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Penn Medicine
Lancaster General Health

Impact of smart pump-electronic health record (EHR) interoperability with auto-documentation on infusion-therapy Current Procedural Terminology (CPT®) code billing claims at a community hospital

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Background

- Smart pump-electronic health record (EHR) interoperability has been demonstrated to reduce adverse events and increase documentation and billing accuracy.[1,2,3]
- Relatively little is known about the impact of interoperability on infusion therapy billing claims and hospital finances.

Purpose

- To evaluate the impact of smart pump-EHR interoperability with auto-documentation on Current Procedural Terminology (CPT®)-coded infusion-therapy billing claims submissions.

Methods

- Retrospective cohort study approved by the Institutional Review Board.
- Data were analyzed from patients admitted to Penn Medicine Lancaster General Health who received IV infusions and for whom CPT®-coded infusion-therapy billing claims were submitted.
- Data was collected for patients in the emergency department (ED) and in non-ED units (e.g., oncology, neuroscience, cardiac telemetry, etc.).
- A "patient event" is defined as an ED visit or a non-ED unit admission day.
- The intervention was defined as the use of smart pump-EHR interoperability to auto-document infusion-therapy start and stop times.
- The 2016 pre-auto-documentation group had auto-documentation of start time only; the 2017 post-auto-documentation group had auto-documentation of both start and stop times.
- The primary outcome of the study was the total count of all CPT® codes submitted.
- Secondary outcomes included the individual CPT® codes count submitted and the corresponding 2017 Medicare Addendum B dollar amounts.
- CPT® reimbursement rates were converted to annualized amounts.

Results

Fig. 1 Overall patient events

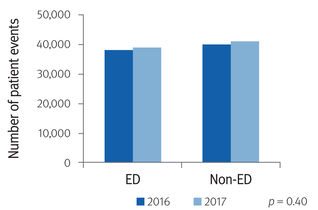

Fig. 2 Overall billed therapies

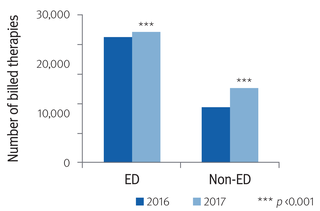

Fig. 3 Overall impact (ED plus non-ED) of billed therapies by CPT® code

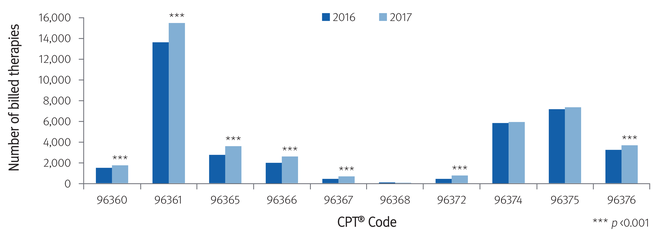

Fig. 4 Financial impact (ED plus non-ED), 2017 Medicare Addendum B dollar amounts by CPT® Billing claim value

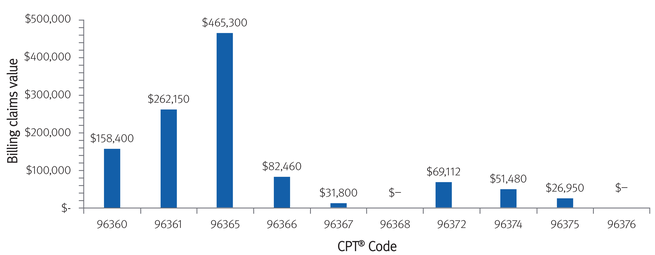

Fig. 5 Comparison of 2016 and 2017 billed therapies for ED by CPT® code

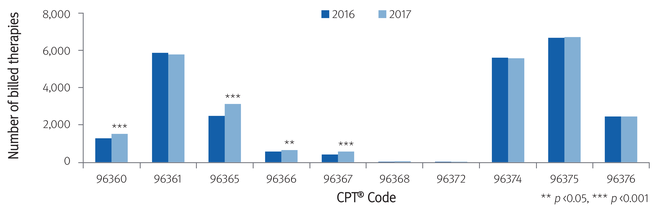

Fig. 6 Comparison of 2016 and 2017 billed therapies for non-ED by CPT® code

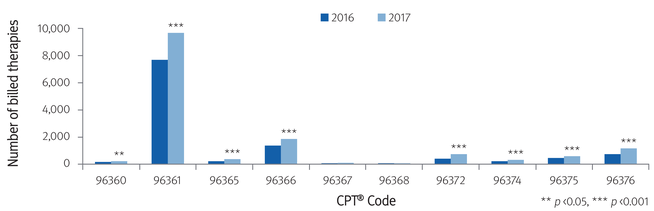

Table 1 ED versus non-ED: Medicare Addendum B annual dollar amount change by CPT® code

Category	Description	CPT® code	Rate	ED ($)	Non-ED ($)	Total ($)
Hydration	Initial	96360	$ 180.00	112,320	46,080	158,400
	Additional	96361	$ 35.00	(11,130)	273,280	262,150
IV Infusion	Initial	96365	$ 180.00	351,540	113,60	465,300
	Additional	96366	$ 35.00	10,080	72,380	82,460
	New Drug	96367	$ 53.00	25,440	6,630	31,800
	Concurrent	96368	$ —	—	—	—
Injection	SQ/IM	96372	$ 53.00	—	69,112	69,112
	Initial Push	96374	$ 180.00	(16,200)	67,680	51,480
	Initial Push, new drug	96375	$ 35.00	6,930	20,020	26,950
	Additional push, same drug	96376	$ —	—	—	—
		Total		478,980	668,672	1,147,652

Table 2 Overall billing impact for IPs and OPs

Visit type	No. of billed therapies in 2016	No. of billed therapies in 2017	% change in billed therapies	P value	Annualized billing ($)
IP	14,605	16,566	13.4	<0.001	536,940
OP	22,430	25,180	12.3	<0.001	610,712
Total	37,035	41,746	12.7	<0.001	1,147,652

Conclusions

- This is the first study to document the positive impact of interoperability on CPT®-coded infusion therapy billing claims.
- The findings from this study support the value of smart pump-EHR interoperability and extend the benefits beyond patient safety to include improved hospital financial performance through charge capture and billing compliance.
- CPT® code submission count was higher among patients who had auto-documentation of infusion start and stop times enabled by smart pump-EHR interoperability.
- The annualized increase in value of the corresponding 2017 Medicare Addendum B rates was $1,147,652.
- When divided by study groups, the ED had a $478,980 increase, while non-ED units had an increase of $668,672 in claims.
- Viewed by admission status, claims increased by $610,712 for outpatients and $536,940 for inpatients.
- Gains demonstrated across units and by admission status suggest these effects may be generalizable to the broad hospital population.
- The net hospital revenue associated with these codes is subject to a highly complex analysis of payer mix, reimbursement contracts, etc. and is beyond the scope of this study.
- These community hospital results may help drive adoption of smart pump-EHR interoperability by providing critical financial considerations.
- Further study is required to confirm and evaluate the implications of these results.

Directions for further study

- Trend of interoperability driven billing improvements over time.
- Financial results of conversion from total manual documentation to auto-documentation of start and stop times.
- Impact of interoperability on documentation of therapies not delivered by the infusion pump.

REFERENCES
1. Ohashi K, Dalleur O, et al. Benefits and Risks of Using Smart Pumps to Reduce Medication Error Rates: A Systematic Review. Drug Saf. 2014;37:1011-1020.
2. ECRI Guidance Article. Infusion pump integration. Health Devices. 2013:210-21.
3. Biltoft J, Finneman L. Clinical and financial effects of smart pump-electronic medical record interoperability at a hospital in a regional health system. Am J Health-Syst Pharm. 2018;75(14)1064-8.

DISCLOSURES
- John Beard is an employee and a shareholder of ICU Medical Inc.
- Tina Suess, Michael Ripchinski, Matthew Eberts, and Kevin Patrick have not received personal compensation for their roles in this study.
- Leo Tharappel is an employee of Indegene, Pvt. Ltd., which was contracted to perform statistical analysis for this study.
- LG Health provided marketing and consulting services to ICU Medical Inc.pursuant to a Professional Services and Consulting Agreement.