

APPROPRIATE EMERGENCY DEPARTMENT UTILIZATION LEADING TO BETTER CARE COORDINATION

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Emergency department (ED) utilization contributes significantly to medical expenditure in the United States. Over the past 3 decades, increases in US ED visits have been documented despite decreases in active or operational EDs.^{1,2}

In 2010, nearly 1 in 5 visits were determined to be potentially avoidable and contributed \$65 billion to rising health care costs and ED overcrowding.³ The average cost of treating common primary care treatable conditions at a hospital ED is 12 times higher than visiting a physician office and 10 times higher than traveling to an urgent care center for help with the same issues.⁴ Several factors contribute to patients' utilizing ED services, such as access to primary care, behavioral health diagnosis, lack of care coordination, lack of empowerment to self-manage chronic conditions, and social determinants of health (SDOH).⁵ ED visits are a high-intensity interaction and a cost burden on the health care system, as well as on patients.

Addressing avoidable ED utilization is a focus for Highmark Health, which has implemented interventions in partnership with providers to reduce preventable ED use.

Identification of Avoidable ED Utilization

The Agency for Healthcare Research and Quality (AHRQ) estimated that between 13% and 37% of ED visits could be safely referred to 1 of 3 settings: primary care provider (PCP) offices, urgent care, or retail.⁶ Algorithms to determine potentially avoidable and preventable ED visits have centered around diagnostic and procedure codes. The New York University ED algorithm (NYU-EDA), developed from 1999 to 2001, took a probabilistic approach to determine visits that were in 1 of 4 categories: (1) nonemergent, (2) emergent but treatable in a primary care setting, (3) emergent care required but preventable if appropriate ambulatory care had been received, and (4) emergent care required and not preventable.² Injuries were not included in the original NYU-EDA algorithms and nearly 84% of ED visits were able to be classified.²

Johns Hopkins utilized the original NYU-EDA and added 2 revised algorithms that included injuries and modified the methodology. In so doing, nearly 99% of all visits could be classified, and it was discovered that 58% of the ED visits in the data set were primary care sensitive.⁸ Both ED algorithms were developed with the caution that their appropriate use is in research settings, not on individual case determinations. Using the Johns Hopkins algorithms Highmark has been able to leverage



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potentially preventable ED utilization information to support performance in value-based reimbursement incentive programs.

Support of Provider Best Practices

Highmark has implemented metrics for both overall ED use and preventable ED utilization within its value-based reimbursement programs. Additionally, the Highmark Quality Blue Hospital Program measures return visits to the ED within 3 days post discharge from an inpatient stay. The True Performance Primary Care Physician program has measured overall ED utilization and will narrow the metric to avoidable ED visits starting in 2022. The Highmark field staff who support the value-based reimbursement programs use a variety of reporting methods to identify an organizations' trends in avoidable ED utilization and to determine where workflow redesign efforts are most warranted.

Highmark Health generates daily reports of ED discharges and lists of members with frequent ED use. These lists provide detailed information about which ED was accessed, admitting diagnosis, final diagnosis, date of service, day of the week, and whether the patient is enrolled in any of the various care management programs available. Additional detail is available through a third-party vendor population health management tool through which analysis and trending at an entity, specific practice, or individual provider level can be conducted. Organizations and individual providers can view a specific patient's utilization history assisting with care coordination efforts.

Leveraging these insights, the Highmark Health field staff support targeted initiatives for the physician organizations, individual providers, and hospital systems contracted in value-based arrangements. The field staff use evidence-based resources to promote a range of best practices to minimize avoidable ED utilization. These best practices include patient education, expanded provider access, aligned financial incentives across the care continuum, additional case management, and health system data sharing.

Patient education involves identifying a true emergency, monitoring symptoms, and highlighting other existing appointment options, such as PCP, virtual health, retail clinics, and urgent care. Educating patients can be done proactively by the PCP for those who have been identified as high ED utilizers and retroactively during post-ED visit outreach calls. For inpatients, education occurs by incorporating face-to-face technology, integrating behavioral health, and addressing SDOH.

Expanded provider access, case management, and aligned financial incentives are additional key variables that can aid in reducing avoidable ED visits. Provider practices can ensure their schedule allows for timely appointments leveraging extended and/or weekend hours, and virtual visit options. Case management referrals can be initiated in the ambulatory or hospital setting to achieve more coordinated care.^{2,9} Case management and social work support, either virtually or in person, can be particularly effective while a patient is in the ED so that care coordination with the patient's PCP can take place. If a PCP is not identified for a patient, the case manager can assist the patient in choosing a PCP and arrange a follow-up appointment.¹⁰ Aligned financial incentives within a health system for hospitals, providers, and patients synergize efforts to reduce ED utilization across the continuum of care.

Clinically integrated networks (CINs) and hospital systems that share data between providers have heightened awareness of ED overuse issues, which allows for a data-driven policy implementation. Examples of ED utilization data points that are monitored include hour of the day, day of the week, visit diagnoses, and likelihood of ED use risk calculations. The collection and analysis of these data points allows CIN or hospital system leadership to implement policies and procedures that incorporate best practices to address preventable ED visits—for example, routine identification of patients with a high likelihood of ED utilization and proactive outreach to these individuals prior to weekends when preventable ED visits tend to be observed. Ensuring call center phone tree alignment is another example of a procedure that routes patients to the appropriate point of contact to address their concern and prevent an avoidable ED visit.

When looking at outcomes data, the efforts that have been put into place by the Highmark field staff have shown to be favorable for both the True Performance PCP and Quality Blue Hospital Program. True Performance—participating PCPs demonstrated reduced ED utilization compared with providers not contracted in the True Performance PCP program, which yielded \$66.7 million in potentially avoidable costs. Within the Quality Blue Hospital Program, there were approximately \$1.7 million in potentially avoided costs due to fewer returns to the ED within 3 days of an index ED visit between 2016 and 2019.

Follow-up care post ED visits are very important to improving patient care and health outcomes and potentially decreasing future ED visits. Patient engagement strategies are vital in follow-up care and through motivational interviewing practices can better facilitate patient understanding and awareness. Through enhanced practice culture and processes, conversations at all levels of care can help encourage visits to the PCP rather than the ED. Engaging the patient post ED visit can help lead to better understanding of why the patient went to the ED, allow for the opportunity to gauge patient understanding of their care and discharge instructions, assess medication adherence, assess SDOH risk factors, and provide an opportunity for patient education.¹⁰

Support of SDOH

One of the biggest contributing factors to avoidable ED utilization is SDOH, which are defined by the CDC as “economic and social conditions that influence the health of people and communities.”¹¹ Highmark’s enterprise SDOH department has identified the following SDOH domains: social connections, financial resource strain, health literacy, food insecurity, transportation, safety, housing stability, childcare access and affordability, and employment. Most, if not all, of these factors have an impact on ED utilization, thus addressing them on an ongoing basis with patients may help contribute to fewer preventable ED visits.

One of the resources used to support provider improvement in ED utilization rates is a ED Utilization Toolkit created by the Highmark Population Health Department. The toolkit references the most cited reasons for avoidable ED use, such as lack of access and lack of education, both of which fall under the SDOH umbrella.¹² At-risk populations for ED failures are also discussed in this toolkit. Per AHRQ, included in these populations are those with cognitive impairment, psychiatric illness, alcohol and drug abuse, and poor health literacy.¹³ This toolkit recommends ways to help combat these problems including data analysis to help predict which patients may fall into one of these categories. Screening for SDOH on a regular basis may help identify which patients will be likely to overutilize the ED related to social factors. The post ED follow-up call is also discussed in detail in this toolkit. Asking

open-ended questions related to SDOH may help retroactively identify patients who may continue to use the ED because of social determinants.

The Highmark Population Health Department has also developed an internal-facing SDOH toolkit that has embedded documents that can be shared externally with providers. This toolkit emphasizes the need for screening patients for social determinants. A recent study in the *Journal of the American Medical Society* showed that “approximately 24% of hospitals and 16% of physician practices reported screening for food insecurity, housing instability, utility needs, transportation needs, and interpersonal violence. Federally qualified health centers and physician practices participating in bundled payments, primary care improvement models, and Medicaid accountable care organizations screened more than other hospitals, and academic medical centers screened more than other practices.”¹⁴ Although screening is increasing, there remains room for improvement. The SDOH toolkit comprises the Highmark Enterprise SDOH Assessment as well as 3 additional assessments that are nationally recognized. The SDOH toolkit also provides recommendations for implementing SDOH screening into practice workflow.

Highmark Health and Allegheny Health Network (AHN) have various programs and pilots in place that address SDOH and ED utilization. One of programs focuses on Mobile Integrated Health (MIH), which is available across the AHN footprint; this program is headed by Jonah Thompson, CP-C, operations manager of MIH at AHN. Patients are referred via a variety of sources including inpatient, ambulatory, community, and enterprise partner sources. Most AHN clinicians can also make a referral through the Epic electronic health record (EHR) and there is also a mechanism to refer via the Allscripts EHR.

MIH is care that is delivered by community paramedics to patients outside the clinic and outside the hospital to patients who may have been described as “difficult” or “noncompliant” and often have had frequent physician visits and ED visits and recurrent hospitalizations. These patients may have been referred to case managers and community programs but persist with poorly managed health issues and overutilization of ED and hospital care.

The community paramedics work to develop a relationship with these patients and help to determine why they are not connecting to the provided referrals. They meet the patients in person whenever possible—whether it be at someone’s home, the bench at a park, or at a fast-food restaurant—and they closely examine SDOH factors as well as issues in the home that may be affecting the patient’s ability to follow through with resources provided. The community paramedics meet the patient where they are in order to help set goals by looking at the patient’s motivation. Some of the findings are that many of these patients are dealing with loneliness and depression, as well as transport and mobility issues. Thompson describes the program as “understanding why gaps and barriers exist and ensuring we take enough time to really do that in depth with patients who have likely fallen through the cracks or failed more conventional approaches (Jonah Thompson, CP-C, operations manager, Mobile Integrated Health, Allegheny Health Network, conversations and emails, January 11, October 18, and October 19, 2021).

A second program, led by Phyllis Rebholz, RN, MEd, CCM, executive director of case management at AHN, was initiated at St. Vincent Hospital in Erie, Pennsylvania, and has since expanded to Forbes Hospital and Allegheny General. In this payer-agnostic program, patients who come into the ED and

meet certain predictable analytic criteria (based on NYU logic of avoidable ED usage) will generate a “ping” to a social worker from the Care Management Transitional Care Team. The patients are low acuity as their ED visit has been deemed preventable. The social worker will then interact with the patient in real time while they are still in the ED to assess the patient in order to link them to community-based organizations, educate them about medication resources, and connect them to the right provider. The goal is to turn over care to the PCP so the physician office can take over the care coordination and education of the patient. Some of the needs that are frequently seen are related to transportation, food insecurity, and social isolation (Phyllis Rebholz, RN, MSED, CCM, executive director of case management at Allegheny Health Network, conversations and emails, October 13 and October 18, 2021).

The third program is the Front Door Initiative (FDI) and is funded through a grant from the Jefferson Regional Foundation. Funding began in 2018 and will continue until 2023. Alyson Lush, senior project manager of the FDI at AHN, oversees the program, which targets patients discharged from Jefferson Hospital ED with the goal of helping patients connect with community programs and services that address SDOH to reduce ED utilization. ED staff send FDI referrals for adult patients who visit the ED, screen positive for at least 1 SDOH need, and have been discharged. Community health workers (CHWs) reach out to patients 4 days post discharge and follow up again at 30, 60, and 90 days. Community referrals are made at any or all these contacts depending on need. FDI also reaches out to community-based organizations for resources leading to more targeted referrals to patients and the details of services are compiled so the CHW can use them as a resource for patients. A third objective is training in the ED. Trainings are provided to ED staff at Jefferson Hospital around SDOH, cultural competency, and other pertinent subjects. At this time, FDI is collecting outcome data related to the project. (Alyson Lush, senior project manager, Front Door Initiative, Allegheny Health Network, conversations and emails, October 13, 13, and 18, 2021).

Support for Behavioral Health

Behavioral health and substance abuse disorders are also well-known contributors to overall rising health care costs in the United States. These conditions are the leading cause of combined disability and death among women and the second highest among men. In 2007, approximately 12 million ED visits were related to mental health or substance abuse, which is one-eighth of all ED visits.¹⁵ The ED is also highly utilized among patients who suffer from mental health and substance abuse issues. In 2017, HHS declared the opioid epidemic a public health emergency, and in 2019, more than 70,000 people died from drug overdose, according to HHS.¹⁶

According to Highmark’s 2020 data, members with severe and persistent mental illness (SPMI) and/or substance use disorder (SUD) accounted for 9% of the total Highmark patient population. Of that 9%, the SUD population accounts for 86%, the SPMI population accounts for 10%, and dually diagnosed account for 4%. Despite accounting for a small percentage of the member cohort, the 9% of patients with SUD/SPMI utilized 33% of the ED visits, and SUD alone accounted for 27%. The total ED utilization cost associated with members with SPMI/SUD was 4.4 times higher than the members without SUD/SPMI, and the cost for the dually diagnosed for outpatient ED utilization was still 8 times higher than for those without SUD/SPMI.

These numbers are staggering. These data demonstrate that a small number of people contribute to high percentages of ED cost and utilization. To address this growing problem, Highmark has

developed a Behavioral Health Toolkit to assist PCPs in delivering care to this vulnerable population. The toolkit contains links to information sheets with best practice recommendations, screening tools, and clinical practice guidelines, as well as additional tools and resources that can be incorporated into their practice. Two of the resources available are information sheets for providers: “Follow-up after ED Visit for Alcohol and Other Drug Abuse and Dependence” and “Follow-up After ED Visit for Mental Illness.”

Pharmacist Integration

One of the proven ways to provide the greatest impact on ED utilization across the entire care continuum is with pharmacist involvement. One study estimated that 7.6% of all ED visits are a result of medication nonadherence.¹⁷ Recognizing that medication adherence is a significant contributor to positive clinical outcomes, Highmark has moved medication adherence efforts upstream to prevent ED visits and hospital admissions. Involving pharmacists to identify potential adherence barriers, educate patients on the role of their medications, and communicate with providers to simplify complex medication regimens can significantly improve medication adherence.¹⁸

Although the goal is ED avoidance, patients may still require emergency services. Therefore, embedded emergency medicine pharmacy services aim to work in a team-based manner to provide the most efficacious, safest, and fiscally appropriate medication management. One study showed that pharmacist interventions in the ED led to more than \$1 million in cost avoidance over 4 months.¹⁹ By embedding pharmacists in the ED, care can be optimized by providing recommendations on appropriate medication prescribing and reducing the likelihood of medication errors and the associated costly consequences.

Additional services that ED pharmacists provide are medication reconciliation, discharge counseling, and post-ED follow-up calls. Medication reconciliation and discharge counseling during transitions of care have been shown to significantly reduce ED visits as well.^{20,21} When pharmacists perform post-ED follow-up with patients, they can determine if any additional testing has resulted, provide further guidance or changes to treatment plans, and encourage outpatient management.²²

Finally, avoiding revisits to the ED is another area for pharmacist involvement and improvement of care. Studies have shown that up to 70% of medication-related ED visits are preventable.²³ Pharmacists embedded in primary care offices offer many outpatient services, including chronic disease state management, that allow patients to remain engaged with primary care, which shifts patient care from reactive to preventive and can significantly reduce ED utilization.²⁴

Enhanced Community Care Management

Those who visit the ED often tend to be in poor health and require ongoing medical support, and additional support systems and better access to care could benefit these patients and help to reduce ED use.²⁵ Effective care management can improve the coordination of care for more complex patients and provide a patient and their family with the ability to improve disease control and self-management, reduce stress, and prevent ED utilization, admissions, and readmissions. Highmark’s Enhanced Community Care Management (ECCM) team accomplishes this by providing specialized care coordination, palliative care, and supportive care free of charge to Highmark Medicare and individual Affordable Care Act high-risk populations.

The goal of the ECCM program is to help members living with serious illness to live their best life possible while maintaining their independence in the community. The interdisciplinary team of the ECCM program includes physicians, advanced practice providers (nurse practitioners or physician assistants), nurses, and social workers. The team is trained in motivational interviewing, health literacy, and how to help those struggling with SDOH. The clinicians provide team-driven care directed by whole person–centered outcomes, such as activating members to engage in the self-management of their chronic conditions, quality of life, symptom burden, emotional well-being, advanced care planning, communication, continuity of care, and caregiver burden. ECCM care is provided both virtually and, in the home, (including stays in nursing facilities) and the model is flexible, reducing disruption for the member, family, and caregiver by streamlining communication across health care settings to ensure members’ needs are matched with the appropriate resources. By doing this, the team can help to decrease unplanned care or care inconsistent with member’s goals, which in turn decreases the overall cost of care. Highmark’s ECCM team outcomes when comparing engaged ECCM members with a propensity matched cohort of eligible members has demonstrated an 8% reduction in admissions, a 13% reduction in readmissions, and a 7% lower total cost of care.

ED Utilization and Technology

Providers and care teams need to understand when, why, and how patients access the ED to address the reduction of costs and avoid unnecessary visits. Monitoring patient visits to the ED is not an easy task, especially with a multitude of contributing factors such as disease, access to care, patient knowledge and decision-making, and lines of communication between facilities and providers.

Technology plays a large part in monitoring ED utilization. Specifically, telemedicine and care coordination have aided providers in making more precise care management decisions. With the recent pandemic, telemedicine has emerged as a widely adopted technology among providers. A patient may be more likely to attend a telemedicine visit in place of going to the ED, and this also gives the PCP the opportunity to tell the patient if another level of care is appropriate. Thus, telehealth can lead to a stronger, more inspirational patient/physician relationship. Care coordination involves cooperation and collaboration between all parties involved in the patient’s care, and the exchange of information is crucial. Technology supports this via patient portals and interactive medical records.

Other technologies include admission/discharge feeds and care integration algorithms. Admission/discharge feeds notify providers when one of their patients has been seen, allowing office staff to quickly reach out to the patient and make a follow-up visit if necessary. This also allows for potential issues with discharge medications and misunderstanding of discharge instructions to be resolved on a timely basis. Care integration algorithms and proactive transition processes can connect high-risk patients with resources while still in the ED, thereby potentially limiting future ED visits.²⁶

Conclusions

The cause and effects of ED utilization on health care have been well documented. Not all ED utilization can be averted, and focus is shifting to look at what utilization could be possibly avoided, the contributing factors, and how to address those issues and concerns. Addressing ED utilization and other aspects of health care requires continual collaboration and communication across the continuum of care by all members of the health care team, payers, and members. Highmark Health’s mission is to “create a remarkable health experience, freeing people to be their best.” The efforts that

the Highmark field teams are undertaking in collaboration across the Highmark footprint have shown positive effects in addressing ED utilization and putting member/family in the center of everything we do, thereby driving to create the future of health care and collaborating to achieve shared success.

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References:

1. Gandhi SO, Sabik L. Emergency department visit classification using the NYU algorithm. *Am J Manag Care*. 2014;20(4):315-320.
2. Nguyen CA, Shih JA, Lin KV, Aladesanmi OA. Targeting national emergency department overuse: a case for primary care, financial incentives, and community awareness. *Harvard Health Policy Rev*. 2014;14(1):23-26.
3. Yang C, Delcher C, Shenkman E, Ranka S. Expenditure variations analysis using residuals for identifying high health care utilizers in a state Medicaid program. *BMC Med Inform Decis Mak*. 2019;19:131. doi:10.1186/s12911-019-0870-4
4. Williams JP. Avoidable ER visits fuel health care costs. *US News*. July 22, 2019. Accessed October 15, 2021. <https://www.usnews.com/news/health-news/articles/2019-07-22/avoidable-er-visits-fuel-us-health-care-costs>
5. Capp R, Misky GJ, Lindrooth RC, et al. Coordination program reduced acute care use and increased primary care visits among frequent emergency care users. *Health Aff (Millwood)*. 2017;36(10):1705-1711. doi:10.1377/hlthaff.2017.0612
6. Heath S. Patient-centered tips to cut emergency department overutilization. Patient Engagement HIT. January 6, 2020. Accessed November 1, 2021. <https://patientengagementhit.com/news/patient-centered-tips-to-cut-emergency-department-overutilization>
7. Gandhi SO, Sabik L. Emergency department visit classification using the NYU algorithm. *Am J Manag Care*. 2014;20(4):315-320.
8. Klaus WL, Pham K, Ravert DM, Weiner JP. A revised classification algorithm for assessing emergency department visit severity of populations. *Am J Manag Care*. 2020;26(3):119-125. doi:10.37765/ajmc.2020.42636
9. Maeng DD, Hao J, Bulger JB. Patterns of multiple emergency department visits: do primary care physicians matter? *Perm J*. 2017;21:16-063. doi:10.7812/TPP/16-063
10. Enard KR, Ganelin DM. Reducing preventable emergency department utilization and costs by using community health workers as patient navigators. *J Healthc Manag*. 2013;58(6):412-428.
11. What are social determinants of health? CDC. Updated December 19, 2019. Accessed November 13, 2021. <https://www.cdc.gov/nchhstp/socialdeterminants/faq.html#what-are-social-determinants>
12. [Wirth C. ED avoidance 101. Advisory Board. May 2019. Accessed January 13, 2022.](https://www.advisory.com/en/topics/classic/2019/05/edavoidance101)
13. [Improving the emergency department discharge process: environmental scan report. Agency for Healthcare Research and Quality. October 2014. Accessed November 28, 2021.](https://www.ahrq.gov/sites/default/files/wysiwyg/professionals/systems/hospital/edenvironmentalscan/edenvironmentalscan.pdf)
14. [Fraze TK, Bewster AL, Lewis VA, Beidler LB, Murray GF, Colla CH. Prevalence of screening for food insecurity, house instability, utility needs, transportation needs, and interpersonal violence by US physician practices and hospitals. *JAMA Netw Open*. 2019;2\(9\):e1911514. doi:10.1001/jamanetworkopen.2019.11514](https://doi.org/10.1001/jamanetworkopen.2019.11514)
15. Institute of Medicine. *Improving the Quality of Health Care for Mental and Substance-Use Conditions*. The National Academies Press; 2006.

16. Owens PL, Mutter R, Stocks C. Mental health and substance abuse-related emergency department visits among adults, 2007. Healthcare Cost and Utilization Project statistical brief No. 92. Agency for Healthcare Research and Quality. July 2010. Accessed October 11, 2021. <https://www.hcup-us.ahrq.gov/reports/statbriefs/sb92.pdf>
17. Butler RJ, Davis TK, Johnson WG, Gardner HH. Effects of nonadherence with prescription drugs among older adults. *Am J Manag Care*. 2011;17(2):153-160.
18. Chisholm-Burns MA, Kim Lee J, Spivey CA, et al. US pharmacists' effect as team members on patient care. *Med Care*. 2010;48(10):923-933. doi:10.1097/mlr.0b013e3181e57962
19. Lada P, Delgado G Jr. Documentation of pharmacists' interventions in an emergency department and associated cost avoidance. *Am J Health Syst Pharm*. 2007;64(1):63-68. doi.org/10.2146/ajhp050213
20. Bonetti A, Reis WC, Mendes AM, et al. Impact of pharmacist-led discharge counseling on hospital readmission and emergency department visits: a systematic review and meta-analysis. *J Hosp Med*. 2019;15(1):52-59. doi:10.12788/jhm.3182
21. Zdyb EG, Courtney DM, Malik S, Schmidt MJ, Lyden AE. Impact of discharge anticoagulation education by emergency department pharmacists at a tertiary academic medical center. *J Emerg Med*. 2017;53(6):896-903. doi:10.1016/j.jemermed.2017.06.008
22. Dumkow LE, Kenney RM, MacDonald NC, Carreno JJ, Malhotra MK, Davis SL. Impact of a multidisciplinary culture follow-up program of antimicrobial therapy in the emergency department. *Infect Dis Ther*. 2014;3(1):45-53. doi:10.1007/s40121-014-0026-x
23. Patel P, Zed PJ. Drug-related visits to the emergency department: how big is the problem? *Pharmacotherapy*. 2002;22(7):915-923. doi:10.1592/phco.22.11.915.33630
24. Moreno G, Fu JY, Chon JS, et al. Reducing emergency department visits among patients with diabetes by embedding clinical pharmacists in the primary care teams. *Med Care*. 2021;59(4):348-353. doi:10.1097/mlr.0000000000001501
25. Hunt KA, Weber EJ, Showstack JA, Colby DC, Callahan ML. Characteristics of frequent users of emergency departments. *Ann Emerg Med*. 2006;48(1):1-8. doi:10.1016/j.annemergmed.2005.12.030
26. Wood D. Strategies for reducing emergency department overuse. AMN Healthcare. May 19, 2014. Accessed November 1, 2021. <https://www.amnhealthcare.com/latest-healthcare-news/strategies-reducing-emergency-department-overuse/>