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X-RAY REFERRALS FOR UNCOMPLICATED FRACTURES

GREGORY JOHNSTON, MS3

WATERBURY FAMILY MEDICINE

FEBRUARY 2019

MENTORS: WILLIAM COVE, JENNIFER GELBSTEIN, JUSTIN KARLITZ-GRODIN

PROBLEM IDENTIFICATION

- EMERGENCY DEPARTMENTS WITHIN VERMONT ARE FREQUENTLY OVERUTILIZED FOR THOSE IN NEED OF AN X-RAY DESPITE OUTPATIENT CLINICS, SKI HILLS, AND EXPRESS CARE FACILITIES ALL HAVING THE CAPACITY TO PERFORM X-RAYS AND HAVE THEM READ BY LOCAL RADIOLOGISTS^{1,2,3}
- NO CENTRAL RESOURCE, GUIDELINE, OR ALGORITHM FOR WHERE TO REFER OR SEND PATIENTS WITH UNCOMPLICATED FRACTURES
- SIGNIFICANTLY INCREASED COST ASSOCIATED WITH EMERGENCY DEPARTMENT VISITS COMPARED TO OUTPATIENT AND EXPRESS CARE FACILITIES^{4,5}
- PRESENT SHORTAGE OF HOSPITAL BEDS WITHIN THE STATE OF VERMONT (PARTICULARLY PSYCHIATRIC) LEADING TO LONGER WAIT TIMES, FEWER BEDS, AND BUSIER HEALTHCARE PROFESSIONALS WITHIN VERMONT EMERGENCY DEPARTMENTS^{6,7,10,11}

COST CONSIDERATIONS

EMERGENCY ROOM COST ⁸

- PORTER MEDICAL CENTER IN MIDDLEBURY, VERMONT PUBLISHES COST ESTIMATES FOR PATIENTS
- ESTIMATED COST OF AN ED VISIT WITH AN EXTREMITY X RAY IN VERMONT:
- FACILITY CHARGE: \$156
- PROFESSIONAL CHARGE: \$134-\$667
- X-RAY CHARGE KNEE/SHOULDER/ANKLE: \$339
- PROFESSIONAL CHARGE: \$32-\$36
- MINIMUM CHARGE: \$661 EXCLUDING RADIOLOGIST BILLING
- MEAN CHARGE OF A MINOR PROBLEM RADIOLOGY VISIT: **\$900-\$1100**
- MEAN WAIT TIME: **197 MINUTES**

EXPRESS CARE COSTS ⁹

- EXTREMITY X RAY SHOULDER/KNEE/ANKLE: \$386
- PROFESSIONAL READING CHARGE: \$32-26
- MINIMUM CHARGE: **\$418**
- MEAN WAIT TIME: **< 30 MINUTES**
- BY VISITING EXPRESS CARE, PATIENTS MAY FOREGO MULTIPLE FACILITY CHARGES ASSOCIATED WITH THE ED AND FACE MUCH SHORTER WAIT TIMES
- EVEN LESS EXPENSIVE OPTIONS EXIST WITHIN OUTPATIENT CLINICS

COMMUNITY PERSPECTIVE

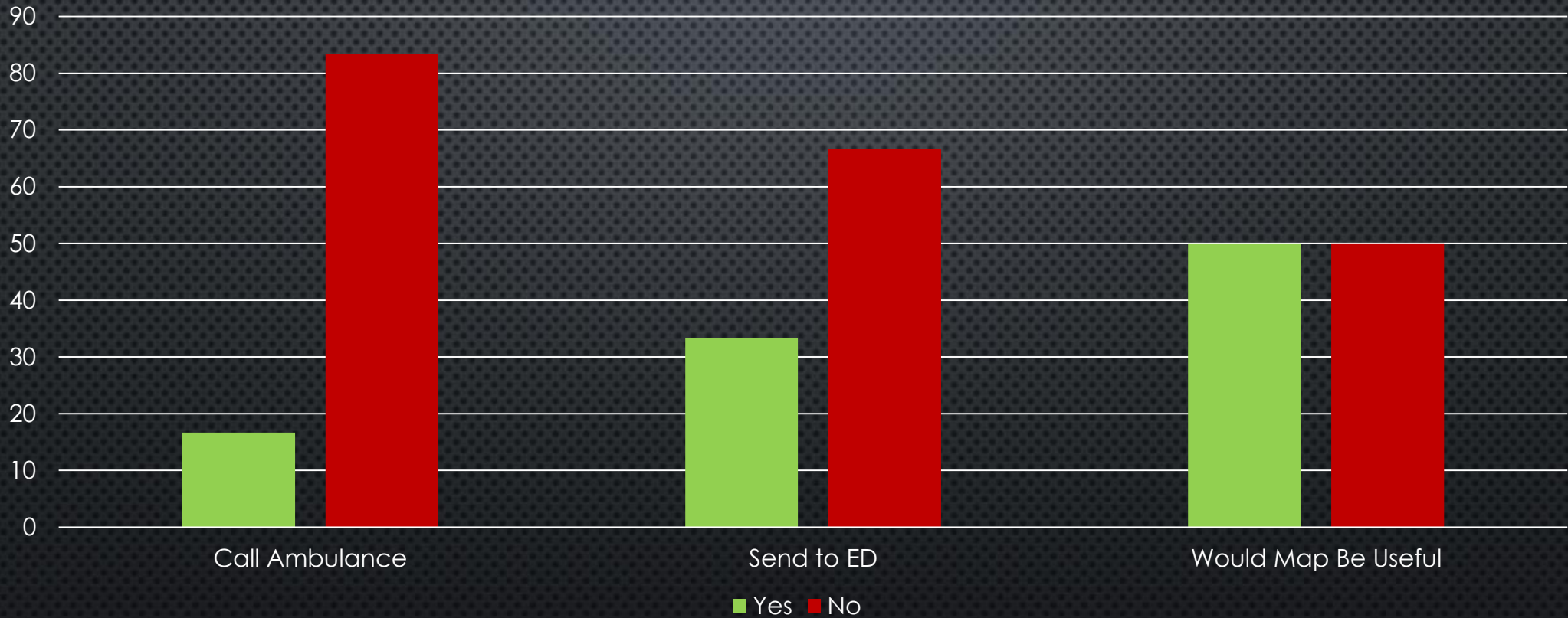
- IN ORDER TO GAIN MORE PERSPECTIVE ON THIS ISSUE OF COST AND PROBLEMATIC RESOURCE UTILIZATION, I SPOKE WITH MY PRECEPTOR, DR. WILLIAM COVE, AS WELL AS MATT SPEIER, RESCUE TECHNICIAN / PARAMEDIC WITH COLCHESTER TECHNICAL RESCUE AS WELL AS SKI PATROLLER IN STOWE, VERMONT. MY QUESTIONS MAINLY FOCUSED ON HOW THE DECISION IS MADE WHETHER A PATIENT IS SENT TO THE EMERGENCY DEPARTMENT FOR IMAGING OR IF OTHER CHEAPER OPTIONS ARE FIRST CONSIDERED.
- “WE USED TO HAVE AN X-RAY MACHINE IN HOUSE AT WATERBURY FAMILY MEDICINE, WHICH WAS ASSOCIATED WITH MUCH LOWER COSTS. HOWEVER, NOW WE SIMPLY REFER OUR PATIENTS TO EXPRESS CARE IF IT IS AN UNCOMPLICATED PATIENT AND ALL WE NEED IS AN X-RAY.”
 - WILLIAM COVE, DO
- “AT STOWE THE PATROL WOULD PROVIDE [INJURED SKIERS] WITH A MAP THAT LISTS PLACES THAT PROVIDE CARE AND IMAGING. THAT LIST INCLUDES BUT IS NOT LIMITED TO [WATERBURY] EXPRESS CARE, MT. MANSFIELD ORTHOPEDICS, COPLEY AND UVMCC.”
 - MATT SPEIER, STOWE SKI PATROL

INTERVENTION AND METHODOLOGY

- IN ORDER TO EFFECTIVELY UNDERSTAND AND ATTEMPT TO LOWER COSTS RELATED TO THIS ISSUE, THE EFFORTS OF THIS SHORT TERM STUDY WERE FOCUSED AT THREE MAIN SOURCES OF UNCOMPLICATED FRACTURES WITHIN THE STATE OF VERMONT:
- SUGARBUSH, STOWE, AND BOLTON VALLEY SKI RESORTS
- 4 SKI PATROLLERS WERE INTERVIEWED AT EACH OF THESE SITES (N = 12) AND ASKED 3 QUESTIONS:
- *“WHEN AN ACUTE INJURY PRESENTS WITH SUSPICION FOR AN UNCOMPLICATED FRACTURE IN A STABLE PATIENT, IS AN AMBULANCE CALL WARRANTED?”*
- *“WHEN A DECISION IS MADE THAT AN X-RAY IS WARRANTED, ARE PATIENTS SENT TO THE EMERGENCY DEPARTMENT?”*
- *“WOULD AN INCREASED KNOWLEDGE OF X-RAY MACHINES IN THE AREA BE USEFUL TO THE RESCUE TEAM PRESENT HERE AT THE MOUNTAIN?”*
- A MAP OF LOCALLY AVAILABLE X-RAY MACHINES WAS THEN CREATED SPECIFICALLY FOR THIS STUDY, AND PUBLISHED WITHIN THIS POWERPOINT.

RESULTS OF QUESTIONS

% of Participant Responses to Questions



RESULTS (CONT.)

- THE VAST MAJORITY OF PARTICIPANTS IN THE STUDY OPTED NOT TO CALL AN AMBULANCE IF A PATIENT WAS STABLE WITH A SUSPECTED UNCOMPLICATED FRACTURE (N = 10/12), ASSUMING THE PATIENT WAS STABLE AND CAPABLE OF BEING DRIVEN TO AN X-RAY MACHINE.
- MOST PARTICIPANTS WOULD NOT SEND THE PATIENT TO THE EMERGENCY DEPARTMENT. IMPORTANTLY, THE 4 RESPONDENTS WHO WOULD SEND A PATIENT TO THE EMERGENCY DEPARTMENT WERE ALL AT BOLTON VALLEY RESORT
- AS FAR AS USE OF A MAP FOR SKI PATROLLERS, HALF OF RESPONDENTS (N = 6/12) STATED "YES", AND HALF OF RESPONDENTS STATED "NO".
- IMPORTANTLY, ONE PARTICIPANT OF THE STUDY INFORMED INTERVIEWERS, "THE CHOICE TO SEND TO THE EMERGENCY DEPARTMENT IS USUALLY MADE BY THE EMS TEAM ARRIVING BY AMBULANCE."

MAP OF AVAILABLE X RAY SITES IN VERMONT*

Note: Outside of Hospital facilities, there is an apparent lack of X ray sites in Northeast Vermont

*More X-ray sites may exist, however these were all sites reported by either Ski patrol participants, Waterbury Family Medicine Providers, and/or private companies which advertise their X-ray machines online.

*3 other sites were available and advertised within Burlington, Vermont, however they were excluded from this map to highlight sites distant from UVMCC.



EFFECTIVENESS AND LIMITATIONS

EFFECTIVENESS

- THE RESULTS OF THIS STUDY HAVE SHOWN THAT THERE IS A SIGNIFICANT DECREASE IN BOTH TIME AND COST FOR PATIENTS WHO OPT TO UTILIZE X RAY OUTSIDE OF THE EMERGENCY DEPARTMENT SETTING WITHIN THE STATE OF VERMONT
- THERE IS AN APPARENT LACK OF KNOWLEDGE AND GUIDELINES FOR PATIENTS, PROVIDERS, AND EMERGENCY RESPONSE PROFESSIONALS WITH REGARDS TO WHERE THESE X RAY MACHINES ARE AVAILABLE AND ACCEPTING OF PATIENTS IN NEED OF EVALUATION
- MANY PATIENTS WHO PRESENT TO SKI HILL CLINICS WITH UNCOMPLICATED FRACTURES IN STABLE CONDITION ARE CONSIDERED CAPABLE OF BEING TAKEN TO A NEARBY X RAY MACHINE THAT IS **NOT** THE EMERGENCY DEPARTMENT **WITHOUT** AN AMBULANCE, AND THERE ARE MULTIPLE X-RAY SITES AVAILABLE IN VERMONT
- DESPITE KNOWING ABOUT OTHER X-RAY MACHINES IN THE AREA, MANY INJURED PATIENTS STILL GET REFERRED TO THE EMERGENCY DEPARTMENT
- SHORTAGE OF AVAILABLE X-RAY SITES IN NORTHEAST VERMONT

LIMITATIONS

- LARGE VARIABILITY BETWEEN SKI HILLS. SUGARBUSH RESORT HAS AN IN HOUSE X-RAY MACHINE WITH RADIOLOGY STAFF, WHILE STOWE AND BOLTON VALLEY DO NOT.
- LOCATION OF REFERRAL IS SITE SPECIFIC: AS BOLTON VALLEY IS WITHIN 30 MILES OF UVM'S EMERGENCY DEPT, PATROLLERS ARE FAR MORE LIKELY TO REFER PATIENTS THERE COMPARED TO STOWE AND SUGARBUSH.
- WHEN AN AMBULANCE IS CALLED, EMS MAKES THE DECISION OF WHERE TO TAKE THE INJURED PATIENT, AND THIS IS STATE REGULATED, MAKING EDUCATION AND AVAILABILITY OF LOCAL X-RAYS LESS USEFUL OF AN ENDEAVOR

RECOMMENDATIONS FOR FUTURE INTERVENTIONS

- FOCUS ON SITE SPECIFIC CHANGES, AS SUGARBUSH ALREADY HAS AN X-RAY MACHINE, WHEREAS STOWE AND BOLTON VALLEY DO NOT
- EXPAND INTERVIEW TO EMS PERSONNEL. IF LARGE SCALE CHANGES WOULD BE MADE WITH X-RAY UTILIZATION, IT WOULD HAVE TO OCCUR AT THE STATE LEVEL, WHERE EMS ARE TRAINED TO TRIAGE CERTAIN PATIENTS IN NEED OF X-RAY TO OTHER SITES, FREEING UP EMERGENCY DEPARTMENTS, LOWERING COST, AND LESSENING THE TIME REQUIRED TO GET AN X-RAY
- CONSIDER CREATING A WEBPAGE OR APP FOR SKIERS AND OTHER GROUPS AT HIGH RISK OF INJURY THAT LISTS AVAILABLE EXPRESS CARES AND CLINICS IN THE AREA EQUIPPED WITH X-RAY
- PROVIDE INJURED SKIERS WITH THE MAP CREATED IN THIS STUDY AND ALLOW THEM TO MAKE MORE EDUCATED DECISIONS WITH REGARDS TO THEIR CARE

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