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LEGIONELLA PNEUMOPHILA URINE ANTIGEN TESTING IN COMMUNITY-ACQUIRED PNEUMONIA: A QUALITY IMPROVEMENT INITIATIVE IN DIAGNOSTIC STEWARDSHIP

Guidelines for community-acquired pneumonia recommend *Legionella pneumophila* urine antigen testing in only two settings: (1) severe pneumonia or (2) epidemiological risk factors, such as a community outbreak or recent travel.[1] We were surprised to find *L. pneumophila* urine antigen testing ordered in patients with no pneumonia diagnoses whatsoever. We then suspected that much of our hospital's *Legionella* testing was guideline discordant. Therefore, we launched a quality improvement project to reduce this inappropriate diagnostic testing. Despite the importance of diagnostic stewardship,[2] we encountered two challenges. First, a burdensome intervention would be unsustainable and, indeed, could exacerbate burnout, a phenomenon increasingly recognized in the wake of the pandemic.[3] Second, hospitals are facing financial challenges. An intervention requiring extensive data resources and electronic health record modification would be unacceptable to a hospital data department struggling to maintain basic operations amid constrained budgets. Therefore, rather than attempting to eliminate all inappropriate tests, our quality improvement project focused on reducing the most egregiously inappropriate testing, i.e., testing patients who lacked any pneumonia or related diagnosis.

We assessed an intervention to improve guideline concordance with a one-group pretest-posttest quasi-experimental design.[4] The research proposal was approved by the Creighton University Institutional Research Board and the requirement for obtaining consent was waived. Starting on July 13, 2021, electronic orders for *L. pneumophila* urine antigen testing at CHI Health Creighton University Medical Center Bergan Mercy required selection of "suspected pneumonia" or "suspected or confirmed *Legionella* outbreak in the hospital, community or facility" as indications. Also, at three meetings of the Quality Improvement Committee (which includes hospitalists and medicine residents designated as quality improvement champions), we explained our rationale. Orders from 2022 for non–intensive care unit inpatients at least 18 years old were compared to orders for 2020. ICD-10 codes identified patients with pneumonia or a related diagnosis.

Results showed that the number of tests done on non-pneumonia patients decreased from 319 to 179. In 2020, tests were done on 220 of 1166 pneumonia patients (19%) versus 129 of 911 (14%) in 2022. Nebraska had no *Legionella* outbreaks from 2020 to 2022.

Others have decreased testing (including urine cultures in asymptomatic bacteriuria) with similar changes in computerized physician order entry.[5,6] However, a PubMed search using the terms "*Legionella pneumophila,*" "urine antigen test," and "quality improvement" failed to retrieve any citations.

A strong theoretical rationale for our intervention, which focused on changing the test order form, is lacking. However, this is generally the case for quality improvement programs to implement guidelines.[7]

Legionella pneumophila urine antigen testing guidelines have engendered criticism. However, criticism has advocated wider use of this testing in pneumonia, and a focus of our project was to reduce the use of testing in patients with no pneumonia diagnoses at all.

As in other testing initiatives,[5] limitations of this report arise from its sustainable, low-cost ethos, such as our quasi-experimental design, which has weaknesses for assessing causality[4] but is simple to implement. Distinguishing the impact of our intervention from the impact of the COVID-19 pandemic is nonetheless a challenge. Statistical analysis to deal with clustering (one physician might manage multiple patients, with testing decisions correlated) was not done as part of this limited initiative.

We have provided sparse data describing the initiative. We have not quantified the time required of physicians nor savings accrued to the hospital. However, others regard this kind of intervention as a low-cost, sustainable approach.[5,6] This is consistent with SQUIRE criteria noting that not all elements are always needed for every manuscript.

Our report may encourage other quality improvement initiatives that have limited aims yet have low resource demands and are sustainable. On the other hand, our report

may encourage more thorough evaluation of diagnostic stewardship interventions as a way to change physician behavior.

AUTHORS' NOTE

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