Evidence brief

Demand management in radiology

18 June 2024

Evidence check question

What are the demand management strategies for radiology services?

Summary

- Concepts and practices that are relevant to the issue of demand management in medical imaging include low-value imaging, overuse, misuse, non-productive use, and unnecessary or inappropriate use.[1]
- Low-value imaging practices add little to no benefit to the management and outcomes of patients.[2]
- Internationally, the proportion of low-value imaging ranged from 4% to 100% depending on the specific body areas being examined, patient diagnosis, jurisdictions and clinical settings.[3]
  - Examinations with a high proportion of low-value imaging include: repeat head or routine trauma computed tomography (CT), echocardiography, magnetic resonance imaging (MRI) in hip, knee and upper extremity pain, CT or MRI in acute pancreatitis, and pre-op templar bone CT in cochlear implantation.[3]
- According to a 2021 systematic review, single or multi-component interventions that have shown to reduce low-value imaging by more than 30% include:[4]
  - Clinical decision support systems
  - Feedback to referrers
  - Multiple measures for referrers, imaging staff, and patients
  - Required action from referrers
  - Education
  - Specialist involved in ordering examinations
  - Education and guideline implementation for referrers and imaging staff
  - Combination of new clinical procedures
  - Education, feedback and hand-outs
  - Guideline implementation
  - Education, alerts and new procedures for referrers
  - Health information exchange
- Most interventions target the referring physicians (Figure 1, Appendix).

- Multi-component interventions are more likely to be effective than single-component interventions.[4]
- Targeting high-referrers of low-value imaging is a promising strategy.[2]
  - An Australian study investigating the effect of individualised audit and feedback to high-requesting GPs (top 20% of GP referrers for 11 targeted musculoskeletal imaging tests) found that sending written letters to GPs about their ordering rate comparisons with peers can significantly decrease the overall rate of requests over 12 months.[5]
- According to a 2022 systematic review, interventions in emergency departments (EDs) that were shown to consistently reduce CT usage included:[6]
  - diagnostic pathways
  - alternate test availability
  - specialist involvement
  - provider feedback.
- There is emerging evidence that machine learning and deep-learning based methods for clinical decision support and auto-vetting the appropriateness of imaging referrals can help to curb the low-value and inappropriate use of imaging examinations.[7-9]
  - In Ireland, a point-of-care clinical decision support tool that incorporates radiology appropriateness guidance into physician workflow for head and neck specialist referrers has resulted in:[9]
    - a reduction in absolute advanced imaging volume by 8.2%
    - a reduction in duplicate CT and MRI imaging by 61%.

Contributors to low-value or wasteful imaging or overuse:[1, 10-13]

- Financial incentives or fee-for-service to perform the imaging and no incentives for refusing
- Lack of guidelines
- Lack of details on medical indication for imaging in clinical guidelines and diagnostic pathways
- Health services working in silos and local protocols and routines that encourage retaking images locally
- Inadequate information technology infrastructure for image storage and communication
- Lack of national shared image archive
- Retaking, rejecting or not using images for diagnostic purposes
- Duplicate ordering
- Repeated examinations at too short time intervals
- Examinations ordered before patient examination
- Imaging without sufficient clinical information
- Screening examinations not supported by high-quality evidence
- Difficulties and time-constraints in imaging departments contacting the referrers and vice-versa referrers contacting the imaging department for feedback

- Lack of competence about different modalities and the consequences of imaging among referrers
- Excessive confidence among referrers on the value of imaging and technology
- Exaggerated expectations from patients and their families
- Referrers avoiding saying no to patient demands
- Defensive medicine – referrers being afraid of making mistakes and requesting imaging to be on the safe side or to buy time
- Poor referral quality which lack relevant information to evaluate the appropriateness of the imaging
- More time-consuming to reject imaging referral which may come back with a re-referral than just accept
- Industry promotions and marketing

Methods

PubMed search terms

(("wasteful"[Title] OR "overuse"[Title] OR "low-value"[Title] OR "overutilisation"[Title] OR "overuse"[Title] OR "unnecessary"[Title] OR "inappropriate"[Title]) AND ("imaging"[Title] OR "radiology"[Title])) AND (2018:2024[pdat])

143 hits on 20 February 2024

Google search terms

Key terms: demand management in radiology, low-value imaging, wasteful imaging, overuse of imaging

Appendix

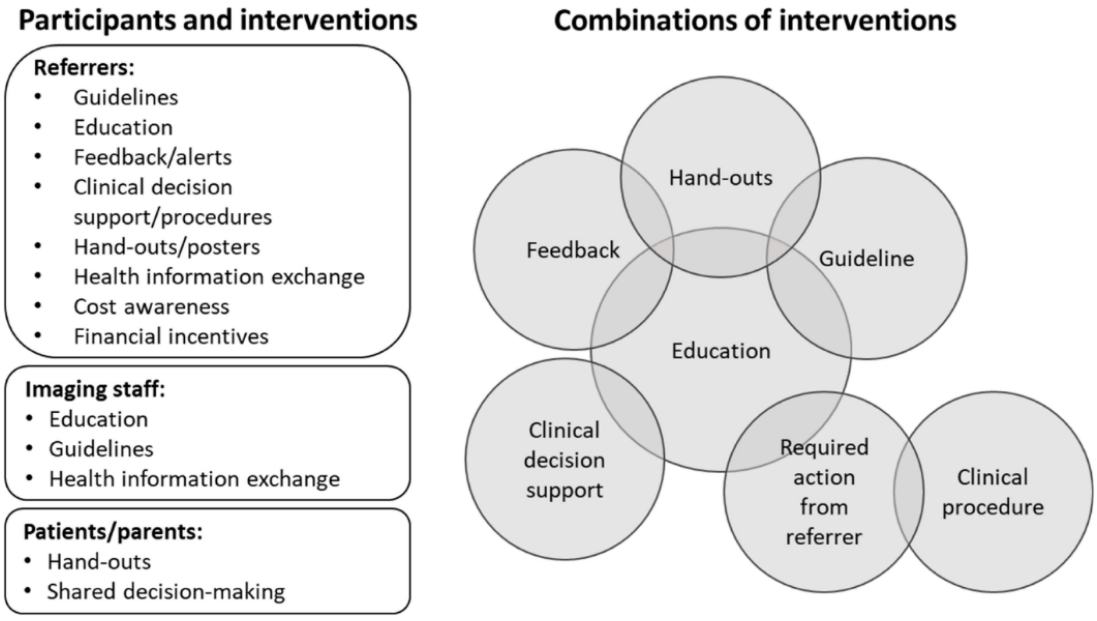

Figure 1. Overview of participants, interventions and combinations in multi-component interventions (Source: Interventions to reduce low-value imaging – a systematic review of interventions and outcomes by Kjelle et al. under a Creative Commons Attribution 4.0 International License[4]).

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