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RESEARCH ARTICLE

Improving Quality Metrics for Adolescents: Lessons Learned from a Clinically Integrated Network's Regional Quality Improvement Initiative

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Abstract

Introduction: Given the clinical concerns around adolescent mental health and gaps in care exacerbated by the COVID-19 pandemic, a regional, pediatric clinically integrated network developed a systematic, evidence-based initiative to improve outcomes on three adolescent-focused quality metrics. The objective of this study was to implement changes at regional primary care pediatric practices to improve rates of depression screening, vaccination completion, and social determinants of health (SDOH) screening for patients 13-21 years old by 10% from baseline within six months.

Methods: Twenty-six regional practices participated in the 6-month quality improvement project consisting of three rounds of PDSA cycles and educational seminars. Evaluation was completed by reviewing patient records at baseline and then every 2 months for 3 cycles of change. The significance of change for each intervention cycle was compared using the $\chi 2$ test of homogeneity or the Fisher exact test.

Results: Statistically significant improvements in depression screening and coding and SDOH screening and coding were demonstrated at cycle one and sustained throughout the six-month study. The vaccine metric did not show statistically significant improvement, likely a consequence of the high baseline rates of meningococcal and tetanus, diphtheria, and pertussis (Tdap) vaccination and the interventions on human papilloma virus (HPV) vaccination focused on timing of dose 1.

Conclusions: Collective PDSA cycles across a regional clinically integrated network can improve depression screening and SDOH screening quality metrics over a six-month period. More time is required to assess impact of interventions on adolescent vaccination rates.

1. Introduction

Clinically Integrated Networks (CINs) represent a collection of health care providers who work together to improve patient care and reduce overall health care cost (1). The Pediatric Health Network (PHN) is a CIN in the mid-Atlantic region of the United States focused on improving the quality of pediatric health care delivery while collectively contracting with payors around value-based care. Network-wide quality improvement initiatives are designed to focus on specific aspects of care that have room for improvement and, depending on specific contract-defined outcome metrics, could result in shared savings for participating practices.

In fall 2021, the American Academy of Pediatrics (AAP), American Academy of Child and Adolescent Psychiatry (AACAP), and Children's Hospital Association (CHA) declared a national emergency in child and adolescent mental health after the already rising rates of mental health challenges

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among youth were exacerbated during the COVID-19 pandemic (2). The pandemic also exacerbated negative social drivers of health (3) and delayed immunizations for adolescents (4). In reaction to these clinical consequences of the pandemic, network payor contracts began focusing on improving HEDIS metrics related to adolescent care. Therefore, the PHN developed a collaborative quality improvement initiative with a global aim of improving health care delivery to regional adolescents.

2. Methods

The specific aim of the initiative was to optimize patient care at regional primary care pediatric practices by increasing documented completion of specified AAP-recommended components of annual well-child visits for patients 13-21 years old by 10% from baseline within 6 months. The specific components of the adolescent well visit include depression screening and follow up (5); Immunizations (6); and Social Determinants of Health (SDOH) screening (Table 1). Root cause analysis was conducted with multidisciplinary team to identify the key drivers to success with these measures as patient/parent participation, clinician and staff education, and practice workflows (Figure 1). These insights helped us develop our quality improvement initiative, which ran from March 2022 through October 2022 (Figure 2).

Thirty practices were recruited from pre-established email listservs targeting PHN network practices and other regional non-network practices. These listservs contained contacts for over 800 providers at regional practices, ranging from single practitioner practices to large academic institutions. Involvement was voluntary, and all practices that expressed interest were included. Of the 30 practices who registered to participate, 26 regularly participated in all 3 cycles; six of those practices were non-PHN members. Participating providers were offered continuing medical education credit and American Board of Pediatrics Maintenance of Certification Part IV credit.

Baseline data was collected from retrospective chart review from January and February 2022. Each participating practice completed three Plan, Do, Study, Act (PDSA) Cycles to implement changes and study the effect of those changes (Figure 2). Practice participants designed their own PDSA cycles focusing on improving one or more of the above metrics. Cycle data was captured at the practice level via chart review and reported using a REDCap survey. Practice team leaders across the network met every other month to review data and share their experiences. PHN provided virtual education seminars on best known practices for improving care of adolescents as assessed by each of the above metrics.

Demographic characteristics and survey responses were summarized by frequencies and percentages. Binary and categorical variables were compared using Chi-squared tables and Fisher's exact test. P values were considered significant if <0.05. Of note, this project was undertaken as a Quality Improvement Initiative at Children's National Hospital, the PHN hospital partner, and does not constitute human subject's research. As such, it was not under the oversight of the Institutional Review Board.

3. Results

Baseline data showed most practices were screening for depression with a validated tool (86%), but few were using the recommended billing codes outlined by our payor contracts as best for capturing completion (15% using G codes and/or LOINC codes). Fewer practices were regularly screening for SDOH with a validated tool (45%) and coding for these screening results with the recommended billing codes (8% using G codes). For the adolescent immunization measure, the great majority of patients were receiving 1 dose of meningococcal (97%) and 1 dose of Tdap vaccine (97%) prior to their 13th birthday. However, only 69% were completing the two-dose HPV series in that same time frame, bringing the total percentage of individuals achieving the desired measure outcome to 66%. (Table 2).

Table 1. *Initiative Metrics, Definitions, and Recommended Coding Strategies for Data Capture*

Quality Measure	Definition Source	Specific Aim	Numerator	Denominator	Recommended Coding [a]
Depression Screening and Follow up (DSF)	HEDIS	Depression screening using a validated tool for patients age 13-21 years at well-child visits	Patientsage 13-21yearswho werescreened for depression using an age-appropriate validated tool [b]	Patients 13 to 21 who had a well-child visit during the measurement cycle	Screening results documented by G codes (G8431 for positive screen; G8510 for negative screen) and/or LOINC codes [b] associated with depression screening score

Immunizations for Adolescents (IMA)	HEDIS	Administration of one dose of meningococcal vaccine, one-dose tetanus, diphtheria toxoids and acellular pertussis vaccine (Tdap), and two-doses of the human papillomavirus vaccine (HPV) by age 13	Patients who received one-dose of meningococcal vaccine, one-dose tetanus, diphtheria toxoids and acellular pertussis vaccine (Tdap) and completed the human papillomavirus (HPV) vaccine series by age 13 years.	All patients presenting for their 13 year old well visit during the measurement time frame.	Appropriate vaccine administration CPT codes
Social Determinants of Health (SDOH) Screening	Regional Payor Contract	SDOH screening using a validated tool [d] completed for patients 13-21 years at well-child visits.	Patients who were screened for either unmet food, housing or transportation needs using a validated tool during measurement period	Patients 13 to 21 years old who had a well-child visit	G codes of screening performed and positive (G9920) and screening performed and negative (G9919); Z codes also available to label identified need.

[a] *recommended by regional payor to help capture data for value-based care contracts*

[b] *89208-3 Beck Depression Inventory Fast Screen Total Score; 89205-9 Center for Epidemiologic Studies Depression Scale-Revised total score [CESD-R]; 71354-5 Edinburgh Postnatal Depression Scale; 55758-7 Patient Health Questionnaire 2 item; 44261-6 Patient Health Questionnaire 9 item; 89204-2 Patient Health Questionnaire 9: Modified for Teens total score; 71965-8 PROMIS 29 Depression score T score*

[c] *90734 Meningococcal; 90715 Tdap; 90649-90651 HPV*

[d] *A Safe Environment for Every Kid (SEEK) Questionnaire; Accountable Health Communities Core Health-Related Social Needs Screening Questions; Health Leads Screening Tool; Hunger Vital Sign Questionnaire; Protocol for Responding to and Assessing Patients' Assets, Risks, and Experiences (PRAPARE)*

Table 2. *Quality Improvement Outcome Measures by Cycle*

Pediatric Health Network	Baseline	Cycle 1	Cycle 2	Cycle 3	P value*
Adolescent Population	**Total**				
Number of Charts Reviewed	**739**	**685**	**716**	**682**	
Depression Screening					
Number of patients screened for clinical depression using a validated tool?	**636**	**648**	**666**	**644**	
Percent of patients who were screened for clinical depression using a validated tool	86%	95%	93%	94%	<0.001
Percent of Depression Screenings captured using G Codes (G8431 & G8510)	15%	42%	66%	74%	<0.001
Percent of Depression Screenings captured using LOINC Codes	15%	8%	14%	15%	0.937
Percent of Depression Screenings captured using Other Methods	57%	39%	21%	14%	<0.001
Adolescent Immunizations (Combo 2)					
Total Number of 13-year-old patients	**154**	**183**	**229**	**191**	
Percent of patients who received 1 dose of Meningococcal vaccine before their 13th birthday	97%	96%	98%	97%	0.757
Percent of patients who received 1 dose of Tdap vaccine before their 13th birthday	97%	97%	97%	98%	0.52

Percent of patients who received 2 doses of HPV vaccine before their 13th birthday	69%	68%	70%	70%	0.907
Percent of patients who received the complete Adolescent Combo 2 Series	66%	68%	69%	70%	0.561
Social Needs Screening					
Number of patients screened for social needs using a validated tool?	**332**	**371**	**415**	**394**	
Percent of patients who screened for social needs using a validated tool	45%	54%	58%	58%	<0.001
Percent of SDOH Screenings captured using G Codes (G9919 & G9920)	8%	32%	43%	52%	<0.001
Percent of SDOH Screenings captured using Other Methods	36%	26%	26%	22%	<0.001

**P value comparing baseline data to cycle 3 data*

There were statistically significant improvements from baseline through cycle 3 data for both screening measures. Depression screening rates increased by 8% (p<0.001) and captured G codes improved by 59% (p<0.001) to a rate of 74% (Figure 3). LOINC code usage stayed stable at 15%. The interventions implemented during the study period included educating providers and billing teams on best practices; adjusting screening tools, templates, and workflows to improve screening administration; and automating appropriate coding in the electronic medical record (Figure 1).

For the SDOH screening (Figure 4), there was a 13% increase in screening during the study period, and a 44% increase in capturing those screens with designated G codes (P<0.001). The interventions implemented during the study period included selecting an initial screening tool or transitioning to a better screening tool; educating providers on best screening practices; updating resources to offer patients; adjusting methodology of screening (text, paper, or electronic medical record); and adding documentation and/or billing templates to record results (Figure 1).

There was no statistically significant improvement in the immunization metric, with rates of completing the combination of vaccines improving only 4% during the study (Table 2). The interventions included educating patient and family on safety and efficacy of vaccine through direct messaging, on-hold voice messages, or waiting room posters; educating providers on best practices for HPV vaccination and communication; initiating series earlier than age 11 years; and recalling patients who were deficient in HPV vaccination (Figure 1).

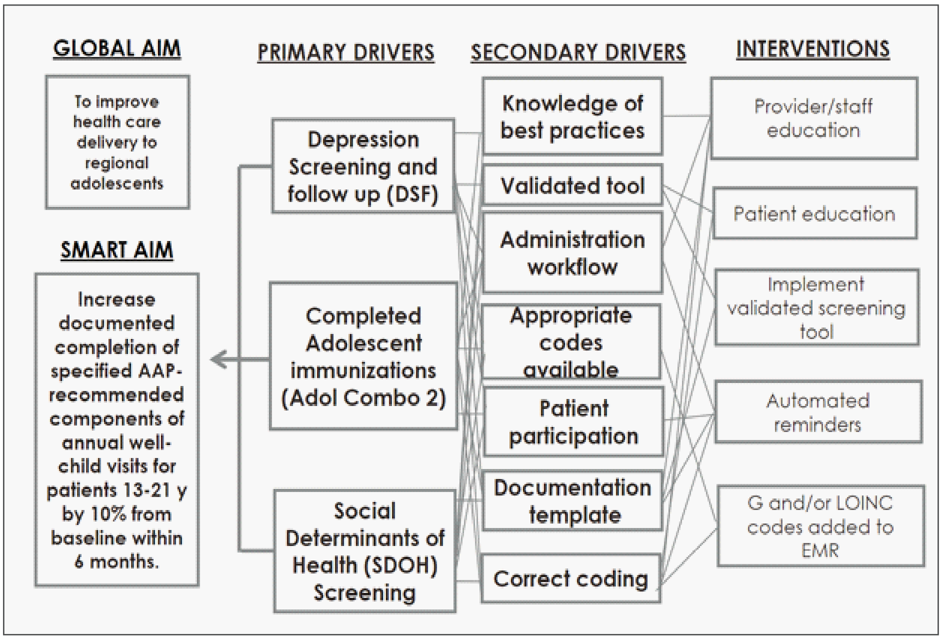

Figure 1. *Key Driver Diagram*

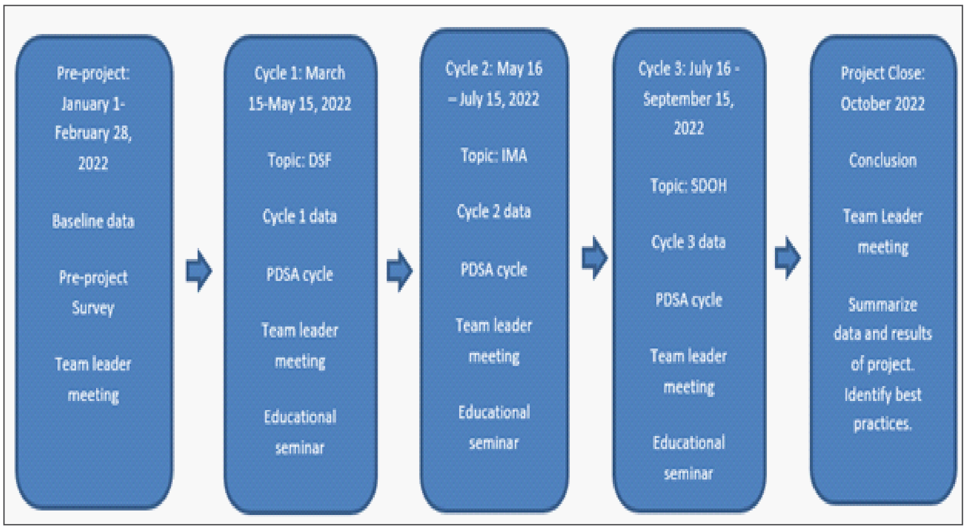

Figure 2. *Timeline of Quality Improvement Initiative*

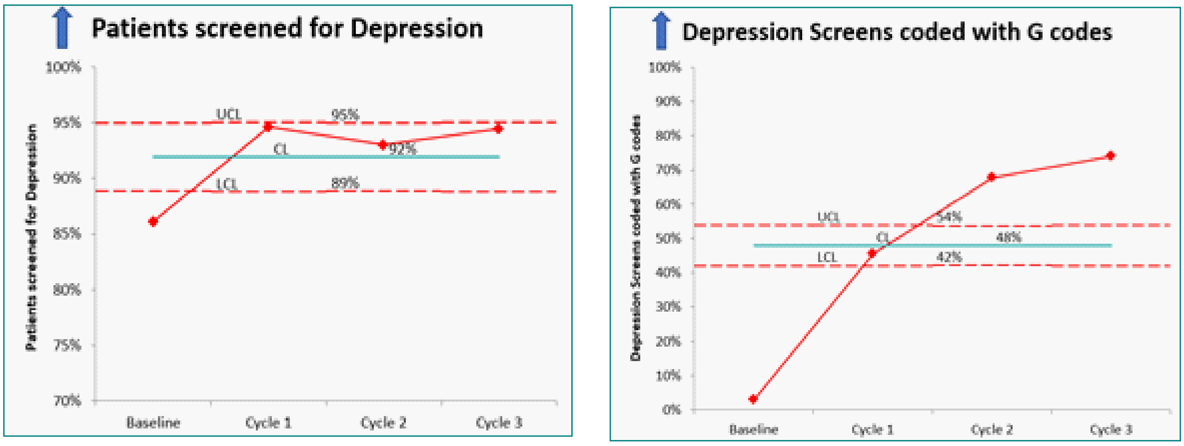

Figure 3. *P charts showing rates and G code usage for depression screening*

Figure 4. *P charts showing rates and G code usage for SDOH screening*

4. Discussion

Working collectively and sharing best practices is an efficient and effective way to improve care delivery across a network. Given the variety of resources and experiences attributed to each individual practice within a network, CINs must allow for individual practice interventions to achieve improved collective outcomes. This study reiterates what current literature has shown (7, 8, 9): that using PDSA cycles tailored for individual practices but aimed at common metrics can be a successful way to improve care across a network.

From this collective initiative, we identified some best practices to improve two adolescent quality improvement outcome measures. Our data shows that efforts to standardize and automate the documentation and billing of the screening tools has a statistically significant positive impact on rates of captured depression and SDOH screening in adolescents. This is consistent with current research which shows automated coding for quality metrics are superior to manual capture of these metrics (10). However, this study uniquely shows that educational efforts and automation around G codes specifically can lead to improved outcomes for depression and SDOH screening in adolescents. This is particularly relevant for SDOH screening, as many quality initiatives have focused on capturing rates of screening documentation, typically not adequate for value-based care metric confirmation, or ICD-10 diagnoses for social determinants, which providers have less comfort labeling in patient charts (11). This shows that automated coding could be an appropriate alternative to ICD-10 codes for SDOH screening.

Best clinical practices to improve completed adolescent immunizations rates were highlighted during this study through PDSA cycle reviews and educational seminars. These strategies focused on early HPV education for patients and parents along with coaching providers and adjusting system workflows to offer the first HPV vaccine at age 9 and 10. Although impact of these interventions has not yet proven statistically significant, current literature suggests this will have a positive impact on vaccination rates (12).

Although there are many generalizations that can be learned from this work, there are some important limitations to note. First, in data collection, we only collected information on three outcome variables and did not assess balancing measures as other studies have done (9). Therefore, we cannot comment on any negative or positive consequential impact of our interventions. We also did not collect information explicitly on why screens were not completed and or immunizations were not given to individual patients. This direct patient feedback would be able to reinforce or challenge our current understanding of the root causes for low performance. It is also important to note that our data collection time was too short to observe change for the adolescent immunization measure. The HPV series requires 6-12 months between doses, and the adolescent vaccine measure specifies completion of two doses by age 13. Observing change on this measure may require years of data collection unless interventions are focused on the 2nd immunization alone. Finally, given the flexibility practices had in developing individualized PDSA cycles, we are unable to assume causality of the results on the network level or determine which intervention was more effective in making change, as each clinical environment posed a different set of variables.

Going forward it will be important to continue this work to improve outcomes around these metrics and to assess the sustainability of effective interventions. For depression and SDOH screening, it will be important to identify best practices in addressing positive screens in order to assure completeness of care for the patient and family. This will likely require exploration into opportunities for care management and partnership with community resources, as this has been shown successful in prior studies (13). With the release of the new ECDS HEDIS measure focused on Social Needs Screening (SNS), studies in this area can now align data collection methods to the specific codes outlined by NCQA; although G codes are not part of the specifications, there are automated codes that can be linked to the screens to allow for analysis for process improvement. For adolescent immunizations, longer data collection periods will be necessary to assess effectiveness of offering the vaccine at age 9 and 10. Until then, it is difficult to determine if the strategy increases the overall population rates of complete HPV vaccination by age 13 or rather just catches the same individuals at an earlier time frame.

This confirms the known science that quality improvement across a network is possible (13), and this project elucidated important concepts that should be considered by CINs when creating initiatives in the future. First, practice feedback showed interest in improving care and sustaining outcomes in one area before targeting a new metric. Participating practices appreciate the focus on adolescent care that this population deserves; however, the practices preferred to keep the scope of future initiatives more focused. Mastering one measure with multiple PDSA cycles to further improve sustainable results and standardization was preferred over targeting multiple measures. Practices also requested strategies to help implement more automated interventions. Educating people on new science, best practices and/or ideal workflows is essential to implementing change, but automating change led to greater improvement with less variability by provider. This was particularly apparent with billing/coding practices, as G codes are notoriously difficult to implement in some systems given its lack of associated charge. Centralized CIN expertise in these automated solutions simplifies the workflow burdens on providers and staff who are managing multiple demands on patient care and documentation. Therefore, to be most helpful, the CIN should strive to understand the various electronic medical records (EMRs) and screening platforms to best assist practices in their quality improvement interventions. Finally, this data was collected from chart reviews completed by each team leader. This process is onerous and time consuming and can lead to transcription errors. CINs, when able, should offer a population health data analysis tool to ensure accuracy and ease of data collection. This can help monitor compliance with successful interventions to help sustain quality improvement.

5. Conclusion

Collective PDSA cycles across a regional clinically integrated network can improve tracking of outcome measures for adolescent quality measures.

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Conflicts of interest

None.

Presentation

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