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Pediatrician Perceptions of the Patient-Centered Medical Home Model

A thesis submitted in partial fulfillment of the requirements for the degree of
Master of Science at Virginia Commonwealth University

by

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Table of Contents

Contents

Table of Contents	ii
List of Figures.....	iii
List of Tables	v
Abstract.....	vi
Chapter 1: Background.....	1
The Current State of Healthcare in the United States	1
The Patient-Centered Medical Home	2
History of the Medical Home Model.....	5
The Modern Patient-Centered Medical Home: Claims and Evidence.....	9
Chapter 2: Primary Research Question and Methods	11
Chapter 3: Results	16
Physician and Practice Demographic Data.....	16
Self-Assessment of PCMH Understanding, Agreement with PCMH Principles, Current Level of PCMH Integration, and PCMH Interest.....	20
Behavioral Questions Related to Principles and Practices of the Patient-Centered Medical Home	28
Perceived Barriers to Integration of the PCMH Model	39
Chapter 4: Discussion	55
Future Directions	58
References.....	61
Appendix A: Survey.....	64
Appendix B. Statistical Tables.....	73

List of Figures

Figure 1. Survey data vs. AAP data.....	17
Figure 2. Percentage of patient population composed of CSHCNs, Generalists vs. Subspecialists.	19
Figure 3. Self-Assessment of PCMH Familiarity	21
Figure 4. Physician Agreement with PCMH Principles.....	22
Figure 5. Self-Assessment of Current Level of PCMH Integration	23
Figure 6. PCMH Interest.....	24
Figure 7. Differences in PCMH Interest Levels: Physicians with Primarily White Patient Populations vs. Physicians with Non-Primarily White Patient Populations	25
Figure 8. PCMH Agreement vs. PCMH Familiarity.....	26
Figure 9. PCMH Interest vs. PCMH Familiarity.....	27
Figure 10. Responses to the question "When contacted by a child's family regarding a health concern, do you have a standard procedure in place for speaking directly with the child or family to address those concerns?"	29
Figure 11. Speaking Directly with a Child or Family to Discuss Health Concerns: Urban vs. Suburban.....	30
Figure 12. Transfer of Care Meeting: Urban vs. Suburban.	33
Figure 13. Transfer of Care Meeting: Generalists vs. Subspecialists.....	33
Figure 14. Confidence in Receiving Notes from Subspecialist.....	36
Figure 15. Reviewing Subspecialist Notes with Patient	36
Figure 16. Physician E-mail Use for Patient Communication	38
Figure 17. Frequency of E-mail Use for Patient Communication	38
Figure 18. Payment Issues as a Barrier to PCMH Integration.	41
Figure 19. Associated Expenses as a Barrier to PCMH Integration.....	42
Figure 20. Lack of Defined Steps as a Barrier to PCMH Integration.....	43
Figure 21. Lack of Defined Steps as a Barrier to PCMH Integration: Physicians with Primarily White vs. Not Primarily White Patient Populations	44
Figure 22. Adequate Evidence of PCMH Benefits.....	45
Figure 23. HIPAA Compatibility of the PCMH Model	46
Figure 24. HIPAA Compatibility of the PCMH Model: Males vs. Females.....	47
Figure 25. Current Generation Health Care Information Technology and the Medical Home Model	48
Figure 26. Time Commitment as a PCMH Barrier.....	49
Figure 27. Time Commitment as a PCMH Barrier: Private Practice vs. Academic	50
Figure 28. Human Resource Needs as a PCMH Barrier.....	51

Figure 29. Human Resource Needs: Private Practice vs. Academic.....	52
Figure 30. Human Resource Needs: Urban vs. Suburban.....	52
Figure 31. Human Resources: 5 or Fewer Physicians vs. More than 5 Physicians.....	53
Figure 32. Human Resource Needs: Males vs. Females.....	54

List of Tables

Table 1. Joint Principles of the Patient-Centered Medical Home	7
Table 2. The NCQA's six standards of PCMH accreditation	8
Table 3. Demographic parameters and demographic groups used for pair-wise comparisons of participant sub-populations	15
Table 4. Appointments per week and average appointment time, Generalists vs. Subspecialists.	18
Table 5. Responses to behavioral questions regarding the principle of "Whole Person Orientation."	32
Table 6. Responses to behavioral questions regarding the principle of coordinated/integrated care	35
Table 7. Commonly Cited Issues Regarding System-Wide PCMH Integration.	39
Table 8. Commonly Cited Challenges to PCMH Integration: Perceived Barriers, Perceived Non-Barriers, and Issues with No Consensus.	40
Table 9. Physician and Practice Demographic Data.	73
Table 10. Survey Participant Patient Demographics.....	74
Table 11. Statistical Differences in Responses between Related Demographic Groups: Self-Assessment Items	75
Table 12. Having a defined process for speaking directly with the child or family to discuss health care concerns – Urban vs. Suburban	76
Table 13. Likelihood to hold a transfer of care meeting when appropriate - Urban vs. Suburban.	76
Table 14. Likelihood to hold transfer of care meeting - Generalists vs. Subspecialists	77

Abstract

PEDIATRICIAN PERCEPTIONS OF THE PATIENT-CENTERED MEDICAL HOME MODEL

By Christopher Chambers Ray

A thesis submitted in partial fulfillment of the requirements
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Virginia Commonwealth University, 2011

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The Patient-Centered Medical Home (PCMH) is an emerging model of health care designed to provide a simpler, more effective health care experience. The model places heavy emphasis on the concept of every patient having a “personal physician” who is the point of access for all health care needs and concerns. The personal physician integrates all relevant health care information to provide the patient with a holistic picture of his health. The supposed benefits of the PCMH model include an improved patient experience, increased effectiveness of care, increased efficiency of care, greater access to care, among others. Only now is evidence beginning to emerge to substantiate those claims.

As evidence continues to emerge supporting the PCMH model, one area that warrants further study is how those directly involved in health care perceive this model.

Here, a survey was developed to assess the following information among a population of pediatric physicians: understanding of the PCMH model, agreement with PCMH principles, interest in moving to a PCMH-based practice, and what issues are perceived as barriers to PCMH integration.

Results suggest that there is a high degree of familiarity with the PCMH model and a high level of agreement with PCMH principles in this population, but that agreement does not correlate with interest in moving one's practice toward the PCMH model. Data further indicate that issues regarding payment and associated expenses for PCMH integration are universally perceived barriers. On the other hand, a lack of evidentiary support and compatibility issues with HIPAA are not perceived as barriers. Other issues, such as human resource needs, were more likely to be perceived as barriers in one subpopulation versus another. These data suggest a disconnect between PCMH familiarity and PCMH interest in pediatric physicians. Further, while some issues are perceived as barriers to all pediatric physicians, some issues are more likely to be perceived as barriers in one physician subpopulation versus another, and these differences must be recognized and addressed to help ensure success of the PCMH movement.

Chapter 1: Background

The Current State of Healthcare in the United States

As of 2008, 46 million people in the United States were uninsured, a figure corresponding to 15 percent of the total U.S. population¹. In 2009, this figure rose to over 50 million, or 16.7 percent². For the first time since 1987, the number of people in the U.S. with health insurance actually declined—falling from 255.1 million insured in 2008 to 253.6 million in 2009². Compared to other developed nations, the U.S. is an extreme outlier when it comes to costs per capita, a gap that has widened extensively over the past two decades. In the U.S., healthcare costs per capita exceed \$7,000 annually. This figure is more than double that of many wealthy nations including the United Kingdom (\$2,992) and Germany (\$3,588)³. Further, the U.S. has the highest health care spending as a percentage of GDP of any other nation in the world⁴ and in 2009, this figure rose by 1.1%, the highest single-year increase since 1960⁵. It is expected that health care expenditures as a percentage of GDP will continue to rise, approaching 20% of the U.S. GDP by 2015⁶.

When the Commonwealth Fund ranked the United States against six other comparable developed nations (Australia, the United Kingdom, Canada, Germany, New Zealand, and the Netherlands), the U.S. fell in last place in quality measurements

including safety, cost-related access problems, efficiency, equity, and in the ability to live long, healthy, and productive lives, including occupying the last place spot in overall health system performance³. The U.S. tied for last place when compared to eighteen other wealthy countries in “Deaths before age 75 from conditions at least partially modifiable with effective medical care⁷.” Additionally, infant mortality rates are higher in the U.S. than most other wealthy nations, including the United Kingdom, Switzerland, and Germany⁸.

One area that has been cited as a major reason for the current state of the U.S. health care system is a continually weakening primary care system. Over the past two decades, medical students’ interest in primary care professions has declined steadily. From 1996 to 2002, the number of graduating medical students that filled a primary care position in family practice dropped by 45%⁸. This growing shortage should not come at a great surprise, as recent figures show that while the average primary care physician’s lifetime earnings is less than half that of the average cardiologist⁹. Coupled with the stress that comes with financing a medical education, an endeavor that will leave current students over \$150,000 in debt¹⁰, reasons become clear for a sharp, consistent decline of interest in primary care.

The Patient-Centered Medical Home

The Patient-Centered Medical Home (PCMH) model is a model of care that is designed to provide a more integrated approach to managing all aspects of the patient’s health. In the modern PCMH model, the patient identifies a single “personal physician” who is their first point-of-contact for any and all health care issues and concerns. The

PCMH model places heavy emphasis on physician-led, team-based provision of healthcare. The personal physician takes ownership and supreme responsibility of the complete and holistic care of the entire patient by acting as the leader of a patient's care team. Besides arranging and performing the patient's care within the physician's own practice, the personal physician is also in charge of coordinating care across any medical specialties that are to be involved in any aspect of the patient's care. Additionally, the personal physician is responsible for connecting the patient with community resources that may positively impact the patient's physical, mental, or emotional health. Because of the generalist nature of the "personal physician" concept, the patient's primary care physician generally tends to fill the role of personal physician; however this is not necessarily always the case. The PCMH model ties many of the traditional principles and roles of primary care with practices that place a greater emphasis on improving the patient's experience by enhancing coordination and communication among all players in the patient's health. As its name implies, the PCMH model aims to put the patient more in charge of his own care by providing the patient with more information, additional resources, and greater choice, ultimately providing improved patient autonomy.

Besides improving the patient experience, other supposed benefits of the PCMH model include increasing the efficiency of care, providing more effective care, providing safer care, and providing greater access to care. Advocates of the PCMH model believe that the model holds significant promise in decreasing the costs of healthcare at both the patient level and of the system as a whole.

By giving the personal physician a more active role in the holistic care of a patient, it is argued that redundant procedures and visits can be largely limited or

eliminated, providing significant cost savings at every level of the system. Further, advocates argue that the personal physician focus of the PCMH model will allow an increased focus on preventive services. This increased focus on preventive care would then presumably limit the need for more expensive urgent care later in the patient's life. In this regard, the PCMH model's emphasis on increased preventive services serves to increase both the efficiency of care as well as the effectiveness of care.

An increased emphasis on care coordination should also enhance the effectiveness of care by helping the patient receive recommended specialist services in a more timely fashion. The PCMH model places strong emphasis on the use of modern health care technology in the provision of care. Patient safety is increased by the use of physician decision support software and by the use of centralized electronic medical records (EMR). Patient safety is further addressed in the PCMH model by the use of a care planning process that provides a systematic framework on which the long-term care of the patient is to be built. Finally, the PCMH model emphasizes the need for giving patients new tools to communicate with the practice of the personal physician to enhance patient access to care. Access to care is further addressed by the PCMH model via encouragement of open scheduling and expanded practice hours.

History of the Medical Home Model

The term “Medical Home” first appeared in 1967 in a book published by the AAP entitled *Standards of Child Health Care*¹¹. The AAP recognized the necessity of highly coordinated care in the health supervision of children with chronic diseases. As it was defined then, the Medical Home referred to the specific brick-and-mortar location where the complete, comprehensive medical record was maintained for such children. Whenever and wherever the child was treated, the Medical Home would be consulted in order to provide effective care, and when care was provided outside of the medical home, the record maintained at the Medical Home would be updated to maintain the new records of care. While the term was maintained and referenced over time, “medical home” did not appear in official AAP policy until decades later¹¹.

The modern Medical Home model as we know it today finds much of its roots in the efforts of Dr. Calvin Sia on the islands of Hawaii. In the late 1970s, Dr. Sia led a successful effort to have the Medical Home concept adopted into state legislature. The Medical Home, as defined by the Hawaii Child Health Plan, had several key features: family-centered care, financially and geographically accessible, offers continuity, comprehensive, and coordinated care, and involves the use of other related local resources¹¹. Word of the perceived success of this model of care began to spread, resulting in the publication of the AAP’s first policy statement of the Medical Home in 1992 and in the formation of many programs to promote the incorporation of such a model into practices nationwide. In 1993 the AAP established Community Access to Child Health (CATCH) as part of its Division of Community Pediatrics that promoted the vision that “every child in every community has a medical home and other needed

services to reach optimal health and well-being”¹¹. In 1999, the Maternal and Child Health Bureau established the National Center of Medical Home Initiatives for Children with Special Needs (www.medicalhomeinfo.org) that today is a key player in advocacy of the widespread adoption of the Medical Home model¹¹.

In 2002, the AAP published “The Medical Home,” which outlined the desirable characteristics of the medical home, which include: Accessible, Family-Centered, Continuous, Comprehensive, Coordinated, Compassionate, and Culturally Effective¹². While the benefit of the Medical Home model of care was most evident in the case of children with special health care needs (CSHCNs), recognition of the model’s potential benefit to all children was slowly gaining traction. In the early to mid-2000s the Medical Home concept began to spread from pediatrics to other primary care specialties. In 2004 the American Academy of Family Physicians (AAFP) adopted the term “medical home,” with the goal of “a personal medical home for each patient, ensuring access to comprehensive, integrated care through an ongoing relationship”^{13,14}. This stance was further endorsed by the American College of Physicians (ACP)^{13,15}. In 2005, the Patient-Centered Primary Care Collaborative was established by the cooperation of care providers, insurers, and interested corporations and organizations as an advocacy group with the goal of promoting improved primary care outcomes via the medical home model^{13,16}. This ultimately culminated in 2007 through the publication of “Joint Principles of the Patient-Centered Medical Home,” a combined effort of the AAP, the AAFP, the ACP, and the American Osteopathic Association. The seven principles cited in the publication included: personal physician, physician-directed medical practice, whole person orientation, quality and safety, enhanced access, and payment that reflects

value-added services¹⁷. These seven principles are outlined in Table 1. In recent years, several Patient-Centered Medical Home (PCMH) accreditation programs have developed largely based on the Joint Principles¹⁸. Among these, the National Committee for Quality Assurance's (NCQA) PCMH Recognition program (PPC-PCMH) is the most widely recognized¹⁸. The most recent PPC-PCMH recognition is based on six standards¹⁹. These standards are outlined in Table 2.

Table 1. Joint Principles of the Patient-Centered Medical Home.
Text was adapted from the AAP, AAFP, AOA, and ACP's *Joint Principles of the Patient-Centered Medical Home*¹⁷.

The Joint Principles of the Patient-Centered Medical Home	
1	A personal physician for first-contact, continuous and comprehensive care
2	A physician-directed team that collectively cares for the patient
3	Whole person orientation including acute, chronic, preventive, and end-of-life care
4	Coordinated care across all elements of the health care system
5	Improved quality and safety via evidence-based medicine, decision-support tools, and health IT
6	Enhanced access through open scheduling, expanded hours, and more options for patient communication
7	Payment reform reflecting added value of PCMH practices

Because of the abstract nature of the PCMH concept, there is some disagreement regarding how accurately such accreditation programs capture and appropriately prioritize PCMH elements. PPC-PCMH measures have been criticized for an overemphasis of “high tech” principles (such as use of electronic medical records (EMR))

and decision support software) while underemphasizing “high touch” principles (such as identification of a personal physician and whole-person orientation)^{13,18}. For example, by the NCQA standards a practice could earn 50 of 100 possible accreditation points simply via proper implementation of an EMR and could be certified as a medical home without patients having an identified primary care provider within the practice or without providing access to clinicians on nights or weekends by phone¹³. Of the 22 identified PCMH pilot programs in 2008, 15 used the PPC-PCMH standards for PCMH qualification¹³.

Table 2. The NCQA's six standards of PCMH accreditation. These principles are taken directly from the NCQA's "PPC-PCMH Standards and Guidelines"²⁰.

Six Standards of PPC-PCMH Accreditation	
1	Enhance Access and Continuity
2	Identify and Manage Patient Populations
3	Plan and Manage Care
4	Provide Self-Care Support and Community Resources
5	Track and Coordinate Care
6	Measure and Improve Performance

The Modern Patient-Centered Medical Home: Claims and Evidence

Supporters of the Patient-Centered Medical Home (PCMH) model believe that the model has the potential to fundamentally improve effectiveness, efficiency, and accessibility of care within the U.S. health care system^{13,18,21}. However, a number of potential barriers could prevent the widespread adoption of the model. First, in each definition of the medical home, an enhanced open-scheduling system is cited as a goal under “enhanced access,” but with the considerable time constraints that already limit primary care physicians, the ability to open up time in each day for previously unscheduled appointments seems infeasible. Second, up to this point there have been no large studies that link enhanced access with improved health outcomes¹³. Further, ambiguous definitions for “patient-centeredness” make quantitatively measuring its effects on health outcomes very difficult. Does “patient-centeredness” refer to a patient’s satisfaction with his care or is the term broader in scope? Similarly, while “continuity of care” or “continuous care” is cited as a key element of the PCMH model, there is not a strict consensus on what practices fall within this principle, nor how it can be appropriately measured¹³.

While opinions both for and against the PCMH model are widely offered, up to this point research regarding the PCMH to support such claims remains thin¹⁸. A significant problem with quantitatively measuring the PCMH model’s effect on health outcomes is that there is no widespread agreement on what constitute as appropriate PCMH metrics, largely due to the abstract nature of PCMH principles^{13,18}, as well as the fact that multiple similar definitions of the “medical home” have been established with substantial overlap, but it remains that there is not a single, governing definition for the

term¹³. However, some research is now beginning to emerge that relates PCMH principles to improved outcomes, improved access, and/or improved efficiency. Very recently funded efforts been made to explore the feasibility of widespread practice redesign and to assess the actual changes in health outcomes and costs that are associated with the Medical Home model. One such program, the National Demonstration Project, aimed at assessing the feasibility of practice redesign based on the PCMH began in 2006 and concluded in 2010, though the final results of the project have yet to be published²². A 2009 study by the Commonwealth Fund found that patients with access to a practice that satisfied the Fund's definition of a medical home reported greater receipt of preventive services combined with higher levels of satisfaction^{13,23}. A 2010 study found positive associations between practices exhibiting certain PCMH principles and a greater degree of delivery of preventive services in family medicine and internal medicine practices¹⁸. Specifically, researchers found that principles of "personal physician" (such as continuity with the same physician and the number of office visits within a two-year period) and "whole-person orientation", including well-visits and treatment for chronic diseases, were most positively associated with greater receipt of preventative services, and that referral systems for community resources and use of clinical decision-support tools were also associated with greater receipt of preventative services¹⁸. By their metrics, the group found no association between "enhanced access" and preventive care delivery, nor was the practice's use of EMRs associated with higher levels of preventive services delivery¹⁸.

Chapter 2: Primary Research Question and Methods

Most current research regarding the PCMH model is focused on determining if the claims of the PCMH are substantiated in practice (e.g., improved health care outcomes, increased efficiency, and patient satisfaction). These studies involve cross-sectional analyses of practices involved in PCMH pilot projects and demonstration projects across the country. The results of these studies will be critically important in gauging the feasibility and the practicality of PCMH implementation moving forward. However, even if these studies produce overwhelming evidence in support of the PCMH model, significant challenges will remain in integrating the PCMH model into the fabric of the U.S. health care system.

One example of such a challenge will be producing provider-level support of the PCMH. Integrating PCMH concepts into practices nationwide will require a high degree of cooperation and a great effort by the various stakeholders in all practice settings. Among those stakeholders are physicians. The American Medical Association and many major physician specialty organizations have voiced support for the PCMH²⁴. However, to our knowledge no previous attempt has been made to assess physician perceptions of the PCMH directly. Determining how clinicians perceive the PCMH model and determining what clinicians perceive as the barriers to its integration will be very important in advancing the PCMH model. Thus, the following research questions were

asked: How do physicians perceive the principles of the PCMH model and the potential value of the model? What issues do these physicians rate as the primary barriers to PCMH integration? Do perceptions of the Medical Home concept and barriers to its integration vary among practicing clinicians based on their practice demographics?

A survey was designed that would attempt to find answers to these questions. The survey was designed to be completed by pediatric physicians. The reason for this target population was two-fold. First, the PCMH model originated in the pediatric physician community, and thus pediatric physicians made a logical starting point for assessing physician perceptions. Second, the pediatric physician community was the most convenient physician community to which we had access.

The survey was composed of four sections. The first section asked the physician to self-assess their familiarity with the PCMH model, their agreement with the PCMH model, how they felt the level of PCMH integration in their practice compared to other practices nationwide, and their interest in moving towards a PCMH model. For these topics of self-assessment, participants were asked to rate their agreement with a given statement on a 7-point Likert scale ranging from “strongly disagree” (1) to “strongly agree” (7).

The second section asked a series of behavioral questions. Each behavioral question corresponded to a practice suggested by the PCMH model. This section was designed to assess what aspects, if any, of the PCMH model had been integrated into the physician’s practice. This section contained a mix of Likert scale questions, simple yes/no/NA questions, and some questions with multiple response choices.

The third section looked at commonly cited barriers to PCMH integration and whether or not the physician agreed that each issue stands as a barrier to PCMH integration. Similar to the self-assessment section, questions in this section asked the participant the degree to which he or she agreed with a given statement on the same 7-point Likert scale.

The final section of the survey collected physician demographic data, including practice type (generalist vs. subspecialist), practice size, practice setting, years in practice, and physician gender, among other things.

The survey was then reviewed by members of the VCU Department of Pediatrics and by members of the VCU Department of Human and Molecular Genetics. After several drafts and revisions, the survey was submitted for approval by the VCU Institutional Review Board (IRB). Once IRB approval was attained (IRB#HM13133), the survey was posted online using Survey Monkey (www.surveymonkey.com). Survey participants were recruited in the following four ways: e-mail announcement to the VCU Department of Pediatrics listserv, inclusion in the electronic newsletter of the Virginia chapter of the American Academy of Pediatrics (AAP), e-mail distribution to members of the AAP Section on Administration and Practice Management, and e-mail distribution to members of the AAP Council on Children with Disabilities.

Responses were collected from October 2010 until March 2011. Data analysis was performed using Prism Graphpad and IBM SPSS statistical software packages. Two rounds of statistical analysis were performed on each question in each of the three survey segments (self-assessment, behavioral questions, and perceived barriers).

The first round of analysis was used to determine if a significant consensus was observed in responses to each question. This analysis considered survey participants as a whole. One of two tests was used to determine statistical consensus for each question: Fisher's Two-Tailed Exact Test or the Wilcoxon Signed Rank Test. Fisher's Two-Tailed Exact Test was used in the case of questions involving a binary ("yes or no") choices, while the Wilcoxon Signed Rank Test was used in the case of Likert scale questions. In rare cases, Likert responses were converted to binary responses if a graded response was later determined to be arbitrary, and thus would be subjected to Fisher's Two-Tailed Exact Test instead of the Wilcoxon Signed Rank Test. In the case of both statistical tests, observed responses were compared to expected responses under the null hypothesis ("there is no real difference in responses to this question that cannot be explained by chance"). The results of each test were evaluated using a 95% confidence interval ($p < 0.05$).

The second round of analysis was used to determine if a significant difference in responses could be seen between related demographic groups. Seven demographic parameters were used to produce these related groups: practice type, practice setting, practice size, practice affiliation, years in practice, patient demographics, and physician gender. These groups are summarized in Table 3. For these comparisons, one of two statistical tests was used, again based on the type of response. Questions with binary responses were analyzed using Fisher's Two-Tailed Exact Test. Instead of comparing overall observed responses to the null hypothesis, responses for sub-population 1 were compared to responses for sub-population 2. Questions involving a Likert scale rating were analyzed using the Mann-Whitney U test. The Mann-Whitney U test compares the

median responses of two samples, taking into account the response variance of each sample. The results of each test were evaluated using a 95% confidence interval ($p < 0.05$).

Table 3. Demographic parameters and demographic groups used for pair-wise comparisons of participant sub-populations.

Group Comparisons based on Demographic Parameters
Practice Type (Generalist vs. Subspecialist)
Practice Size (5 or fewer physicians vs. more than 5 physicians)
Practice Setting (Urban vs. Suburban)
Practice Affiliation (Private Practice vs. Academic)
Years in Practice (Less than 20 vs. 20 or More)
Physician Gender (Male vs. Female)

Chapter 3: Results

Physician and Practice Demographic Data

In total, 91 survey responses were received and 79 were completed, corresponding to an 86.8% survey completion rate. Demographic data that were collected included physician gender, practice type, practice size, practice setting, practice affiliation, years in practice, and patient demographics. All demographic data are referenced in Table 9 (Appendix B).

Demographic data regarding physician gender, practice type, practice setting and practice size were compared to data from the AAP's Periodic Survey of Fellows #76 and 77 (2010)²⁵. Survey data and AAP data were similar for physician gender, physician practice settings, and practice type (see Figure 1, A-C). Data regarding practice size were dissimilar between survey data and AAP data (see Figure 1D). Collectively, these data suggest that survey participants are representative of the greater pediatric physician population in many respects. However, physicians of smaller practice sizes were overrepresented in this survey, suggesting that participant recruitment methods may have catered more strongly to physicians in small practice settings.

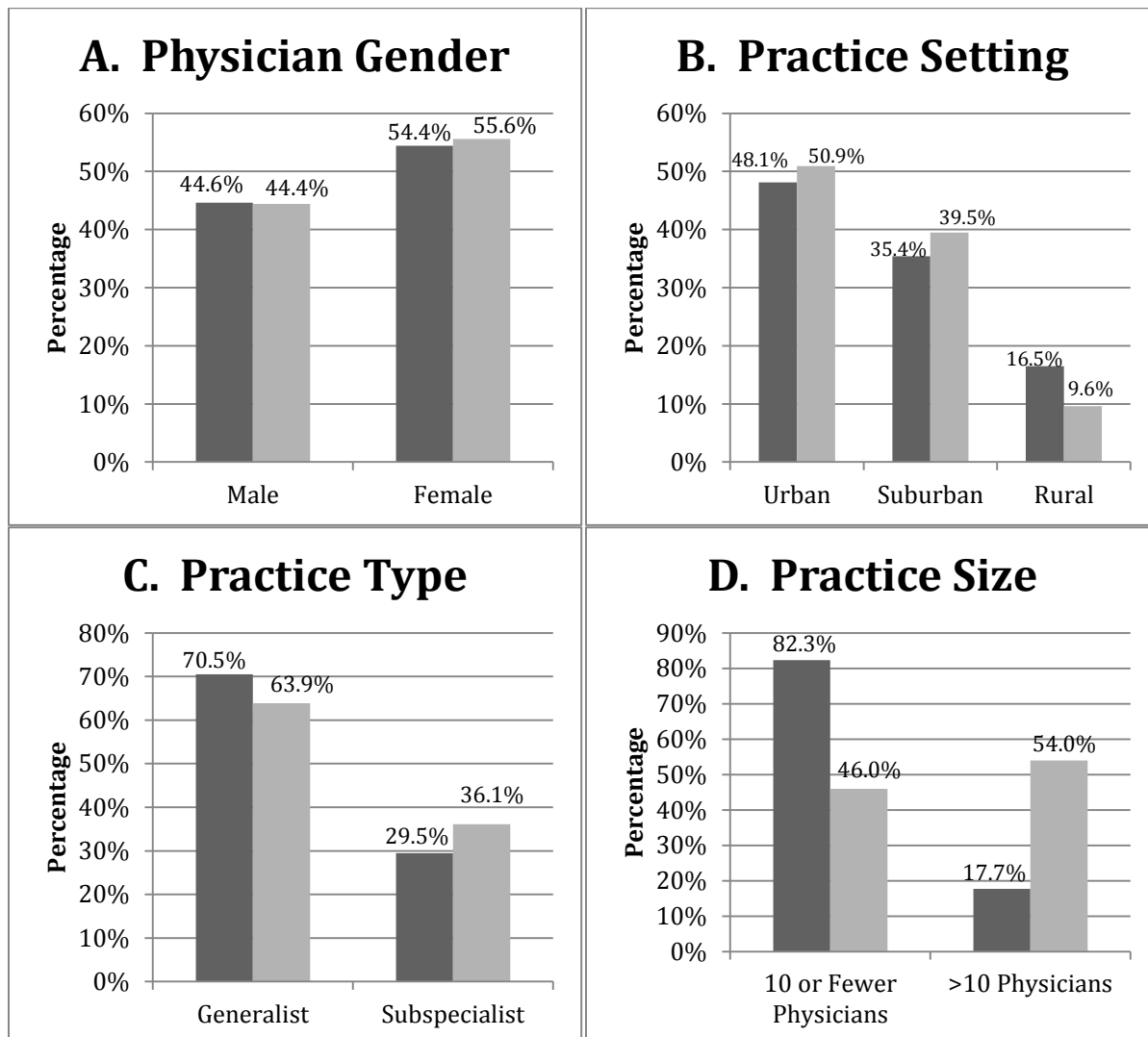


Figure 1. Survey data vs. AAP data. Dark grey bars represent survey data, light grey bars represent data from AAP's Periodic Survey of Fellows #76 and 77. **A)** Physician gender. Survey n = 78. **B)** Practice Setting. Survey n = 79. **C)** Practice Type. Survey n = 78. **D)** Practice Size. Survey n = 79.

More than half of survey respondents (53.8%) reported being in practice for more than 20 years, and over 75% reported being in practice for more than 10 years. Almost all survey respondents reported either being in private practice (56.9%) or practicing in an academic setting (40.3%). In terms of Electronic Medical Record (EMR) use, 64.6% reported using EMR while

35.4% reported no EMR use. Almost half of survey respondents (49.4%) reported a predominately Caucasian patient population, while 10.4% reported a predominately African American patient population and 3.8% reported a predominately Hispanic patient population. American Indians and Alaskan Natives, Native Hawaiians and Other Pacific Islanders, and Asian composed a very small portion of participants' patient populations. All data regarding patient demographics are shown in Table 10 (Appendix B).

Table 4. Appointments per week and average appointment time, Generalists vs. Subspecialists.

<u>Average Number of Appointments per Week (Std Dev)</u>		
Generalists (n = 51)	86.1	(43.8)
Subspecialists (n = 20)	27.7	(18.8)
<u>Average Appointment Time in Minutes (Std Dev)</u>		
Generalists (n = 55)	20.9	(9.4)
Subspecialists (n = 19)	39.8	(24.7)

For average appointments per week, average appointment time, and percentage of patients being children with special health care needs (CSHCNs), data were dichotomized between generalists and subspecialists due to the stark differences between the two groups. The average number of appointments per week was 86 for generalists compared to 28 for subspecialists. The average appointment time was 21 minutes for generalists compared to 40 minutes for subspecialists (see Table 4). As expected, most subspecialists (90.5%) reported having >20% of their patient populations. Generalists reported smaller CSHCN populations: the median range of CSHCNs as a proportion of total patient population for generalists was 6-10% (see Figure 2).

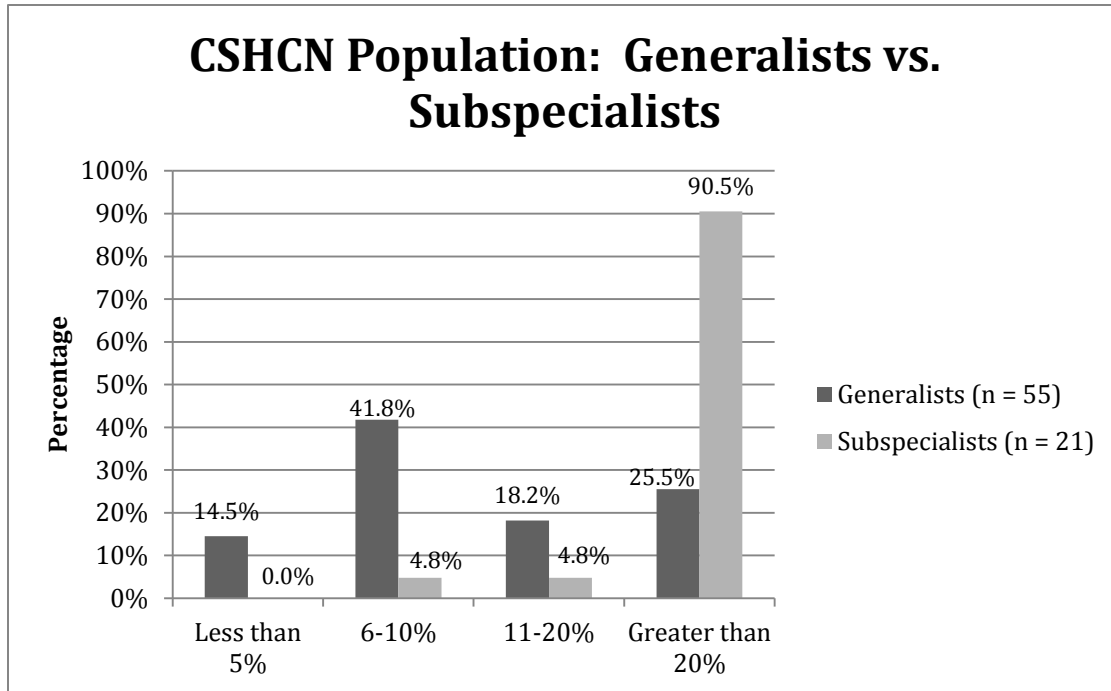


Figure 2. Percentage of patient population composed of CSHCNs, Generalists vs. Subspecialists.

Self-Assessment of PCMH Understanding, Agreement with PCMH Principles, Current Level of PCMH Integration, and PCMH Interest

The self-assessment section contained four items addressing the following four areas: physician self-assessed familiarity with PCMH principles, physician agreement with PCMH principles, physician's self-assessed current level of PCMH integration, and physician interest in moving to a PCMH-based practice. Participants were first asked to rate agreement with the statement "I consider myself to be very familiar with modern Medical Home principles and practices" on a 7-point Likert scale (see Figure 3). A significant consensus was observed in the total participant population that indicates that this population considers itself very familiar with PCMH principles and practices ($p < 0.001$; standardized $T = 7.084$). Pair-wise comparisons were performed based on practice type, practice setting, practice size, practice affiliation, years of physician experience, patient demographics, and physician gender. No significant differences were seen in responses in any of the seven comparisons (see Appendix B, Table 11). Together, these data suggest that the assessed pediatric physician population was familiar with modern PCMH principles and practices, and the level of PCMH familiarity was universal regarding all physician subpopulations that were examined.

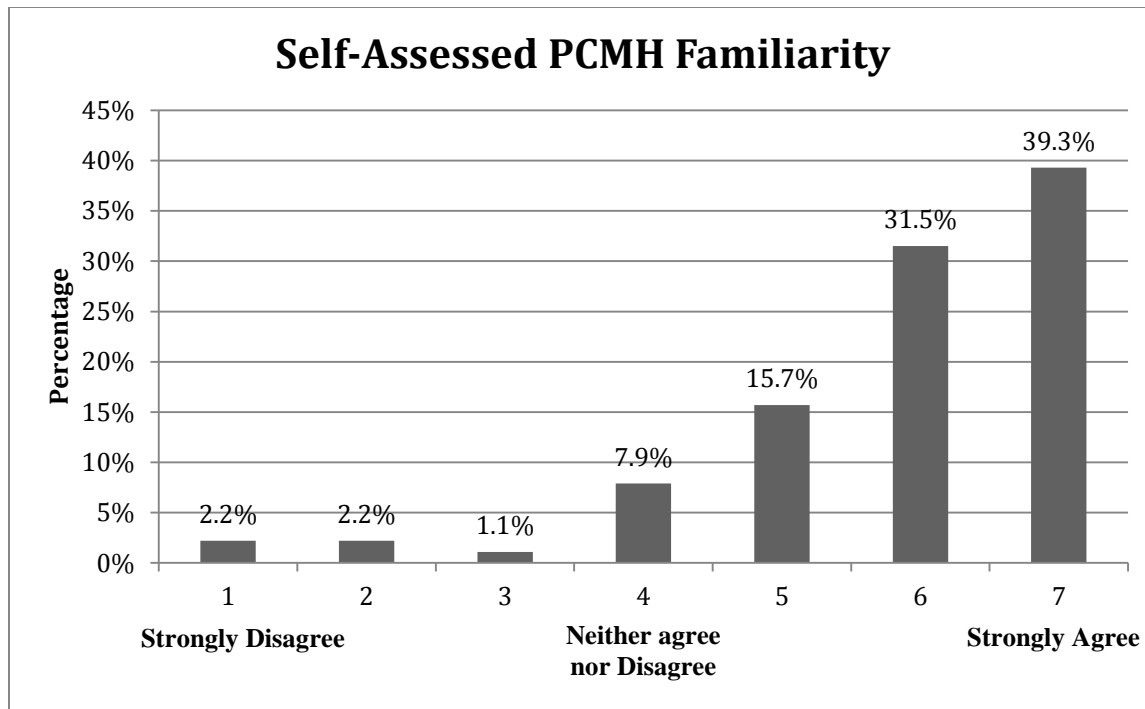


Figure 3. Self-Assessment of PCMH Familiarity. Participants' rated agreement with the statement "I consider myself to be very familiar with modern Medical Home Principles and Practices." n = 89; average rating = 5.84.

Participants were next asked to rate agreement with the statement "I agree with modern principles and practices of the Medical Home model, as far as I am familiar with them" on the same 7-point Likert scale (see Figure 4). The observed consensus was significant, indicating that pediatric physicians agree with PCMH principles to the extent to which they are familiar with them ($p < 0.001$; standardized $T = 6.927$). Pair-wise comparisons performed on the basis of practice type, practice setting, practice size, practice affiliation, years of physician experience, patient demographics, and physician gender produced no significant differences between sub-populations (see Appendix B, Table 11). These data suggest that pediatric physicians agree with PCMH principles, and that agreement was not related to any of the seven demographic parameters that were examined.

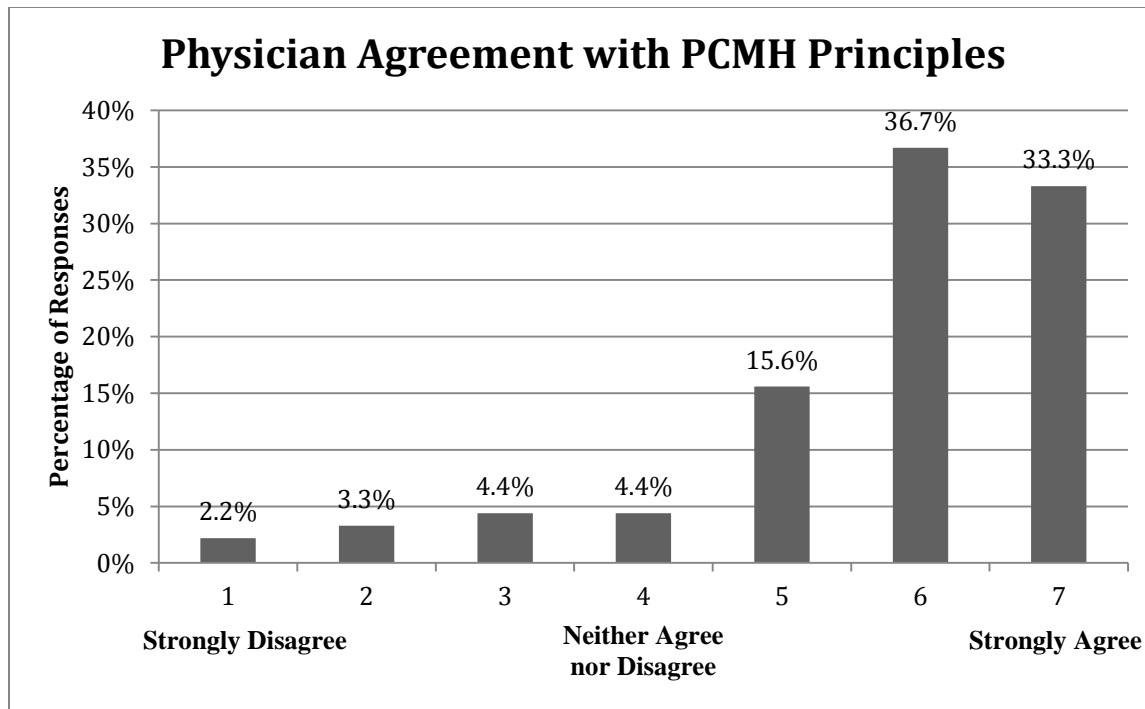


Figure 4. Physician Agreement with PCMH Principles. Participants’ rated agreement to the statement “I agree with modern principles and practices of the Medical Home model, as far as I am familiar with them.” n = 90; average rating = 5.71.

The third item in the self-assessment section asked participants to rate agreement with the statement “As compared with other pediatric practices, I feel that the level of integration of the Medical Home model in my practice is on par with other practices nationwide” on the same 7-point Likert scale (see Figure 5). The observed consensus was significant ($p < 0.001$; standardized $T = 4.161$). Pair-wise comparisons were performed based on practice type, practice setting, practice size, practice affiliation, years of physician experience, patient demographics, and physician gender. Again, significant differences were not seen in responses in any of the seven comparisons (see Appendix B, Table 11). Together, these data suggest that there is a high level of integration of PCMH principles in pediatric physician practices, and further that there was no observed relationship between the level of PCMH integration and any of the seven examined demographic parameters.

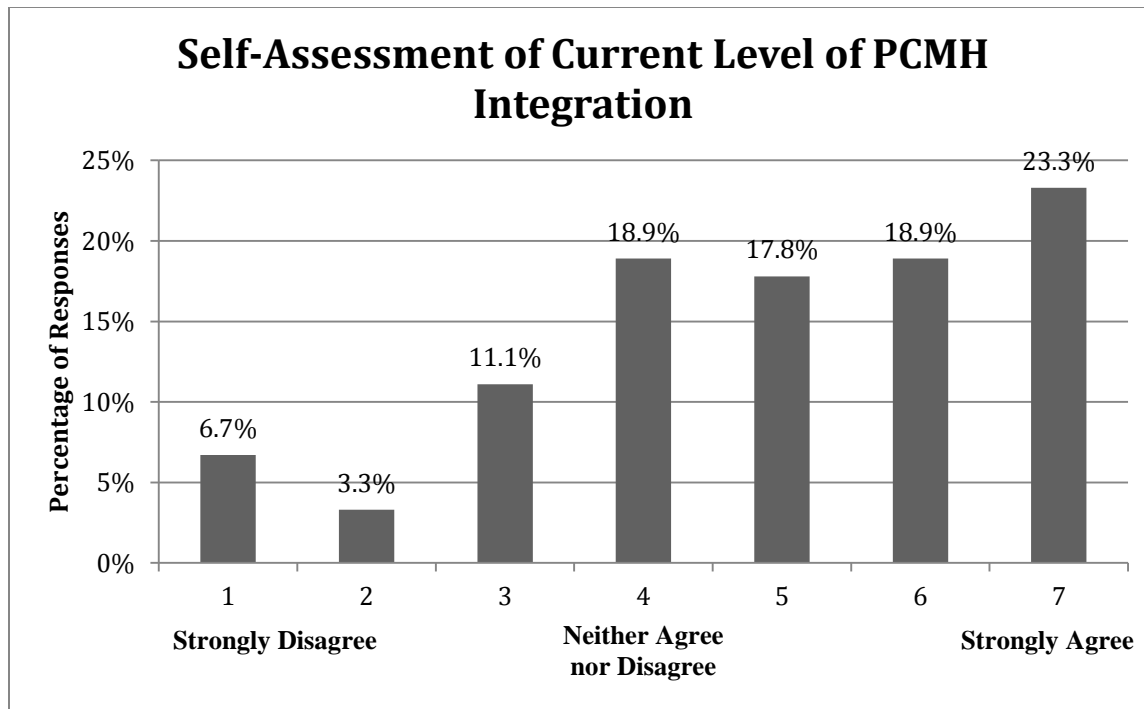


Figure 5. Self-Assessment of Current Level of PCMH Integration. Participants' rated agreement with the statement "as compared to other pediatric practices, I feel that the level of integration of the Medical Home model in my practice is on par with other practices nationwide." n = 90; average rating = 4.88.

Finally, participants were asked to rate agreement with the statement "although my practice has not made a conscious effort to move to a Medical Home model, I am interested in moving to the Medical Home model" on the same 7-point Likert scale (see Figure 6). No significant consensus was achieved in either direction regarding this statement ($p = 0.690$; standardized $T = 0.398$), indicating mixed interest in moving toward a PCMH model. A significant difference in responses was observed between physicians with a primarily white patient population and physicians whose patient population is not primarily white ($p = 0.049$; Mann-Whitney $U = 659.0$). Physicians with a patient population that is not primarily white were significantly more likely to be interested in moving to a PCMH model compared to physicians with a primarily white patient population (see Figure 7). No significant differences in responses

were seen in comparisons based on practice type, practice size, practice affiliation, practice setting, years of physician experience or physician gender (see Appendix B, Table 11).

Collectively, these data suggest that there is mixed interest in moving to a PCMH-based practice model and that interest may be related to certain physician demographic characteristics, such as patient population.

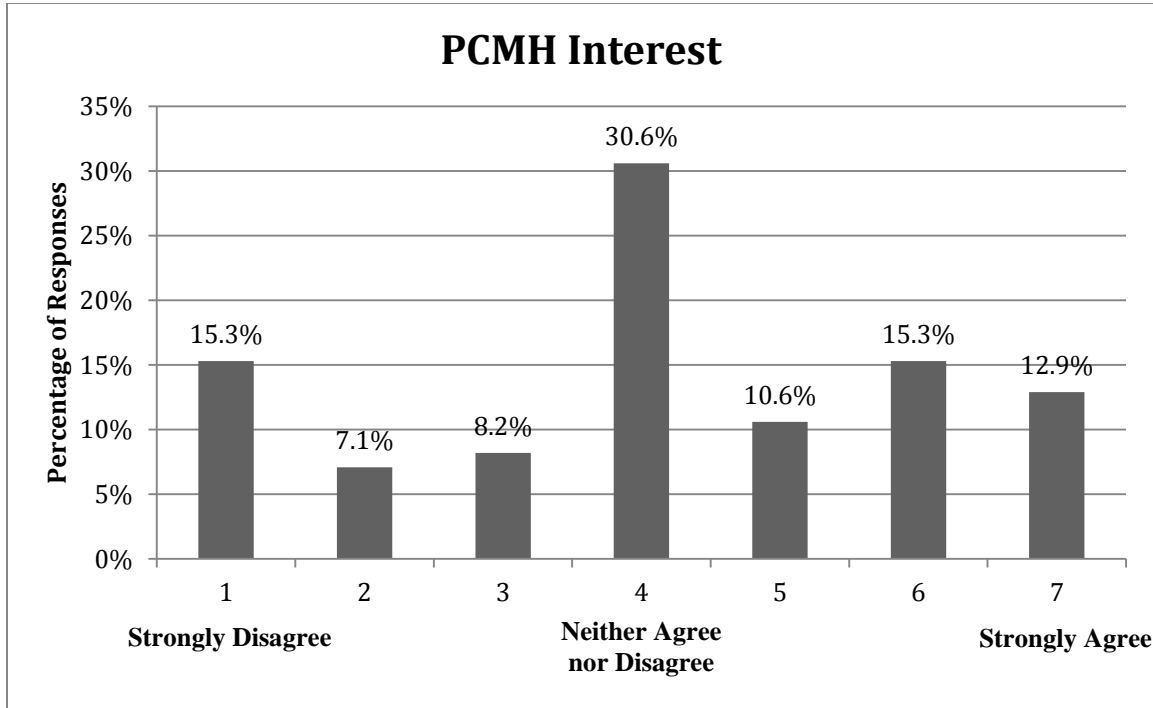


Figure 6. PCMH Interest. Participants' rated agreement to the statement "although my practice has not made a conscious effort to move to a Medical Home model, I am interested in moving to the Medical Home model." n = 85; average rating = 4.12.

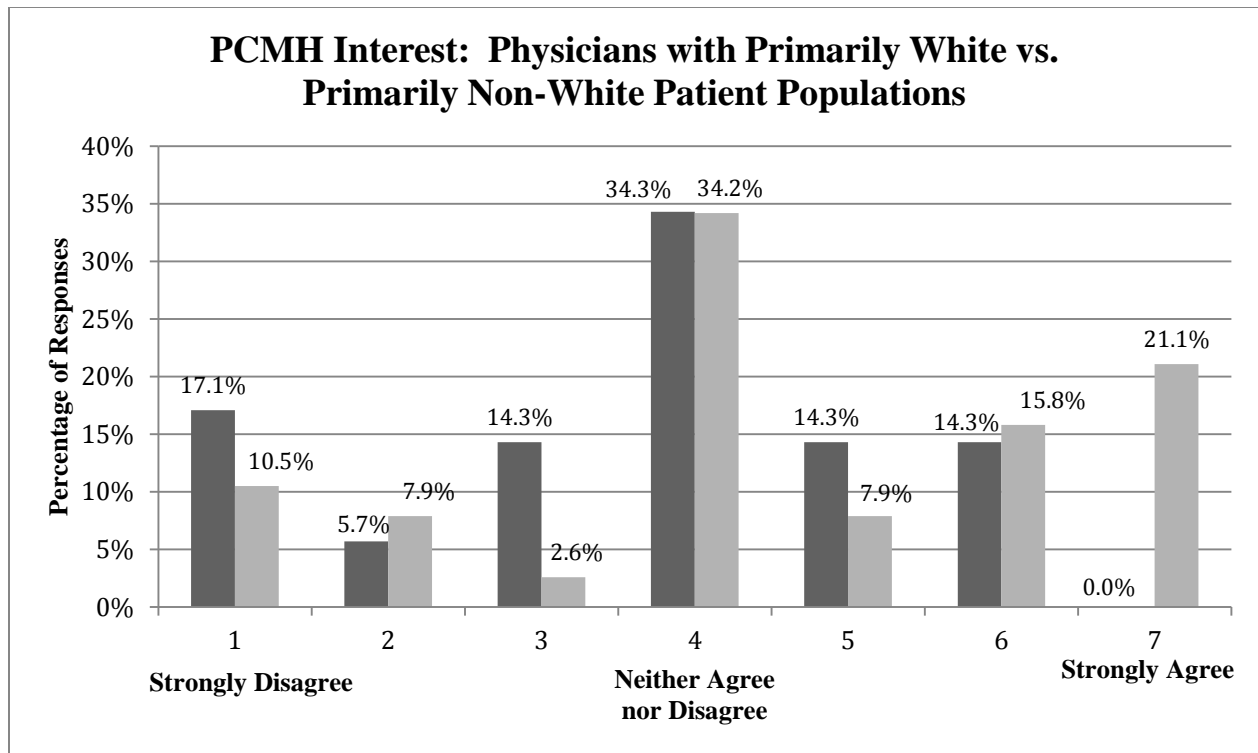


Figure 7. Differences in PCMH Interest Levels: Physicians with Primarily White Patient Populations vs. Physicians with Non-Primarily White Patient Populations. Responses from physicians with primarily white patient populations are represented in dark grey; responses from physicians with primarily non-white patient populations are represented in light grey. Physicians with primarily non-white patient populations were significantly more likely to show interest in moving toward a PCMH model practice.

Data from all four self-assessment items were further used to test for correlations between items. Level of PCMH familiarity was found to be significantly positively correlated with level of PCMH agreement ($r = 0.673$; $p < 0.001$; see Figure 8). This indicates that the more a physician considered himself or herself to be familiar with PCMH principles and practices, the more likely he or she was to agree with those practices. Conversely, no significant correlation was observed between PCMH familiarity and PCMH interest ($r = -0.119$; $p = 0.372$; see Figure 9), nor was a significant correlation observed between PCMH agreement and PCMH interest ($r = 0.081$; $p = 0.459$).

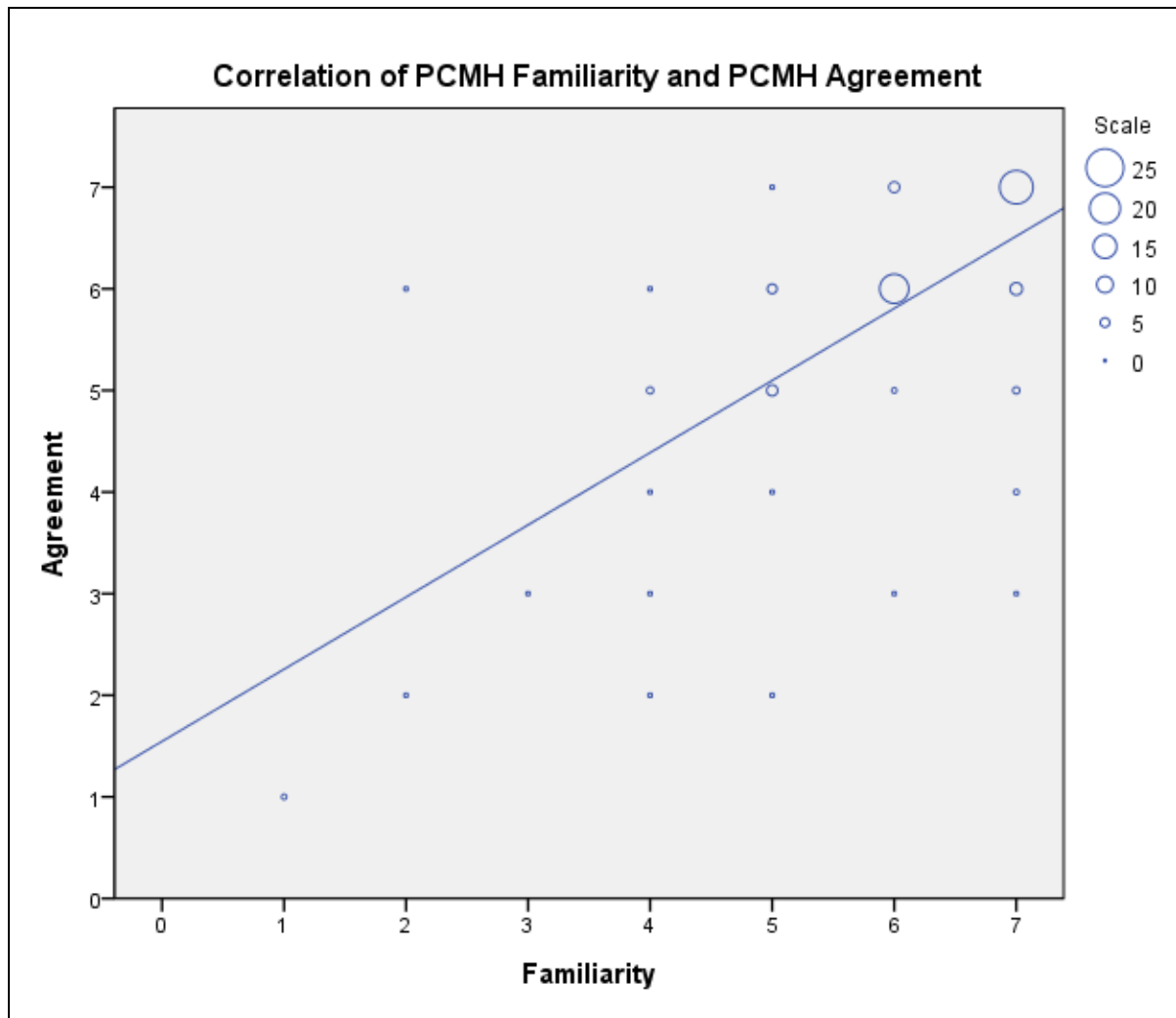


Figure 8. PCMH Agreement vs. PCMH Familiarity. A significant positive correlation was observed between PCMH Familiarity and PCMH agreement ($r = 0.673$; $p < 0.001$). Circle sizes correspond to the number of cases for each pair of ratings.

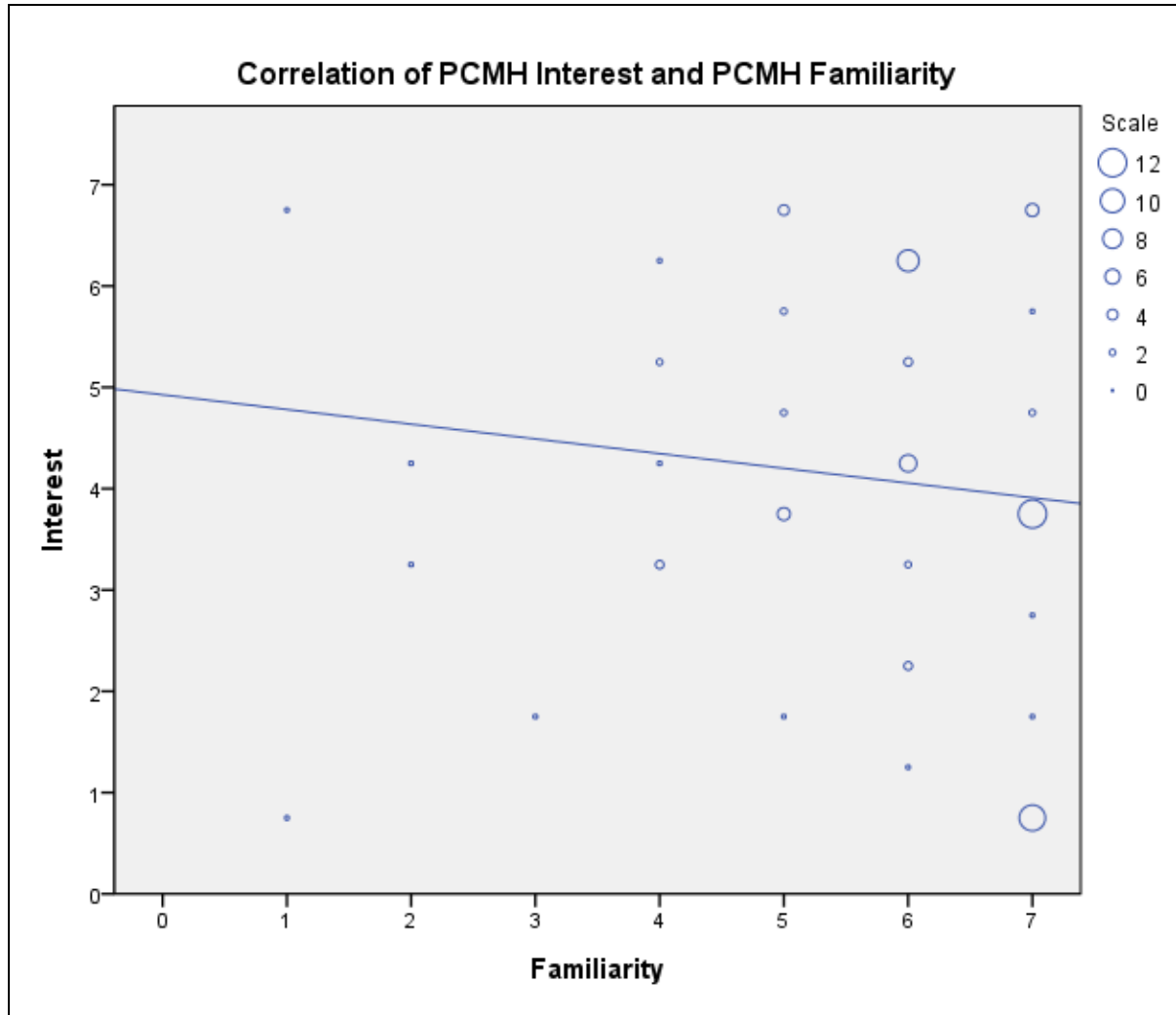


Figure 9. PCMH Interest vs. PCMH Familiarity. No significant correlation was observed between PCMH interest and PCMH familiarity ($p = 0.372$). Circle sizes correspond to the number of cases for each pair of ratings.

Behavioral Questions Related to Principles and Practices of the Patient-Centered Medical Home

Participants were asked a series of behavioral questions that were designed to assess the integration of PCMH practices into the participant's practice. Behavioral questions were not originally designed to confer to specific principles of the "Joint Principles of the Patient-Centered Medical Home¹⁷," but for the purposes of analysis, appropriate questions have been tagged to their corresponding Joint Principle. Four of the seven Joint Principles were represented: personal physician, whole person orientation, coordinated/integrated care, and enhanced access. No behavioral questions were asked that appropriately confer to the Joint Principles of Physician Directed Medical Practice, Quality and Safety, or Payment.

Fisher's Two-Tailed Exact Test (95% C.I.) was used to assess the significance of differences in overall responses. Observed results were tested against the null hypothesis ("there is no significant difference in responses") to determine overall consensus. Differences in responses were then examined between related groups according to the following six demographic parameters: practice type (generalist vs. subspecialist), practice setting (urban vs. suburban), practice affiliation (private practice vs. academic), practice size (5 or fewer physicians vs. more than 5 physicians), and physician experience (20 years or more vs. less than 20 years). Differences were assessed using Fisher's Two-Tailed Exact Test (95% C.I.).

The Joint Principles defines principle of the "Personal Physician" as "an ongoing relationship with a personal physician trained to provide first contact, continuous, and comprehensive care¹⁷." One question was asked related to the principle of "Personal Physician."

When asked, “When contacted by a child’s family regarding a health concern, do you have a standard procedure in place for speaking directly with the child or family to address those issues?,” 84.9% answered yes with 15.1% answering no (n=86, see Figure 10). This finding was significant ($p < 0.0001$), indicating an overall consensus regarding having a standard procedure for directly speaking with patients and their families when contacted about a health concern. This further indicates that pediatricians have at least one aspect of the “personal physician” principle currently integrated into their practice. When differences in responses between groups were analyzed using the six previously mentioned parameters, one significant difference was observed: pediatricians practicing in an urban setting were significantly less likely to have a standard procedure in place for speaking directly with the child or the family to address concerns when compared to pediatricians in a suburban setting ($p = 0.018$; see Figure 11).

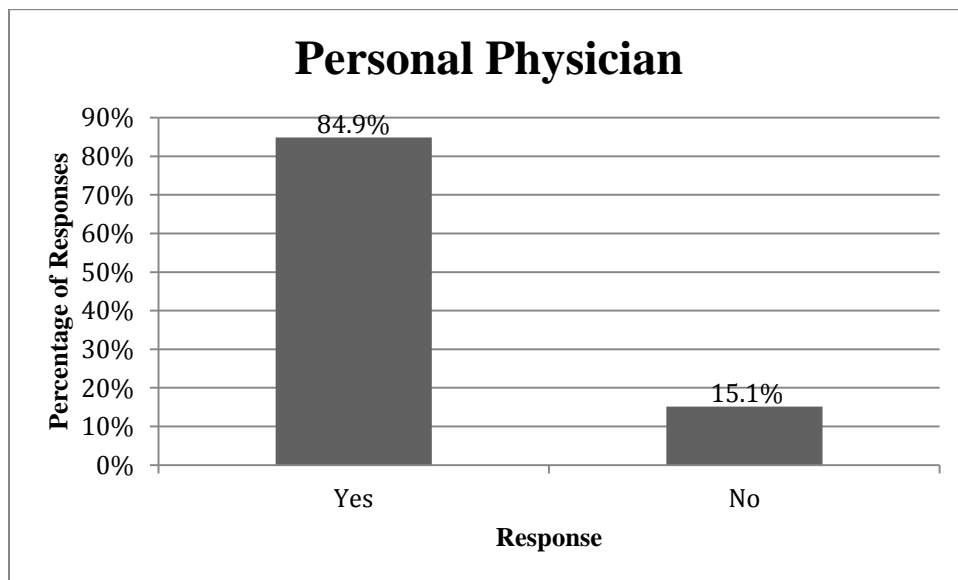


Figure 10. Responses to the question "When contacted by a child's family regarding a health concern, do you have a standard procedure in place for speaking directly with the child or family to address those concerns?" n = 86.

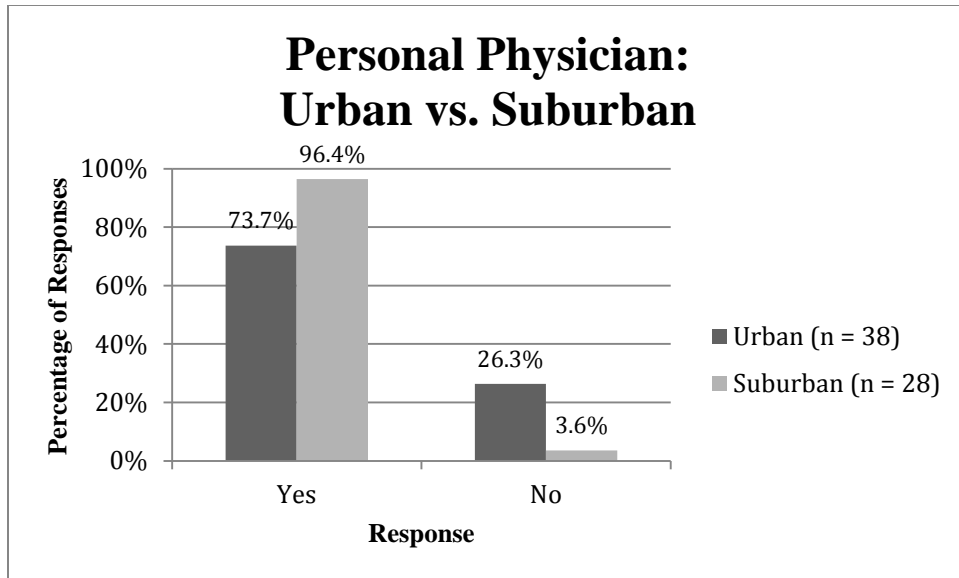


Figure 11. Speaking Directly with a Child or Family to Discuss Health Concerns: Urban vs. Suburban. Urban physicians were significantly less likely to speak directly with a child or family to discuss health concerns when contacted by the family ($p = 0.018$).

The Joint Principles defines “Whole Person Orientation” as follows: “the personal physician is responsible for providing all the patient’s health care needs or taking responsibility for appropriately arranging care with other qualified professionals¹⁷.” Five questions were asked that addressed the principle of “Whole Person Orientation” (see Table 5).

The well-being of a child’s primary caregiver is a critical piece of the overall health of the child. When asked, “If a child’s primary caregiver shows signs of physical or emotional distress do you discuss your concern with this person?” 96.5% responded yes compared to 2.3% that responded no, with 1.2% responding “Not Applicable” (see Table 5). This finding represented a significant consensus ($p < 0.0001$). There were no observed differences between groups based on the six previously described demographic parameters. Participants that answered “yes” to the previous question were then asked, “Do you refer the caregiver to specific

resources for counseling and treatment?,” 87.7% answered yes and 13.3% answered no ($p < 0.0001$; see Table 5). No statistically significant differences in responses between groups based on demographic parameters were observed.

When asked, “For families of children with special health care needs, do you recommend that the families look into options for respite care?,” a significant consensus was observed ($p < 0.0001$) with 86% of participants answering yes while 14% answered no (see Table 5). There was no statistical difference in responses between groups based on demographic parameters. As a follow-up to this question, those who responded yes to the previous question were then asked, “Do you recommend specific resources?,” to which 76% answered yes and 24% answered no, representing significant consensus ($p = 0.0021$). No statistical differences in responses were seen between groups based on demographic parameters.

When necessary, the effective transfer of a patient’s care from one primary care physician to another is a key piece of the PCMH model. Asked if, “When appropriate, do you regularly conduct a meeting with a child and his family regarding transfer of care to another primary care physician (either another pediatrician or a family physician)?,” 51.8% responded yes, 30.6% responded no, and 17.6% responded not applicable (see Table 5). These results showed no statistical consensus ($p = 0.1725$). However, statistical differences in responses were observed when demographic groups were compared in two of the six examined parameters. Physicians practicing in an urban setting were more likely to hold a transfer of care meeting versus physicians in a suburban setting ($p = 0.046$, see Figure 12). Similarly, subspecialists were significantly more likely to hold a transfer of care meeting versus generalists ($p = 0.01$ see Figure 13). This indicates that while the transfer of care from one primary care provider to another is being facilitated by a slight majority of pediatricians, this facilitation process is not being

embraced universally. Together, these data suggest that there is already a high level of integration of many aspects of the principle of “whole person orientation,” but that there are at least some aspects that have yet to be embraced by the pediatric community.

Table 5. Responses to behavioral questions regarding the principle of "Whole Person Orientation."

Responses to behavioral questions regarding principle of "whole person orientation"						
Question	Yes		No		Not Applicable	
	n	Percent	n	Percent	n	Percent
If a child's primary caregiver shows signs of physical or emotional distress do you discuss your concern with this person?	83	96.5%	2	2.3%	1	1.2%
If you responded yes to the previous question, do you refer the caregiver to specific resources for counseling or treatment?	71	84.5%	10	11.9%	3	3.6%
When appropriate, do you regularly conduct a meeting with a child and his family regarding the transfer of care to another primary care physician (either another pediatrician or a family physician)?	44	51.8%	26	30.6%	15	17.6%
For families of children with special health care needs, do you recommend that the families look into options for respite care?	74	86.0%	12	14.0%	0	0.0%
If you answered yes to the previous question, do you recommend specific resources?	57	67.9%	18	21.4%	9	10.7%

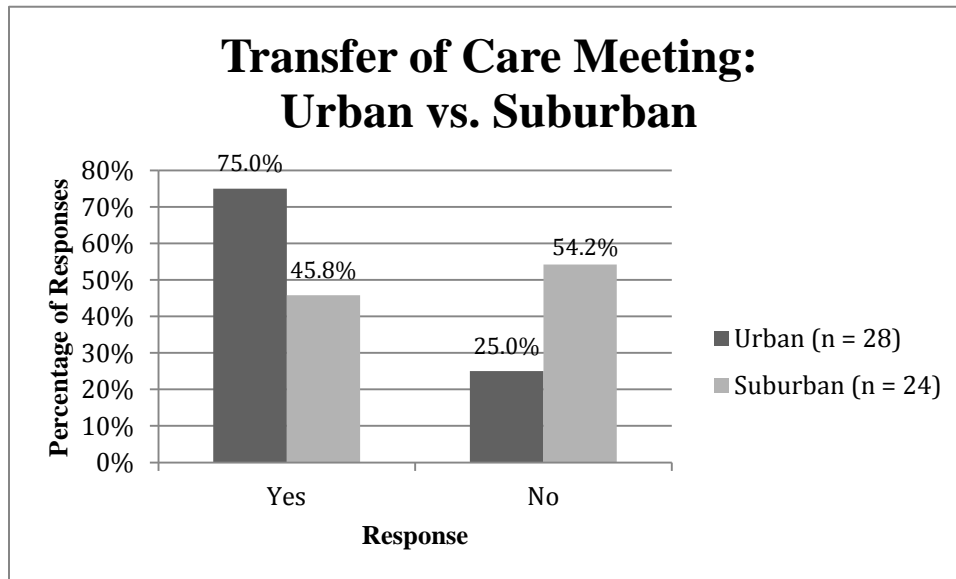


Figure 12. Transfer of Care Meeting: Urban vs. Suburban. Suburban physicians are significantly less likely to hold a transfer of care meeting versus urban physicians ($p = 0.046$).

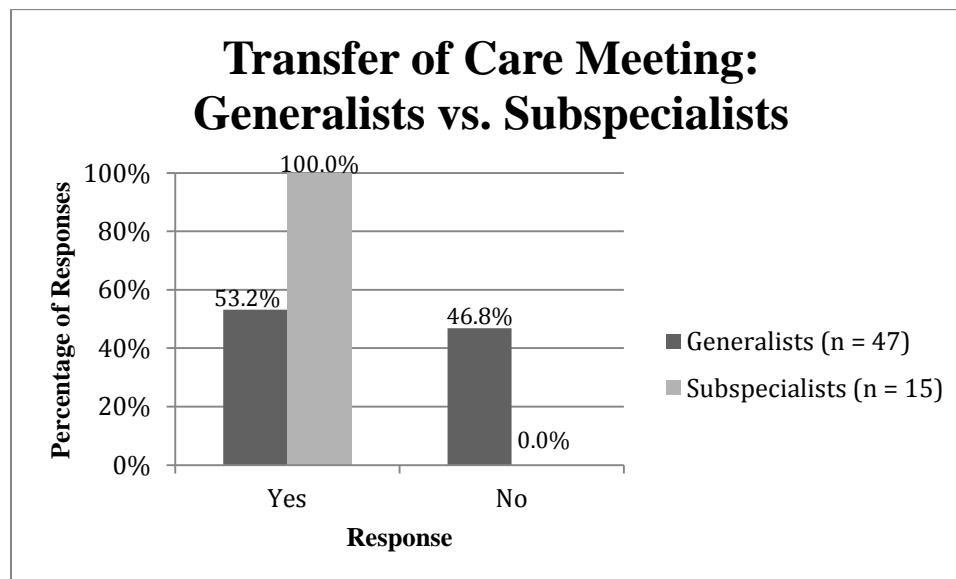


Figure 13. Transfer of Care Meeting: Generalists vs. Subspecialists. Subspecialists are significantly more likely to hold a Transfer of Care meeting when appropriate ($p = 0.01$).

Participants were asked four behavioral questions relating to the PCMH principle of “Coordinated/Integrated Care.” The principle of coordinated care contains aspects of physician leadership, including strong, two-way communication with providers of outside care¹⁷. When asked, “When outside care is to be provided, do you have a specific system for coordinating this additional care for your patients with the intended provider of that care?,” 78.2% responded yes, 18.4% responded no, and 3.4% responded not applicable (see Table 6). A significant consensus was observed when considering only yes and no responses ($p < 0.0001$). No statistically significant differences in responses between groups were observed based on any of the six examined demographic parameters. As a follow up to this question, participants that responded yes to the previous question were then asked, “Do you have follow-up procedures in place to help ensure that the care is received and that the details regarding the visit are placed in the patient’s permanent file?,” to which 60.3% responded yes and 30.8% responded no (see Table 6). This difference did not represent a statistical consensus ($p = 0.0882$). Further, no significant differences in responses were observed between groups based on demographic parameters.

Table 6. Responses to behavioral questions regarding the principle of coordinated/integrated care.

Responses to behavioral questions regarding principle of "coordinated/integrated care"						
Question	Yes		No		Not Applicable	
	n	Percent	n	Percent	n	Percent
When outside care is to be provided, do you have a specific system for coordinating this additional care for your patients with the intended provider of that care?	68	78.2%	16	18.4%	3	3.4%
If you answered yes to the previous question, do you have follow-up procedures in place to help ensure that the care is received and that the details regarding the visit are placed in the patient's permanent file?	47	60.3%	24	30.8%	7	9.0%

When asked to rank the degree to which the participant agreed with the statement, “When I refer my patient to a subspecialist, I am confident that I will receive notes regarding details of the visit from the referred physician,” on a scale from 1 (strongly disagree) to 7 (strongly agree), the average rating was a 4.57 (see Figure 14). These results produced a significant consensus ($p = 0.005$; Wilcoxon $T = 2.780$). There were no significant differences between groups in any of the six observed demographic parameters.

When asked to rate agreement with the statement, “After such a referred subspecialist visit, I make sure to review the reason for the visit and discuss the results of that visit with the family upon their next visit,” on the same scale, the average rating was a 5.42 (see Figure 15). A significant consensus was observed indicating agreement ($p < 0.001$; Wilcoxon $T = 6.050$). No differences in responses between groups based on demographic parameters.

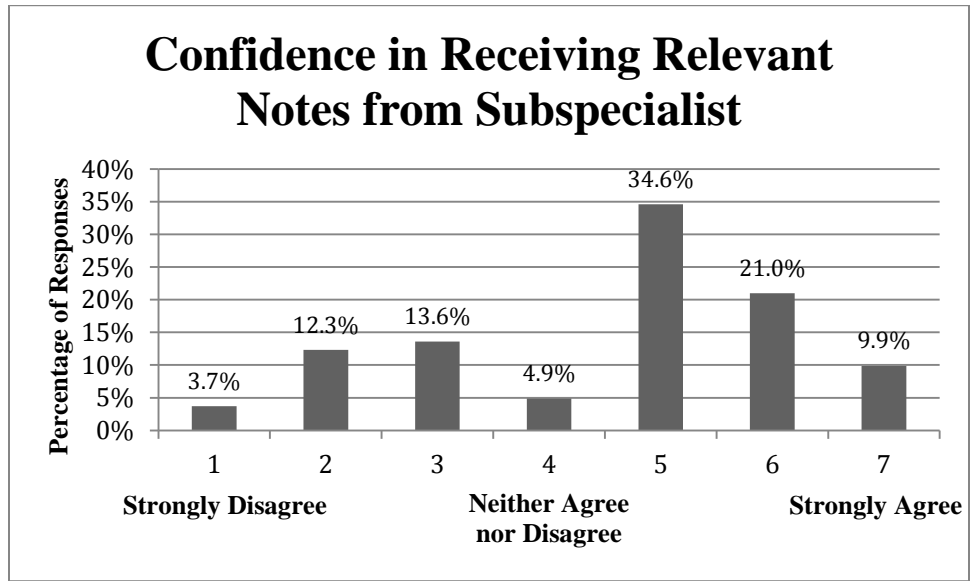


Figure 14. Confidence in Receiving Notes from Subspecialist. Participants’ agreement with the statement “When I refer my patient to a subspecialist, I am confident that I will receive notes regarding details of the visit from the referred physician.” A significant consensus was observed indicating overall confidence in receiving notes from the subspecialist ($p = 0.005$; $n = 81$).

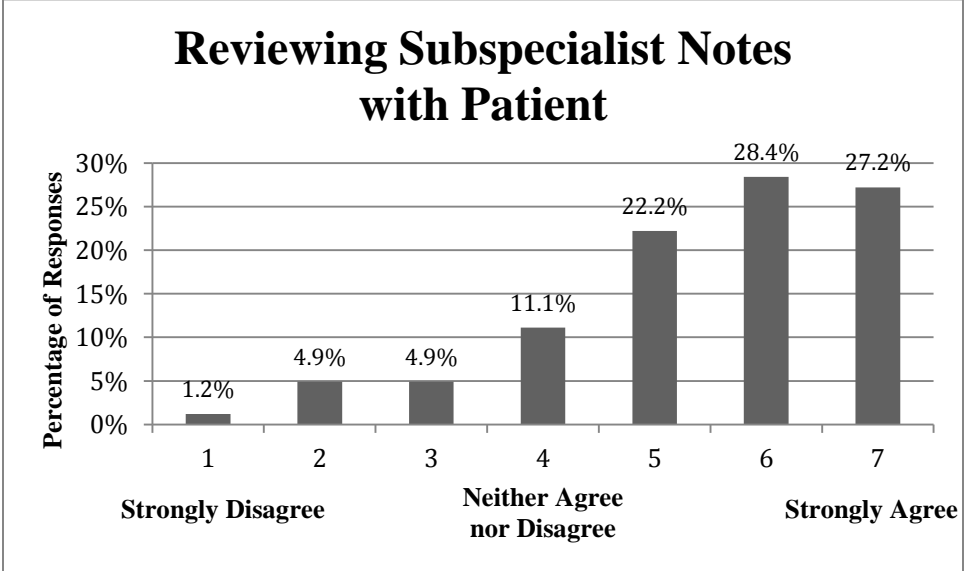


Figure 15. Reviewing Subspecialist Notes with Patient. Participants’ agreement with the statement “After such a referred subspecialist visit, I make sure to review the reason for the visit and discuss the results of that visit with the family upon their next visit.” A significant consensus was observed indicating agreement ($p < 0.001$; $n = 81$).

Two behavioral questions were asked that addressed the PCMH principle of “Enhanced Access” (see Figure 16 and Figure 17). The Joint Principles defines Enhanced Access as follows: “enhanced access to care is available through systems such as open scheduling, expanded hours, and new options for communication between patients, their personal physician, and practice staff¹⁷.” The only aspect of this principle that was queried in this survey was physician e-mail use for communication with patients. First, participants were asked if patients are able to communicate with their practice via e-mail, to which 41.0% responded yes and 59.0% responded no (see Figure 16), which did not produce a significant consensus ($p = 0.3495$). Differences in responses were not observed between groups based on any of the six examined demographic parameters.

As a follow up to this question, those who responded yes to the previous question were asked how often they use e-mail to communicate with patients given the following choices “multiple times each day,” “daily,” “once a week,” or “less than once a week” (see Figure 17). “Less than once a week” accounted for the greatest number of responses (34.3%), followed by “Daily” (31.4%), followed by “multiple times each day” (20%), and finally “once a week” (14.3%). Together, these data suggest that the use of e-mail for patient communication has yet to be widely adopted in the pediatric physician community, and that frequency of e-mail use for patient communication varies considerably.

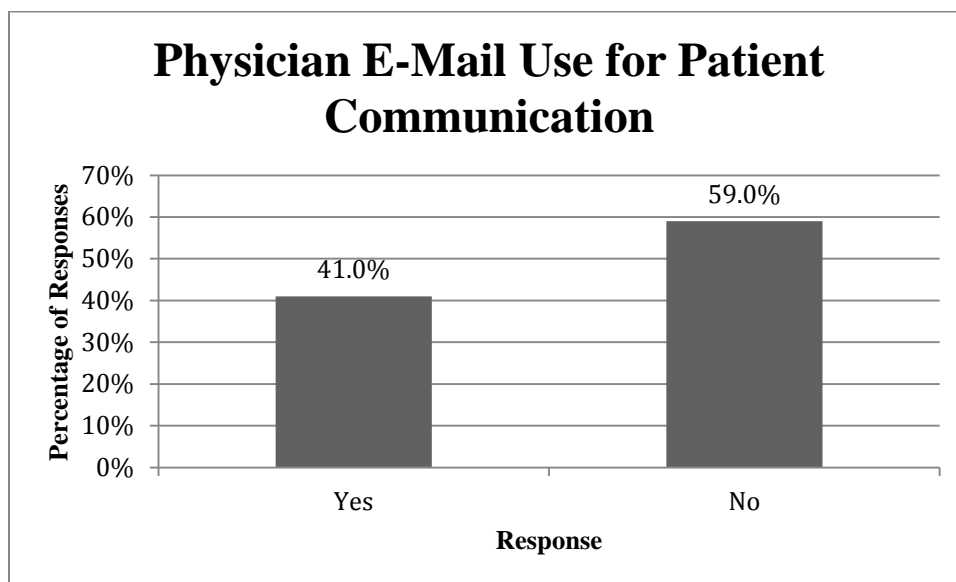


Figure 16. Physician E-mail Use for Patient Communication. Participants' responses to the statement "Patients are able to communicate with my practice via e-mail." n = 83.

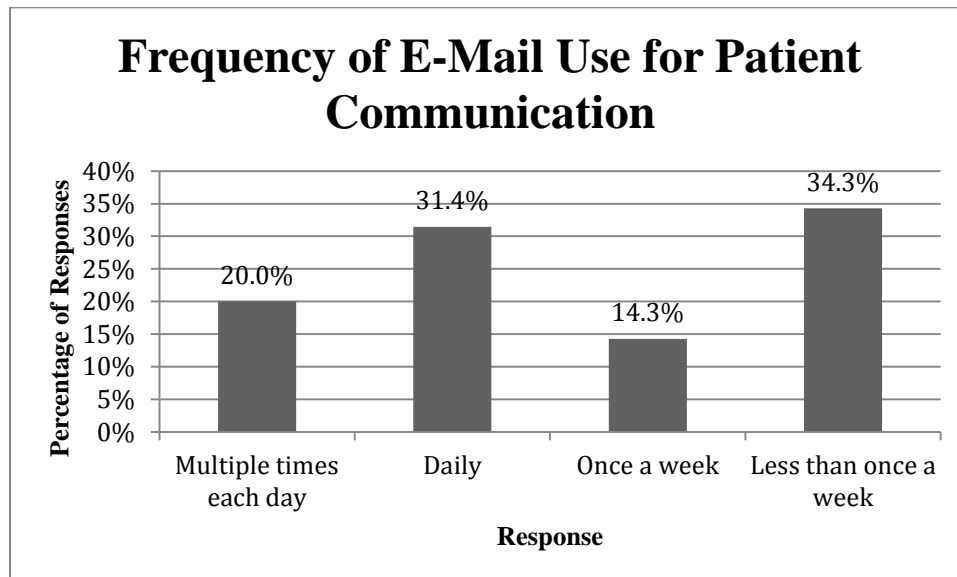


Figure 17. Frequency of E-mail Use for Patient Communication. n = 35.

Perceived Barriers to Integration of the PCMH Model

Participants were asked to rate their level of agreement with eight separate statements that represent commonly identified challenges in the adoption of the PCMH model at a system-wide level. These eight challenges include: payment issues, a lack of evidence of PCMH benefits, HIPAA compatibility, associated expenses, a lack of a defined procedure for PCMH integration, time commitment in setting up and maintaining a PCMH-based practice, the current state of health information technology, and human resource needs (see Table 7).

Table 7. Commonly Cited Issues Regarding System-Wide PCMH Integration.

Eight Commonly Cited Issues for System-Wide PCMH Integration	
1	Lack of Evidence of PCMH Benefits
2	HIPAA Compatibility
3	Associated Expenses
4	Lack of a Defined Procedure for PCMH Integration
5	Associated Time Commitment
6	Current State of Health Information Technology
7	Human Resource Requirements
8	Payment Issues

Participants were asked to rate agreement with each statement on a 7-point Likert scale in which a score of 1 corresponded to “strongly disagree” and a score of 7 corresponded to “strongly agree.” Overall responses for each item were tested for significant consensus using the Wilcoxon Signed Rank test. Using this method, three issues were identified as perceived

barriers, two issues were identified as not being perceived as barriers, and three issues had no significant consensus in either direction (see Table 8).

Table 8. Commonly Cited Challenges to PCMH Integration: Perceived Barriers, Perceived Non-Barriers, and Issues with No Consensus.

Perceived Barriers	P-value
Payment Issues	<0.001
Associated Expenses	0.025
Lack of a Defined Procedure for PCMH Integration	0.035
Not Perceived as Barriers	
Lack of Evidence of PCMH Benefits	<0.001
HIPAA Compatibility	<0.001
Issues with No Consensus	
Time Commitment	0.073
State of Health IT	0.564
Human Resource Needs	0.941

In regard to issues perceived as barriers, the most significant consensus was observed for payment issues ($p < 0.001$; see Figure 18). Participants were asked to rate agreement with the statement, “I feel that payment issues are a barrier in integrating principles and practices of the Medical Home into my own practice.” No statistically significant differences in agreement levels were seen between related demographic groups based on any of the seven examined demographic parameters. Collectively, these data suggest that payment is perceived as a PCMH barrier in the pediatric physician population, and that this perception is universal among all examined sub-populations.

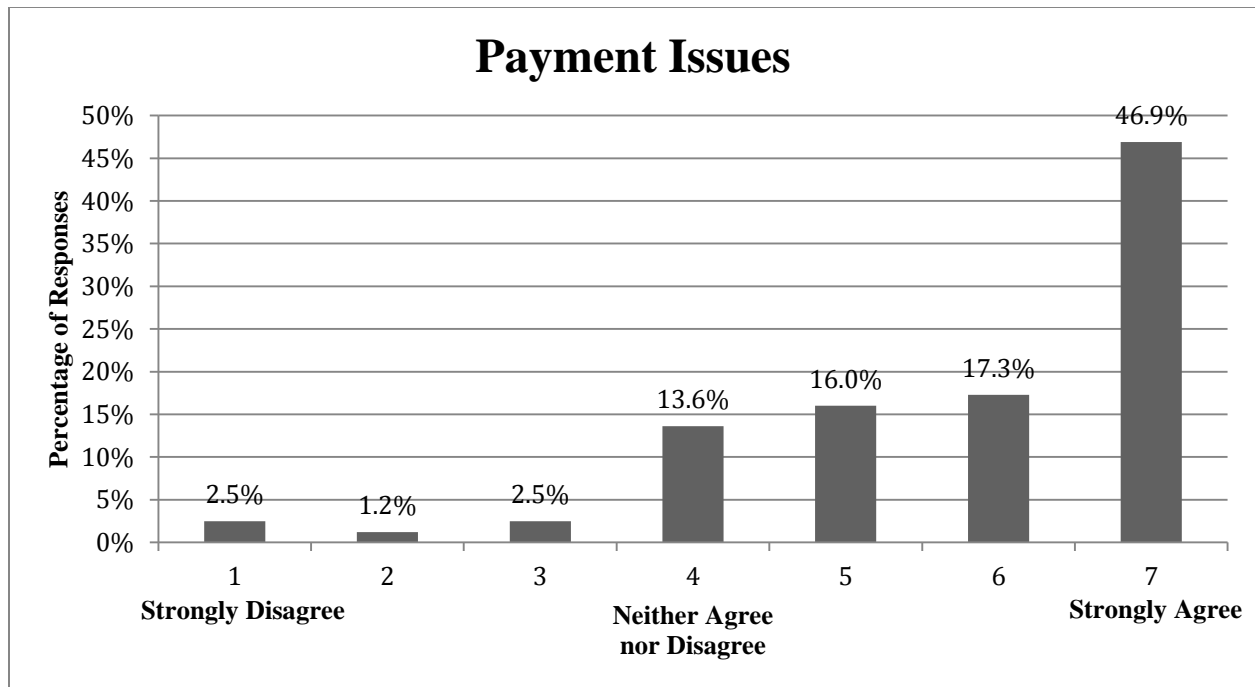


Figure 18. Payment Issues as a Barrier to PCMH Integration. Participants’ rated agreement with the statement “I feel that payment issues are a barrier in integrating principles and practices of the Medical Home model into my own Practice.” A significant consensus was observed indicating agreement (n = 81; $p < 0.001$).

The issue of “Associated expenses” was the perceived barrier with the second highest level of significant consensus ($p = 0.025$). Participants were asked to rank agreement with the statement, “While I am able to see the benefit of the Medical Home model, I feel that the associated expenses (such as hiring and training additional staff) are cost prohibitive” (see Figure 19). No significant differences in responses were seen between related groups in any of the seven examined demographic parameters. This suggests that associated expenses are perceived as a PCMH barrier to pediatric physicians, and this perception is universal to all sub-populations examined.

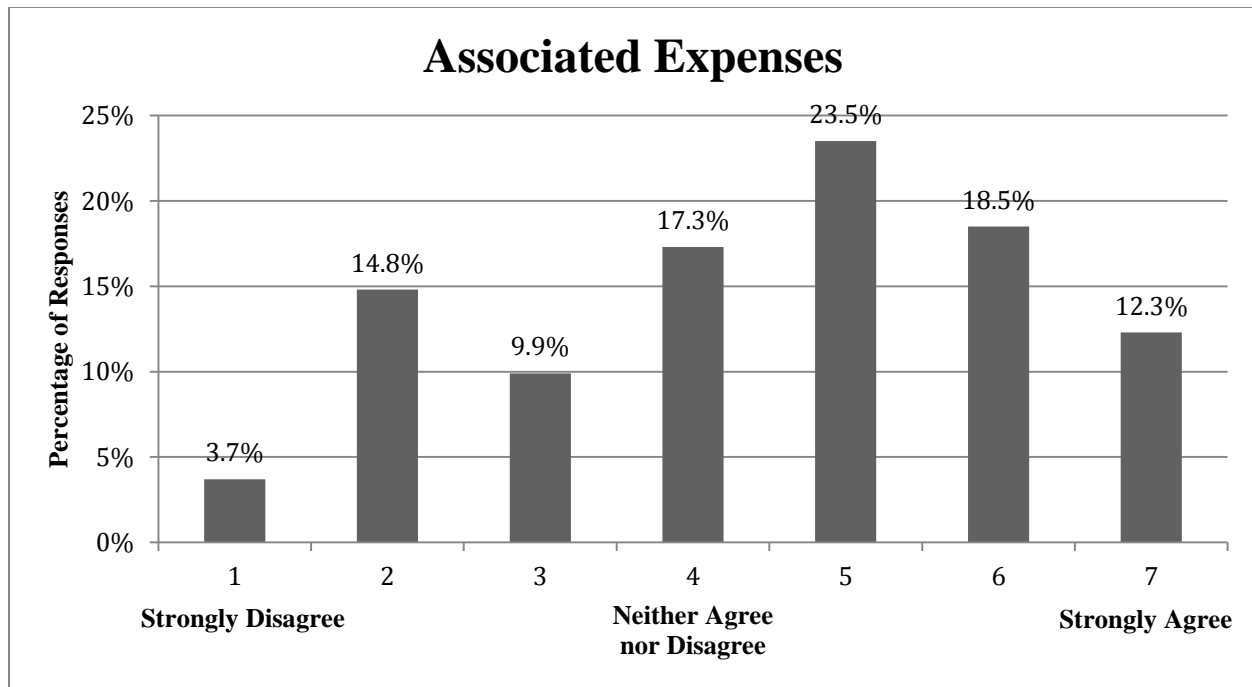


Figure 19. Associated Expenses as a Barrier to PCMH Integration. Participants’ responses to the statement “While I am able to see the benefit of the Medical Home model, I feel that the associated expenses (such as hiring and training additional staff) are cost prohibitive.” A significant consensus was observed indicating agreement with this statement ($p = 0.025$; $n = 81$).

The final issue that was perceived as a PCMH barrier was the lack of a defined procedure for PCMH integration. Participants were asked to rate agreement with the statement, “I believe that a lack of defined steps or procedures for integration of the Medical Home model stands as a barrier to forwarding the Medical Home model of primary care” (see Figure 20). A significant consensus is observed indicating agreement with the statement ($p = 0.035$). Physicians with primarily white patient populations were significantly less likely to identify the lack of defined steps for PCMH integration as a barrier when compared to physicians with patient populations that are not primarily white ($p = 0.006$; see Figure 21). Significant differences were not seen in responses between related demographic groups based on any of the other six demographic parameters. These data suggest that while the pediatric population as a whole perceives the lack

of defined steps for PCMH integration as a barrier to PCMH integration, this perception varies based on the physicians' patient demographics.

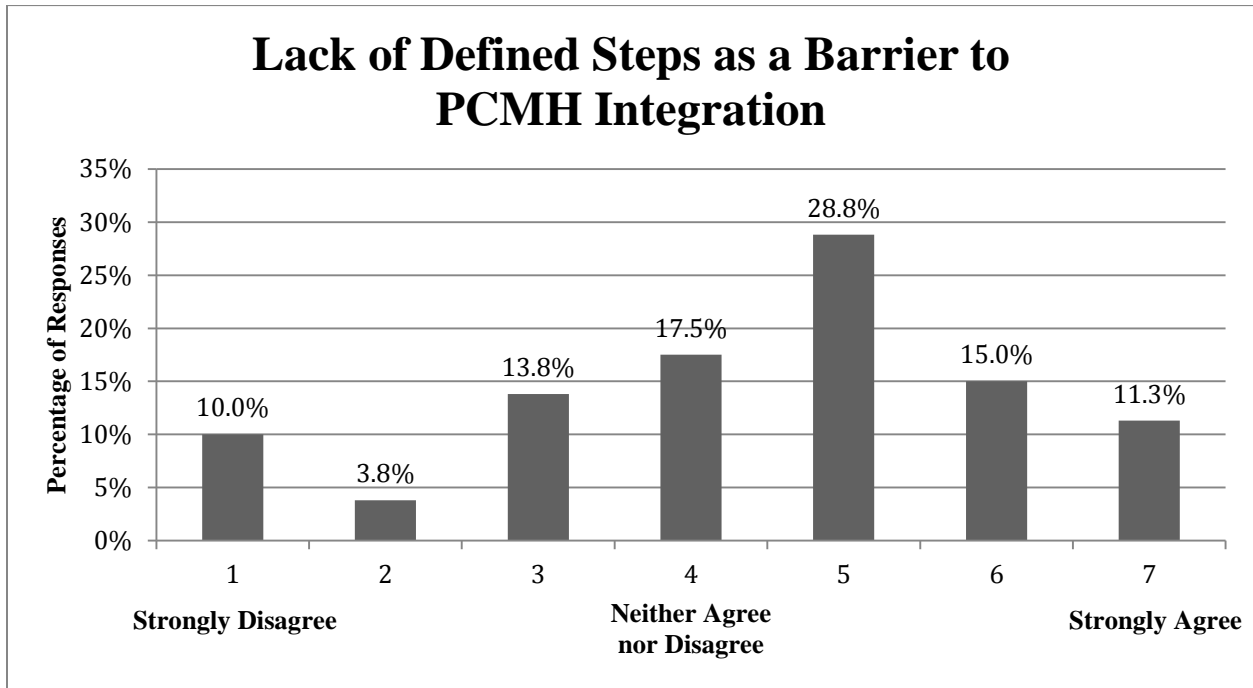


Figure 20. Lack of Defined Steps as a Barrier to PCMH Integration. Participants' agreement with the statement "I believe that a lack of defined steps or procedures for integration of the Medical Home model stands as a barrier to forwarding the Medical Home model of primary care. A significant consensus was observed indicating agreement with this statement ($p = 0.035$; $n = 80$).

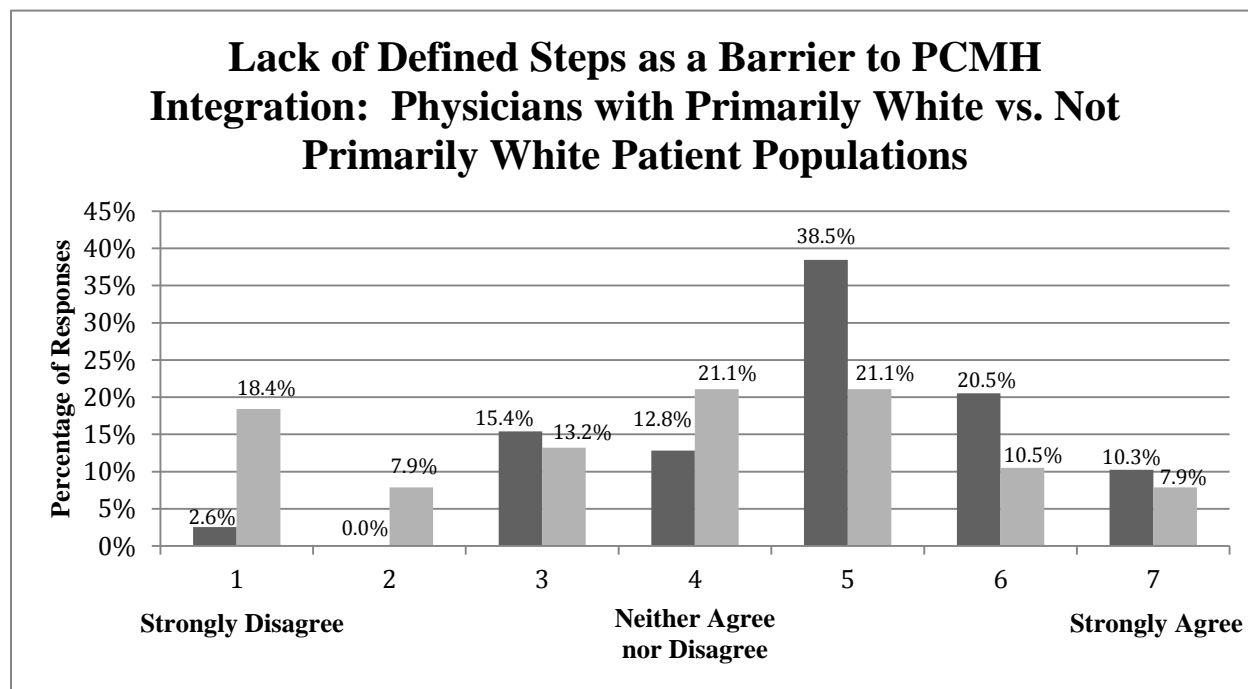


Figure 21. Lack of Defined Steps as a Barrier to PCMH Integration: Physicians with Primarily White vs. Not Primarily White Patient Populations. Physicians with primarily non-white patient populations (n = 39) are represented in dark grey; physicians with primarily white patient populations (n = 38) are represented in light grey. Physicians with primarily white patient populations were significantly less likely to perceive a lack of defined steps for PCMH integration as a barrier to PCMH integration (p = 0.006).

Physicians collectively do not perceive a lack of evidence of PCMH benefits as a barrier for PCMH integration. When asked to rate agreement with the statement, “I feel that adequate evidence exists of the benefits of the Medical Home model to support its integration into practices worldwide,” a significant consensus was seen corresponding to agreement (p < 0.001; see Figure 22). No significant differences in responses were seen between related demographic groups in comparisons based on any of the seven examined demographic parameters. Together, these data suggest that pediatric physicians believe that adequate evidence already exists

justifying PCMH benefits and that this perception is universal within all examined sub-populations.

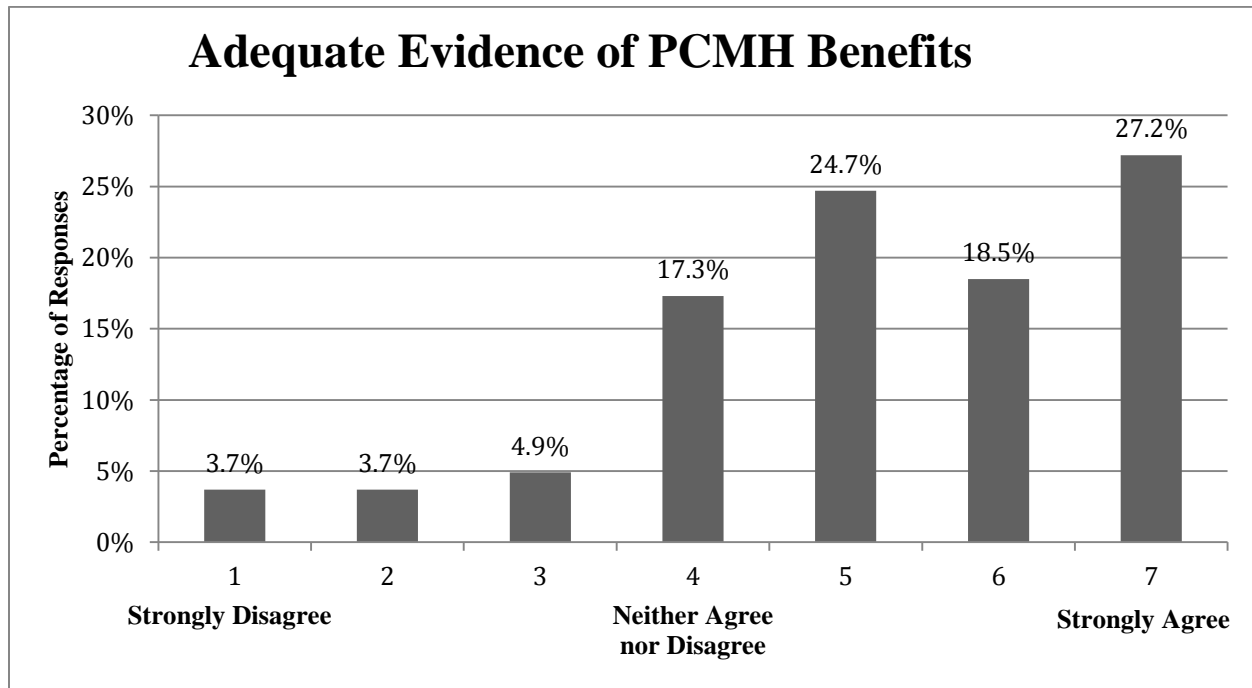


Figure 22. Adequate Evidence of PCMH Benefits. Participants’ agreement with the statement “I feel that adequate evidence exists of the benefits of the Medical Home model to support its integration into practices worldwide.” A significant consensus was observed indicating agreement with this statement ($p < 0.001$; $n = 81$).

The current PCMH model is perceived to be compatible with current HIPAA requirements in the pediatric physician population. Participants were asked to rate agreement with the statement, “I feel that the Medical Home model is compatible with current HIPAA requirements” (see Figure 23). A significant consensus was observed indicating agreement with this statement, with 71.4% of participant responses in the range of 5-7 ($p < 0.001$). Male physicians showed significantly stronger agreement than did female physicians ($p = 0.003$; see Figure 24), indicating a possible difference in perceptions of HIPAA between genders.

Collectively, these data suggest that pediatricians perceive the current PCMH model to be HIPAA compatible, but that female physicians show lower agreement than male physicians.

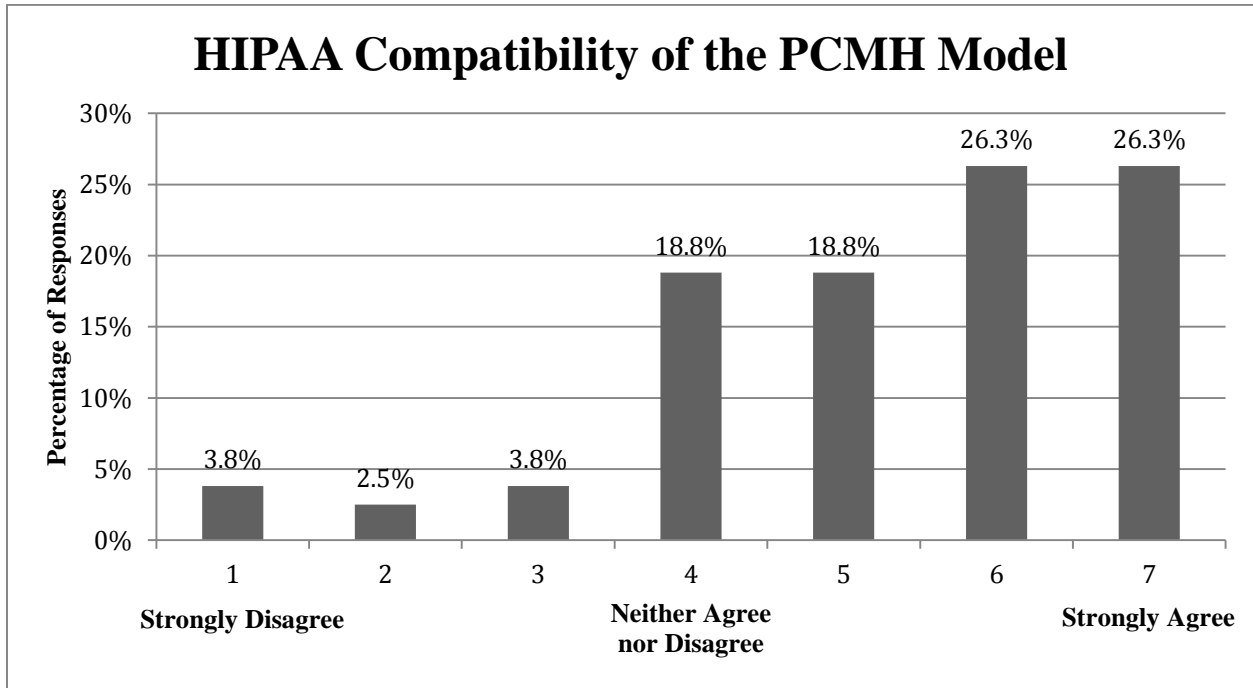


Figure 23. HIPAA Compatibility of the PCMH Model. Participant agreement with the statement “I feel that the Medical Home model is compatible with current HIPAA requirements.” A significant consensus was observed indicating agreement ($p < 0.001$; $n = 80$).

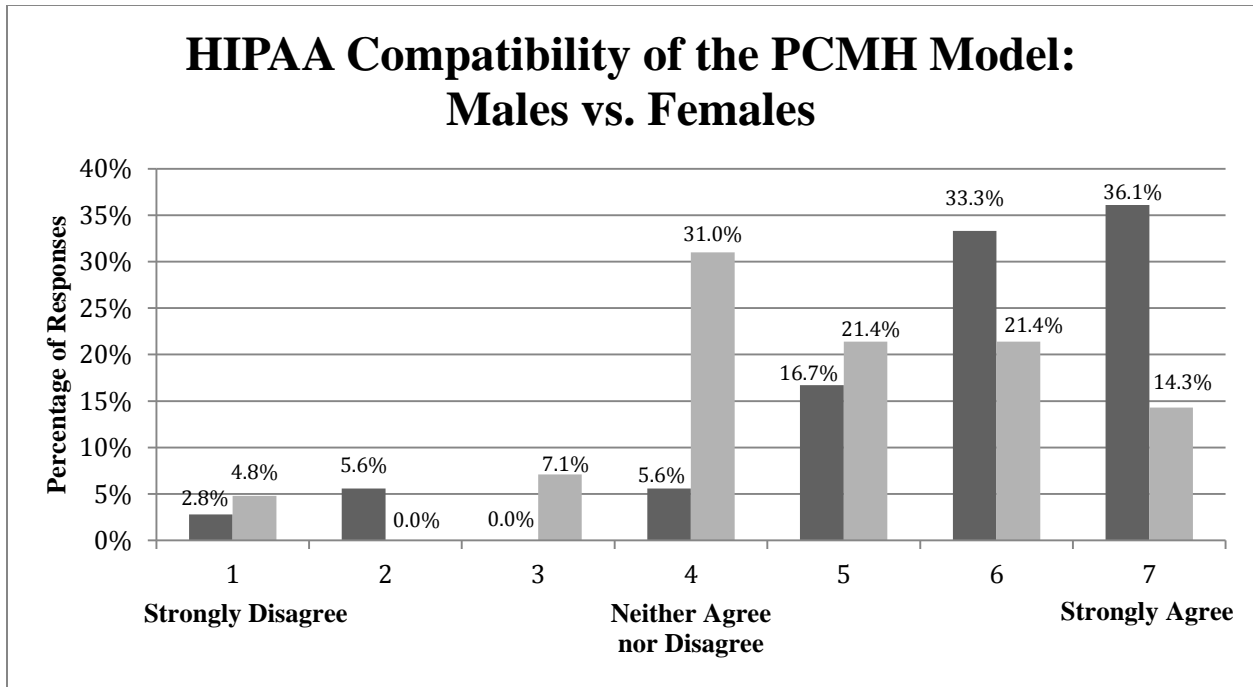


Figure 24. HIPAA Compatibility of the PCMH Model: Males vs. Females. Females showed significantly weaker agreement with the statement “I feel that the Medical Home model is compatible with current HIPAA requirements ($p = 0.003$; $n = 78$).

There was no consensus regarding whether or not the current state of health care information technology is perceived as a barrier in the pediatric physician population ($p = 0.564$). Participants rated agreement with the statement, “I feel that the current generation of healthcare information technology facilitates the integration of the Medical Home model” (see Figure 25). Further, no significant differences in responses were seen between related demographic groups based on any of the seven examined parameters. Collectively, these data suggest that physician opinion is split regarding the current generation of health care information technology with respect to the Medical Home model.

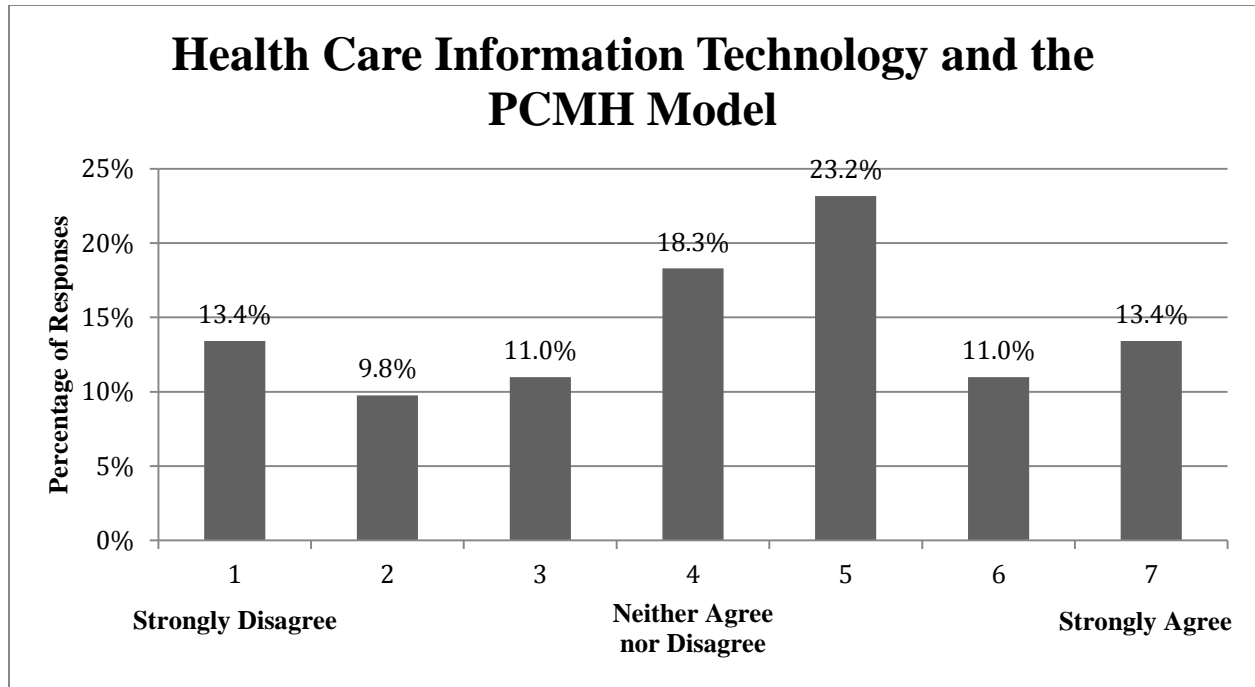


Figure 25. Current Generation Health Care Information Technology and the Medical Home Model. Participant agreement with the statement "I feel that the current generation of health care information technology facilitates the integration of the Medical Home model. No significant consensus was achieved in either direction ($p = 0.564$; $n = 82$).

A significant consensus was not reached regarding if required time commitment represented a barrier to PCMH integration ($p = 0.073$). Participants rated agreement with the statement "I feel that the time commitment required in both creating and maintaining a Medical Home-based practice is a barrier in integrating principles and practices of the Medical Home into my own practice" (see Figure 26). However, physicians practicing in an academic setting were significantly more likely to perceive time commitment issues as a barrier compared to physicians in private practice ($p = 0.015$; see Figure 27). Significant differences were not seen between related demographic groups based on any of the other six examined demographic parameters. These data suggest that, while there is no overall consensus regarding time commitment issues as a barrier to PCMH integration, this perception varies based on at least one demographic parameter.

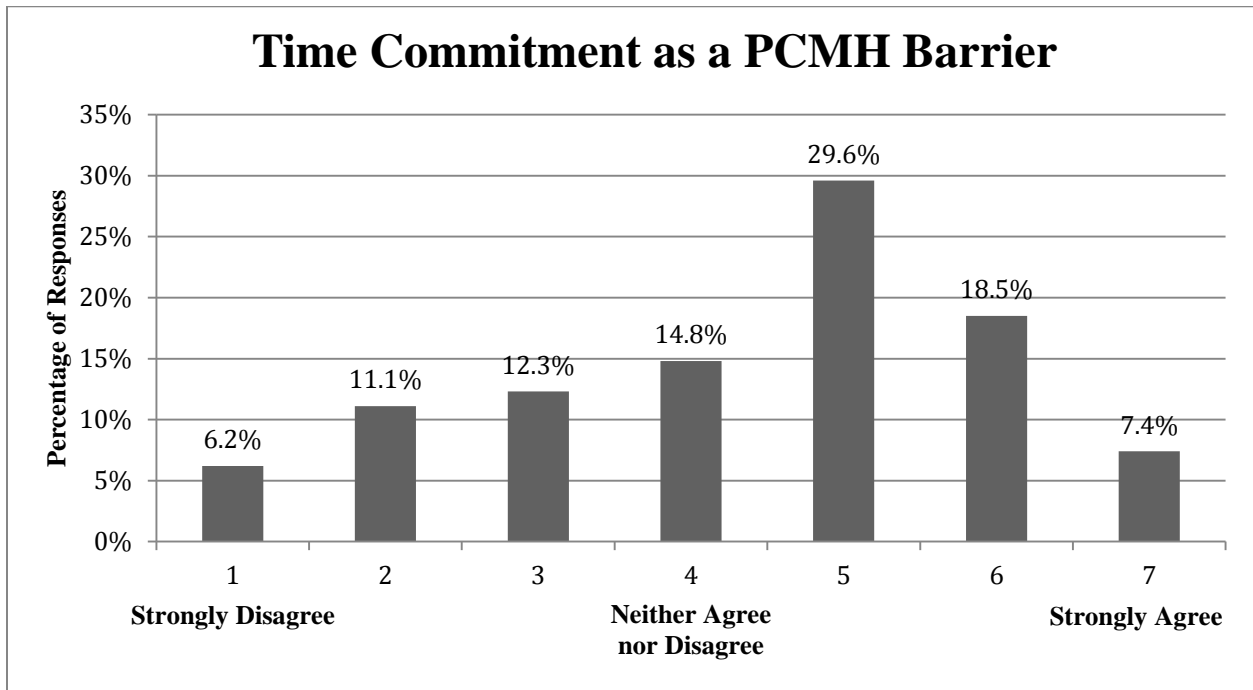


Figure 26. Time Commitment as a PCMH Barrier. Participant agreement with the statement “I feel that the time commitment required in both creating and maintaining a Medical Home-based practice is a barrier in integrating principles and practices of the Medical Home into my own medical practice” (p = 0.073; n = 82).

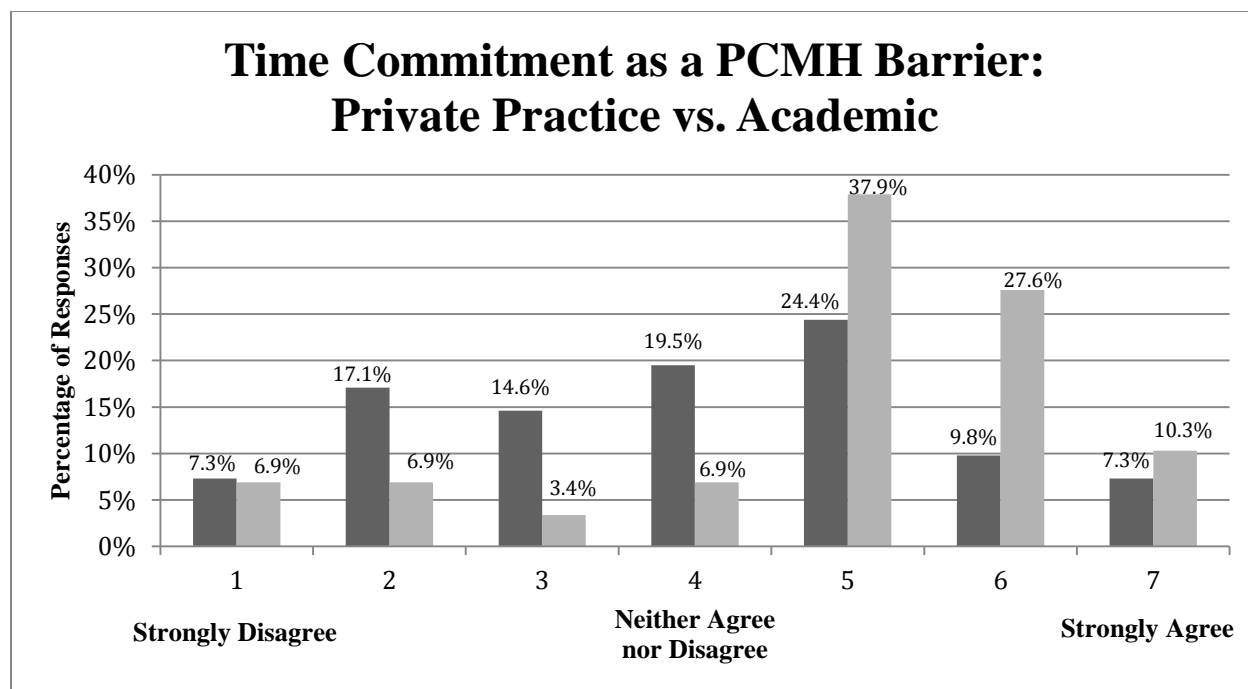


Figure 27. Time Commitment as a PCMH Barrier: Private Practice vs. Academic. Physicians in private practice are represented in dark grey (n = 41); academically-affiliated physicians are represented in light grey (n = 29). Academically-affiliated physicians were significantly more likely to cite time commitment issues as a barrier than physicians in private practice (p = 0.015).

Participants rated their agreement with the statement, “I feel that my practice already has the personnel/human resources in place necessary to effectively coordinate patient care as prescribed by the Medical Home model.” No consensus was achieved regarding whether physicians perceive human resource needs as a barrier to PCMH integration (p = 0.941; see Figure 28). Significant differences in responses were seen between related demographic groups in four of the seven demographic parameters that were examined. Physicians in academic settings showed significantly stronger disagreement with the statement compared to physicians in private practice (p < 0.001; see Figure 29). Physicians in urban settings were significantly more likely to identify human resource needs as a barrier compared to physicians in suburban practice settings (p = 0.017; see Figure 30). Physicians in practice settings of more than 5 physicians were also significantly more likely to identify human resource needs as a PCMH

barrier versus participants in practice settings of 5 or fewer physicians ($p = 0.023$; see Figure 31). Finally, females were significantly more likely to identify human resource needs as a barrier than males ($p = 0.027$; see Figure 32). Collectively, these data show that while on the surface, human resource needs do not appear to be perceived as a PCMH barrier to physicians as a whole, the issue is divisive when assessed at a deeper level.

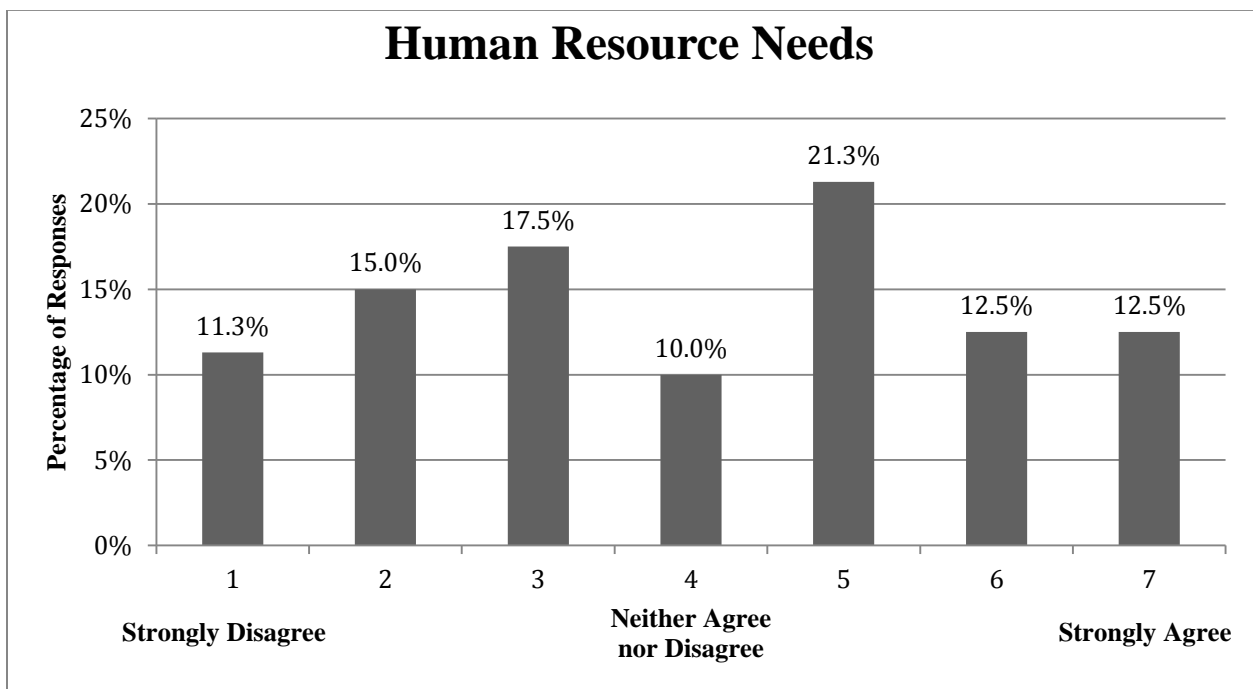


Figure 28. Human Resource Needs as a PCMH Barrier. Participant agreement with the statement “I feel that my practice already has the personnel/human resources in place necessary to effectively coordinate patient care as prescribed by the Medical Home model. No significant consensus is reached in either direction ($p = 0.941$; $n = 80$).

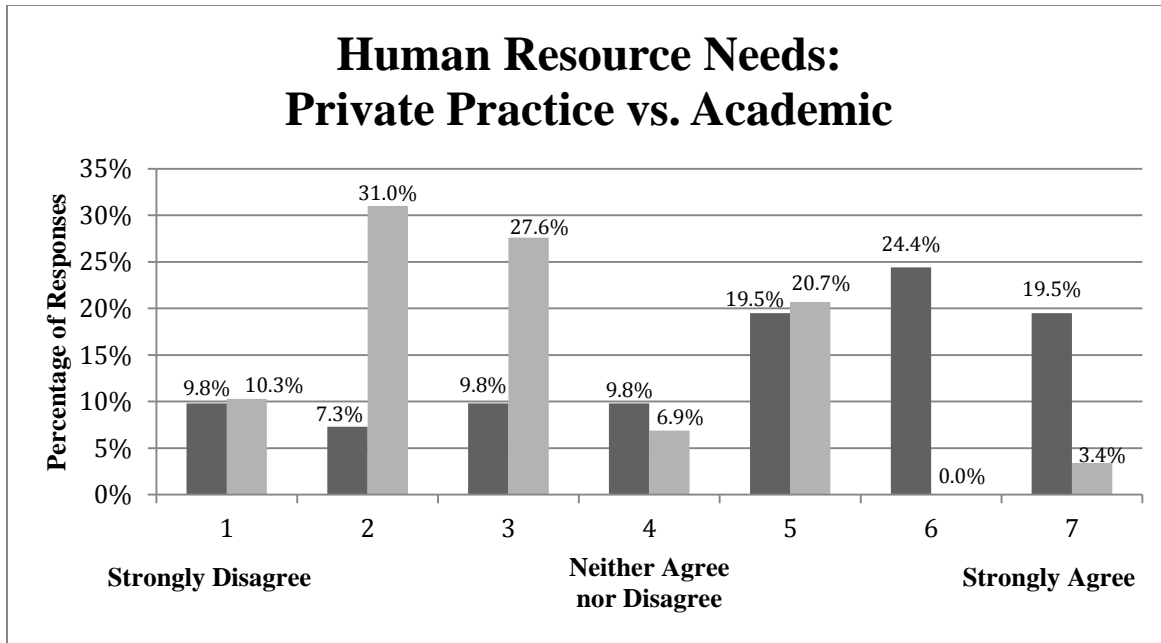


Figure 29. Human Resource Needs: Private Practice vs. Academic. Participants in private practice are represented in dark grey (n = 41); physicians practicing in academic settings are represented in light grey (n = 29). Physicians in academic settings were significantly more likely to identify human resource needs as a PCMH barrier (p < 0.001).

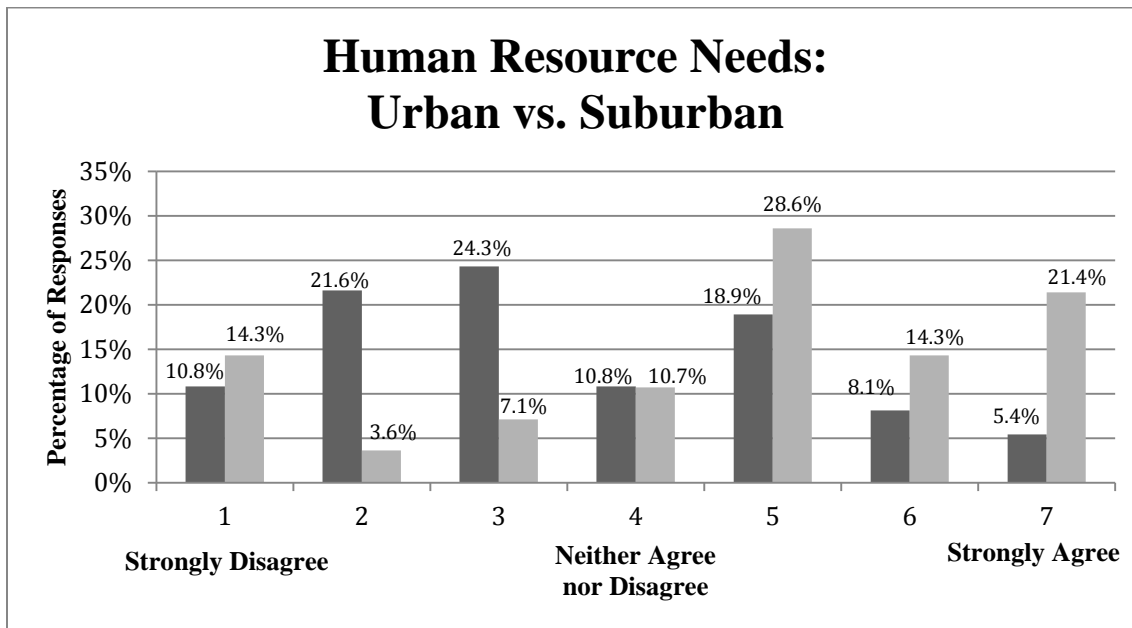


Figure 30. Human Resource Needs: Urban vs. Suburban. Participants in urban practice settings are represented in dark grey; participants in suburban practice settings are represented in light grey. Participants in urban practice settings showed significantly stronger disagreement with the statement compared to physicians in suburban practice settings (p = 0.017).

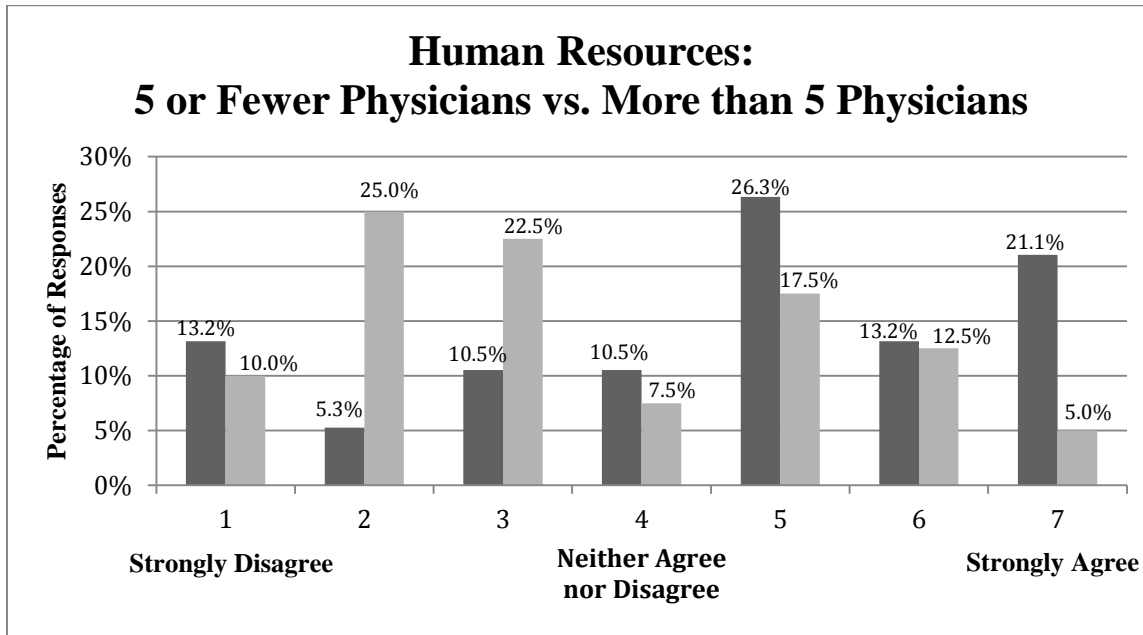


Figure 31. Human Resources: 5 or Fewer Physicians vs. More than 5 Physicians. Participants in practices of 5 or fewer physicians are represented in dark grey (n = 38); participants in practices of more than 5 physicians are represented in light grey (n = 40). Participants in practices of more than 5 physicians were significantly more likely to identify human resource needs as a barrier to PCMH integration (p = 0.023).

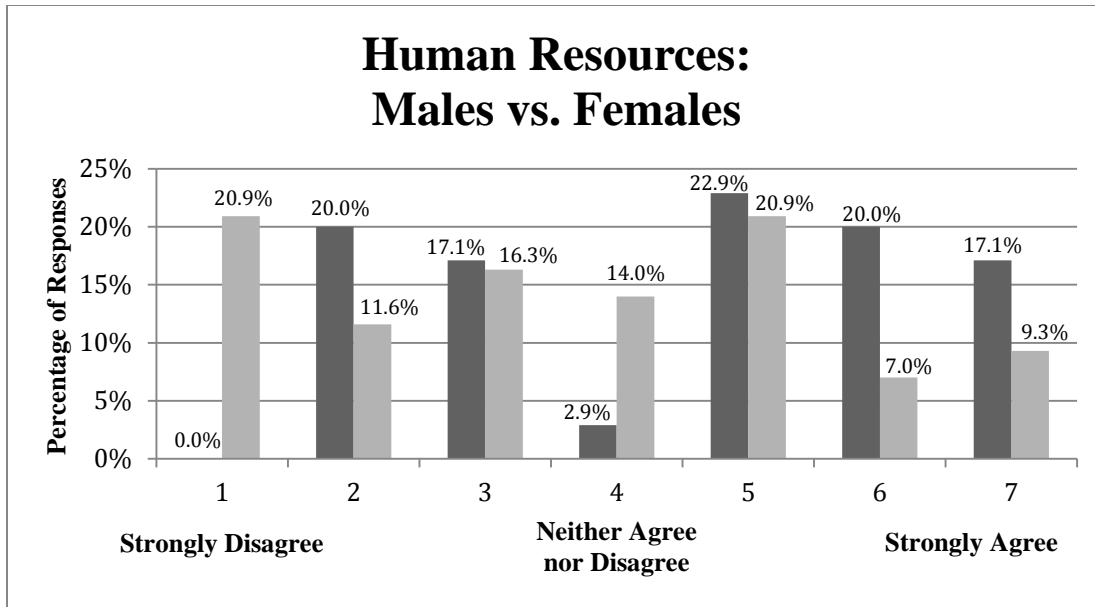


Figure 32. Human Resource Needs: Males vs. Females. Males are represented in dark grey (n = 35); females are represented in light grey (n = 43). Female physicians were significantly more likely to identify human resource needs as a barrier compared to male physicians (p = 0.027).

Chapter 4: Discussion

The trend of continually rising U.S. health care costs will prove unsustainable in the medium-term and long-term future. The U.S. has the most expensive health care system in the world, but falls short of other nations in care access, safety of care, and even care quality. The PCMH model is hailed as a promising model of health care that could help address these issues, and emerging evidence regarding the PCMH is positive. However, even if pilot programs show that the PCMH model improves health outcomes and decreases costs, provider-level support of the PCMH will be required to ensure the success of the PCMH.

The first question that this survey was designed to assess was the overall level of familiarity with the PCMH model within the pediatric community. As a whole, data from survey participants suggest that pediatricians consider themselves to be very familiar with the PCMH model, though an ascertainment bias may have skewed these data. Three of the five methods used to solicit responses involved the AAP, and two of those methods involved distribution to AAP committees that influence AAP policy. The perceptions reflected in the survey population could vary significantly from the greater pediatric population in terms of PCMH familiarity. Further, those with strong opinion or familiarity with the PCMH may have been more likely to complete the survey than pediatricians who are unfamiliar or have no opinion regarding the PCMH model.

With these considerations in mind, the results of this survey are best interpreted differently than originally intended. Instead of assessing perceptions and opinions of the PCMH model in the overall pediatric community, this survey has assessed the perceptions and opinions of the PCMH model in a population that considers itself familiar with PCMH practices and principles.

Within this population, a high degree of agreement with PCMH principles was reported. The high level of correlation between familiarity and agreement suggests that pediatricians who consider themselves to be familiar with the PCMH model also believe in the PCMH model (see Figure 8). In contrast, interest in moving to the PCMH model among this population is divided, suggesting that some factor or factors at work producing a rift between agreement with PCMH principles for and the desire to move to such a model (see Figure 9). What are these factors? Can they be explained by commonly cited PCMH barriers alone or are there other factors that contribute to this rift? Could this rift be partially explained by physicians' acceptance of current practice dynamics? All of the factors causing this rift between agreement and interest must be uncovered if a system-wide movement to the PCMH model is to be undertaken. Otherwise, resistance to change may threaten to undermine the promise held by the PCMH model.

Further, these results speak to how issues are perceived as barriers among different physician demographic groups. It is clear that within this population, issues relating to payment are perceived as the most universal barrier to PCMH integration (see Figure 18). Issues related to payment reform are commonly cited as the greatest barrier to PCMH integration in current literature¹³. These data show that this perception trickles

down to the provider level. On the other hand, this population universally dismisses the notion that a lack of evidence of PCMH benefits stands as a barrier to PCMH integration. Several examples of current literature cite the need for practice-based evidence to justify the PCMH model^{13,22}. Together, these results produce an interesting model for the difference in what is perceived as the primary barrier to PCMH integration to the pediatric physician versus what is perceived as the primary barrier to PCMH integration by other interested parties. A dichotomy emerges in PCMH literature between the school of thought that highlights payment reform as the most outstanding issue regarding the PCMH¹³ and the school of thought that highlights the need for evidentiary support for PCMH benefits as the most outstanding issue²⁶. This suggests that perceived barriers may vary between physicians and other stakeholders interested in the PCMH model.

These data further suggest that perceptions of barriers vary based on a physician's practice dynamics. Chief among these issues are human resource needs, time commitment, and a lack of defined steps for PCMH integration. Physicians practicing in urban settings, physicians practicing in a group of more than 5 physicians, and those that are academically-affiliated are significantly more likely to identify a lack of human resources as a barrier to PCMH integration when compared to those in suburban settings, in practices of 5 or fewer, and in private practice, respectively. This further suggests that the PCMH model is naturally more compatible with some practices than it is others. Does the total number of barriers that are perceived by the physician directly correlate to the physician's interest in moving to a PCMH-based practice? These findings further support the notion that a "one-size-fits-all" PCMH recognition process is not feasible. Effective tools that recognize the unique challenges that face providers in different

practice settings will be necessary to make PCMH integration feasible in many different contexts.

Future Directions

While the modern Medical Home model originated in the pediatric community, its modern application is much more universal. The promise of the PCMH model is now being recognized across a much wider range of specialties. In particular, the greater primary care community, including family medicine and internal medicine, has recently embraced the concept of the PCMH, as evidenced by the publication of the Joint Principles of the Patient-Centered Medical Home in 2007. An extension of this study that assesses perceptions of the PCMH and barriers to its integration in a broad sample of physicians in all specialties could produce some important considerations. Such a survey would be designed to assess several key questions. For example, how does the perceived definition of the PCMH vary across specialties? Is there a universal understanding of what is meant by the term “Patient-Centered Medical Home” among providers? What role do specialists see themselves playing in such a model? How do perceived barriers differ across specialties? The answers to these questions would help determine the level of PCMH support that exists in the physician population at large, which will be key to understanding how to best forward the PCMH model or may help shape future policy and practice models. Determining the difference in what issues are perceived as barriers for specific groups could help in the development of tools to break

down those barriers such that movement to the PCMH model is more feasible in a variety of different practice settings.

One potential issue that emerged in data analysis was how different physicians define different terms related to the PCMH model. One example of this is the term “children with special health care needs” (CSHCNs). How does the pediatrician define a child with special health care needs? Is the term reserved for children with developmental or other neurological disorders? Does the term apply more broadly to any child that requires any form of health management such as children with asthma or children that receive medications for conditions like ADHD? Differences in how terms such as this are perceived need to be recognized. A follow-up study assessing the differences in how these terms are defined would be useful in more thorough analysis of the data presented here, as well as in the data analysis of other studies regarding the PCMH.

Another question that arises from these findings is how the integration of the PCMH model is shaping the future physician landscape. Data suggest a declining interest in primary care among medical students in recent years^{6,9,27}. This reduced interest threatens to weaken an already fragile primary care system. A study that assesses medical student familiarity with the PCMH model and how familiarity with the model correlates with residency choice could be very informative. Such a study would be designed to answer several relevant questions to this issue. Are medical students familiar with the PCMH model? What level of penetration does the PCMH model have in medical education? Do students agree with the PCMH model? Are students that are familiar with the PCMH model more likely to choose a primary care specialty? An

effective study design may be to follow first year medical students through their four years of undergraduate medical education, assessing on a yearly basis the student's intended choice of specialty, the student's familiarity with PCMH concepts, and the student's perception of the value of the PCMH model.

The data presented in this study suggest that there is a disconnect between agreement with principles of the Patient-Centered Medical Home and physician interest in moving toward a PCMH-based practice. All of the factors that are responsible for this difference must be identified and appropriately handled if there is to be wide-spread physician support for integrating the PCMH model into physicians' personal practices. It seems clear that pediatricians consider issues regarding payment reform as a barrier to PCMH integration. This perception may be one of the greatest factors that produce the rift between agreement and interest. These data further provide evidence that issues perceived as barriers vary based on the physician's practice dynamics. Moving forward, an important challenge will be to recognize the different issues that are faced by physician's in different practice settings to facilitate the integration of the PCMH model.

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Appendix A: Survey

Pediatrician Perceptions of the Medical Home Model and Barriers to its Integration

The National Center for Medical Home Implementation of the American Academy of Pediatrics describes the “Medical Home” as follows:

A family-centered medical home is a trusting partnership between a child, a child's family and the pediatric team who oversees the child's health and well-being within a community-based system that provides uninterrupted care with appropriate payments to support and sustain optimal health outcomes.
(<http://www.medicalhomeinfo.org/>)

The modern concept of the Medical Home has really taken shape within the past twenty-five years and has been pushed to the forefront of national policy discussions within the past decade.

This survey has two purposes: first, to assess clinician perceptions of the Medical Home model, and second, to assess the greatest perceived barriers to implementation of the Medical Home model from the perspective of practicing clinicians. We also ask questions about your practice and the type of patients you treat. Your input will help guide further research regarding the future of care in the pediatric setting, with the ultimate goal of creating a positive impact on pediatric healthcare at the practice level.

The survey takes approximately twenty minutes to complete. Thank you so much for helping us by participating in this research. You are not required to provide an answer for every question, though every answer will help us in creating a more complete picture of the results. If you have any questions or feedback regarding the research, please feel free to contact Dr. Sarah Elsea (selsea@vcu.edu) or Christopher Ray at rayc@mymail.vcu.edu.

Dr. Sarah Elsea, Ph.D.

Department of Human and Molecular Genetics

Virginia Commonwealth University

Perceptions of the Definition of the Medical Home Model

1. I consider myself to be very familiar with modern Medical Home principles and practices.
(Strongly disagree) 1 2 3 4 5 6 7 (strongly agree)
2. I agree with modern principles and practices of the Medical Home model, as far as I am familiar with them.
(Strongly disagree) 1 2 3 4 5 6 7 (strongly agree)
3. As compared with other pediatric practices, I feel that the level of integration of the Medical Home model in my practice is on par with other practices nationwide.
(Strongly disagree) 1 2 3 4 5 6 7 (strongly agree)
4. Although my practice has not made a conscious effort to move to a Medical Home model, I am interested in moving to the Medical Home model.
(Strongly disagree) 1 2 3 4 5 6 7 (strongly agree)
5. When contacted by a child's family regarding a health concern, do you have a standard procedure for speaking directly with the child or the family to address those concerns?
 - a. Yes
 - b. No
6. If a child's primary caregiver shows signs of physical or emotional distress do you discuss your concern with this person?
 - a. Yes
 - a. If yes, do you refer the caregiver to specific resources for counseling or treatment?
 - i. Yes
 - i. No
 - b. No

7. When appropriate do you regularly conduct a meeting with a child and his family regarding transfer of care to another primary care physician (either another pediatrician or a family physician)?
- Yes
 - No
8. When outside care is to be provided, do you have a specific system for coordinating this additional care for your patients with the intended provider of that care?
- Yes
 - No
- a. Do you have follow-up procedures in place to help ensure that the care is received and that details regarding the visit are placed in the patient's permanent file?
- Yes
 - No
9. What percentage of your population do you feel would benefit from the Medical Home model?
- <5%
 - 5-25%
 - 26-50%
 - >50%
 - Only those patients with special health care needs
10. For families of children with special health care needs, do you recommend that the families look into options for respite care?
- Yes
 - No
- c. If so, do you recommend specific resources?
- Yes
 - No

11. When referring a patient to a subspecialist, I am confident that the reason for the referral and all relevant patient information is received and reviewed by the subspecialist prior to the visit.

(Strongly disagree) 1 2 3 4 5 6 7 (strongly agree)

12. When I refer my patient to a subspecialist, I am confident that I will receive notes regarding details of the visit from the referred physician.

(Strongly disagree) 1 2 3 4 5 6 7 (strongly agree)

13. After such a referred subspecialist visit, I make sure to review the reason for the visit and discuss the results of that visit with the family upon their next visit.

(Strongly disagree) 1 2 3 4 5 6 7 (strongly agree)

14. I feel that the current generation of healthcare information technology facilitates integration of the Medical Home model.

(Strongly disagree) 1 2 3 4 5 6 7 (strongly agree)

15. Patients are able to communicate with my practice via e-mail.

- a. Yes
- b. No

16. If yes, how often do you use e-mail to communicate with patients?

- a. Multiple times each day
- b. Daily
- c. Once a week
- d. Less than once a week

17. Do you use e-mail to help coordinate outside services to be provided for your patients?

- a. Yes
- b. No

Perceived barriers to the integration of the Medical Home Model

1. I feel that repayment issues are a barrier in integrating principles and practices of the Medical Home model into my own practice.

(Strongly disagree) 1 2 3 4 5 6 7 (strongly agree)

2. I feel that my practice already has the personnel/human resources in place necessary to effectively coordinate patient care as prescribed by the Medical Home model.

(Strongly disagree) 1 2 3 4 5 6 7 (strongly agree)

3. While I am able to see the benefit of the Medical Home model, I feel that the associated expenses (such as hiring and training additional staff) are cost-prohibitive.

(Strongly disagree) 1 2 3 4 5 6 7 (strongly agree)

4. I feel that the time commitment required in both creating and maintaining a Medical Home-based practice is a barrier in integrating principles and practices of the Medical Home into my own medical practice.

(Strongly disagree) 1 2 3 4 5 6 7 (strongly agree)

5. I feel that I can trust the majority of my patients' parents or primary caregivers with the responsibilities necessary for well-being of the patient.

(Strongly disagree) 1 2 3 4 5 6 7 (strongly agree)

6. I feel that adequate evidence exists of the benefits of the Medical Home model to support its integration into practices nationwide.

(Strongly disagree) 1 2 3 4 5 6 7 (strongly agree)

7. I believe that a lack of defined steps or procedures for integration of the Medical Home model stands as a barrier to forwarding the Medical Home model of primary care.

(Strongly disagree) 1 2 3 4 5 6 7 (strongly agree)

8. I feel that the Medical Home model is compatible with current HIPAA requirements.

(Strongly disagree) 1 2 3 4 5 6 7 (strongly agree)

Open-ended questions

9. Please share with us any additional thoughts you have in regards to the practicality of the Medical Home model and/or your desire to move toward this model.
10. Please also share with us any thoughts you have regarding barriers to the integration of the Medical Home model that you feel have not been addressed by this survey.

Demographic Questions

1. What is your sex?
 - a. Male
 - b. Female

2. Years in practice:
 - a. 1-5
 - b. 6-10
 - c. 11-20
 - d. >20 years

3. Main affiliation of practice:
 - a. Private practice
 - b. Academic
 - c. Health Management Organization (HMO)
 - d. Public health (county, state, city agency)
 - e. Other (please describe)_____

4. How many total physicians are in your practice?
 - a. 1
 - b. 2-5
 - c. 6-10
 - d. >10

5. Does your practice use an Electronic Medical Record (EMR)?
 - a. Yes
 - i. If yes, how long has this been in use? _____years
 - b. No

6. Which of the following settings most describes where you practice:
 - a. Urban
 - b. Suburban
 - c. Rural

7. Please describe the demographics of your patient population in terms of percentages of each of the following:

- a. White/Caucasian
 - i. <5%
 - ii. 5-25%
 - iii. 26-50%
 - iv. >50%
- b. Hispanic or Latino
 - i. <5%
 - ii. 5-25%
 - iii. 26-50%
 - iv. >50%
- c. Black or African American
 - i. <5%
 - ii. 5-25%
 - iii. 26-50%
 - iv. >50%
- d. American Indian and Alaska Native
 - i. <5%
 - ii. 5-25%
 - iii. 26-50%
 - iv. >50%
- e. Native Hawaiian and Other Pacific Islander
 - i. <5%
 - ii. 5-25%
 - iii. 26-50%
 - iv. >50%
- f. Asian
 - i. <5%
 - ii. 5-25%
 - iii. 26-50%
 - iv. >50%

8. Please give an approximation of the percentages of your patients or patients families paying by each of the following methods:
- a. Medicare/Medicaid:
 - i. <5%
 - ii. 5-25%
 - iii. 26-50%
 - iv. >50%
 - b. Private insurance:
 - i. <5%
 - ii. 5-25%
 - iii. 26-50%
 - iv. >50%
 - c. Other
 - i. <5%
 - ii. 5-25%
 - iii. 26-50%
 - iv. >50%
9. How many appointments do you typically schedule on a weekly basis?
10. What is your average appointment time for a check-up or well visit? _____
11. What percentage of your patient population is composed of children with special health care needs (CSHCNs)?
- a. <5%
 - b. 6-10%
 - c. 10-20%
 - d. >20%
12. Are you a subspecialist?
- a. Yes
 - i. If yes, what is your subspecialty? _____ (Write-in)
 - b. No

Appendix B. Statistical Tables.

Table 9. Physician and Practice Demographic Data.

Physician and Practice Demographic Data			
	<u>n</u>		<u>Percentage</u>
Physician Gender			
Male	36		45.6%
Female	43		54.4%
Years in Practice			
Less than 5 Years	9		11.5%
6-10 Years	7		9.0%
11-20 Years	20		25.6%
More Than 20 Years	42		53.8%
Practice Affiliation			
Private Practice	41		56.9%
Academic	29		40.3%
Health Management Organization	1		1.4%
Public Health	1		1.4%
Practice Size			
1 Physician	13		16.5%
2-5 Physicians	26		32.9%
6-10 Physicians	26		32.9%
More Than 10	14		17.7%
EMR Use			
Yes	51		64.6%
No	28		35.4%
Practice Setting			
Urban	38		48.1%
Suburban	28		35.4%
Rural	13		16.5%
Subspecialist			
Yes	23		29.5%
No	55		70.5%

Table 10. Survey Participant Patient Demographics

Patient Demographics (as reported by physician)		
	<u>n</u>	<u>Percentage</u>
White/Caucasian		
Less than 5%	1	1.3%
5-25%	14	18.2%
26-50%	24	31.2%
Greater than 50%	38	49.4%
Hispanic or Latino		
Less than 5%	21	26.6%
5-25%	42	53.2%
26-50%	13	16.5%
Greater than 50%	3	3.8%
Black or African American		
Less than 5%	20	26.0%
5-25%	34	44.2%
26-50%	15	19.5%
Greater than 50%	8	10.4%
American Indian and Alaskan Native		
Less than 5%	63	88.7%
5-25%	7	9.9%
26-50%	1	1.4%
Greater than 50%	0	0.0%
Native Hawaiian and Other Pacific Islander		
Less than 5%	70	95.9%
5-25%	3	4.1%
26-50%	0	0.0%
Greater than 50%	0	0.0%
Asian		
Less than 5%	38	50.7%
5-25%	36	48.0%
26-50%	1	1.3%
Greater than 50%	0	0.0%

Table 11. Statistical Differences in Responses between Related Demographic Groups: Self-Assessment Items. “P-values” indicate independent sample Mann-Whitney U test p-values. Significant p-values are in bold.

Statistical Differences in Responses between Demographic Groups for Self-Assessment Items				
Demographic Parameter	P - Values			
	PCMH Familiarity	PCMH Agreement	Current PCMH Integration	PCMH Interest
Physician Gender	0.094	0.897	0.218	0.087
Practice Type	0.254	0.694	0.616	0.219
Practice Size	0.883	0.497	0.573	0.591
Practice Affiliation	0.663	0.960	0.118	0.170
Practice Setting	0.412	0.476	0.864	0.771
Patient Demographics	0.644	0.610	0.452	0.049
Years in Practice	0.189	0.571	0.907	0.200

Table 12. Having a defined process for speaking directly with the child or family to discuss health care concerns – Urban vs. Suburban. Physicians in an urban setting are significantly less likely to have a system in place for speaking directly with the patient or family when a health care need arises ($p = 0.018$).

		Urban vs. Suburban		Total
		Urban	Suburban	
When contacted by a child's family regarding a health concern, do you have a standard procedure for speaking directly with the child or the family to address those concerns?	No	10	1	11
	Yes	28	27	55
Total		38	28	66

Table 13. Likelihood to hold a transfer of care meeting when appropriate - Urban vs. Suburban. Physicians in an urban practice setting are significantly more likely than physicians in a suburban setting to hold a transfer of care meeting ($p = 0.046$).

		Urban vs. Suburban		Total
		Urban	Suburban	
When appropriate, do you regularly conduct a meeting with a child and his family regarding transfer of care to another primary care physician (either another pediatrician or a family physician)?	No	7	13	20
	Yes	21	11	32
Total		28	24	52

Table 14. Likelihood to hold transfer of care meeting - Generalists vs. Subspecialists.
 Generalists are significantly less likely to hold a transfer of care meeting than subspecialists ($p = 0.001$).

		Are you a subspecialist?		Total
		No	Yes	
When appropriate, do you regularly conduct a meeting with a child and his family regarding transfer of care to another primary care physician (either another pediatrician or a family physician)?	No	22	0	22
	Yes	25	15	40
Total		47	15	62