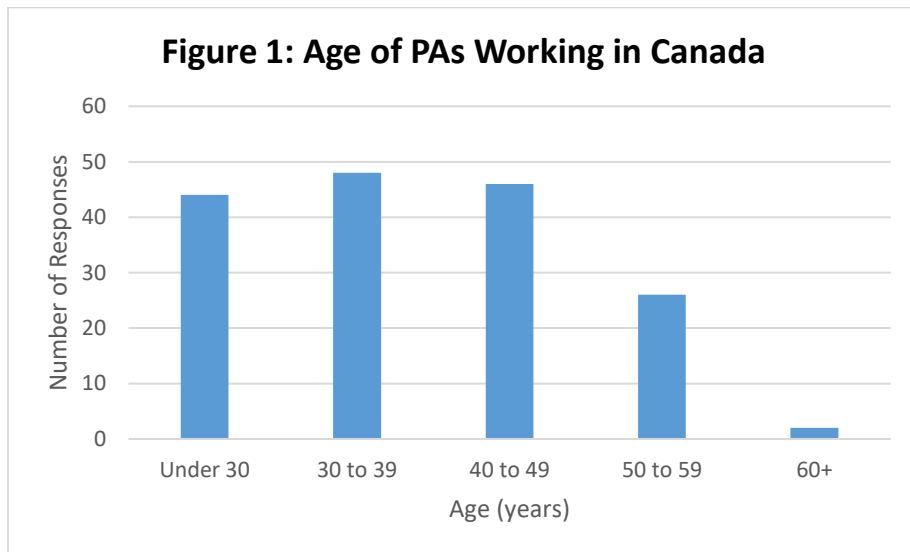


Table 1: Level of Formal Education of PAs Working in Canada

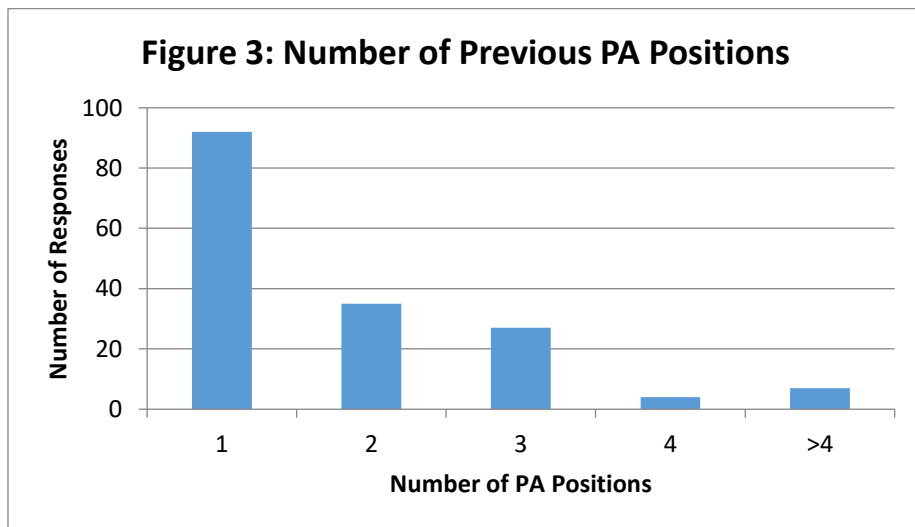
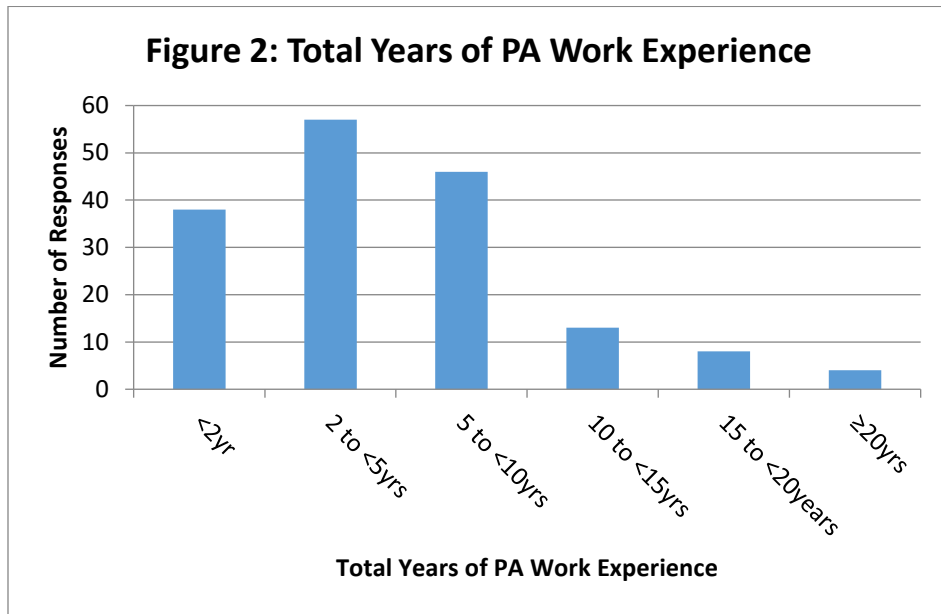
Master or Doctoral Degree.....	48.5%
Some Master or Doctoral Work.....	2.4%
College, Trade or University Degree.....	45.5%
Some College, Trade or University Work.....	1.2%
High School Diploma.....	2.4%

Table 2: Career Background Before PA Training

Researcher (ex. Public health, clinical, laboratory)	13.7%
Licensed Health Care Provider (ex. RMT, PA, IMG, PT, kinesiologist, dietician)	30.4%
First responder (ex. military medic, paramedic).....	27.4%
N/A – not directly related to health care (ex. Bachelor degree, teacher).....	28.6%

PA Experience

Respondents had varying amounts of PA work experience. Over half of them reported less than 5 years of experience (Figure 2). Most respondents had only held 1 previous position as a PA, although some have had greater than 4 (Figure 3).

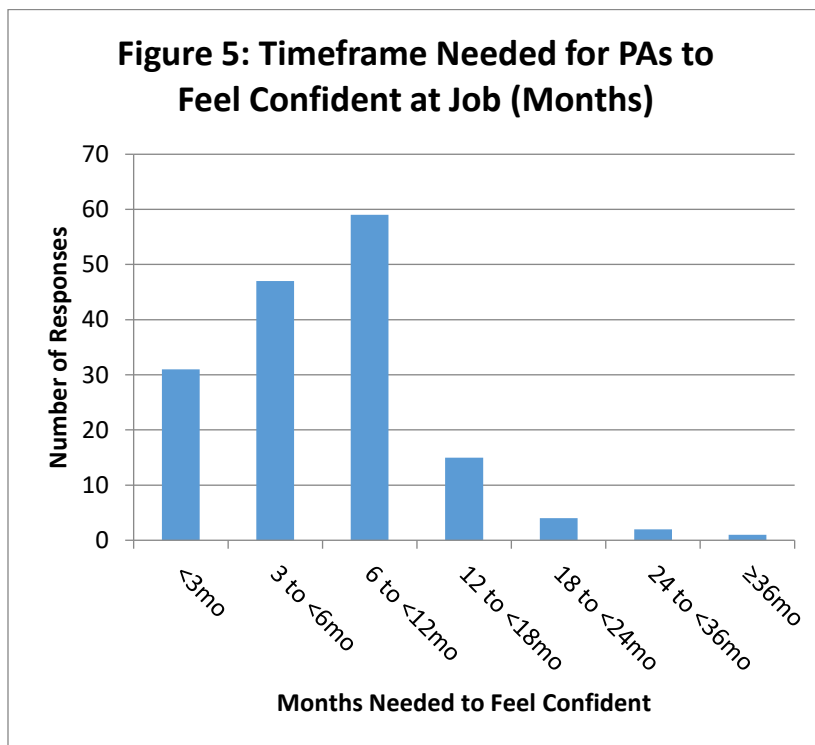
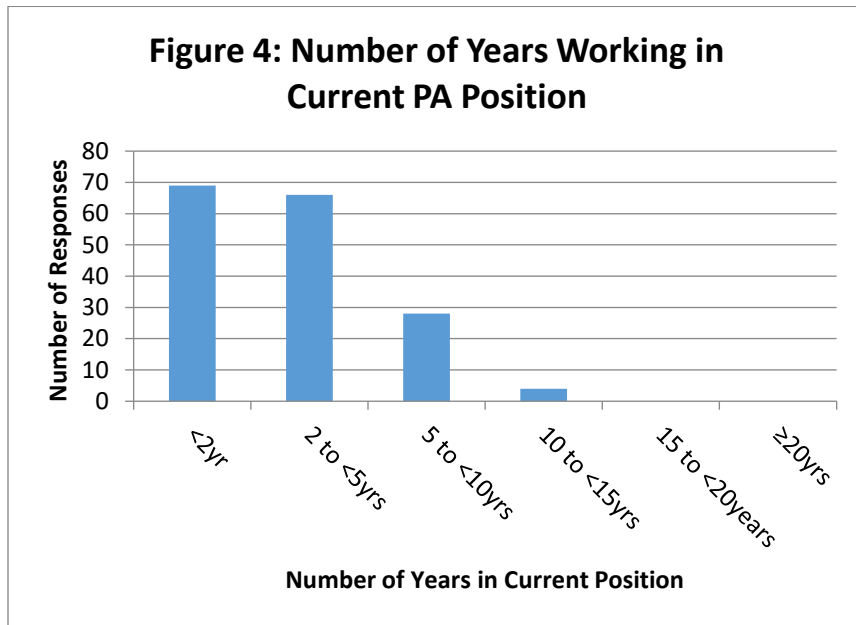


Current PA Position

In line with total experience, the majority of respondents (80%) have been working at their current position for less than five years. Of the PAs captured in this study, no PA has held their current

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position for greater than 15 years (Figure 4). Within their current position, participants were asked how long it took them to feel confident that they were meeting the majority of the expectations of their position. Eighty-six percent indicated they were confident at their job by one year, 96% were confident by 1.5 years, and 98% were confident by two years (Figure 5).



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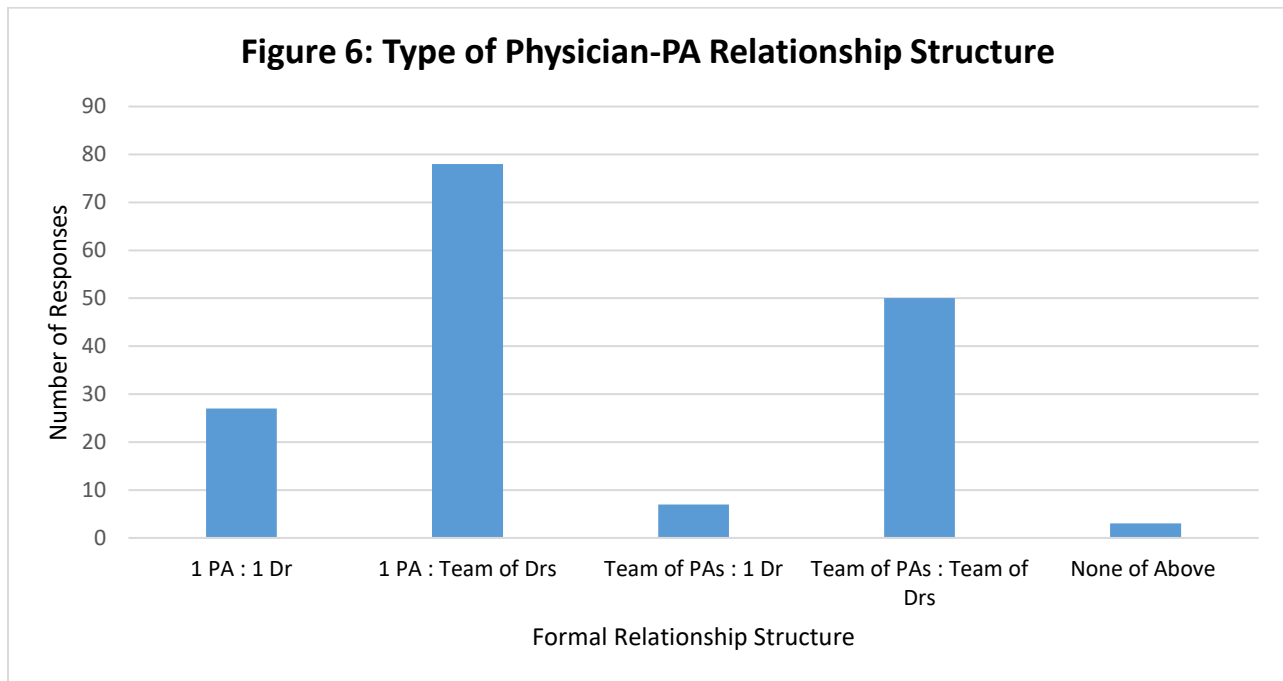
PAs work in a large variety of specialties and have been treating a greater number of patients as outpatients than inpatients. Participants were asked to report on the proportion of inpatient to outpatient populations they treated; 51.9% indicated they work solely with outpatients, 13.5% work solely with inpatients, and the remainder work with both to varying degrees. The specialty that employs the greatest number of PAs in Canada is primary care/family medicine (29.3%) (Table 3). The second and third most common specialties were surgery (17.4%) and emergency medicine (14.1%). A small portion of respondents are employed by more than one specialty. Half of the respondents reported working on a teaching service (51.2%).

Table 3: Percent of Canadian PAs by Specialty

Primary Care/Family Medicine (incl. 1.2% that also work in ER or surgery).....	30.5%
Surgery (general, plastics, cardiac, orthopedics, thoracic, vascular)(incl. 0.6% also family med)..	17.4%
Emergency Medicine (incl. 0.6% that also work in family med).....	14.1%
Military Medicine.....	7.2%
Internal medicine/hospitalist/inpatient medicine.....	6.6%
Occupational/industrial health/consultant.....	3.6%
Adult hematology/oncology.....	3.0%
Geriatric Medicine.....	2.4%
Psychiatry.....	1.8%
Educator/Academic.....	1.2%
Endocrinology.....	1.2%
Neurology.....	1.2%
Critical Care.....	1.2%
Obstetrics and Gynecology.....	1.2%
Sports Medicine	0.6%
Rehabilitation Medicine	0.6%
Pediatrics	0.6%
Pediatric Neurology.....	0.6%
Cardiology/Cardiac Medicine.....	0.6%
Nephrology.....	0.6%
Urology.....	0.6%
Pulmonary Medicine.....	0.6%
Gastrointestinal Medicine.....	0.6%
Primary Geriatrics/Long-term Care.....	0.6%
Sleep Medicine.....	0.6%
Pain Clinic.....	0.6%

Physician-PA Structure and Relationship

Various physician-PA structures are currently being utilized (Figure 6). Most PAs (47.3%) work as a single PA with a team of up to 25 physicians. It is also very common (30.3%) for multiple PAs to work with multiple physicians. These arrangements included up to 11 PAs and up to 85 physicians. Rarely (4%), multiple PAs (up to 4) work with 1 physician.



Participants were questioned regarding the frequency of consulting with their supervising physicians, which varied substantially. Participants reported on average how often they currently consult with their supervising physician during a shift, and how often they did this during their first three to six months in their current role. On a scale of one to five (described in methods), the mean for consult frequency was 4.04 in the first 6 months at their current job and 2.86 in their current daily routine.

Participants were also asked the proportion of their day in which they felt they function autonomously (without direct supervision). Participants reported spending a high proportion of their day

working autonomously, $M=71.6\%$, $SD=28.4\%$. Not surprisingly, there was a significant negative correlation between the reported frequency of consulting supervising physician and autonomy, $r = -0.66$, $p<.01$. Perceived autonomy increased as the frequency of consulting decreased.

Comparisons

Previous career background, total years of experience as a PA, number of previous PA positions, number of years in current PA position, specialty, and number of supervising physicians were each investigated for significant effect on two measures of autonomy: frequency of consulting the physician and percent of day working autonomously.

Effects of Background and Prior Experiences on Autonomy

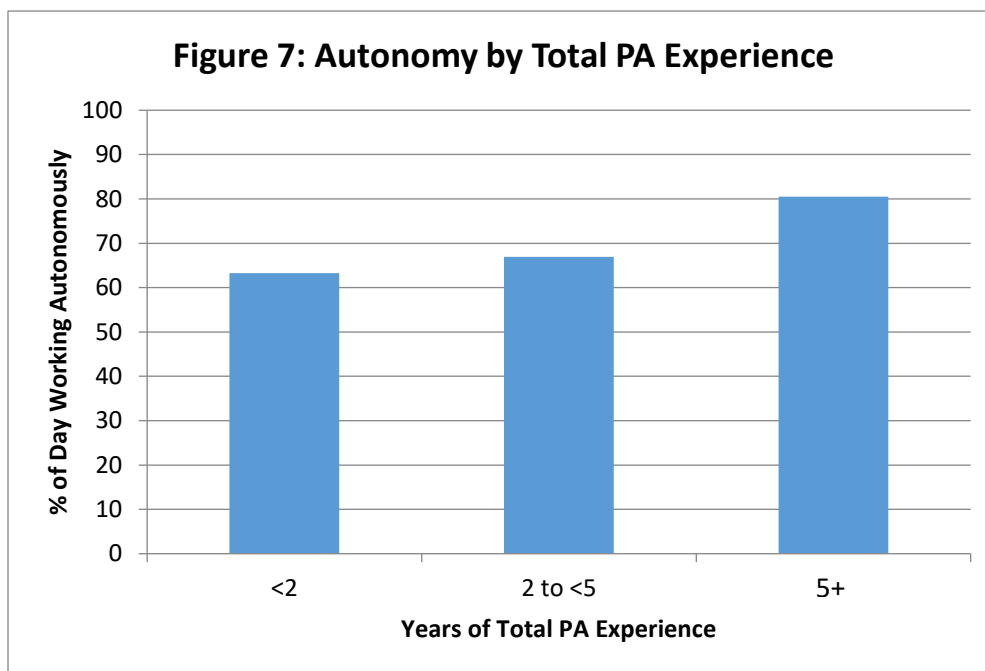
Previous career background was investigated for overall effect on both consult frequency and autonomy. Career background was consolidated into four groups: researcher, licensed healthcare provider, first responder (including military medics), and N/A or no direct medical background. Previous career background had a significant effect on consult frequency, $\chi^2 (3) = 8.36$, $p<0.04$, with respective consult frequency mean ranks of 94.3, 89.2, 67.47, and 91.1. Previous career background also had a significant effect on autonomy, $\chi^2 (3) = 8.49$, $p<0.04$, with respective autonomy mean ranks of 74.2, 81.2, 101.1, and 75.3. Subsequently, post-hoc analyses were performed. There were no significant differences in frequency of consulting nor autonomy amongst the 4 groups.

The influence of total years of experience on frequency of consulting was examined. Few participants had greater than 10 years of experience. As a result, the upper four response categories were collapsed into one. The collapsed groups included in the analyses were: <2 years, 2 to <5 years, and 5+ years. There was a significant effect of experience on the frequency with which the PA consults their supervising physician, $\chi^2 (2) = 12.21$, $p<0.01$, with a mean rank consult frequencies of 95.6, 93.8, and 68.8 for <2 years, 2 to <5 years, 5+ years, respectively. Post-hoc analysis revealed there was no

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significant difference in consult frequency between <2 years and 2 to <5 years, $p = n.s.$ However, participants with 5+ years of experience reported significantly lower consult frequencies compared to participants with '<2 years' and '2 to <5 years' of experience; $U = 830, p < 0.01$ and $U = 1315, p < 0.01$, respectively.

The influence of total years of experience on perceived autonomy was also examined using the same collapsed groups (Figure 7). There was a significant effect of experience on autonomy, $\chi^2 (2) = 14.76, p < 0.01$, with mean rank autonomy of 68.0, 72.5, and 99.3 for '<2 years', '2 to <5 years', and '5+ years' respectively. Post-hoc analysis revealed there was no significant difference in autonomy between '<2 years' and '2 to <5 years', $p = n.s.$ However, as with consult frequency, participants with 5+ years of experience reported significantly greater autonomy than both participants with '<2 years' and '2 to <5 years' of experience; $U = 837, p < 0.01$ and $U = 1345, p < 0.01$, respectively.



The influence of number of previous PA positions on consult frequency was investigated. Response categories were collapsed due to the limited number of respondents with greater than 3

positions. Categories used for comparison were 1, 2, and 3+ positions. Frequency of consult decreased significantly as number of previous positions increased, $\chi^2 (2) = 8.50, p < 0.01$, with mean rank consult frequencies of 89.5, 86.8, and 63.9 for 1, 2, and 3+ positions respectively. Post-hoc analysis revealed that there was no significant difference in frequency between 1 position and 2 positions, nor 2 positions and 3+ positions, $p = n.s.$. There was a significant difference in consult frequency for PAs with only 1 versus 3+ positions, $U = 1202, p < 0.01$.

Number of previous PA positions was also investigated for influence on perceived autonomy. The same categories as above were used for comparison. Autonomy increased significantly with number of previous positions, $\chi^2 (2) = 9.0, p < 0.01$, with mean ranks of 78.0, 72.7, and 102.38 for 1, 2, and 3+ positions respectively. Post-hoc analysis revealed that there was no significant difference in autonomy between 1 and 2 previous positions, $p = n.s.$ However, there was significant difference between only 1 versus 3 or more previous positions, $U = 1206, p < 0.01$, and with 2 versus 3 or more previous positions, $U = 433, p < 0.01$.

The influence of number of years in current position on consult frequency and perceived autonomy was investigated. Similar to the way in which the response categories were collapsed for total years of PA experience, years in current position were collapsed into 3 groups for analysis. There were no significant differences, $p = n.s.$, with consult frequency mean ranks of 88.0, 83.3, and 76.8, and autonomy mean ranks of 81.2, 82.0, and 91.6 for '<2 years', '2 to <5 years', and '5+ years', respectively.

Effects of Specialty and Physician-PA Structure on Autonomy

This study also investigated the effect of specialty on both consult frequency and perceived autonomy. There was a significant effect of specialty on consult frequency, $\chi^2 (3) = 17.8, p < 0.01$, with mean rank consult frequencies of 72.3, 75.2, 120.3, and 82.0 for primary care, surgery, emergency

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medicine, and all others, respectively. Post-hoc analysis revealed that respondents in emergency medicine consulted significantly more frequently than the remaining groups; primary care, surgery, and other, $U = 234, p < 0.01$, $U = 123, p < 0.01$ and $U = 441, p < 0.01$, respectively. No additional comparisons were significant, $p = n.s$. The same specialty groups were compared for autonomy. There was a similar non-significant trend, $\chi^2 (3) = 6.47, p < 0.09$, with mean rank autonomy of 94.8, 78.6, 62.0, and 82.8 for primary care, surgery, emergency medicine, and other specialties, respectively.

Number of supervising physicians was investigated for effect on frequency of consult and autonomy. Outliers were omitted prior to analysis; the resultant number of physicians ranged from 1-30. There was a (weak) significant positive correlation between the number of physicians and consult frequency, $r = -0.30, p < .01$. Correspondingly, there was a weak significant negative correlation between number of supervising physicians and perceived autonomy, $r = -0.24, p < .01$. As the number of physicians in a team increase, autonomy decreases and frequency of consulting increases.

There was a significant relationship between the number of supervising physicians and specialty, $\chi^2 (3) = 25.6, p < 0.01$. Surgery and emergency medicine both reported significantly greater numbers of supervising physicians than both primary care and the other group. The mean ranks were 45.5, 73.3, 88.2, and 47.7 for primary care, surgery, emergency medicine, and other, respectively. The pair-wise comparisons had the following results: surgery-primary care $U = 128, p < 0.01$, surgery-other $U = 181, p < 0.01$, emergency medicine-primary care $U = 62, p < 0.01$, and emergency medicine-other $U = 95, p < 0.01$. There were no differences between surgery and emergency medicine nor between primary care and other, $p = n.s$.

Teamwork Questionnaire

The Tuckman Team Work Survey was used to assess the physician-PA stage of team functioning. The majority of PAs identified with the performing stage (75.0%) and the remaining PAs

primarily identified as transitioning (unable to identify one stage) (20.6%). The residual 5% was comprised of storming and norming stages.

Statistical analysis of the Tuckman Team Work survey was limited. Most participants identified with the performing stage. A chi-square analysis examined the number of years in current position and the proportion of PAs in the performing versus transitioning between stages. There was a significantly higher number of respondents transitioning between stages in the group that had been working less than 2 years. Only 22.9% of respondents had less than 2 years of total experience. The number of participants identifying with the stages other than performing was not sufficient to conduct analyses comparing the stages. As an alternative to the overall Tuckman score, the individual stage scores were used for additional analysis. A Pearson's correlation was performed between the performing scores and time to feel confident (in months). There was a very weak but significant negative correlation: less time (fewer months) to feel confident was associated with a higher performing score, $r = -0.17, p < .03$. There was no relationship between performing score and the number of previous positions or the years in current position.

DISCUSSION

At present, this is the first study to address Canadian physician assistant autonomy and physician-PA relationship structure and dynamics through a unique national survey.

Demographic Data

The current demographic data is based on a sample of nearly one third of the population (31.7%), and can be used in conjunction with the CAPA 2015 census data (49%)(22). Although there are hundreds of PA education programs in the USA and only four in Canada, this survey indicates that approximately 95% of PAs working in Canada were also educated in Canada. This has increased from

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85.5% in 2012(23). As Canadian programs continue to produce greater numbers of graduates, the workforce is likely to become increasingly Canadian-educated.

Half of all PAs captured in this study have completed graduate education, and 95% have completed a university, college, or trade education. Approximately 3% of PAs did not complete a secondary education program. It is likely that these respondents entered the profession through military training prior to the awarding of a Bachelor's degree (2009)(22). Many PAs have career backgrounds in the health care field. The type of background may influence PA practice. Although not a statistically significant difference, there was a trend toward first responders reporting less frequent consults and greater autonomy. This may be explained by previous experience in emergent situations with no physician present, necessitating independent management.

Over half of the respondents have been working as a PA for less than five years. This may be a true reflection of the Canadian PA population due to the youth of the profession, with civilian graduates only since 2010. Alternatively, this may also reflect a greater willingness to participate in surveys near the start of a career. Consistent with total years of PA experience, over three quarters of respondents had been working at their current job for less than five years. Comparing the total number of years as a PA and the total number of years in current position provides more insight. Although 7.2% of the survey sample had worked greater than 15 years, no PA had reached 15 years at their current position. Most of the study participants have held one or two jobs as a PA. A limited number of PAs reported having greater than four PA positions. Factors influencing turnover were not investigated but would assist the health care system, employers, and physicians in learning how to retain PAs once they are trained in their positions.

Medical Specialty

Specialty affects the role and practice of the PA. PAs currently treat many more outpatients than inpatients, which partially reflects that almost one third of Canadian PAs indicated they work in primary care. Emergency medicine PAs were found to consult their supervising physicians more frequently than primary care, surgery, and other specialties collectively. Conversely, autonomy was not significantly different for this group. This suggests that although the emergency medicine PAs consult more frequently, they do not feel substantially less autonomous than other groups. It would be logical to assume that the nature of emergency medicine necessitates consulting the supervising physician more frequently. Previous literature had suggested that primary care PAs had the greatest autonomy and surgical PAs had the least(5). Primary care did have a higher mean than the other groups.

Evolution of Autonomy

On average, the PAs in this Canadian study spend most of their day working independently. Most PAs can expect to feel confident at their job by 1 year, and it rarely takes longer than 1.5 years. Similarly to the reports of Cawley and Bush (5), autonomy increased and consult frequency decreased with total years of PA experience. This is also supported by comparing the average frequency of consulting in their first 3-6 months to the current timepoint. Most of the respondents were within the first 5 years of post-graduate employment. As a result, conclusions cannot be drawn with respect to the decrease in consult time over the entire career of a PA. However, examining the total years of experience revealed that PAs markedly decrease in consult frequency and increase in autonomy after 5 years. This suggests that it takes approximately 5 years for PAs to function more independently and without direct supervision. However, the exact time point is difficult to pinpoint due to the nature of the response categories used in this study; an open-ended 'how many total years have you worked as a PA?' would have been beneficial. Consulting frequency may plateau around 5 years of experience,

considering that there was a significant difference for frequency of consult between less than 5 years and more than 5 years of total PA experience. However, the current study had a low sample size for PAs that have been working greater than 10 years. Results by Cawley and Bush suggest that time consulting continues to decrease until around 15 years of experience (5).

The concept of experience can be assessed as time in years, seen above, and by number of positions. As anticipated, number of previous PA positions also affects the role of the PA. By the third position, consult frequency decreases and PAs tend to have greater autonomy. This is intuitive as they would have a greater exposure and breadth of knowledge with each additional position. This decrease in physician-PA consulting time may also be attributed to the development of trust and increased comfort with mutual expectations of how to handle different situations. Increasing autonomy could be explained similarly.

Physician-PA Structure and Relationship

It is most common for PAs to work with a team of physicians, whether as a single PA or a team of PAs. The results of this study revealed that PAs working with larger physician teams felt less autonomous and consulted more frequently. This phenomenon could be explained by considering that larger physician teams require the PA to gain familiarity with a greater number of individual physicians. A large team may cultivate less intimacy, resulting in prolonged time to establish relationships. Working with multiple physicians would also demand that the PA adapts to many individual leadership styles and team dynamics. Some PAs identified working in a group with over 80 physicians. If negotiated performance autonomy relies on developing trust between the physician and the PA, it may be difficult to progress when there are such high volumes of collaborating physicians.

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The number of supervising physicians was associated with specialty. It is reasonable to assume that different specialties would have different structures due to the nature of the care being provided. Surgery and emergency medicine PAs reported greater numbers of supervising physicians than primary care and the other specialties collectively. It is interesting to note that for emergency medicine PAs, the number of physicians was greater and consult frequency was greater. These results suggest that although emergency medicine PAs consult their supervising physicians more frequently, the nature of their medicine dictates this and they do not feel any less autonomous than other PAs. A larger number of supervising physicians also likely contributes to a greater consult frequency as discussed previously. Surgical specialties also have a greater number of supervising physicians. This may be attributed to the often large role of the surgical PA in ward work. With ward work, the PAs often care for many patients under the care of many different attendings.

Team Work Survey

The most valuable data derived from the Tuckman Model Team Work Survey was that although more than half of the PAs had been working as a PA for less than five years, three quarters of the PAs were identifying with the performing stage. This supports the idea that perceptions of autonomy are solidified in the first 5 years of practice. The performing stage suggests better functioning as a team, with greater autonomy and less direction from the supervising physician than the other stages. Correspondingly, respondents who had higher scores for the performing stage also had taken less time to feel confident at their current job.

It is encouraging that most PAs identified their team with the performing stage, despite the high proportion of respondents who had only been working less than 5 years. However, the group that had been working less than 2 years did have a significantly higher number of PAs that identified as currently

transitioning between stages. This suggests that although some physician-PA teams attain the performing stage within 2 years, many teams are still working towards this level of functioning.

It appears that the Work Study Survey representing the Tuckman model may not be as appropriate as hoped, since a high proportion of PAs are working with large and varying teams of physicians. Based on study results and some participant comments, it may be difficult to answer survey questions about the 'team' when the 'team' is frequently changing. The Tuckman Model is seen to be an appropriate theoretical framework for addressing the functionality of this very important healthcare team. However, the Team Work Survey as itself may not be the most appropriate method of addressing stages of group development amongst physicians and PAs, especially those who have variable and large teams. It may be that a different and specific questionnaire or rating system is needed.

CONCLUSIONS

Canadian PAs are employed in primary care/family medicine, surgery, emergency medicine, and an assortment of other specialties. PAs tend to treat more outpatients than inpatients. Most PAs work as a single PA with a team of supervising physicians. It is also common for multiple PAs to work with multiple physicians. Many PAs are employed in settings where they work with many varying physicians, which makes it difficult to describe a team with this model. Larger numbers of supervising physicians reflect in a weaker team model. PAs in surgery and emergency medicine tend to be part of larger teams than are PAs in primary care and 'other specialties'. PAs in larger teams feel less autonomous and consult with their supervising physician(s) more frequently.

As PAs gain experience, they gain autonomy and consult their supervising physician less. This reflects a progressing relationship as well as the physician's developing comfort level with the skills of the PA. These improvements in autonomy are evident after 5 years of experience in the workforce. Additionally, most PAs are confident they meet the expectations of their job by 1 year, and almost all

PAs report this by 1.5 years. Most PAs in this study had been employed for less than 5 years and spend the majority of the day working autonomously.

PA training allows for generalist knowledge and the ability to change positions and specialties if desired. This benefits the PA as well as employers. PAs should be made aware that, just as it takes up to 5 years of residency for a physician resident to develop their specialty, it takes several years for PAs to become confident and develop autonomy. Perhaps this insight would decrease PA turnover.

The relationship between physicians and PAs is vital to the success and optimization of the PA workforce. It affects every individual PA, the physician(s) they work with, and the patients for which they care. Research investigating elements of the physician-PA dynamic are valuable. This research was expected to provide a first glimpse into this vitally important relationship in Canadian health care, as well as the related evolution of PA autonomy. It is suggested that PAs become confident within 6 months to 1.5 years and substantially autonomous by 5 years of PA experience. This timeframe for workplace skill acquisition informs both the physician and PA on expected and realistic milestones. Insights may result in more realistic expectations and/or accelerated attainment in the evolution of negotiated PA autonomy. Educating employers, physicians and PAs regarding the supervision structure and skill level expectations may also result in better defined roles and/or a smoother transition towards higher functioning team dynamics. For example, a smaller number of supervising physicians is desired. This study provides insight into this dynamic, but more research is needed.

LIMITATIONS

There are several limitations to this study. Inherent to this study design, there may have been self-report and recall bias. The survey asked how many previous PA jobs the individual had held, but did not give the option of '0' for if the current position was their first. It is thought that the '1' column represents PAs who have worked a total of 1-2 PA jobs. For several questions, there may have been

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greater statistical power if respondents had entered exact values (ex. number of years of experience) rather than categories (ex. <2 years). The survey also presumed that the total number of supervising physicians listed by respondents was the largest number of physicians in their team, who do not all necessarily work together in any one shift. It would have been beneficial to clarify this number by addressing 2 questions: 1) the number PAs and physicians that work as a team each shift, and 2) the total number of PAs and physicians in your team on service. Lastly, some PAs found it difficult to identify with the Team Work Survey. Most notably, working with several supervising physicians leads to different teams that cannot be evaluated as one.

FUTURE DIRECTIONS

To address the evolution as accurately as possible, it would be ideal to conduct a prospective longitudinal study. Wherein, a group of PA graduates is assessed at regular intervals over the first 5 years of their employment to identify when transitions occur and a more concrete timeframe for reaching the performing stage. A better method for assessing the Tuckman stages could be explored, whether that be having the PA fill out a separate survey for each 'team' of which he or she perceives to be a member, or testing a modified or new questionnaire. It may also be beneficial to identify barriers to team development and functioning.

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