

Additional file 2: Original framework [1]

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| 1.0 | Health policy and organization |
| 1.1 | Politics |
| 1.2 | Laws and regulations |
| 1.3 | Government |
| 1.4 | Social economics |
| 1.5 | Organisation of healthcare services |
| 1.6 | Access to services |
| 1.7 | Capacity and prioritising |
| 1.8 | Resources |
| 1.9 | Logistics |
| 1.10 | Financial incentives |
| 1.11 | Guidelines and patient pathways |
| 1.12 | Routines |
| 1.13 | Roles and tasks |
| 1.14 | Time constrains |
| 1.15 | Patient economics |
| 1.16 | Justice |
| 1.17 | Dignity |
| 1.18 | Management |
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| 2.0 | Quality in health care services |
| 2.1 | Value for patients and next of kin |
| 2.2 | Value for referrers |
| 2.3 | Value for society |
| 2.4 | Estimation of benefits vs. costs |
| 2.5 | Referral quality |
| 2.6 | Efficiency vs. quality |
| 2.7 | Risks |
| 2.8 | Quality indicators |
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| 3.0 | Knowledge and competence |
| 3.1 | Knowledge |
| 3.2 | Competence |
| 3.3 | Lack of competence |
| 3.4 | Research |
| 3.5 | Evidence |
| 3.6 | Opportunity to stay up to date |
| 3.7 | Access to information |
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| 4.0 | Interaction and communication |
| 4.1 | Dialogue between patient and referrer |
| 4.2 | Dialogue between hospital referrers and radiologists |
| 4.3 | Dialogue between GPs and radiologists |
| 4.4 | Dialogue between colleagues in the same discipline |
| 4.5 | Trust |
| 4.6 | Co-selection |
| 4.7 | Interaction |
| 4.8 | IT-systems |
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| 5.0 | Attitude and culture |
| 5.1 | Prioritisation challenges |
| 5.2 | Expectations to the radiological department |
| 5.3 | Defensive medicine |
| 5.4 | Management of uncertainties |
| 5.5 | Examination hierarchy |
| 5.6 | Professional ambition |
| 5.7 | Market-driven thinking |
| 5.8 | Expectations and desires |
| 5.9 | Resignation |
| 5.10 | Awareness |
| 5.11 | Willingness to change |
| 5.12 | Discretionarily assessments |

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| 5.13 | Healthcare professionals' authority |
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| 6.0 | Measures for reducing low-value imaging |
| 6.1 | Consciousness-raising |
| 6.2 | Better interaction |
| 6.3 | Better communication |
| 6.4 | Guidelines and patient pathways |
| 6.5 | Decision support |
| 6.6 | Internal invoicing |
| 6.7 | Dedicated imaging slots |
| 6.8 | Revisions |
| 6.9 | Common IT-systems |
| 6.10 | Referral assessment |
| 6.11 | Feedback/guidance |
| 6.12 | Rejections |
| 6.13 | Education and courses |
| 6.14 | Discussion groups |
| 6.15 | Await/make plans |
| 6.16 | Change the financial system |
| 6.17 | Change in management |
| 6.18 | Right to order imaging |
| 6.19 | Multimodal measures |
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| 7.0 | Measure characteristics /effects |
| 7.1 | Process |
| 7.2 | Complexity |
| 7.3 | Respect/ownership |
| 7.4 | Targeted |
| 7.5 | Include relevant parties |
| 7.6 | Duration/effect |
| 7.7 | Simple and low resource-intensive |
| 7.8 | Awareness |

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| 7.9 | Whom the measure should be directed to |
| 7.10 | How the measure is received/experienced |
| 7.11 | Enforceability |

Reference

1. Andersen ER, Hofmann BM, Kjelle E: **Reducing low-value radiological services in Norway –a qualitative multi-professional study on measures and facilitators for change.** *BMC Health Services Research* 2022, **22**(1):678.