

Telemedicine Use by Pediatric Rheumatologists during the COVID-19 Pandemic

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Abstract

Background

To characterize various aspects of telemedicine use by pediatric rheumatology providers during the recent pandemic including provider acceptability of telehealth practices, clinical reliability, and clinical appropriateness.

Methods

An electronic survey was generated and disseminated amongst the Childhood Arthritis and Rheumatology Research Alliance (CARRA) listserv (n = 547). Survey items were analyzed via descriptive statistics by question and correlates amongst burnout and satisfaction with telemedicine were examined via ANOVA with appropriate statistical software.

Results

The survey response rate was 40.8% (n = 223) with the majority of respondents in an attending-level role. We observed that musculoskeletal components of the exam were rated as the most reliable components of a telemedicine exam and 85.6% of survey respondents reported engaging the patient or patient caregiver to help conduct the virtual exam. However, 63.5% of providers reported not being able to elicit the information needed from a telemedicine visit to make a complete clinical assessment. We also noted areas of disagreement regarding areas of patient engagement and confidentiality. We found that approximately one-third (33.5%) of those surveyed felt that their level of burnout was increased due to telemedicine.

Conclusion

In general, providers found exam reliability (specifically around focused musculoskeletal elements) in telemedicine visits but overall felt that they were unable to generate the information needed to generate a complete clinical assessment. Additionally, there were suggestions that patient engagement and confidentiality varied during telemedicine visits when compared to in-person clinical visits. Further qualitative work is needed to fully explore telemedicine use in pediatric rheumatology.

Background

The coronavirus disease 19 (COVID-19) pandemic has radically impacted the way health systems operate across the United States and around the world. One of the most visible impacts has been in ambulatory care centers with the rapid deployment of telemedicine use to deliver both routine and urgent care, with centers reporting hundreds-fold increases in daily telemedicine visits.¹ Historically, telemedicine has been

a modality of care to help improve access and establish continuity of care, but the uptake prior to the pandemic was modest at best.² Due to the recent pandemic and accompanying telehealth policy changes³, the volume and attitudes around telemedicine have been shifting. Pediatric rheumatologists are faced with multiple issues in health care delivery and availability⁴ and a few reports have begun to explore telemedicine within this specialty in regards to patient acceptability⁵ along with cost and time effectiveness.⁶ The historical paucity of telemedicine adoption within this specialty may be for a number of reasons including the reliance on patient-reported outcomes in addition to objective clinical findings⁷ and lack of standardization of telemedicine exam practices.⁸

With the rapid implementation of telemedicine over the previous several months, there is a unique opportunity to evaluate telemedicine use in the pediatric rheumatology setting. Recent pediatric studies have described the ability to deploy telemedicine rapidly during the COVID-19 pandemic,⁹ however, few studies have described the potential benefits and clinical limitations from the subspecialists' perspective during this time. Though clinicians and patients are clearly impacted by COVID-19 in multiple ways, this study explores the perceived limitations and benefits of the teleclinical interaction and provider acceptability of various telehealth practices. This includes rheumatologists' perceptions regarding specific areas of clinical assessment such as the exam and appropriateness of telemedicine follow-up by visit type, as well as potential patient-facing issues including engagement and confidentiality. It is critical that we understand this baseline state of telemedicine use amongst pediatric rheumatologists so that we can more safely and effectively integrate its use in routine care.

Methods

The Childhood Arthritis and Rheumatology Research Alliance (CARRA) is a collaborative research network inclusive of pediatric rheumatologists, pediatric rheumatology trainees, advanced practice professionals, nurses, researchers, and patient partners with members primarily in the United States and Canada. A survey was developed with a goal of evaluating various aspects of telehealth use (please see Supplementary Data). The study was approved by the Stanford Institutional Review Board. The electronic survey (SurveyMonkey Inc, San Mateo, CA) was disseminated via the CARRA provider listserv. Survey results were analyzed via descriptive statistics and other trends in data were evaluated using one-way ANOVA tests in SAS University Edition (SAS Institute, Cary, NC).

Results

Responses and Participants

A total of n = 547 surveys were sent via the CARRA member listserv and 40.8% (n = 223) of subjects agreed to participate in the study. The majority of participants were pediatric rheumatologists (71.6%) followed by fellow trainees (16.4%) but included other professionals such as nurse practitioners and other researchers (Table 1). Mean years in practice was 13.3 years (+/- 9.9) with a range of 0 to 48 years.

Table 1
Respondent roles and years experience

RESPONDENTS	N (%)
Pediatric Rheumatologist	157 (70.4)
Other Subspecialists/Providers	3 (1.3)
Resident/Fellow Trainees	41(18.4)
Advanced Practice Providers	6 (2.7)
Nurse	2 (0.08)
Social Worker	1 (0.04)
Other Research Staff	9 (4.0)
Did not answer	4 (1.8)
Total	223
YEARS PRACTICE	Years
Mean Years Practice (Total)	13.2 years
Range Years Practice	0 to 48 years
Number omitted/no answer	68

Volumes of Telemedicine Use and Types of Telehealth Platforms

Prior to the COVID-19 pandemic, baseline use of telemedicine was minimal and 86.7% of providers reported not conducting telemedicine visits compared to 3.6% of providers who report not having completed video visits over the last month. Since the pandemic, video-visit use has skyrocketed; 51.8% of providers have conducted greater than twenty direct provider-to patient video visits over the last month compared to only 2.0% of providers prior to the pandemic. Roughly similar numbers of providers utilize a free-standing telehealth platform (36.8%) versus those that utilize a telehealth program that is either embedded or external to the electronic health record (35.4%).

Telehealth Use by Modality

This survey item sought to evaluate changes in telehealth use by specific patient-care electronic tools. For five forms of telehealth including patient portal usage, provider-to-provider telemedicine visits, provider-to-patient telemedicine visits, provider-to-patient telephone visits and electronic consults, there were increases in use from “Pre-Covid” to present times with the greatest increase seen in the use of provider to patient video visits which had an increase of 734.8%. followed by provider-to-provider telemedicine visits which had an increase of 657.1%. Other types of telehealth use described by survey respondents included the use of telehealth for family meetings, patient education and teaching.

Physical Exam, Patient and Caregiver Engagement, and Assessment with use of Telemedicine

Survey participants were queried regarding the ability to perform standard exam components reliably during a video visit. Though this survey was presented to rheumatology-focused providers, all exam components were included. The exam features reported as being most reliably completed by video visit (as determined by total number selected) were examination of the extremities, the musculoskeletal cervical exam, musculoskeletal hand, wrist and elbow, musculoskeletal knees and ankles and mental status. The exam components that ranked lowest were the cardiovascular, respiratory, gastrointestinal, strength, and neurologic examination (Table 2). Of note, 64.6% of survey participants reported utilizing a standardized exam approach during video visits and 85.6% of participants also reported engaging the patient or patient caregiver to help conduct components of the virtual exam. Of the standardized exam approaches, the vast majority of providers reported use of the Pediatric Gait Arms Legs and Spine (pGALS)¹⁰ or a modified form, as well as other variations of standardized exams such as the Childhood Myositis Assessment Scale (CMAS)¹¹ or their own in-person clinical template adapted for telemedicine. In terms of how patient caregivers were included in the examination process, providers reported that caregivers were asked to palpate, assess for warmth and passively range various joints, as well as other exam components such as identifying skin lesions, abdominal palpation, assessing for edema and lymph nodes, and directing the video camera for examination purposes. Interestingly, 39.2% of practitioners reported that patient engagement did not change via telemedicine, though 38.1% of respondents did report that they felt that telemedicine worsened patient engagement when compared to in-person clinical visits. Additionally, an overwhelming majority of providers (63.5%) felt that they were not able to elicit all the pertinent information needed to make a complete clinical assessment.

Table 2
Exam components by percent selected “able to complete reliably”

Exam Component	Number selected as reliably done by video	(%)
MSK hands/wrists/elbows	129	57.8
MSK: cervical	126	56.5
Mental Status	123	55.2
MSK knees/ankles	121	54.3
Extremities	112	50.2
Skin	108	48.4
MSK: TMJ	93	47.4
Eye exam (external only)	92	41.2
MSK hips	77	34.5
MSK spine	69	30.9
Oral Exam	71	31.8
MSK strength	55	24.7
Neurologic exam	26	11.7
Respiratory	18	8.1
GI exam	4	1.8
CV	3	1.3

Visit Type Appropriateness

In considering appropriateness of telemedicine patient encounters, by type of encounter, providers reported that routine follow up visits, encounters for injection teaching, and need for labs were the most appropriate visits for either in-person or telemedicine visits. Visits that were rated as most appropriate for in-person only clinical encounters were follow-up visit due to concern for flare, urgent follow up, or triage for anticipated hospitalization.

Impact of Telemedicine on Patient Care

In general, patient wait times, continuity of care, patient health access, communication, pre-visit planning and clinical follow up were areas of care that were predominantly rated as no change to moderately or significantly improved secondary to telemedicine. On the other end of the spectrum, surveyed providers rated assessment of disease activity and physical exam as parts of clinical care that, in general, have been moderately to significantly worsened through use of telemedicine care delivery. Interestingly there was disagreement regarding adolescent and young adult confidentiality; 37.5% of providers rated that

confidentiality was moderately worsened whereas 41.2% of providers rated it as no change, and 11.6% even reported that it was moderately improved (Fig. 1).

Impact of Telemedicine on Provider Burnout and Satisfaction

Though most providers reported that telemedicine did not change their (self-perceived) level of burnout, approximately a third (33.5%) of survey respondents reported an increase in their level of burnout. One-way ANOVA was used to assess for a relationship between burnout and overall satisfaction with telemedicine, and there was a statistically significant suggestion regarding an inverse relationship (an increase in self-perceived burnout correlated with a decrease in mean telehealth satisfaction score).

Discussion

The use of telemedicine during the COVID-19 pandemic has been omnipresent and its potential effects on clinical care—for better or for worse—cannot be ignored. Pediatric rheumatologists have long struggled with ways to provide continuity and access to patients¹² and telemedicine may have a place in routine ambulatory care moving forward. Barriers to telemedicine use in pediatric ambulatory care have included limitations in policy and reimbursement, technology¹³⁻¹⁴ and understanding the appropriateness and potential impact on patient health outcomes. Due to sheer volume of ambulatory telemedicine use with COVID-19, we have the opportunity to understand the real-world use of telemedicine in multiple specialties including pediatric rheumatology. This brief study asked a large cohort of pediatric rheumatology providers to detail their real-world experience of telemedicine use during a time where telemedicine, for many providers, was the dominant modality of care. We were able to observe specific trends amongst clinical care domains including exam reliability, visit type appropriateness, and the ability to make a clinical assessment, but also determined potential areas of disagreement amongst providers surrounding adolescent confidentiality, patient engagement, and provider burnout. As providers, we have a responsibility to our patients to optimize the integration of telemedicine care and address equity and disparities, identify tele-amenable issues, and measure quality and safety.¹⁵

With respect to visit type appropriateness, we found that in general, providers felt telemedicine was most appropriate for routine follow-up or follow-up due to ancillary needs such as injection teaching or lab result discussions. Generally, providers felt that urgent needs—whether flare of disease or patient concern regarding disease activity—were best suited for in-person clinical assessment. Interestingly, the majority of providers in this survey felt that components of the musculoskeletal exam, minus strength testing, were amongst the most reliable exam components done via video visit and the majority of providers were using a modified approach of standardized exams (such as the PGALS) with caregiver assistance to make their assessments. Virtualization of the standard musculoskeletal exam is necessary in pediatric rheumatology telemedicine visits.¹⁶ Regardless of visit type appropriateness or ability to conduct a reliable exam, the majority of providers (63.5%) felt that they were not able to elicit all the needed information from a telemedicine visit to make a complete clinical assessment. Further investigation

needs to be done to outline the components that contribute to these perceived shortfalls of the telemedicine clinical assessment. Areas of further investigation may include the impact of diagnosis and disease state, patient-reported outcomes in a virtual visit, and components of the exam that are not able to be reliably assessed via video. Ultimately, controlled clinical studies evaluating in-person versus telemedicine visits may be required to understand the complete impact of telemedicine-related factors on the ability to make a sound clinical assessment.

Regarding patient engagement, the results appeared split between no change and less patient engagement despite providers reporting that patient caregivers were directly participating in the physical assessment tasks. Over a third of providers felt that patient engagement was worse when compared to in person clinical visits. This is an important finding in a specialty which provides chronic disease management because improved patient engagement and shared decision-making have been suggested to correlate with improved health outcomes.¹⁷⁻¹⁸ Beyond health outcomes, there may be important correlates surrounding patient engagement and communication in the health care transition of patients from pediatric to adult rheumatic care.¹⁹

An additional area of interest in pediatric rheumatology and in pediatrics in general, is teenage and young adult confidentiality. A benefit of telemedicine may include being able to take note of the patients' environment and the potential implications of that environment on health, however, patients may have limited ability to be able to engage confidentially with their provider. During an in-person visit, there is no question of who is and is not in the exam room and it is less clear in a telemedicine visit. Though 41.2% of providers felt that confidentiality was not changed via telemedicine, over a third (37.5%) of providers felt that it was worsened when compared to an in-person visit. Providers must learn how to adapt their practice to ensure adolescent confidentiality and integrate new approaches to ensure this in telemedicine visits.²⁰

Lastly, this survey acknowledges the potential of telemedicine to impact physician burnout. Physician burnout is multifactorial, though there is some suggestion that COVID-19 has introduced new stressors.²¹⁻²² Given the rapid deployment of telemedicine, the change in the care delivery model, and the increase in volume of visits, telemedicine may inevitably be associated with provider workload or stress versus increases in provider productivity and worktime saved. Though burnout was increased in approximately a third of survey respondents, we cannot exclude other confounding factors and stressors related to the COVID-19 pandemic that occurred simultaneously with the increase in telemedicine care. The rapid implementation of technology in the health care system may place added stress on providers as they navigate novel roles of information technology and should not be overlooked. Further qualitative studies need to be performed to assess physician burnout in relation to telemedicine.

This survey was intended to identify specific clinical domains related to telehealth for further study and as such, is subject to several limitations. This study did not examine external factors such as lack of validated assessment tools, patient environment, provider telemedicine education, visit follow-up completion or intrinsic factors such as patient diagnosis, patient disease activity, and communication

barriers. Further in-depth qualitative studies regarding the physician experience and additional clinical studies involving telemedicine visits in pediatric rheumatology are needed. Most of the providers surveyed in this study were pediatric rheumatologists which may have impacted specific findings related to reliability around certain aspects of the physical exam; therefore, these results may not directly apply to other pediatric subspecialties. In addition, this study does not involve the patient or caregiver perspective which is necessary when considering reliance on patient or caregiver reported outcomes via telemedicine. Lastly, this study does not separately evaluate the impact of COVID-19 or the rapidity of telemedicine deployment on the physician experience.

A potentially unique finding in this study is that most pediatric rheumatologists surveyed felt that telemedicine use increased patient health access. Understanding the impact of telemedicine on access and addressing disparities in care is vital; a major challenge in pediatric rheumatology remains patient access to care, and telemedicine may be one avenue to address this. However, social inequities may introduce unforeseen disparities of care in through the application of telemedicine. This survey did not specifically address this, and further work, particularly on the patient-facing side, is needed to understand this implication of telemedicine care.

Conclusion

This is the first professional organization-wide study that captures a large cohort of pediatric rheumatologists and their experience regarding telemedicine use in their day to day practice during the COVID-19 pandemic. We found that in general, providers felt that components of the musculoskeletal exam were able to be done reliably through telemedicine, yet interestingly the majority of providers felt that they were not able to generate a complete clinical assessment. We also found that perception of patient engagement and confidentiality varied when compared to in person clinical visits, and further work is needed to fully understand the potential impact on patient care. This study was completed during what has been a very stressful time for individuals and the hospital systems they operate within—follow-up work, particularly around the above findings, is key as telemedicine becomes incorporated into routine rheumatologic practice. These survey findings only begin to uncover the complexities of telemedicine care in rheumatology and further in-depth qualitative, patient-facing, and outcomes-focused work is needed in order to develop standardized telemedicine approaches to pediatric rheumatologic care.

Abbreviations

CARRA - Childhood Arthritis and Rheumatology Research Alliance

Declarations

Ethics Approval and consent to participate

The study was approved by the Stanford University IRB.

Consent for publication

Not applicable

Availability of data and material

The datasets during and/or analyzed during the current study available from the corresponding author on reasonable request.

Competing Interests

Dr Ronis receives partial salary support for work as the CARRA publications committee chair and the steering committee member.

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Author Contributions

Drs Pooni, Ronis, and Lee made substantial contributions to conception of the study and its design, analysis of the data, interpretation of the data, and drafting the article and critically revising it and approved the final version to be published.

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References

1. Mann DM, Chen J, Chunara R, Testa PA, Nov O. COVID-19 transforms health care through telemedicine: evidence from the field. *J Am Med Inform Assoc* [Internet]. 2020 Apr 23 [cited 2020 May 18]; Available from: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7188161/>
2. Kruse CS, Karem P, Shifflett K, Vegi L, Ravi K, Brooks M. Evaluating barriers to adopting telemedicine worldwide: A systematic review: *Journal of Telemedicine and Telecare* [Internet]. 2016 Oct 16 [cited 2020 Jul 28]; Available from: <https://journals.sagepub.com/doi/10.1177/1357633X16674087>
3. COVID-19: Federal Waivers, Flexibilities, and Guidance Needed to Expand Telehealth [Internet]. ATA. [cited 2020 Jul 23]. Available from: <https://www.americantelemed.org/policies/covid-19-federal-waivers-flexibilities-and-guidance-needed-to-expand-telehealth-and-ensure-virtual-care-delivery/>
4. Henrickson M. Policy challenges for the pediatric rheumatology workforce: Part II. Health care system delivery and workforce supply. *Pediatric Rheumatology* [Internet]. 2011 Aug 15 [cited 2020 Jul 23];9(1):24. Available from: <https://doi.org/10.1186/1546-0096-9-23>

5. Bullock DR, Vehe RK, Zhang L, Correll CK. Telemedicine and other care models in pediatric rheumatology: an exploratory study of parents' perceptions of barriers to care and care preferences. *Pediatr Rheumatol Online J* [Internet]. 2017 Jul 11 [cited 2019 Sep 16];15. Available from: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5504634/>
6. Kessler EA, Sherman AK, Becker ML. Decreasing patient cost and travel time through pediatric rheumatology telemedicine visits. *Pediatr Rheumatol Online J* [Internet]. 2016 Sep 20 [cited 2019 Aug 6];14. Available from: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5029100/>
7. Knudsen LR, Thurah A de, Lomborg K. Experiences With Telehealth Followup in Patients With Rheumatoid Arthritis: A Qualitative Interview Study. *Arthritis Care & Research* [Internet]. 2018 [cited 2020 Jul 23];70(9):1366–72. Available from: <https://onlinelibrary.wiley.com/doi/abs/10.1002/acr.23483>
8. Pooni R, Sandborg C, Lee T. Building a Viable Telemedicine Presence in Pediatric Rheumatology. *Pediatr Clin North Am*. 2020 Aug;67(4):641–5.
9. Patel PD, Cobb J, Wright D, Turer RW, Jordan T, Humphrey A, et al. Rapid development of telehealth capabilities within pediatric patient portal infrastructure for COVID-19 care: barriers, solutions, results. *J Am Med Inform Assoc*. 2020 01;27(7):1116–20.
10. Foster HE, Jandial S. pGALS – paediatric Gait Arms Legs and Spine: a simple examination of the musculoskeletal system. *Pediatric Rheumatology*. 2013;11(1):44. doi:10.1186/1546-0096-11-44
11. Lovell DJ, Lindsley CB, Rennebohm RM, Ballinger SH, Bowyer SL, Giannini EH, et al. Development of validated disease activity and damage indices for the juvenile idiopathic inflammatory myopathies. II. The Childhood Myositis Assessment Scale (CMAS): a quantitative tool for the evaluation of muscle function. The Juvenile Dermatomyositis Disease Activity Collaborative Study Group. *Arthritis Rheum*. 1999 Oct;42(10):2213–9.
12. Mayer ML, Mellins ED, Sandborg CI. Access to pediatric rheumatology care in the United States. *Arthritis Care & Research* [Internet]. 2003 [cited 2019 Sep 28];49(6):759–65. Available from: <https://onlinelibrary.wiley.com/doi/abs/10.1002/art.11462>
13. Kulkarni R. Use of telehealth in the delivery of comprehensive care for patients with haemophilia and other inherited bleeding disorders. *Haemophilia*. 2018 Jan;24(1):33–42.
14. Olson CA, McSwain SD, Curfman AL, Chuo J. The Current Pediatric Telehealth Landscape. *Pediatrics* [Internet]. 2018 Mar 1 [cited 2020 Oct 28];141(3). Available from: <https://pediatrics.aappublications.org/content/141/3/e20172334>
15. Telehealth Should Be Expanded—If It Can Address Today's Health Care Challenges | Health Affairs Blog [Internet]. [cited 2020 Nov 10]. Available from: [/do/10.1377/hblog20200916.264569/full](https://doi.org/10.1377/hblog20200916.264569/full)
16. Shenoi S, Hayward K, Curran ML, Kessler E, Mehta JJ, Riebschleger MP, et al. Telemedicine in pediatric rheumatology: this is the time for the community to embrace a new way of clinical practice. *Pediatric Rheumatology* [Internet]. 2020 Oct 31 [cited 2020 Nov 10];18(1):85. Available from: <https://doi.org/10.1186/s12969-020-00476-z>

17. Greene J, Hibbard JH, Sacks R, Overton V, Parrotta CD. When patient activation levels change, health outcomes and costs change, too. *Health Aff (Millwood)*. 2015;34(3):431-437. doi:10.1377/hlthaff.2014.0452
18. Wyatt KD, List B, Brinkman WB, Prutsky Lopez G, Asi N, Erwin P, et al. Shared Decision Making in Pediatrics: A Systematic Review and Meta-analysis. *Acad Pediatr*. 2015 Dec;15(6):573–83.
19. Sabbagh S, Ronis T, White PH. Pediatric rheumatology: addressing the transition to adult-orientated health care. *Open Access Rheumatol [Internet]*. 2018 Jul 3 [cited 2020 Nov 10];10:83–95. Available from: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6037274/>
20. Carlson JL, Goldstein R. Using the Electronic Health Record to Conduct Adolescent Telehealth Visits in the Time of COVID-19. *J Adolesc Health [Internet]*. 2020 Aug [cited 2020 Nov 10];67(2):157–8. Available from: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7275171/>
21. Amanullah S, Ramesh Shankar R. The Impact of COVID-19 on Physician Burnout Globally: A Review. *Healthcare [Internet]*. 2020 Dec [cited 2020 Nov 10];8(4):421. Available from: <https://www.mdpi.com/2227-9032/8/4/421>
22. Khalafallah AM, Lam S, Gami A, Dornbos DL, Sivakumar W, Johnson JN, et al. Burnout and career satisfaction among attending neurosurgeons during the COVID-19 pandemic. *Clin Neurol Neurosurg [Internet]*. 2020 Nov [cited 2020 Nov 10];198:106193. Available from: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7462441/>

Figures

Assessment of Components of Clinical Encounters

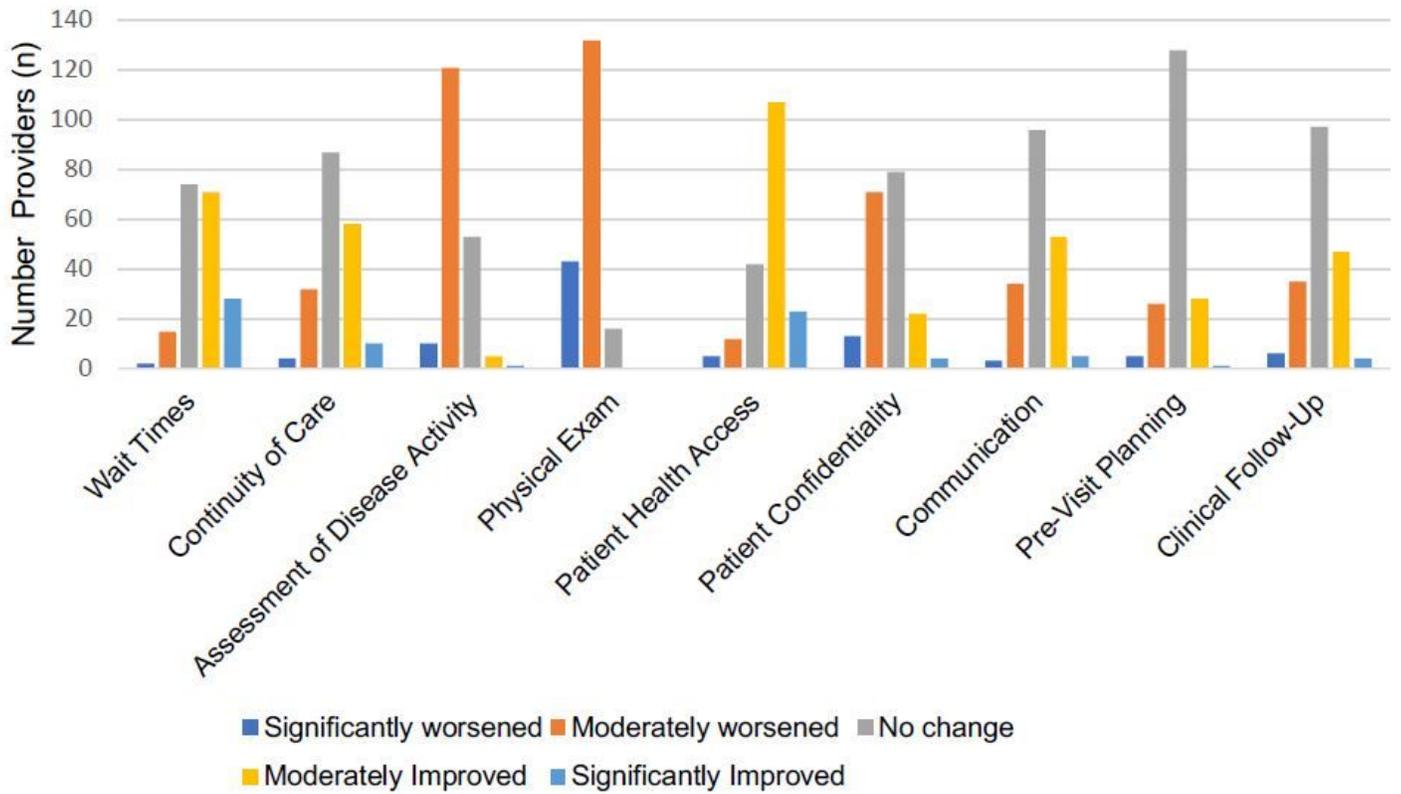


Figure 1

pedsrheum. Assessment of Components of Clinical Encounters

Supplementary Files

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