



# Telemedicine Delivery and Successful Reimbursement in Toxicology

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## Abstract

**Introduction** Telemedicine and its use in medical toxicology have existed for some time. There are varied definitions, but existing ones center on using currently available forms of audio, video, and internet communications to provide “real-time” patient care. Definitions have historically limited reimbursement but recently expanded CMS guidelines have improved this. Here we describe our experience with telemedicine and reimbursement.

**Methods** A retrospective study was conducted of all toxicology and billing reimbursement for fiscal year 2016 for a solo Medical Toxicology service. Clinical identifiers were used to match telemedicine consults to hospital financial databases and then removed. Telemedicine consults were isolated, quantified, and described.

**Results** A total of 16 telemedicine consults were conducted. Average age was 37.2 (range 2 months–82 years). Gender was evenly split at 8:8. Twenty-five percent were pediatric consultations. The main purposes of consultation were as follows: diagnosis and disease management in drug ingestion, triage assistance, clearance consults, antidote administration, and buprenorphine induction. At the time of the work, \$1896.00 for 9.3 h of teletoxicology services was reimbursed equating to an hourly reimbursement rate of \$203.90/h.

**Limitations** Our data was obtained from a toxicology practice with a surrounding infrastructure dedicated to telemedicine. All sites may not have this robust ancillary support. Furthermore, not all states have reimbursement mandates such as New York State.

**Conclusion** To our knowledge, this is the first published work describing pilot data in the successful reimbursement for Medical Toxicology services delivered via telemedicine. Toxicology via telemedicine represents a great opportunity for advancing the practice of toxicology in an economically feasible way, particularly in rural or underserved areas.

**Keywords** Toxicology · Billing · Charges · Reimbursement · Compensation · Telemedicine · Teletoxicology

## Background

Telemedicine and teleconsultation are not new concepts but have existed in different forms and for different specialties for quite some time. In 2004, the U.S. Army medical department approved the use of email as a form of telemedicine for dermatology consultation for soldiers in remote environments and subsequently expanded its use to include a total of 11 different subspecialty services including toxicology [1].

There have been a wide variety of definitions applied to telemedicine and teleconsultation. These definitions range from simple terminology such as “The use of telecommunications to support healthcare” [2] to the more complex “Synchronous or asynchronous consultation using information and communication technology to omit geographical and functional distance” [3]. This led to restrictions on what would qualify as reimbursable when telemedicine was performed. For example, in the late 1990s, the Health Care Financing Administration began to allow some reimbursement for telemedicine services but excluded most store-and-forward technologies [4]. This significantly limited reimbursement for what is an often used method to provide telemedical care, particularly in the provider-to-provider context [5]. To some extent, this has also contributed to a lower number of reportable utilization figures for telemedicine in the existing literature [4, 5]. Consequently, lack of reimbursement and revenue has been regularly cited as a significant barrier to the adoption and implementation of telemedicine services.

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Although similar data has been presented at the March 2017 Annual Scientific Meeting for ACMT in Puerto Rico, this specific data is unique and has not been presented in another format.

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No matter what formal definition one chooses to use, in our evolving medical system, the essence of telemedicine is the use of the currently available forms of audio, video, and internet telecommunications to provide “real-time” patient care and consultation under most circumstances and under most state law. These forms of technology can be particularly valuable in circumstances where there are geographic or systemic barriers that prohibit or impair in-person patient care.

In his 2015 keynote address during the ACMT annual scientific meeting [6], Dr. Ken Kizer reported that in order to be sustainable in the current climate of medicine, any services provided must be able to simultaneously achieve economic viability *within* a health care institution or organization, and yet show overall cost savings for the health system as a whole. As the technology and recognition of the value of telemedicine has grown, some mechanisms have been put in place to provide reimbursement for telemedicine services although this varies by state. This has potential to provide a cost savings for the overall system. For example, in 2011, Medicaid provided a model for reimbursement for telemedicine services provided that certain criteria were met [7]. In 2015, the nation’s largest health insurer as estimated by market share, United Healthcare, generated a formal partnership with three telemedicine companies to provide and reimburse video-based primary care telemedicine services [5]. When the California-based Dignity Healthcare system implemented its TeleICU program, the cost was reduced from the traditional in-person model at over \$100,000 per bed per year to \$30,000 per monitored bed per year while simultaneously improving patient satisfaction scores to over 91% and reducing mortality, re-intubation rates, and emergency transfers [5].

With respect to the practice of toxicology, telemedicine and teleconsultation began with the informal use of telephone consultation and occasionally video methodologies such as Facetime or Skype® [8]. Even though Current Procedural Terminology (CPT) codes for telephone consultation have been in place for some time (CPT 99441-5 and 99446-9), the services remained largely unreimbursed and were often not HIPPA compliant. Currently, billing and reimbursement coverage is state dependent, but the Centers for Medicare and Medicaid services have set guidelines for the development and structure of telemedicine care delivery [9]. In 2016, New York State expanded its 2014 legislation to prohibit commercial insurance companies from declining reimbursement for telemedicine services when they would have otherwise been covered if provided in person.

In this work, we describe our practice and reimbursement for toxicology telemedicine services provided for the year 2016 when state law related to parity of telemedicine encounters to bedside care took effect in New York State.

## Methods

This was a retrospective study that was conducted after Institutional Review Board approval. Initially, for clinical, billing, and quality assurance purposes, patient information had been collected at the time of the consultation and the encounter noted as a telemedicine consult including the use of the appropriate Evaluation and Management CPT codes identifying it as a telemedicine encounter. At the conclusion of 2016, billing and financial records for toxicology telemedicine consults performed between January 1, 2016, and December 31, 2016, were identified using appropriate telemedicine CPT codes. Billing information such as hospital charges, rates per CPT code, professional fees, reimbursement, and insurance type were extracted from the billing records. A single investigator abstracted the clinical data. This investigator was also the sole medical toxicologist performing telemedicine consultations at the time the consultations were performed. Clinical data including patient demographics, site of consultation, reason for consultation and diagnosis, or procedures performed were abstracted from the electronic health record to a data collection form. Billing information including charges, reimbursement, and insurance type were abstracted by three investigator billers and coder from the billing records. The results were then analyzed using descriptive statistics.

As formal telemedicine services had been planned as a clinical endeavor under the recent New York State statutes, our telecommunications platform was already in place prior to data collection. This consisted of Zoom® Meeting software utilized in conjunction with a variety of hardware platforms such as password-protected and encrypted mobile phone, iPad, or standard computer at the “hub” or home site and primary hospital where the toxicologist was located, and similar type hardware platforms (mobile phone and iPad) on a mobile-but-secured, height adjustable cart located at certain “spoke” or remote sites where the patient was located. Telemedicine encounters involved rotators on the toxicology rotation including an on-call toxicology resident (typically Emergency Medicine, Medicine or Pediatric Post Graduate Year 1–3 rotators) that were used to assist the medical toxicologist directly from the bedside of the patient utilizing the telemedicine software and hardware platforms. In this setting, the medical toxicologist performed the actual consultation on the patient utilizing real-time audio and with the assistance of the rotator who held/manipulated the camera and instigated the audio/video connection or relayed laboratory and other data results. Rotators were typically utilized when telemedicine was performed from faculty back to the primary site when a patient came in overnight in certain critical situations based on the medical toxicologist discretion or when the medical toxicologist was otherwise not available for bedside consultation (e.g., while traveling) but could perform the encounter via telemedicine. Otherwise, Emergency Department staff at the “spoke” site located in a

geographically more remote area approximately 60 miles from the “hub” site were trained in the use of the equipment and software, as well as the availability of the service itself and assisted with utilizing software and hardware at the patient bedside (e.g., ED nurses, medical assistants, or physicians contacted the medical toxicologist from the bedside).

Consults were initiated in standard way by formal request to the on-call medical toxicologist at the two primary hospitals or by Emergency Medical staff via an Emergency Care Coordinator (ECC) and were carried through as shown by the flow diagram in Fig. 1 for the remote site.

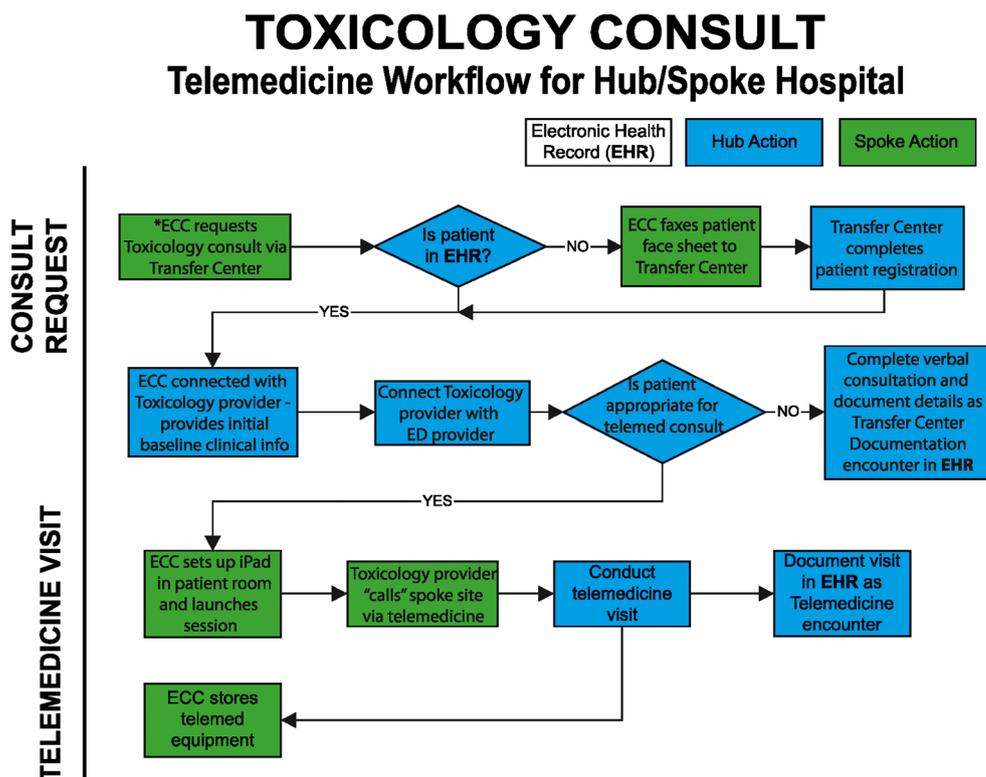
Subsequent to each consult, in keeping with normal billing policy of the institution, three telemedicine CPT codes were utilized: G0425 (focused) 30 min, G0426 (detailed) 50 min, and G0427 (comprehensive) 70 min. The telemedicine consultation was performed when the “originating” site (“spoke”) initiated a call for the toxicology consult. This site billed using a modifier Q3014 followed by an Evaluation and Management (E&M) code specific to the encounter. The medical toxicologist at the receiving site or “hub” was a New York (NY) state licensed physician and enrolled in NY State insurance (e.g., Medicaid) and credentialed/privileged with both the “hub” and “spoke” sites. Both sites were also enrolled in state insurance programs (Medicaid) so that patient care could take place and facility and specialist charges submitted. Specific to telemedicine E&M codes designating place: inpatient = 21; Emergency Department = 23; office = 11 were added to the encounter when

submitted to billing based on patient location when consultation was performed. Also, the specialist utilized the modifier GT adding this to the CPT code which signified it as a telemedicine CPT code. In order for a telemedicine charge to be billed, it required originating (“spoke”) site documentation that a consultation was requested. All telemedicine billing was only reimbursed when performed face-to-face via interactive audio and video telecommunication in real time and via approved software platforms for example Skype® was excluded by state regulation.

### Results

A total of 16 telemedicine toxicology consultations were conducted between January 1, 2016, and December 31, 2016. Since telemedicine billing for toxicology consults did not begin until September of 2016, all 16 consults with billing records occurred between September and December. Average patient age was 37.2 years (range 2 months to 82 years). Consultations were evenly split among genders with eight males and eight females. There were four (25%) pediatric consultations performed via telemedicine. Billing code G0425 (30 min) was used 13 times, G0426 (50 min) was used twice, and G0427 (70 min) was used once. Location of telemedicine encounters included three different hospital sites (two primary sites where standard bedside toxicology consultations were also performed) and a remote affiliate hospital

Fig. 1 Toxicology telemedicine workflow



\*ECC: Emergency Care Coordinator at Spoke Site

(Fig. 1) represents the telemedicine initiation process for this remote “affiliate” site. Location within the hospitals included one encounter in the adult ICU, four encounters in the pediatric ED, four encounters in the adult ED, and seven encounters in the adult ED critical care bay. Table 1 contains a description of patient location, demographics, and billing codes for each of these encounters.

There were several types of consultations, but in general, the main purposes of consultation were as follows: diagnosis and disease management in drug ingestion, assistance with triage (medicine floor vs. intensive care unit placement), clearance from ingestion, antidote administration, and assistance with opioid withdrawal.

Although payment reimbursement was collected by our billing department on a rolling basis, at the time of this work, there was a total of \$1896.48 reimbursed for the 16 consults with 15/16 encounters having some form of collected reimbursement. One of the charges was still outstanding at the time of data collection and analysis. A summary of CPT codes and billing information is included in Table 2. In total 9.3 overall hours of telemedicine toxicology services were provided during the 16 encounters. This equates to an hourly reimbursement rate of \$203.90 for telemedicine professional services alone.

## Discussion

Although telemedicine is not a new concept, it is only recently being acknowledged as an economically valuable

proposition. Despite the patchwork of state-by-state reimbursement policies, there exists a wealth of opportunity for medical toxicologists to extend coverage areas and enhance productivity, improve efficiency, and generate revenue while potentially simultaneously saving system costs compared to providing the same types of services when physically present at the bedside or compared to non-toxicologist involvement in these cases.

Furthermore, the practice of delivering consultation via telemedicine for Medical Toxicology encounters is continually evolving in its form and function. While some groups have shown successful expansion of established networks to include toxicology services [10], recent work by others such as Chai et al. has described the use of advanced technologies such as Google glass® and other wearable remote visualization tools [11–13] and shown the validity of their use in remote viewing as compared to bedside observation. Combined with our work, this has shown feasibility in the successful use of toxicology telemedicine in a number of different technological platforms not only on a clinical basis, but on a financial basis.

To our knowledge, this data describes the first successful billing and reimbursement for Medical Toxicology consultation encounters performed via telemedicine. These telemedicine encounters included a range of different types of evaluation and management techniques including, but not limited to patient assessment and triage, patient clearance, as well as medication and antidote support. Treatment of opiate withdrawal via buprenorphine induction was performed in one

**Table 1** Consult and billing description by case for the 16 encounters

Case	Age/gender	CPT (Current Procedural Terminology)	Payment	Carrier	Patient location
1	40 F	G0425	\$78.13	MMC	ICU
2	58 M	G0425	\$42.73	BCO	ED/critical care bay
3	24 F	G0425	\$94.09	MCD	Adult ED
4	2 M	G0425	\$42.73	BCO	Pediatric ED
5	82 F	G0425	\$97.66	1V1CR	ED critical care bay
6	16 M	G0425	\$160.90	BC	Pediatric ED
7	68 F	G0425	\$97.66	MBC	Adult ED
8	34 M	G0425	\$97.66	MCR	ED critical care bay
9	24 F	G0425	\$310.00	COR	Adult ED
10	24 M	G0425	\$94.66	EP	ED critical care bay
11	73 F	G0425	\$97.66	MBC	Adult ED
12	48 M	G0425	pending	AETNA,	ED critical care bay
13	18 F	G0425	\$160.90	BS	Pediatric ED
14	17 M	G0426	\$133.00	BS	Pediatric ED
15	28 M	G0426	\$217.50	VRF-NA	ED critical care bay
16	42 F	G0427	\$171.20	BCO	ED critical care bay

BC Blue Choice, MMC Medicaid Managed Care, BS Blue Shield, VRF Veteran Referral, MCD Medicaid, BCO Blue Choice Option (one of our larger MMCs), MCR Medicare, Aetna Aetna, COR Department of Corrections/County Jail, EP Empire, MBC Medicare Blue Choice (one of our larger Medicare Advantage Plans)

**Table 2** Summary of billing data by CPT code

CPT	Type	<i>n</i>	Charge/encounter	Mean reimbursement	Total reimbursed	RVU value/encounter	Total RVU
G0425	IN/ED 30	13	\$310.00	\$105.75	\$1374.78	1.92	24.96
G0426	IN/ED 50	2	\$420.00	\$175.25	\$350.50	5.22	5.22
G0427	IN/ED 70	1	\$620.00	\$171.00	\$171.20	3.86	3.86
Total reimbursement					\$1896.48		

RVU relative value units, CPT Current Procedural Terminology, *IN* inpatient, *ED* Emergency Department

encounter via telemedicine monitoring and direction. The encounters were performed using simple and accessible technology software platforms and facilitated enhanced coverage to the primary sites for consultation when the Toxicology faculty was at home or while traveling and to a remote “spoke” site which was an “affiliate” hospital to the academic tertiary care center where bedside consults typically occurred and the medical toxicologist was based. Reimbursement rates and time spent per consultation compared favorably to consultations performed directly at the bedside in the traditional manner.

Previous work regarding billing and reimbursement for *in-person* toxicology consultation services has suggested lower levels of reimbursement with rates of charge and collection being as low as \$66/h and \$26.19/h respectively [14] in one study and our previously published work has shown a maximum reimbursement of \$167.7/h for certain CPT codes related to bedside consultation [15]. However, our current data would suggest a telemedicine consultation billing and reimbursement profile that could exceed these values by a range of 122–778% depending on the specific nature of the encounter, time involved, and geographic payer mix.

## Limitations

These data were obtained from a solo Medical Toxicology practice with substantial experience related to Medical Toxicology billing and reimbursement. Our site experiences billing and reimbursement support through dedicated Toxicology billers/coders and program management support for telemedicine credentialing. Telemedicine support exists throughout the hospital system with dedicated telemedicine support staff and telemedicine IT services. We suspect that not all potential telemedicine sites are likely to have such similar robust ancillary support. Furthermore, not all states have the same reimbursement mandates, e.g., New York legislation mandating coverage and payment for services beyond designated Health Care Shortage Areas (HCSA) to include all encounters where bedside care would have been reimbursed. Generalizability may be limited by differences in third party payer coverage and patient mix. Lastly, we are reporting on a limited number of cases and although compelling, a larger

amount of data will be needed to definitively describe the typical reimbursement patterns as they evolve.

## Conclusion

This work represents the first description of successful reimbursement for Medical Toxicology services delivered via telemedicine. Others have shown the technologic capabilities of providing telemedicine are broad and expanding. When the potential for economic viability as well as systemic cost savings is considered, along with the possibility of enhanced outreach, increased productivity, and clinical utility of Medical Toxicology practice via telemedicine, it seems clear the time for adopting and accelerating the development of teletoxicology is at hand.

While this work represents pilot data, and more work needs to be done in researching and advancing both the clinical practice of telemedicine and providing for more consistent reimbursement levels on a broad scale, telemedicine provides a promising opportunity for expanding coverage, facilitating patient care and in reimbursement for these services within the practice of toxicology. Telemedicine also represents great opportunities for the enhancement and support of the practice of toxicology in rural or underserved areas.

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## Compliance with Ethical Standards

**Conflict of Interest** The authors declare that they have no conflict of interest.

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