Title: An Investigation of Perceived Barriers to Electronic Patient Care Record (ePCR) Reporting by EMS Transport Provider Agencies to the Illinois Department of Public Health (IDPH)

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Introduction: The Illinois EMS Systems Act (210 ILCS 50) and supporting administrative code enable the collection of NEMSIS Version 3-compliant prehospital patient care record data by licensed EMS transport vehicle providers, and the subsequent submission of these data to the Illinois Department of Public Health (IDPH). In early 2016, IDPH became capable of accepting the web-service-based NEMSIS Version 3 electronic patient care record (ePCR) reports, phasing out the manual batch submission of NEMSIS Version 2 records. As of April 12, 2019, among 617 licensed EMS transport provider agencies in Illinois (and IL-licensed providers based in other states), 73.58 percent (n=454) of agencies were submitting records in NEMSIS Version 3, 7.13 percent (n=44) of agencies were submitting records in the outdated NEMSIS Version 2, and 19.29 percent (n=119) of agencies were not submitting records to IDPH at all (within the past 60 days). It should be noted that the Version 2 submitters are, on average, low volume, and nearly 100 percent of total records received within this time frame are Version 3.

Objective: Non-submission, or reporting in NEMSIS Version 2, of EMS data is a state-wide problem in Illinois. Licensed EMS transport provider agencies not complying with 77 Ill Adm. Code 515.330(1)(6) and 515.330(1)(7) lose out on opportunities for proper oversight, monitoring of important trends (such as the opioid overdose epidemic), and quality assurance activities. The quality of prehospital data is further threatened when utilizing NEMSIS Version 2, rather than the nationally recognized and vetted required elements included in Version 3. The objective of the investigation was to gather perspectives on barriers, and possible solutions, to utilizing NEMSIS Version 3-compliant software to create electronic patient care records and then submit those records to IDPH.

Methods: The key informant interviews helped identify the level of awareness among EMS transport provider agencies of the applicable regulatory statutes, as well as the perceived barriers to timely and complete reporting of EMS data to a state repository. Due to the size, variation, and complexity of the reporting patterns across Illinois, a select group of key informants were sampled to gain a better understanding of the situation. Non-submitting or inconsistently-submitting EMS transport provider agencies, agencies still submitting in NEMSIS Version 2, NEMSIS Version 3-compliant and consistently-submitting agencies, and EMS System Coordinators were interviewed.[i] These participants were selected in order to understand the reasons for not reporting to IDPH at all, as well as why reporting is still being done in Version 2 of NEMSIS, rather than the current Version 3.4. Key informants had direct knowledge of and experience with NEMSIS and EMS transport provider agency reporting systems.

Prior to speaking with key informants, a semi-structured interview guide was developed to learn generally about key issues with regard to ePCR reporting. The key informants chose the time of the interviews, held during February through April 2019, and the telephone-based interviews lasted about 30-45 minutes, on average. Fifty-three interviews were conducted, in total. The key informants were asked to provide verbal consent of their willingness to participate in the interview. Key informants were informed that, despite the interviewer's IDPH affiliation, the interview was completely voluntary.

After reaching saturation through three phases of key informant interviews, a close-ended questionnaire was developed on Google Forms in order to gain perspective from a larger and more diverse group of EMS transport

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[i] "EMS Systems" are entities established by state statue to provide coordination and oversight of prehospital care among their member providers.

provider agencies. The survey was shared at the end of March 2019 with the EMS System Coordinators (n=64) to distribute to their respective EMS transport provider agencies, with the survey closing in mid-April 2019.

Results: EMS agency-level (n=29) key informants included representatives that coordinate submission of EMS data to IDPH from varied organization statuses (volunteer, non-volunteer, and mixed), types (fire department, governmental non-fire, hospital-based, and private non-hospital), and geographic locations in Illinois. EMS System Coordinator (n=24) key informants hailed from nine of Illinois' 11 EMS regions. Examples of frequent sentiments gleaned from the key informant interviews with EMS transport provider agencies and EMS System Coordinators can be found below (Table 1). The closed-ended survey, modeled from the semi-structured interview guide, yielded results which echoed the opinions heard during the key informant interviews, with a sample frame of 681 participants (Illinois EMS System Coordinators and their EMS transport provider agencies) and an approximate response rate of 25% (n=167). In response to "*What problem(s), if any, have you seen that contribute(s) to non-reporting of prehospital data to IDPH? Select all that apply*," participants most frequently reported: issues with software (28.1%, n=47), IL-specific NEMSIS requirements (26.9%, n=45), none (24.6%, n=41), and costs associated with purchasing hardware (21.6%, n=36). When asked "*What would you like to see happen in order to support your agency [or system/region] in becoming fully compliant as defined by the prehospital data program? Select all that apply*," participants requested: improved communication from IDPH (34.7%, n=58), more user friendly IDPH website (32.3%, n=54), and training(s) from IDPH on free ePCR software, KeyData (21.6%, n=36).

Conclusion: Reaching 100% compliance for NEMSIS Version 3 prehospital data submissions is an ambitious and incredibly important goal, made more attainable through a thorough segmentation and investigation of the EMS ePCR reporting community. Specific barriers to ePCR reporting in Illinois were identified, as well as opportunities for a path of "less" resistance for submission of records to IDPH. To mitigate reported barriers to compliance, to date, IDPH has instituted a quarterly newsletter for the EMS community and also adapted the IDPH Prehospital Data Program website, including the technical specifications page, for a better user experience. After reaching full compliance – which consists of both current, error-free data transmission and the submission of all missing prior data – future phases of work will focus on the quality of ePCR data and, ultimately, on understanding and improving the quality of EMS care in Illinois.

Table 1: Qualitatively Reported Barriers to ePCR Reporting (n=53)	
EMS Transport Provider Agencies (n=29)	**EMS System Coordinators (n=24)**
We always know how many runs we did, but we can't know or tell how many runs actually got through to IDPH.	*Probably just that everybody is busy and sometimes it gets pushed to the back shelf – among deadlines, emergency calls, etc.*
I wasn't aware that our system wasn't automatically sending records to the state.	*IL has traditionally lacked any teeth to be able to enforce deadlines.*
I'm not tech savvy, so I am like 'ahh!'	*Funding.*
The crews find workarounds because completing a record is so burdensome.	*New EMS Coordinators at the department level (not trained up on software) – high turnover or lack the staff to do what they need to do.*
The IL requirements are so stringent it makes it hard to actually make the report work.	*Rural, volunteer agencies needed assistance figuring out what NEMSIS was, and how to actually be "compliant," etc.*
We weren't aware that the data had to be sent to the state.	*I want them [EMS transport provider agencies] to be compliant, but what else can I do beyond facilitating the conversation?*
Just like everyone who speeds but they don't care until they get caught – this is similar.	*They [EMS transport provider agencies] buy software and think they are compliant because the software vendor told them it was working.*
Being an EMS Coordinator is a huge job and I had no clue what I was getting myself into.	*Traditionally, we have been in the transport business, not in the healthcare business.*
Once we get online it will be super easy and very effective, it is just about getting online –unfortunately.	*They [EMS transport provider agencies] all know the rules, it is just getting them to follow them.*
I pay the software vendor to demystify the big spreadsheet and requirements and I still don't know if I'm actually IL compliant.	*They [third party software vendors] have made the comment multiple times that IL is just harder, even compared to WI.*
The software company is nationwide but doesn't have many IL agencies –so it took a long time to learn and customize our ePCR.	*The age of our medics is increasing – they didn't grow up with electronics like our newer ones. It's a little harder to adjust.*
Unfunded mandate.	*The most intimidating things were some of the new data elements and the number of options (so many types of aspirin and hypertension, etc.).*