



Overdiagnosis in the emergency department: a sharper focus

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Received: 29 November 2021 / Accepted: 17 February 2022

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Abstract

Overdiagnosis occurs when a person's symptoms or life experiences are given a diagnostic label that ultimately causes them more harm than good. We describe the complex drivers of overdiagnosis spanning five interconnected domains, which can lead to numerous negative impacts on patients. Emergency physicians are often tasked with making timely clinical assessments, decisions, and diagnoses that can unintentionally result in overdiagnosis. Three pertinent areas related to overdiagnosis in Emergency Medicine: anaphylaxis, subsegmental pulmonary embolism, and low-risk chest pain are discussed. For a broader perspective, insight on overdiagnosis from medical students and a patient advisor are presented. The perspectives illustrated are meant to spark reflection on: the ethics of labeling a person with a diagnosis, current clinical practices, the limitations of medical education, and patient care and communication in the context of overdiagnosis in the Emergency Department.

Keywords Overdiagnosis · Overtreatment · Overuse · Low-value care · Ethics · Shared decision-making

Abbreviations

EM	Emergency medicine
ED	Emergency department
PE	Pulmonary embolism
CT	Computerized tomography
ACS	Acute coronary syndrome

Background and introduction

According to the National Institute of Health's National Library of Medicine, overdiagnosis has most recently been defined as "the labeling of a person with a disease or abnormal condition that would not have caused the person harm if left undiscovered, creating new diagnoses by medicalizing ordinary life experiences, or expanding existing diagnoses by lowering thresholds or widening criteria without evidence of improved outcomes. Individuals derive no clinical benefits from overdiagnosis, although they may experience physical, psychological or financial harm" [1]. In its essence, overdiagnosis refers to turning citizens into patients by the application of a diagnostic label that brings only harms and no benefits [2, 3]. It pertains to issues that are not illness per se but part of the normal human experience and if left alone or unknown, would not require medical attention [3]. Figure 1 illustrates the numerous complex drivers of overdiagnosis that span five key interrelated domains: pervasive financial incentives (health systems), increasingly sensitive diagnostic tests (health policy), expanding disease definitions (health professionals), over-reliance on medical tests (patients and public), and faith in early detection (culture) [4]. Invariably, it can result in both unnecessary and harmful labelling and subsequent low-value and harmful treatment of patients, as well as create stigma and impact quality of life [3]. While actively debated in the

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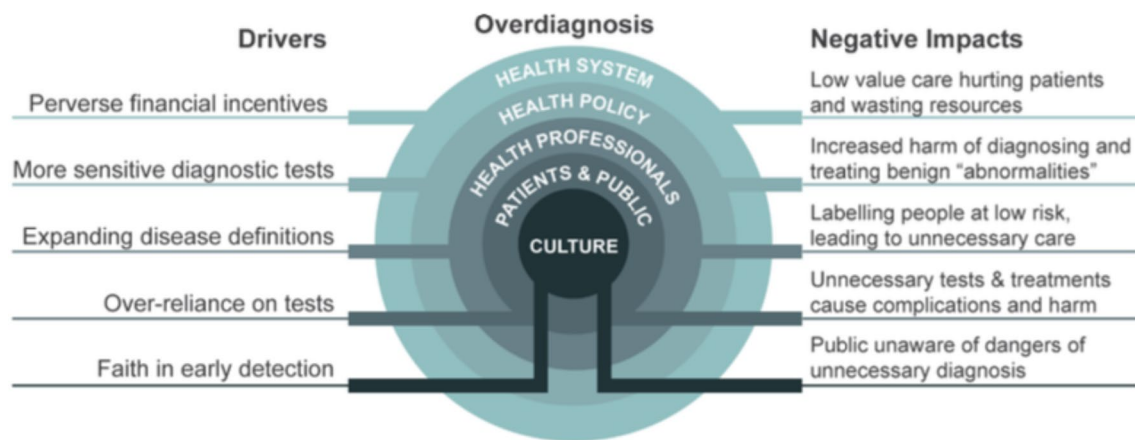


Fig. 1 Five key drivers of overdiagnosis. The drivers of overdiagnosis affect five interrelated domains that can result in numerous negative impacts

domains of cancer screening and mental health, among others, is overdiagnosis an ED issue?

Patients come to the ED in distress with an expectation to receive answers and appropriate care for their current medical ailments. Emergency physicians pride themselves on being diagnosticians and certainly would not expect one of their main duties to result in harmful or unnecessary diagnostic labelling. In addition, the fear of errors of omission and medicolegal concerns may significantly drive the clinical decision-making process towards over-testing, over-referring, and thus overdiagnosing patients [4]. Can the quest for a diagnosis be at cross purposes with the Hippocratic oath of *primum non nocere*? Currently, there are gaps in the EM literature and it would appear that this may be an overlooked area [2]. This article will highlight the perspectives of a patient advisor and medical students, in addition to reviewing salient research. The following three examples were chosen given their prevalence in the ED and are current topics of discussion in the literature on overdiagnosis; however, these areas of EM are still lacking breadth and depth. Ultimately, this provides the rationale for why many of the negative effects of overdiagnosis discussed in this paper are rooted in theoretical speculation rather than concrete scientific evidence. In addition, these examples are provided to demonstrate how applying a diagnosis on clinical grounds alone can lead to overdiagnosis and how post-ED care referral patterns can place patients at risk for harm. Our intent is to inspire others to reflect and subsequently delve into these topics more thoroughly to further quantify the effects of overdiagnosis.

Anaphylaxis

Emergency physicians write dozens of new epinephrine auto-injector prescriptions over the course of their career. According to a British study, the number of dispensed epinephrine auto-injectors has also been steadily increasing for over a decade [5]. Most of these are justified but many may have been written for patients with significant allergic reactions and some respiratory symptoms (e.g., throat tightness that was never confirmed as a soft-tissue narrowing or a manifestation of angioedema). Yet, out of an abundance of caution, the diagnosis of anaphylaxis is made to prevent a highly unlikely fatal outcome [6]. Subsequently, an epinephrine auto-injector prescription is provided with allergist and primary care follow-up. Allergists generally agree on the accuracy of the initial diagnosis after the fact, but there are discrepancies [7]. The incidence of anaphylaxis is rising at a rate that may be difficult to consolidate with any real changes in population atopy [8]. Are EM physicians contributing to overdiagnosis by not raising this uncertainty when counselling patients in the ED? Given the limitations of allergy testing, are allergists and family doctors relying primarily on these diagnoses and continuing the patient on a lifetime of epinephrine auto-injectors, possible anxiety, and avoidance of potential triggers? It is crucial that we weigh both the benefits and harms of past management approaches of anaphylaxis as our understanding of the trade-offs continues to evolve [6].

Subsegmental pulmonary embolism

Overdiagnosis in pulmonary embolism (PE) means the identification of a subsegmental PE that would not have led to patient harm had it not been detected, and is likely not the cause of the symptoms bringing the patient to the ED. EM physicians are operating under the paradigm to avoid missing a large PE, rather than not treating a small PE [9]. Even though physicians are not seeking detection of subsegmental pulmonary emboli, they lack the confidence to ignore them [9]. As the sensitivity of computerized tomography (CT) has grown through increasing multi-slice resolution, so has the ability to detect small thrombi that are of unclear clinical significance. As a result, the prevalence of PE detected in patients presenting to the ED has increased significantly over time, including the provision of more treatment, yet without an improvement in patient-important outcomes to the same extent [9, 10]. The jury is still out regarding whether subsegmental pulmonary emboli requires treatment [11]. In the current reality, the detection of a pulmonary thrombus, even if small or potentially a variant of normal, usually means treatment. These individuals now become patients subjected to prolonged anticoagulation and quite possibly a life-long fear of recurrence. Given the fact that the risk of bleeding while on blood thinners is higher than the risk of subsegmental PE recurrence, is this an acceptable trade-off [9]? While EM physicians are seeking improvement in CT ordering patterns for suspected PE, the practice of informing patients of the risk of PE overdiagnosis when ordering the test, is likely uncommon.

Low-risk chest pain

An ethical dilemma exists for emergency clinicians as they must balance the risks of acute coronary syndrome (ACS) if the patient was discharged with the potential harms that could result from a cardiac workup [12]. Once an ACS has been excluded, as is the case for most patients who present to the ED with low-risk chest pain [12], a common practice fuelled by the pursuit of a diagnosis would involve referring patients on for provocative testing (e.g., stress testing). This would be used to uncover ischemia from underlying coronary disease, even if there is no history of atherosclerosis. With an overdiagnosis lens, this places patients on a trajectory that may diagnose coronary artery disease many years before it would have otherwise come to light, and hence can cause more harm than good. Once a person is labeled as a cardiac patient, implications abound regarding insurability, quality of life, and general

well-being. One would expect the cardiology literature to speak to the issue of overdiagnosis, as we see the number of cardiac diagnostic technologies (e.g., biomarkers and imaging) increasing over time, but alas the risk and burden of overdiagnosis remains quite limited. Based on what is currently reported in the literature, it appears as though early non-invasive cardiac stress testing within 30 days after an ED evaluation for ACS, may only result in minor, if any, reductions in risk of death or myocardial infarction [13, 14]. This highlights the need for reassessing the current guidelines, developing new risk stratification models, and ensuring patients understand their options as well as the trade-offs involved with cardiac stress testing [13, 14]. Ultimately, this could reduce the potential for overuse of these tests, where evidence of benefit for patient outcomes is currently lacking.

Relevance of perspectives on overdiagnosis

In the subsequent section, the medical student and patient advisor perspectives will be explored as a means of adding further insight on the relevance of overdiagnosis to other pertinent stakeholders. A conversation surrounding overdiagnosis would be remiss without considering how the future of the medical profession and the people we serve on a daily basis are impacted by this topic. Our goal is to initiate the conversation so that change in both medical and patient education can be achieved.

Medical student perspective

As medical students, we have limited exposure to the concept of overdiagnosis in our formal medical training. Most efforts appropriately focus on differential diagnoses for various presentations, investigating for and establishing a diagnosis, and taking appropriate next steps in management. As new learners, we are fearful of missing a possible diagnosis which could affect long term outcomes. Although a biopsychosocial model [15] is repeatedly mentioned throughout student training, if we are truly focused on this model, is sufficient attention placed on the impact of harmfully labeling patients with a diagnosis? It has rarely, if ever been suggested to us that making a diagnosis can be harmful. It seems to be an expectation that we tell the patient what is wrong with them but are not encouraged to share the risks involved in pursuing a diagnosis or allowing for diagnostic uncertainty. Would it sometimes be beneficial to not give a diagnosis?

While working with preceptors, we often do not consider the repercussions of the decision-making that has occurred. Are we medicalizing an aspect of life that doesn't need to

be? Patients often seek a diagnosis in the ED; therefore, the importance of including them in a conversation that highlights the risks of testing and diagnostic labelling should not be underestimated. As medical students, we often have the “luxury” of spending more time with patients than most other health care team members. As a result of this, we may be uniquely positioned to encourage shared decision-making [16], despite the fast-paced ED environment, where decisions are made quickly. This underscores the importance of helping medical trainees understand that not everything that is done to a patient, even if well-intentioned, will benefit them. It is our hope that the concept of overdiagnosis will be embedded within the undergraduate medical education curriculum, alongside the current teaching on clinical decision-making and utilization of diagnostic testing. This ensures that students, like ourselves, can better understand overdiagnosis at an early stage of training when we are potentially mouldable and open to differing perspectives. If we begin our careers with this mindset, then the culture of medicine may begin to change.

Patient advisor perspective

As a Patient Advisor, I have experience working with patients and families to understand values, perspectives and preferences related to a wide range of health care encounters and will speak on their behalf. The importance of the patient–physician interaction cannot be underestimated. Treating patients with dignity, respect, and empathy creates a sense of security when they are most vulnerable. Though receiving a diagnosis in the ED can often be reassuring, patients would also want to be informed about the potential harms and negative impacts a diagnosis can have on their life. If testing and diagnostic uncertainty are discussed in greater depth, undue harm may be prevented. In addition, ensuring patients are educated on the importance of the passage of time and on the normalization of their experiences can be imperative in decision-making and their recovery. Ultimately, by enabling patients to become active participants in the pursuit of a diagnosis, a better quality of life is possible for them. While engaging in shared decision-making, physicians must also consider the values that patients hold and their perception of risk, understanding that variation amongst patients will exist in terms of willingness to understand and accept uncertainty. Patients come from diverse backgrounds, with varying levels of health literacy and numeracy, and have differing views, beliefs, and experiences; thus, impacting the level of involvement and decision-making within each person’s care [12]. Taking this into account, EM physicians need to be flexible and adapt to a patient’s wants and needs, and adjust their testing strategy and clinical decision-making appropriately.

Conclusion: where do we go now?

Based on the perspectives discussed in this article, one can argue that overdiagnosis is very relevant to practice, education, and patient care in the ED. What becomes necessary is further research to determine the extent of the problem in EM at present. Ultimately, additional research could inform the development of a robust evidence-based approach to risk-stratification and guidelines, or decision support tools related to appropriateness of diagnostic testing for clinicians. The creation of tools to facilitate communication of diagnostic options and their inherent uncertainty, as well as risks and benefits associated with them, would be necessary for effective shared decision-making with patients to occur. As a possible implication for the future, focusing our attention on patient management in the ED, rather than prioritizing the diagnosis, may be beneficial. This is especially true for stable patients and those presenting with minor complaints, where a diagnosis is not necessarily the primary goal. By communicating our intentions with patients, we may be able to reduce unnecessary testing while still gaining their trust. For this shift in priorities to occur, medical training may also need to adapt its teaching from a diagnostic-centred approach to one in which patient management is emphasized.

In the meantime, we believe that issues pertaining to overdiagnosis should be included in patient counselling during disposition discussions at the bedside in the ED. This may involve sending more patients back to their family physicians with diagnostic uncertainty as opposed to defaulting to additional testing and specialty referrals from the ED. These suggestions are made with the intent of reducing the harms of overdiagnosis and to highlight the importance of informed consent. It is our hope that physicians will reflect on our perspectives and use this as an opportunity to advance future research in overdiagnosis.

Acknowledgements Not applicable.

Authors’ contributions The manuscript was jointly written by all three authors listed. Specific clinical expertise was provided by ESL from the perspective of an Emergency physician. CV provided insight on the medical student section. MV provided additional insight on the medical student perspective as well as the patient advisor perspective section. All three authors were involved in the review and editing of all sections of the manuscript.

Funding Not applicable.

Availability of data and materials Not applicable.

Declarations

Conflict of interest ESL is currently co-chair of the Preventing Overdiagnosis 2022 Conference.

Ethics approval and consent to participate Not applicable.

Consent for publication Not applicable.

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