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Reduced Cost Of Specialty Care Using Electronic Consultations For Medicaid Patients

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ABSTRACT Specialty care accounts for a significant and growing portion of year-over-year Medicaid cost increases. Some referrals to specialists may be avoided and managed more efficiently by using electronic consultations (eConsults). In this study a large, multisite safety-net health center linked its primary care providers with specialists in dermatology, endocrinology, gastroenterology, and orthopedics via an eConsult platform. Many consults were managed without need for a face-to-face visit. Patients who had an eConsult had average specialty-related episode-of-care costs of \$82 per patient per month less than those sent directly for a face-to-face visit. Expanding the use of eConsults for Medicaid patients and reimbursing the service could result in substantial savings while improving access to and timeliness of specialty care and strengthening primary care.

Barbara Starfield described primary care as “the provision of first contact, person-focused, ongoing care over time that meets the health-related needs of people, referring only those too uncommon to maintain proficiency.”¹ The number of patients with conditions deemed “too uncommon to maintain proficiency” has shifted over the past two decades, as suggested by a substantial increase in the number of patients referred to specialists from primary care providers. Between 1999 and 2009 the number of visits to specialists in the US increased from 41 million to 105 million.² One study found that approximately 25 percent of all visits to a community health center resulted in a referral to a specialist.³ For such patients who are cared for in the health care safety net, the challenge posed by increased demand for specialty consultations is compounded by limited access, particularly for the uninsured, patients with Medicaid, and those residing in rural locations. Nationally, approximately one-third of specialist providers limited or were unwilling to see patients with Medicaid in 2011.⁴

The increase in specialty referrals for patients with Medicaid makes a substantial contribution to year-over-year health care cost increases and has significant economic consequences for state budgets.^{2,5} Specialty care is significantly more expensive than primary care.⁶ Limited access compounds the problem by delaying needed treatment and increasing the use of urgent care and emergency departments.⁷

Advanced payment models are rapidly expanding across the country and are providing increased incentives for primary care providers to find ways to increase value and reduce the cost of care. Many cost-saving interventions in primary care have focused on enhancing access in order to reduce unnecessary emergency department visits or on improving care coordination and hospital discharge follow-up to reduce costly hospitalization and rehospitalization. Less attention has been paid to finding strategies to reduce the need for specialty consultation despite the fact that a decision to refer to a specialist is one of the most common, and likely most expensive, decisions made by primary care providers each day.

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Electronic consultations (eConsults) are an emerging strategy to reduce the need for face-to-face specialty consultation. While no standard definition for *eConsults* has been established, most existing systems feature a secure, asynchronous, electronic exchange of clinical information between a primary care provider and a specialist resulting in a consult note or document that becomes a part of the patient's permanent record. Relevant information provided to the specialist may include the reason for consultation, laboratory and imaging results, chart notes, and photos (if needed). Primary care providers maintain treatment authority and are required to use their own clinical judgment to determine how and whether to implement the recommendations of the specialist. Several studies have demonstrated the potential of eConsults to improve access and reduce wait times to specialty care,⁸⁻¹¹ but few have evaluated their economic impact.^{11,12} Previously, we reported cost savings from the use of eConsults for cardiology in a federally qualified health center.¹¹ Based on these positive findings, the eConsult program was expanded to multiple additional specialties. In this article we present an analysis on the impact of eConsults on costs for four specialties: dermatology, endocrinology, orthopedics, and gastroenterology.

Study Data And Methods

SETTING Community Health Center Inc. (CHCI) is a statewide federally qualified health center caring for approximately 150,000 patients in over 200 locations across Connecticut, including schools, homeless shelters, and thirteen primary care clinics. Nearly 70 percent of CHCI patients have Medicaid coverage, and approximately 90 percent have income levels at or below 200 percent of the federal poverty level. Given the spread of practices across the state, CHCI patients needing specialty care are referred to a wide range of ambulatory specialty clinics, including more than twenty different hospital outpatient clinics. This study was reviewed and approved by the Institutional Review Board of CHCI.

DESCRIPTION OF THE PROGRAM In 2011 CHCI began developing an eConsult program to help address the growing shortage of specialists in the state that were available and willing to accept referrals for its patients. CHCI partnered with the state's only publicly funded hospital, UCONN Health, to provide eConsults for patients needing cardiology consultations.¹³ Based on the success of this project, CHCI launched eConsult services for dermatology April 1, 2015; endocrinology October 1, 2015; orthope-

dics February 1, 2016; and gastroenterology April 1, 2016. These specialties were chosen because internal referral data from CHCI demonstrated that they had the highest demand and longest wait times for appointments.

The eConsult platform used for this study was a secure, web-based portal that allowed transmission of a clinical question along with supporting documents from the electronic health record (EHR) to a specialist. While eConsults at CHCI were not mandatory, clinical leadership strongly encouraged their use. To further support use of eConsults, a workflow that empowered clerical staff to manage the process and minimize additional work by clinicians was developed and implemented. Clinicians continued to submit consult requests in the EHR as they had done previously, indicating the specialty requested and the consult question to be addressed. A team of centralized referral coordinators managed all incoming consult requests through a shared queue. A clinical protocol provided a standing order that allowed referral coordinators to route the specialty referral to eConsults unless specific clinical exclusion criteria were present. This "default" to eConsult workflow was an important feature of CHCI's process for efficiently embedding eConsults into its routine operations while maintaining clinicians' autonomy. Referrals were triaged to face-to-face visits if they were considered urgent by the provider, were for post-hospital follow-up, required diagnostic tests or procedures, or were for patients with an established relationship with a given specialist. Clinicians could, at their discretion, request a face-to-face visit rather than an eConsult. On average, consult requests remained in the queue no more than two days before being scheduled or referred for an eConsult. Specialists responded to eConsults within two business days, resulting in a turnaround time of under four days from submission to receipt of a consult note.

Specialists received notice of a new eConsult via secure email and were prompted to log onto the secure platform, review the eConsult, and enter a response. Specialists also indicated whether they felt a face-to-face consult was indicated. Responses were sent back through the portal and placed by the referral coordinator in the provider's referral inbox in the EHR for review and further action. If a face-to-face visit was recommended, the referral coordinator followed the traditional referral process to obtain an appointment with a local specialist. (A schematic of the workflow is in online appendix exhibit A1.)¹⁴

FUNDING Grant funding from the Jesse B. Cox Charitable Trust supported the start-up phase of this initiative.

STUDY PERIOD AND SAMPLE The study period spanned two years before eConsults for dermatology became available and seven months after gastroenterology eConsults became available. The study sample included all patients referred by a CHCI provider to any of the four specialties between July 1, 2014, and June 30, 2016.

DATA SOURCES Medicaid medical and pharmacy claims data from the period April 1, 2013–November 30, 2016, were obtained for patients included in the study. Clinical and operational data were extracted from CHCI's EHR and its eConsult platform. The claims data set included patients' age, sex, allowed and paid amounts, and payment dates. Patients' race/ethnicity, type of consult (face-to-face or eConsult), and dates of consult request were obtained from the EHR and the eConsult database.

COST ANALYSIS We performed a retrospective analysis of the economic impact of eConsults from the Connecticut Medicaid perspective. For each specialty, benchmarks for the cost of each episode of care before eConsults began were based on all face-to-face consults during the baseline period. Costs of all face-to-face visits occurring after an initial eConsult were counted as eConsult costs. Because Medicaid eligibility is determined monthly in Connecticut, only a subset of patients who had a consult during the study period had three-to-twelve-month blocks of continuous eligibility. The lower threshold of three months was based on previous work¹¹ that showed that significant cost reductions accrued almost entirely during the first three months following an eConsult.

Specialty-specific costs were obtained using a commercially available grouper (Symmetry by Optum) that constructs episodes of care by allocating claims for all relevant specialty services such as provider visits; procedures; and pharmaceutical, ancillary, inpatient, and outpatient care while excluding claims not related to the specialty.

Since reimbursements for eConsults were not reflected in the Medicaid claims data file, we included a \$50 fee per eConsult, as authorized by Connecticut's Department of Social Services based on a Centers for Medicare and Medicaid Services (CMS)-approved State Plan Amendment. Additional costs related to implementing and maintaining the eConsult system were covered by grant funding.

For each patient, claims were attributed to a baseline or an intervention period defined by the date of the first consult request within the study period (the "index date"). Six months of baseline claims and three to six months of post-index date claims were analyzed. Consults were divided into two groups: those sent directly for a face-to-

face visit, and those sent for an eConsult. Referrals were included in the eConsult group even if there was a subsequent face-to-face referral to the specialist. Risk adjustment for case severity was not performed. All costs were expressed as per patient per month. Extreme values were not truncated or eliminated.

STATISTICAL ANALYSIS Because of the skewed distribution of the claims data, we used generalized linear models with a gamma log link to compare costs for the face-to-face and eConsult groups. The model adjusted for age, sex, race/ethnicity, and baseline-period costs. Point estimates for average adjusted costs are reported with 95% confidence intervals and significance set at <0.05. All analyses were done in Stata 15. We report analyses controlling for covariates instead of matching on them, because the observed covariates were not rich enough to build comparable subgroups.

LIMITATIONS The study had several limitations. First, because it compared two approaches to specialty consults, lack of randomization could be viewed as a limitation. However, the natural conditions—namely, the large-scale introduction of eConsults to a primary care practice—as well as important logistical and budgetary constraints made randomization infeasible and favored a real-world study. Moreover, the authors had already conducted and published results of a randomized controlled trial demonstrating cost savings in only one specialty, cardiology, albeit with a smaller group of patients. In addition, our previous experience has shown that patient allocation to either study arm under real-world conditions is not intended to be a random event, but is driven by rules which clinicians can override at their discretion.

A second limitation is the large number of patients excluded because of lack of continuous Medicaid eligibility and the larger number of patients in the face-to-face group.

Third, this study did not include outcomes related to clinical quality. Further research is needed to determine the impact of eConsults on these outcomes in addition to the cost of care.

Study Results

Of 120 eligible providers, 101 (84.2 percent) submitted at least one eConsult over the study period. In total, CHCI providers submitted 14,789 consult requests for the four specialties in this study, of which 5,923 were excluded because of patients' lack of continuous Medicaid enrollment. The remaining referrals included face-to-face consults before implementation and face-to-face and eConsults after implementation.

After we excluded patients without continuous

Medicaid eligibility and those without at least six months of complete claims before and after the index date, there were a total of 8,866 consults for 7,847 unique patients to include in the economic analysis. The number of face-to-face consult requests for each of the four specialties in the study decreased after introduction of eConsults for each specialty; the total number of consult requests, expressed as consult requests per 1,000 visits, did not change significantly. In total, 575 eConsults were sent, 359 to dermatology, 77 to orthopedics, 92 to endocrinology, and 47 to gastroenterology.

There were no statistically significant differences in patients' demographic characteristics between those who received an eConsult and those who received a face-to-face consult (exhibit 1), except that the latter were, on average, 1.5 years older ($p = 0.04$). There also were no statistically significant differences in specialty-specific baseline per patient per month costs between the two groups ($p = 0.26$).

Specialty-specific average per patient per month costs were significantly lower after the introduction of eConsults in the eConsult group compared to those in the face-to-face group: \$84 lower in total costs ($p < 0.001$); \$63 lower for endocrinology ($p < 0.05$); \$59 lower for gastroenterology ($p < 0.01$); and \$85 lower for orthopedics ($p < 0.001$) (exhibit 2). For dermatology the difference—\$14 lower—nearly reached significance ($p = 0.069$).

Discussion

This study examined eConsults that were deployed across a statewide safety-net health system. The result was a reduction in the number of face-to-face specialty consultations needed, as many were replaced by eConsults. The use of eConsults was associated with significantly lower specialty-related episode-of-care costs compared to face-to-face visits, even though some of the patients receiving an eConsult needed a subsequent face-to-face consultation. Compared to a face-to-face consult, the cost of an eConsult was, on average, \$84 lower per patient per month, for annualized savings of over \$578,592 to Medicaid.

The Medicaid cost savings observed in this study likely underestimates actual savings for two reasons. First, Medicaid transportation costs were not taken into account in our analysis. Medicaid plans allocate substantial funds to cover such costs, some of which were avoided by reducing face-to-face visits. Second, multiple additional high-volume specialties have been added to eConsult at CHCI since our study period concluded, including neurology, pulmonary, rheumatology, and psychiatry. Additional cost savings have likely accrued from this change, since similar decreases in face-to-face visits have been observed.

Several factors may account for the lower costs seen among patients receiving eConsults. Studies have suggested that many specialty consult

EXHIBIT 1

Patients' demographic characteristics and total and specialty costs for consultation at baseline, among patient groups that received two consultation types

Categorical variables	Face-to-face		eConsult		Difference	
	Number	Percent	Number	Percent	Number	Percent
Female	4,462	61.4	366	63.8	— ^a	— ^a
Race/ethnicity						
Hispanic	2,857	41.42	212	39.92	— ^a	— ^a
White	2,615	37.92	207	38.98	— ^a	— ^a
Black	824	11.95	61	11.49	— ^a	— ^a
Asian	198	2.87	20	3.77	— ^a	— ^a
Native American	25	0.36	3	0.56	— ^a	— ^a
Multiracial	378	5.48	28	5.27	— ^a	— ^a
Continuous variables	Average	95% CI	Average	95% CI	Average	95% CI
Age, years	41.78 ^{**}	(41.37, 42.20)	40.21	(38.74, 41.68)	1.58	(0.05, 3.10)
Total costs	\$221	(11, 232)	\$200	(166, 234)	-\$22	(-58, 14)
Dermatology	33	(27, 40)	26	(16, 37)	-7	(-19, 5)
Endocrinology	180	(147, 213)	151	(75, 228)	-29	(-112, 55)
Gastroenterology	57	(49, 65)	28	(-4, 61)	-28	(-62, 5)
Orthopedics	151	(140, 163)	103	(55, 150)	-49	(-98, 0)

SOURCE Authors' analysis of Medicaid claims data, for years as specified in the text. **NOTES** "Baseline" refers to the period before the index date for claims, as explained in the text. For sex, race/ethnicity, and age, numbers and test shown for patients in the total claims groups (7,273 face-to-face; 574 eConsult). Cost averages are unadjusted estimates and 95% confidence intervals from generalized linear models with log link models of costs before eConsult, predicted by grouping (face-to-face versus eConsult). CI is confidence interval. ^aNot applicable. ^{**} $p < 0.05$

EXHIBIT 2
Intervention costs for patient groups that received two consultation types, after eConsult implementation

	Face-to-face		eConsult		Difference	
	Average	95% CI	Average	95% CI	Average	95% CI
Total costs	\$157	(148, 166)	\$74	(59, 88)	-\$84****	(-101, -67)
Dermatology	43	(36, 51)	29	(18, 41)	-14	(-27, 0)
Endocrinology	126	(104, 148)	63	(31, 94)	-63**	(-102, -25)
Gastroenterology	71	(61, 80)	12	(-1, 26)	-59***	(-75, -42)
Orthopedics	117	(107, 127)	32	(14, 49)	-85****	(-105, -65)

SOURCE Authors' analysis of Medicaid claims data, for years as specified in the text. **NOTES** Estimated average US dollars, per patient per month, from generalized linear models with gamma log link, controlled for baseline costs, age, sex, and race/ethnicity. CI is confidence interval. ** $p < 0.05$ *** $p < 0.01$ **** $p < 0.001$

requests from primary care may be avoidable.¹⁵ eConsults provide a mechanism for specialists to identify such consults and provide guidance, allowing the provider to manage the patient in primary care. The cost of avoided specialist visits likely accounts for a portion of the savings noted in our study. However, while savings varied by specialty, in each case, they were substantially higher than could be explained solely on the basis of the cost saved by the prevented visit. Our previous work¹¹ demonstrated a significant reduction in diagnostic tests and procedures in patients managed with an eConsult compared to face-to-face care. In this study, dermatology—a specialty for which fewer tests and procedures are usually needed—had lower savings. Orthopedics, gastroenterology, and endocrinology are specialties that are more likely to employ costly tests and procedures—a factor that may have accounted for the observed higher savings in these specialties.

It is possible that eConsults, by providing timely feedback and treatment guidance to providers, also resulted in more rapid initiation of appropriate treatment, thereby reducing costly downstream complications and hospitalizations. In addition, patients with unresolved symptoms or complaints that require specialist input may seek care in urgent care facilities or emergency departments while waiting for their face-to-face visit. In contrast, eConsult patients received specialty input and treatment guidance rapidly, in less than four days. Providers generally would contact patients or assign the task to clinical support staff after receiving the eConsult. Whether the response involved reassurance or suggestions for additional tests or treatment, patients spent less time waiting for care after an eConsult. Further research should focus on analyzing patterns of service use to increase understanding of how eConsults affect different cost subcategories.

eConsults could have impact beyond Medic-

aid. Because the reimbursement rates paid by commercial payers for specialty consults are considerably higher than Medicaid rates, eConsults would likely generate even more substantial savings.

Our study did not factor in potential savings from the patient's perspective related to the reduced need to travel or obtain child care, or fewer lost wages from time off from work. For plans that include a patient copay for specialist visits, eConsults would represent additional savings.

From the perspective of the specialist, eConsults provide additional reimbursement for cognitive services provided via the eConsult that previously were done informally through internal triage processes or curbside consultations and thus not explicitly paid for.

Lastly, primary care health centers often invest resources for scheduling, tracking, and following up on face-to-face consults. This labor-intensive and costly function was reduced by the use of eConsult for many specialty consultations.

This study had several strengths. The observational study design allowed for comparison of a large number of patient consults obtained under "real-world" conditions that accurately reflect outcomes that could be expected if eConsult were implemented in other safety-net settings. Our implementation approach allowed us to demonstrate the impact of a networkwide standard protocol for allocating patients to eConsult or face-to-face based on established clinical and administrative criteria. The use of such criteria mitigates variability in the choice of a consult modality (and therefore savings estimates) that would have existed had the decision been left to each individual provider.

The use of a widely used commercial grouper offered an important advantage by allocating claims that were relevant only to each separate specialty. This allowed for a greater chance of detecting cost differences ("signal") between groups than cost shifts that would be detectable

comparing total medical costs (“noise”). Second, it provided a basis for comparison with future studies that use the same grouper.

Conclusion

eConsults were implemented for four common, high-demand specialties in a large, statewide federally qualified health center in Connecticut,

resulting in a reduction in face-to-face referrals and significantly lower costs. As payment reform efforts continue to align incentives for payers and providers to reduce costs and improve efficiency, linking specialty providers and primary care providers electronically should be an important component of practice transformation and system redesign. ■

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