Mis-diagnosis, Overdiagnosis, and the Unintended Consequences of Prevention: Interpreting the USPSTF Autism Screening Report

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Introduction

- The US Preventive Services Task Force (USPSTF) is an independent, volunteer panel of national experts that rigorously reviews peer reviewed research to inform evidence-based recommendations for clinical preventive services.
- Based on their analysis, the USPSTF assigns a letter grade based on the strength of the evidence and the balance of the benefits and harms of the preventive service.

Grade	Definition	Suggestions for Practice
A	The USPSTF recommends the service. There is high certainty that the net benefit is substantial.	Offer or provide this service.
B	The USPSTF recommends the service. There is high certainty that the net benefit is moderate or there is moderate certainty that the net benefit is moderate to substantial.	Offer or provide this service.
C	The USPSTF recommends selectively offering or providing this service to individual patients based on professional judgment and patient preferences. There is at least moderate certainty that the net benefit is small.	Offer or provide this service for selected patients depending on individual circumstances.
D	The USPSTF recommends against the service. There is moderate or high certainty that the service has no net benefit or that the harms outweigh the benefits.	Discourage the use of this service.
I Statement	The USPSTF concludes that the current evidence is insufficient to assess the balance of benefits and harms of the service. Evidence is lacking, of poor quality, or conflicting, and the balance of benefits and harms cannot be determined.	Read the clinical considerations section of USPSTF Recommendation Statement. If the service is offered, patients should understand the uncertainty about the balance of benefits and harms.

U.S. Preventive Services Task Force. Grade Definitions. U.S. Preventive Services Task Force. 2012. URL: https://www.uspreventiveservicestaskforce.org/Page/Name/grade-definitions (Accessed 11 March 2019).

- Clinical and research response to "I" statement about screening for autism spectrum disorder (ASD):

1) could cause a decrease in early screening and delay in early intervention

2) parents/health care professionals may not recognize developmental concerns and, therefore, will not push for screening when needed

Purpose

1) To explore the USPSTF's operationalization of harm.
2) Discuss how these themes can pertain to ASD screening.

Methods

Document Review

1) USPSTF procedure manual
2) Evidence Review and "I" statement regarding ASD screening
3) Fifteen other reports released by the USPSTF between 2016 and 2018 that were issued an "I" statement.

Procedures

1) Two investigators read each report and abstracted, summarized, and then compared data on the operationalization of harm.
2) Data were coded and themes were identified, discussed, and further defined as an iterative process.
3) Disagreement was reviewed by a third researcher and discussed until consensus was reached.
4) A framework was developed from these data and then applied to the example of ASD screening.

Results

- We identified **4 sources** of **potential** harm:

Direct Harms

(1) "Subsequent diagnostic tests resulting from the screening"
(1) "Early treatment of screen-detected asymptomatic disease"
(2) "**No studies** assessed or addressed harms of screening"
(2) "**No studies** of behavioral interventions reported harms... in terms of child, family, or system impact"

Classification Errors

(1) "What is known about the number of false positives"
(1) "Psychological harm from labeling"
(2) "High level of parental stress associated with ASD diagnostic process... Both delays and demands associated with the ASD diagnostic process **may** place a burden on the families of children who falsely screen positive"
(3) Anxiety related to false positive screen (e.g., Chlamydia, Gonorrhea)
(3) Invasive diagnostic workup secondary to a false positive screen
(3) Concern about false negatives

Opportunity Costs

(1) "The time and effort required by both patients and the health care system to implement the preventive care service"
(2) "Some families access diagnostic and treatment services quickly, while other families report significant time (e.g., waitlists) and financial barriers in accessing evaluation resources"

Overdiagnosis

(1) "The unintended consequence of creating 'disease' that often leads to unnecessary and ineffective treatment"
(2) "**It is unknown** whether [children who received ASD diagnosis but no longer qualified when re-evaluated] represent diagnostic errors, correct diagnoses in children whose developmental pattern encompasses significant improvements in ASD-related impairments, or are the results of accurate early diagnosis and treatment"
(3) Overdiagnosis and overtreatment of [disease] that would never have harmed the patient in the absence of screening (e.g., skin cancer, corrective lenses for children whose visual acuity is not causing harm)

Source: (1) USPSTF procedure manual; (2) Evidence Review and "I" statement regarding ASD screening; (3) Fifteen other "I" statement reports

- Recognizing that the evidence of harm is often sparse, the USPSTF procedure manual suggests conditions under which harm can be **inferred** even if **evidence is lacking**.
- The harms of ASD screening and subsequent interventions are **likely** to be small based on evidence regarding ASD prevalence, accuracy of screening, and effectiveness of behavioral interventions, yet interventions can place a large time and financial burden on families, and if children identified by screening (vs. parental or clinician concern) will experience similar benefits from early intervention.

Discussion

USPSTF "I" statements often prioritize **Classification Error** and **Overdiagnosis**, over Opportunity Costs and Direct Harms.

Classification Error, or *Diagnostic Error* in the example of ASD, relates to concern about the possibility that ASD screening can lead to both false positive and false negative errors.

> "The validity of [studies of the accuracy of prominent ASD screening instruments] was weakened somewhat by the high dropout rate between screening steps but was still reasonably high for mass screening."
>
> "There are **no data** on the specificity or negative predictive value of these screening tools."

- *False positive errors* **could** expose families to stigma and unnecessary, timely, and costly services.
- *False negative errors* **could** delay other needed services through inappropriate reassurance.

Overdiagnosis of correct ASD diagnoses that will *not* provide benefit.

Contributing Factors:
- Dissemination of ASD screening to asymptomatic populations
- Growing awareness and an accompanying reduction in stigma
- Improvement of diagnostic procedures and changes in diagnostic criteria
- Potential for biased clinical judgement

- The heterogeneity in ASD could be associated with varied response to treatment, making it difficult to determine population-wide benefit.

Conclusion

- Harms and benefits from screening may look very different in different populations.
- ASD screening is one element in a larger system of care. Without the potential for benefit (and sufficient resources in place) it is unnecessary to subject an individual to the shame and/or stigma that may result.

Future Directions

- High quality studies on: 1) the intermediate and long-term health outcomes of children without obvious signs and symptoms and whether earlier identification is associated with clinically important improvements; 2) patients who receive no benefit from accurate ASD diagnosis; and 3) the **potential** harms of ASD screening.

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