

. Hospitals

Emergency Department Coverage by Primary Care Physicians in a Rural Practice-Based Research Network: Incentives, Confidence, and Training

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ABSTRACT: *Context:* In rural areas of the United States, emergency departments (EDs) are often staffed by primary care physicians, as contrasted to urban and suburban hospitals where ED coverage is usually provided by physicians who are residency-trained in emergency medicine. *Purpose:* This study examines the reasons and incentives for rural Oregon primary care physicians to cover the ED and their reported measures of confidence and priorities for additional training. *Methods:* We conducted a cross-sectional survey of primary care physicians in rural Oregon who are members of the Oregon Rural Practice-Based Research Network (ORPRN). The survey was sent to 70 primary care physicians in 27 rural Oregon practices. *Findings:* Fifty-two of 70 (74%) ORPRN physicians representing 24 practices returned the questionnaire. Nineteen of the 52 responding physicians reported covering the ED. The majority (75%) of physicians covering the ED did so as a requirement for practice employment and/or hospital privileges. Physicians covering the ED reported low confidence in pediatric emergencies and expressed the need for additional training in pediatric emergencies as their top priority. *Conclusions:* Almost two fifths of surveyed primary care physicians in a rural practice-based research network provide ED coverage. Based on these physicians' low levels of confidence and desire for additional training in pediatric emergencies, effective education models are needed for physicians covering the ED at their rural hospitals.

increases the likelihood of being seen by a family physician increases 7-fold.⁶

Rural primary care physicians rarely need to employ life-saving emergency management skills, yet remain responsible for life-or-death situations during their careers. Infrequent use of emergency management skills can affect physicians' proficiency and confidence in responding to medical emergencies. An Australian study revealed that more than a third of rural general practice physicians on-call for hospital emergencies expressed low levels of confidence in a variety of scenarios such as pediatric, cardiovascular, and respiratory emergencies. Physicians who participated in this study expressed an interest in additional training in these areas.⁷

Little published literature exists to inform rural health systems about important factors involved with

Emergency department (ED) coverage poses distinct challenges for rural hospitals. In many rural areas of the United States, the majority of ED staff consists of physicians who are not residency-trained in emergency medicine.¹⁻³ In these rural areas, the hospital ED is often staffed by family physicians.^{4,5} As rurality

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recruiting and preparing family physicians for providing ED coverage. Understanding why family physicians cover the ED and their specific training needs and desires is an important step toward improving emergency management preparedness and confidence. We report on findings from a June 2007 survey, which was designed to: (1) describe the reasons and incentives for covering the ED among Oregon Rural Practice-Based Research Network (ORPRN) physicians; (2) measure physicians' self-reported confidence in managing selected emergency medical conditions; and (3) enumerate physicians' additional training needs.

Methods

The study was conducted within the ORPRN. ORPRN is a statewide clinical research network situated in rural communities throughout Oregon. Membership criteria include rural location, providing primary care, and a demonstrated interest in practice-based research. Among ORPRN's 129 clinicians, 70 are physicians and the remaining providers are equally represented by nurse practitioners and physician assistants. According to ORPRN member surveys, the majority of physicians (88%) identify family medicine as their specialty.⁸

Our ED coverage survey was administered to all ORPRN physicians (N = 70) representing 27 practices.

The survey instrument was designed to answer 4 questions: (1) How confident are rural primary care physicians in managing medical emergencies? (2) Is there a difference in emergency management confidence between physicians who cover the ED and those who do not? (3) What are the compensation arrangements and reasons physicians cover the ED? and (4) What additional training in medical emergency management do rural physicians desire?

The survey (available from JRH online as Supporting Information) was modified from a similar questionnaire developed for a rural Australian study by Tolhurst.⁷ Questions were forced multiple choice with open-ended questions about priorities for additional training. A 4-point Likert Scale was used to measure emergency management confidence.

ORPRN is registered with the Practice-Based Research Network (PBRN) Resource Center sponsored by the Agency for Healthcare Research and Quality (AHRQ). The survey was offered on the web using Ultimate Survey (<http://www.prezzatech.com>), a tool available to PBRNs registered with the Resource Center sponsored by AHRQ.⁹

Ultimate Survey compiled online survey results into Microsoft Excel, and paper surveys results were

added manually. The Excel data set was imported into SAS v9.1 software (SAS Institute, Inc, Cary, NC) for all analyses. Descriptive statistics were generated for all survey questions. We examined physicians' current advanced life support training certification and their confidence in managing various medical emergencies, comparing doctors currently covering EDs versus those not currently covering EDs. To evaluate confidence, the 4-point Likert Scale was converted to a Yes-No dichotomous variable where respondents were rated "confident" in managing medical emergencies if they reported 3 or 4 on a 4-point Likert Scale (with 4 being highest level of confidence).

Results

ED Coverage Characteristics. Fifty-two of 70 (74%) ORPRN physicians from 24 of the 27 practices returned the questionnaire. Nineteen (37%) stated they currently cover the ED. There were not significant demographic characteristic differences between responding and nonresponding physicians.

Physicians covering the ED as compared to non-ED covering physicians were more likely to hold certification in Advanced Cardiac Life Support (90% vs 51%) and Advanced Trauma Life Support (79% vs 6%). Difference in certification in Pediatric Advanced Life Support (PALS) was comparatively small (32% vs 27%).

Reasons and Incentives for Covering ED. Among those covering the ED, 11 (58%) physicians reported they enjoyed working in the ED whereas 8 (42%) were either neutral or negative. Approximately, three fourths of the ORPRN physicians currently covering the ED were required to cover the ED either as a condition for practice employment or hospital privileges. More than one third of physicians currently covering the ED reported that they derive greater than 40% of their income from it, while almost two thirds stated "needing/liking extra income" as a reason they work in the ED.

Emergency Management Confidence. Table 1 compares confidence in managing medical emergencies of physicians currently covering ED to those who do not. For each type of emergency those covering the ED expressed more confidence in managing that emergency than the rural physicians who did not cover the ED.

Most ED covering physicians (79% to 100%) were confident in managing the following: adult obstructed airway, cardiogenic shock, septic shock, hypovolemic shock, severe asthma, pneumothorax, myocardial

Table 1. Physicians Who Express Confidence in Managing Various Medical Emergencies

	Not covering ED N = 33	Covering Ed N = 19	P Value
Medical emergency			
Obstructed airway-child	12 (36%)	11 (58%)	.13
Gun shot	7 (21%)	12 (63%)	.003
Pediatric septicemia	14 (42%)	13 (68%)	.07
Drowning	7 (21%)	13 (68%)	.001
Multiple trauma	8 (24%)	14 (74%)	.02*
Spinal injury unstable or spinal cord injury	8 (24%)	15 (79%)	.0001
Knife injury	10 (30%)	15 (79%)	.001
Obstructed airway-adult	17 (52%)	16 (84%)	.02
Unplanned vaginal delivery	27 (82%)	16 (84%)	1.0*
Acute psychosis	18 (55%)	16 (84%)	.03
Carbon monoxide poisoning	14 (42%)	16 (84%)	.003
Head trauma	10 (30%)	17 (90%)	<.0001
Cardiogenic shock	20 (61%)	18 (95%)	.01
Myocardial infarct	24 (73%)	18 (95%)	.07*
Seizures	24 (73%)	18 (95%)	.07*
Septic shock	24 (73%)	19 (100%)	.02*
Hypovolemic shock	28 (85%)	19 (100%)	.15*
Severe asthma	30 (91%)	19 (100%)	.29*
Pneumothorax	16 (49%)	19 (100%)	.0001
Cardiac arrest	23 (70%)	19 (100%)	.01*
Drug overdose	25 (76%)	19 (100%)	.02*
Suicide attempt	28 (85%)	19 (100%)	.15*

*Fisher's Exact Test used due to small expected cell counts.

infarct, cardiac arrest, head trauma, seizures, spinal injury, unplanned vaginal delivery, drug overdose, acute psychosis, suicide attempt, knife injury, and carbon monoxide poisoning. On the other hand, a substantial percentage (26% to 46%) of physicians covering the ED expressed low confidence in emergencies involving a child with an obstructed airway, pediatric septicemia, multiple trauma, drowning, and gunshot wounds.

Training Priorities. All physicians covering the ED identified pediatric emergencies as high priority for additional training (Table 2).

Discussion

A majority of ORPRN primary care physicians who cover the ED are residency-trained family physicians. As such they may not have the same degree of training in medical emergencies as physicians who have completed an emergency medicine residency.

Table 2. Summary of Top 3 Reported Emergency Training Needs Among the 19 Physicians Who Currently Cover ED

	N (% of Physicians	N (%) of Physicians' Top Training Priority
Pediatric emergencies (included PALS, shock, airways)	14 (74%)	8 (42%)
Airway/respiratory emergencies (included difficult/obstructed airway, intubation, chest tube placement)	7 (37%)	5 (26%)
Injury/trauma (include head, spinal, ATLS, multisystem, penetrating)	7 (32%)	2 (5%)
Orthopedic	3 (16%)	0
Psychiatric (included acute psychosis, chemical restraints)	2 (11%)	2 (5%)
Thermal regulation (included hypothermia, hyperthermia)	2 (11%)	0
Metabolic (included acid-base disturbances, seizures, toxicology)	3 (16%)	0

Physicians' confidence levels with managing medical emergencies vary, depending on the type of emergency. While ORPRN physicians covering the ED have a significantly greater overall confidence covering most emergency scenarios than those who do not cover the ED, they express relatively low levels of confidence in emergencies involving a child with an obstructed airway, pediatric septicemia, drowning, and gunshot wounds. The rarity of medical emergencies likely contributes to less preparedness and lower confidence, particularly when physicians lack specialized emergency management training and/or experience. This may be especially true for situations involving pediatric patients. Visits by children 14 years and younger comprise about one fifth of all visits to the ED, with 6% arriving by ambulance and approximately 5.5% requiring immediate attention.¹⁰ Given the relative rarity of pediatric emergencies, it is not surprising that ORPRN physicians reported low confidence in managing them.

Of all responding physicians covering the ED, with and without PALS certification, pediatric emergencies were identified by 42% (8/19) as their top priority for training, and 74% (14/19) rated pediatric emergencies as one or more of their top 3 priorities for additional training. Given our respondents' lower confidence with pediatric emergencies and the desire for additional training we suggest providing effective training opportunities for pediatric emergencies. However,

what constitutes an effective and feasible training curriculum for busy rural family physicians covering the ED is not clear. A recent pediatric residency study evaluating the PALS curriculum found that while training was successful in providing knowledge about caring for pediatric patients in cardiopulmonary arrest, the resident physicians lacked confidence in managing these emergencies.¹¹

We found similar results in our study, where PALS certification was not necessarily associated with greater confidence; indeed, 5 of 6 physicians who cover the ED and were certified in PALS ranked pediatric emergencies as their top training priority.

In a rural setting where life-threatening emergencies are rare and staff and resources are limited, maintaining confidence and competence is a particular challenge. Given the above findings it appears that currently available life support training may not adequately address this challenge and that other options are needed. Potentially successful models may result from efforts under way to study the use of in situ simulation with the local team of health professionals providing care in the ED and obstetrical hospital units.¹²⁻¹⁴

Limitations. Given the small sample size, the ORPRN physicians surveyed may not be generalizable to other rural settings. However, prior work has shown that the characteristics of family medicine physicians in practice-based research networks are similar to family physicians surveyed by the National Ambulatory Medical Care Survey.^{15,16} The pattern of physician coverage of the ED is influenced by local circumstances including history, initial conditions, and practice and health system evolution. The context of factors influencing coverage responsibilities are not adequately covered by our current survey.

Conclusion

Two fifths of surveyed physicians in a rural PBRN provided ED coverage. For the majority of these physicians extra income and hospital/clinic requirements were motivating factors. The physicians covering EDs expressed a desire for additional training in pediatric emergencies. This finding is consistent with lower levels of confidence in managing pediatric emergencies as compared with other emergency scenarios.

Appropriate staffing, training, and financial models are needed to ensure rural residents of quality emergency medical services. Therefore, in addition to PALS, we support the development and testing of training modules in pediatric emergencies for rural

physicians covering the ED. These training modules need to be adapted and responsive to contextual factors influencing rural physicians' preparedness and confidence with ED coverage.

References

1. McGirr J, Williams JM, Prescott JE. Physicians in rural West Virginia emergency departments: residency training and board certification status. *Acad Emerg Med.* 1998;5(4):333-336.
2. Moorhead JC, Gallery ME, Hirshkorn C, et al. A study of the workforce in emergency medicine: 1999. *Ann Emerg Med.* 2002;40(1):3-15.
3. Wadman MC, Muelleman RL, Hall D, Tran TP, Walker RA. Qualification discrepancies between urban and rural emergency department physicians. *J Emerg Med.* 2005;28(3):273-276.
4. Family physicians help meet the emergency care needs of rural America. *Am Fam Physician.* 2006;73(7):1163.
5. Haskins RJ, Kallail KJ. Staffing in small rural hospital emergency rooms: dependence on community family physicians. *Fam Pract Res J.* 1994;14(1):67-75.
6. Peterson LE, Dodoo M, Bennett KJ, Bazemore A, Phillips RL. Nonemergency medicine-trained physician coverage in rural emergency departments. *J Rural Health.* 2008;24(2):183-188.
7. Tolhurst H, McMillan J, McInerney P, Bernasconi J. The emergency medicine training needs of rural general practitioners. *Aust J Rural Health.* 1999;7(2):90-96.
8. Fagnan LJ, Morris C, Shipman SA, Holub J, King A, Angier H. Characterizing a practice-based research network: Oregon Rural Practice-Based Research Network (ORPRN) survey tools. *J Am Board Fam Med.* 2007;20(2):204-219.
9. Tierney WM, Oppenheimer CC, Hudson BL, et al. A national survey of primary care practice-based research networks. *Ann Fam Med.* 2007;5(3):242-250.
10. Nawar EW, Niska RW, Xu J. National Hospital Ambulatory Medical Care Survey: 2005 emergency department summary. *Adv Data.* 2007;(386):1-32.
11. Grant EC, Marcuzinski CA, Menon K. Using pediatric advanced life support in pediatric residency training: does the curriculum need resuscitation? *Pediatr Crit Care Med.* 2007;8(5):433-439.
12. Pizzi L, Goldfarb NI, Nash DB. Crew Resource Management and its Applications in Medicine. Agency for Healthcare Research and Quality, 2001. Accessed June 20, 2008. Available at: <http://www.ahrq.gov/clinic/ptsafety/chap44.htm>.
13. Crofts JF, Ellis D, Draycott TJ, Winter C, Hunt LP, Akande VA. Change in knowledge of midwives and obstetricians following obstetric emergency training: a randomised controlled trial of local hospital, simulation centre and teamwork training. *Bjog.* 2007;114(12):1534-1541.
14. Nielsen PE, Goldman MB, Mann S, et al. Effects of teamwork training on adverse outcomes and process of care in labor and delivery: a randomized controlled trial. *Obstet Gynecol.* 2007;109(1):48-55.
15. Green LA, Miller RS, Reed FM, Iverson DC, Barley GE. How representative of typical practice are practice-based research networks? A report from the Ambulatory Sentinel Practice Network Inc (ASPEN). *Arch Fam Med.* 1993;2(9):939-949.
16. Binns HJ, Lanier D, Pace WD, et al. Describing primary care encounters: the Primary Care Network Survey and the National Ambulatory Medical Care Survey. *Ann Fam Med.* 2007;5(1):39-47.

Supporting Information

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Rural Emergency Dept. Survey

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