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Amy Glynn

Assessing the Impact of Scribe Use on a Pediatric Urgent Care Department One
Year Postimplementation.

Amy Glynn

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Tao Sheng Kwan-Gett, Chair

Ian Painter

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Abstract

Assessing the Impact of Scribe Use on a Pediatric Urgent Care Department One Year Postimplementation.

Amy Glynn

Chair of the Supervisory Committee:
Tao Sheng Kwan-Gett, MD, MPH
School of Public Health

Purpose: To research the feasibility and potential benefits of scribe use in a Pediatric Urgent Care setting.

Hypothesis: Scribe use will help decrease patient length of stay(LOS), improve provider satisfaction, improve patient satisfaction, and decrease number of patients who left without being seen(LWBS).

Background/Significance: Little data exists researching the feasibility or benefits of scribes in clinical care settings. Existing data analyzing scribe use in these settings is limited to that of emergency rooms and primary care. This study focused on the impact of scribe use in a hospital based pediatric urgent care clinics with four sites, three of which implemented scribes and one that did not.

Methods: The pre-post scribe implementation study design included the following quality metrics, namely (1) provider satisfaction as provided by third-party National Research Corporation, Health, (2) nursing satisfaction as provided by third-party National Research Corporation, Health, (3) provider attrition as collected from the hospital's internal Mireaux Management Solutions system, (4) patient satisfaction, as measured through hospital based Family Experience Survey(FES) scores, (5) number of patients who left without being seen(LWBS), and (6) patient length of stay(LOS). The second design was an observational design that compared the three sites utilizing scribes(S, M, B) to a control site without scribes(F). Metrics collected included (1) patients who left without being seen(LWBS) and (2) patient's length of stay(LOS).

Data Analysis: The study data collection period ranged from October 2015 through May 2017. Data extraction was conducted from 33,335 patient encounters pre-scribe implementation, and 36,841 patient encounters in the post-scribe cohort. Quality metrics 1, 2, and 3 were measured descriptively, without the use of statistical analysis. Metrics 4 and 5 were evaluated using Chi-

square tests. To test for significance of relationship, p-values with confidence intervals were reported. P-values <0.05 were considered significant and 95% binomial proportion confidence intervals were reported. Statistical analyses were performed using Stata version 14.2²⁴.

Results: Scribe use was associated with improvements in scores for provider satisfaction (average improvement of 3.52 pre-scribe to 4.07 post-scribe) and decreased provider turnover (45% to 12%).

Scribe use was also associated with improvements in scores for nursing satisfaction (average improvement of 3.54 pre-scribe to 3.76 post-scribe).

Additionally, improvements in scores for patient satisfaction (averaged 87.63 pre-scribe to 88.01 post-scribe) were also seen with scribe use.

Statistically significant decreases in patients who Left-Without-Being-Seen(LWBS) were observed in the S (p-value: 0.049; $\Delta\%$: 0.21; CI: (0.00,0.41)) and M locations (p-value: 0.03; $\Delta\%$: 0.23; CI: (0.02,0.43)), with no statistically significant improvement observed at the F location (p-value: 0.975; $\Delta\%$: 0.00; CI: (-0.19,0.19)) and an increase in patients who LWBS at the B location (p-value: 0.601; $\Delta\%$: 0.07; CI:(-0.32,0.18)). No statistical significance was observed when S (p-value: 0.911; $\Delta\%$: 0.01; CI: (-0.19, 0.17)) and M ((p-value: 0.741; $\Delta\%$: 0.03; CI: (-0.21, 0.15)) locations were compared to the F location, the site without scribes.

In the pre-post implementation study, statistically significant decreased Patient Length-Of-Stay(LOS) was observed in both <60 minute and <90 minute categories at all locations (28% to 34% length of stay less than 60 min; 54% to 65% length of stay less than 90 min). Statistically significant comparisons were also found when two of the three scribe use sites were compared to the F location.

Discussion: In a pediatric urgent care setting, scribe use appears to have a limited impact on patient related metrics. While utilization was associated with increased provider satisfaction, nursing satisfaction, patient satisfaction, and appeared to reduce patient length of stay; scribe use does not significantly impact the number of patients who left without being seen.

Conclusions: Overall quality and throughput metrics were not significantly enhanced by scribes, despite improvements in overall provider and patient satisfaction. The cost of implementing and maintaining a scribe program may not be justified on a purely financial basis, but may enhance provider satisfaction and retention.

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Introduction:

Physicians' abilities to promptly review past medical records, conduct assessments, and document patient-provider interactions are challenged when patients visit an urgent care center¹. To relieve provider stress without compromising quality of care, electronic health records (EHRs) and computerized physician order entries (CPOE)¹ were proposed in 2004 by President George W. Bush²² to assist providers and staff in improving documentation efficiency. However, previous literature has reported that computer interface tasks can take up more than half of a physician's time per shift³ which have led to decreased productivity^{4,5}, decreased patient satisfaction^{4,6}, and rising concern over increased non-clinical responsibilities^{4,7}. To remedy these obstacles in the early 2000's, a national industry of medical scribes emerged to assist providers with charting data during patient visits, and inputting data into patient charts. Current mainstream and national scribe servicing organizations include the American College of Medical Scribe Specialists²² and Scribe America²³.

Existing publications suggest that scribe use is limited to adult primary and emergency care^{1,7-18}, with little research in other clinical settings, such as pediatrics¹⁹⁻²¹. As the employment, training, and development of a scribe program can financially burden a pediatric-based clinic, scribe use in these settings must be critically reviewed to inform administrators and physicians of cost concerns. This study focuses on the impact of scribe use, where data was collected from four hospital-based pediatric urgent care sites, where three implemented scribes (S, M, and B) and one did not (F).

Materials and Methods:

Study design: Two quasi-experimental designs were used in this study. One design was a pre-post scribe implementation study. The second design was a retrospective cohort approach, which compared three sites which implemented scribes to one that did not. This study was determined to not involve "human subjects" as defined by federal regulations.

Study setting and population: The study data collection period ranged from October 2015 through May 2017; at four sites of a hospital-based pediatric urgent care clinic. Collectively, the 4 sites had an annual volume of over 30,000 patient visits in FY 2016; and over 36,000 patient visits in FY 2017. Patients were treated by providers including Physicians, Advanced Practice Providers and Nurses. This study focused on scribe use by Physicians and Advanced Practice Providers.

Intervention: A pilot scribe program organized and trained through Scribe America, a national scribe training and management company, was implemented at 3 out of 4 urgent care clinics (S, M, B). Scribes were contracted by Scribe America²³ in January 2016, trained, and fully deployed in May 2016. Scribes received on-the-job training and were considered proficient after approximately one month of parallel operations with providers. Approximately 2 scribes were available to assist 2 providers within each of the participating clinics at any one point in time. Scribes were pre-assigned to an attending physician and once assigned, charted, recorded data during patient visits, and input data into patient charts. All charts were forwarded to the responsible physician for review, amendment, and signature upon completion of the patient visit.

Study Design: The pre-post scribe implementation study design included the following quality metrics, namely (1) provider satisfaction provided by third-party National Research Corporation, Health, (2) nursing satisfaction provided by third-party National Research Corporation, Health, (3) provider attrition collected from the hospital's internal Mireaux Management Solutions system, (4) patient satisfaction measured through hospital based Family Experience Survey(FES) scores, (5) number of patients who left without being seen(LWBS), and (6) patient length of stay(LOS). The pre-implementation period includes baseline data collected between October, 2015 and May, 2016. The post-implementation data collection began October, 2016 and ran through May, 2017.

The second design was an observational design that compared the three sites utilizing scribes(S, M, B) to a control site without scribes (F). Metrics collected included (1) patients who left without being seen(LWBS) and (2) patient's length of stay(LOS). This study period spanned from October, 2015 through May, 2017.

Outcome Measures: Data was collected using quality assurance reports produced by the Mireaux Management Solutions system and third-party reporting system NRC Connect Experience provided by National Research Corporation, Health. Metrics were quantified by:

- (1) Provider satisfaction measured through a NRC Connect Experience survey reported by the National Research Corporation, Health with questions consisting of a 6 point Likert scale with responses of 0(low satisfaction) to 5(high satisfaction).
- (2) Nursing satisfaction measured through a NRC Connect Experience survey reported by the National Research Corporation, Health with questions consisting of a 6 point Likert scale with responses of 0(low satisfaction) to 5(high satisfaction).
- (3) Provider attrition collected from the hospital's internal Mireaux Management Solutions system.
- (4) Patient satisfaction measured through Family Experience Surveys (FES), as measured through the hospitals internal Mireaux Management Solutions on a scale of 0(low satisfaction) to 100(high satisfaction).
- (5) Number of patients who left without being seen (LWBS) due to transfer to inpatient or the emergency department (E.D.) as measured through the hospitals internal Mireaux Management Solutions.
- (6) Patient length of stay (LOS) as measured from admission to discharge time in the urgent care setting. Two variables, patient length of stay less than 60 minutes, and patient length of stay less than 90 minutes were recorded, analyzed, and measured through the hospitals internal Mireaux Management Solutions.

Data Analysis: Satisfaction measures were reported to give background on levels of provider and patient satisfaction with regards to scribe use. Averaged monthly values excluding standard deviation were provided for quality metrics 1, 2, 3 and 4; and statistical analysis of these values was not conducted due to an overlapping of scribe and non-scribe site data.

Metrics 4 and 5 were evaluated using Chi-square tests of encounter level data. To test for significance of relationship, p-values with confidence intervals were reported. P-values <0.05 were considered significant and 95% binomial proportion confidence intervals were also reported. Statistical analyses were performed using Stata version 14.2²⁴.

Table 1: Provider satisfaction as reported through third-party reporting system NRC Connect Experience provided by National Research Corporation, Health. Questions consist of a 6 point Likert scale with responses of 0(low satisfaction) to 5(high satisfaction).

Item	Pre-scribe (FY 16)	Post-scribe (FY 17)	Change
I am a satisfied employee	3.41	4.16	+0.75
I would recommend this organization as a good place to work	3.44	4.16	+0.72
I would like to be working here three years from now	3.59	4.26	+0.67
I get the tools and resources I need	3.29	3.84	+0.55
I like the work I do	3.94	4.47	+0.53
Would I stay if offered similar job elsewhere	3.29	3.79	+0.50
Organization supports me in balancing work/life	3.24	3.68	+0.44
Job makes good use of my skills and abilities	3.94	4.16	+0.22
Average	3.52	4.07	+0.55

Table 2: Nursing satisfaction as reported through third-party reporting system NRC Connect Experience provided by National Research Corporation, Health. Questions consist of a 6 point Likert scale with responses of 0(low satisfaction) to 5(high satisfaction).

Item	Pre-scribe (FY 16)	Post-scribe (FY 17)	Change
I am a satisfied employee	3.38	3.63	+0.25
I would recommend this organization as a good place to work	3.44	3.88	+0.44
I would like to be working here three years from now	3.84	4.04	+0.20
I get the tools and resources I need	3.06	3.08	+0.02
I like the work I do	4.22	4.50	+0.28
Would I stay if	3.42	3.75	+0.33

offered similar job elsewhere			
Organization supports me in balancing work/life	3.26	3.29	+0.13
Job makes good use of my skills and abilities	3.70	3.96	+0.24
Average	3.54	3.76	+0.24

Table 3: Provider Attrition Rates measured through internal hospital Mireaux Management Solutions system

Provider Attrition	Pre-Scribe	Post-scribe
Rate	45%	12%

Table 4: Patient Satisfaction provided from hospital satisfaction surveys.

Bellevue(Nov-April)	Pre-scribe (FY 16)	Post- scribe (FY 17)	Change
Provider Communication	91.8	90.8	-1.0
Explained Things	90.9	88.5	-2.4
Listened Carefully	92.7	91.8	-0.9
Showed Respect	94.2	93.4	-0.8
Spent Enough Time	89.3	89.4	0.1
Rating of Provider	76.1	74.2	-1.9
Would Recommend	88.0	87.2	-0.8
Census	4461	4817	108%

Mill Creek(Nov-April)	Pre-scribe (FY 16)	Post- scribe (FY 17)	Change
Provider Communication	88.1	89.6	1.5
Explained Things	87.6	87.8	0.2
Listened Carefully	89.7	90.5	0.8
Showed Respect	89.9	92.7	2.8
Spent Enough Time	85.1	87.5	2.4
Rating of Provider	68.8	70.0	1.2
Would Recommend	87.4	86.7	-0.7
Census	5398	4817	102%

Seattle(Nov-April)	Pre-scribe (FY 16)	Post- scribe (FY 17)	Change
Provider Communication	91.6	92.3	0.7
Explained Things	90.9	90.8	-0.1
Listened Carefully	91.9	93.8	1.9
Showed Respect	94.4	93.8	-0.6
Spent Enough Time	89.2	90.9	1.7
Rating of Provider	75.7	77.0	1.3
Would Recommend	87.0	89.5	2.5
Census	4577	4443	97%

Non-Scribe Sites (Federal Way)

Federal Way(Nov-April)	Pre-scribe (FY 16)	Post- scribe (FY 17)	Change
Provider Communication	91.0	90.4	-0.6
Explained Things	89.1	88.1	-0.9
Listened Carefully	90.4	89.9	0.5
Showed Respect	92.7	91.7	-1.0
Spent Enough Time	88.3	85.0	-3.3
Rating of Provider	72.4	73.0	0.7
Would Recommend	87.6	88.8	1.3
Average between all sites	87.6	88.0	+0.4

Results:

Data extraction was conducted from 33,335 patient encounters pre-scribe implementation, and 36,841 patient encounters in the post-scribe cohort. With the exception of site S, all sites saw an increase in the number of patients seen at the clinics between 2016 and 2017. Improvements in scores for provider satisfaction (average improvement of 3.52 pre-scribe to 4.07 post-scribe), improvements in scores for nursing satisfaction (average improvement of 3.54 pre-scribe to 3.76 post-scribe) and decreased provider turnover (45% to 12%) were observed. Improvements in scores for patient satisfaction (averaged 87.6 pre-scribe to 88.0 post-scribe) were also seen.

Table 5: Left Without Being Seen (LWBS) aggregated data comparing FY 2016 to FY 2017

Comparison	2016		2017		Δ%	95% CI	p-value	Volume Change
	n	% LWBS	n	% LWBS				
B	9878	0.81	10606	0.88	0.07	(-0.32, 0.18)	0.601	7%
M	8144	0.59	8873	0.36	0.23	(0.02, 0.43)	0.03	9%
S	8462	0.59	8410	0.38	0.21	(0.00,0.41)	0.049	-0.6%
*F	6851	0.39	8952	0.39	0.00	(-0.19,0.19)	0.975	30%

*Site without scribe

Table 6: LWBS aggregated data comparing scribe containing sites to non-scribe site over FY 17.

Comparison	LWBS		p-value
	2017 Δ%	95% CI	
B vs. F	0.49	(0.27,0.71)	0.000
M vs. F	0.03	(-0.21, 0.15)	0.741
S vs. F	0.01	(-0.19, 0.17)	0.911

Table 7: Patient Length of Stay (LOS) aggregated data comparing FY 2016 to FY 2017

Comparison	LOS<60min(%)					LOS<90min(%)				
	2016(%)	2017(%)	Δ%	95% CI	p-value	2016(%)	2017(%)	Δ%	95% CI	p-value
			Δ%					Δ%		
B	35.0	36.4	1.4	(-2.7,-0.08)	0.03	65.7	66.0	0.03	(-1.60, 1.0)	0.64
M	38.2	43.4	5.2	(-6.7, -3.7)	0.00	68.9	72.3	3.4	(-4.8, -2.0)	0.00
S	26.8	29.8	3.0	(-4.4, -1.6)	0.00	55.2	59.1	3.9	(-5.4,-2.4)	0.00
*F	41.5	47.9	6.4	(-7.9, -4.8)	0.00	70.2	75.9	5.7	(-7.1, -4.3)	0.00

*Site without scribe

Table 8: LOS aggregated data comparing scribe containing sites to non-scribe site over FY 17.

Comparison	LOS<60min(%)			LOS<90min(%)		
	2017 Δ%	95% CI	p-value	2017 Δ%	95% CI	p-value
B vs. F	11.5	(-12.9, -10.1)	0.00	9.9	(-11.1, -8.6)	0.00
M vs. F	4.5	(-5.9, -3.0)	0.00	3.6	(-4.9, -2.3)	0.00
S vs. F	18.1	(-19.5, -16.7)	0.00	16.8	(-18.2,-15.4)	0.00

Statistically significant decreases in patients who left without being seen were observed in the S (p-value: 0.049; $\Delta\%$: 0.21; CI: (0.00,0.41)) and M locations (p-value: 0.03; $\Delta\%$: 0.23; CI: (0.02,0.43)), with no statistically significant improvement observed at the F location (p-value: 0.975; $\Delta\%$: 0.00; CI: (-0.19,0.19)) and an increase in patients who LWBS at the B location (p-value: 0.601; $\Delta\%$: 0.07; CI:(-0.32,0.18)). No statistical significance was observed when S (p-value: 0.911; $\Delta\%$: 0.01; CI: (-0.19, 0.17)) and M ((p-value: 0.741; $\Delta\%$: 0.03; CI: (-0.21, 0.15)) locations were compared to the F location, with no scribe.

Between pre-post implementation, statistically significant decreased patient length-of-stay(LOS) in both <60 minute and <90 minute categories were observed at all locations (28% to 34% length of stay less than 60 min; 54% to 65% length of stay less than 90 min). Statistically significant comparisons were also found when scribe use sites were compared to the F location; with the exception of the B location in the 90-minute category (p-value: 0.64; $\Delta\%$: 0.03; CI: (-1.60,1.0); Table 4).

Discussion:

The pilot scribe program was originally organized through Scribe America²³ and implemented at 3 out of 4 urgent care clinics to determine the financial feasibility of a scribe program in a pediatric urgent care setting. Sites S, M, and B implemented scribes within their clinics; and site F did not. Scribes were contracted in January of 2016, fully hired, trained, and deployed in May, 2016. Scribes received training on-the-job, and were considered proficient after approximately one month of parallel operations with providers. Approximately 2 scribes were available to assist 2 providers within each of the participating clinics at any one point in time and once assigned to an attending physician, charted, recorded data during patient visits, and input data into patient charts. All charts were forwarded to the responsible physician for review, amendment, and signature upon completion of the patient visit.

While providers, nursing staff, and patients reported positive increases in job and patient satisfaction, limitations of the data exist as providers rotated between scribe-implemented and non-scribe implemented sites over the course of the study. Although improvements in (1) provider, (2) nursing and (4) patient satisfaction were observed with decreased (3) provider turnover, data was aggregated and no identifiers were used to indicate whether a provider or patient was satisfied due to scribe use, or scribe presence with provider. Due to the aggregation of satisfaction scores and lack of an ability to segregate scribe utilization, it was not feasible to conduct statistical analysis in those categories (1-4). It is highly plausible that improvements in provider and patient satisfaction over the year implementation period were associated with factors unrelated to scribe use; and were unaccounted for in the study.

In the pediatric urgent care setting, scribe use additionally appears to have a limited impact on patient related metrics. While utilization appeared to reduce patient length of stay; use does not significantly impact the number of patients who left without being seen.

Conclusions:

The study aligns with previously published literature findings, which failed to see significant improvements in metrics as a result of scribe use within pediatric emergency room settings¹.

Overall quality and throughput metrics were not significantly enhanced by scribes, despite an improvement in overall provider and patient satisfaction, and a statistically significant improvement in patient's length of stay. The cost of implementing and maintaining a scribe program may not be justified on a purely financial basis, but may enhance overall provider satisfaction and retention.

References:

1. Heaton, Heather et al. Impact of scribes on emergency department patient throughput one year after implementation. *AM J. Emer. Med.* 2017; 35:311-314
2. Yu FB, Menachemi N, Berner ES, et al. Full implementation of computerized physician order entry and medication-related quality outcomes: a study of 3364 hospitals. *Am J Med Qual* 2009; 24(4): 278–286
3. Grimshaw H. Physician scribes improve productivity. Oak Street Medical allows doctors to spend more face time with patients, improve job satisfaction. *MGMA Connex* 2012;12:27–8.
4. Basanti A, Walch R, Todd B, et al. Computerized prescriber order entry decreases patient satisfaction and emergency center physician productivity *Am Emerg Med* 2010; 56: S83–S84.
5. Bhargava H. UC Davis study finds e-medical records have varying effects on productivity, 2010, [http:// www.news.ucdavis.edu/search/news_detail.lasso?id=9665](http://www.news.ucdavis.edu/search/news_detail.lasso?id=9665) (accessed 23 February 2017).
6. Farber NJ, Liu L, Chen Y, et al. EHR use and patient satisfaction: what we learned. *J Fam Pract* 2015; 64(11): 687–696.
7. Shuaib, Waqas. Impact of a scribe program on patient throughput, physician productivity, and patient satisfaction in a community-based emergency department. *Health Informatics Journal* 2017; 1-9.
8. Tegen A, O'Connell J. Rounding with scribes: employing scribes in a pediatric inpatient setting. *J AHIMA* 2012;83:34–8.
9. Allen BBB, Weeks E, Payton T. An assessment of emergency department throughput and provider satisfaction after the implementation of a scribe program. *Advances in Emergency Medicine* 2014;2014:7.
10. Arya R, Salovich DM, Ohman-Strickland P, Merlin MA. Impact of scribes on performance indicators in the emergency department. *Acad Emerg Med* 2010;17:490–4.
11. Bastani A, Shaqiri B, Palomba K, Bananno D, Anderson W. An ED scribe program is able to improve throughput time and patient satisfaction. *Am J Emerg Med* 2014; 32:399–402.
12. Hess JJ, Wallenstein J, Ackerman JD, et al. Scribe impacts on provider experience, operations, and teaching in an academic emergency medicine practice. *Western J of Emerg Med* 2015;16:602–10.
13. Walker K, Ben-Meir M, O'Mullane P, Phillips D, Staples M. Scribes in an Australian private emergency department: A description of physician productivity. *Emerg Med Australas* 2014;26:543–8.
14. Walker KJ, Ben-Meir M, Phillips D, Staples M. Medical scribes in emergency medicine produce financial gains for some, but not all emergency physicians; 2016. *Emerg Med Australas* 28(3):262–7. <http://dx.doi.org/10.1111/1742-6723.12562>.
15. Heaton HA, Nestler DM, Jones DD, Lohse CM, Goyal DG, Kallis JS, et al. Impact of scribes on patient throughput in adult and pediatric academic EDs. *Am J Emerg Med* 2016;34:1982–5.

16. Heaton HA, Castaneda-Guarderas A, Trotter ER, Erwin PJ, Bellolio MF. Effect of scribes on patient throughput, revenue and patient and provider satisfaction: A systematic review and meta-analysis. *AmJ Emerg Med* 2016;34:2018–28.
17. Heaton HA, Samuel R, Farrell KJ, Colletti JE. Emergency department scribes; a twostep training program. *Ann Emerg Med* 2015;66(4):S159.
18. Allred RJ and Ewer S. Improved emergency department patient flow: five years of experience with a scribe system. *Ann Emerg Med* 1983; 12(3): 162–163.
19. Shultz CG and Holmstrom HL. The use of medical scribes in health care settings: a systematic review and future directions. *J Am Board Fam Med* 2015; 28(3): 371–381.
20. Bank AJ and Gage RM. Annual impact of scribes on physician productivity and revenue in a cardiology clinic. *Clinicoecon Outcomes Res* 2015; 7: 489–495.
21. Koshy S, Feustel PJ, Hong M, et al. Scribes in an ambulatory urology practice: patient and physician satisfaction. *J Urol* 2010; 184(1): 258–262.
22. The American College of Medical Scribe Specialists .The ACMSS.org>About Us. 2010-2018. <https://theacmss.org/about-us/>
23. ScribeAmerica. Our Services. 2014-2016. <http://www.scribeamerica.com>
24. STATA Statistics/Data Analysis 14.2 StataCorp LLC. 2015. <http://www.stata.com>