Article:
Minchin, Mark, Wilkinson, Chris orcid.org/0000-0003-0748-0150, Aktaa, Suleman et al. (1 more author) (2024) Quality indicators for improved cardiovascular care:learnings from the National Institute for Health and Care Excellence. European Heart Journal — Quality of Care & Clinical Outcomes. ISSN 2058-1742

https://doi.org/10.1093/ehjqcco/qcae097

Title: Quality indicators for improved cardiovascular care: learnings from the National Institute for Health and Care Excellence

Authors: Mark Minchin (0000-0002-2778-6627)[1], Chris Wilkinson (0000-0003-0748-0150)[2,3], Suleman Aktaa (0000-0002-9854-481X)[4], Chris P Gale (0000-0003-4732-382X)[5,6,7]

Affiliations:

1. National Institute for Health and Care Excellence, Centre for Guidelines, Manchester, UK
2. Hull York Medical School, University of York, York, UK
3. Academic Cardiovascular Unit, South Tees NHS Foundation Trust, Middlesbrough, UK
4. Department of cardiology, St. Paul's Hospital, Vancouver, BC, Canada
5. Leeds Institute of Cardiovascular and Metabolic Medicine, University of Leeds, Leeds, UK
6. Leeds Institute for Data Analytics, University of Leeds, Leeds, UK
7. Department of Cardiology, Leeds Teaching Hospitals NHS Trust, Leeds, UK

Correspondence: Mark Minchin, National Institute for Health and Care Excellence, Level 1A, City Tower, Piccadilly Plaza, Manchester, M1 4BT. mark.minchin@nice.org.uk

Key words: Pay for performance; financial incentives; healthcare quality; quality indicators.

Background

The necessity for improvement in the quality of care has led to increased attention to the measurement and reporting of processes of care and patient outcomes. The European Society of Cardiology (ESC) recognises this and has developed quality indicators (QIs) to evaluate the management of a range of common cardiovascular conditions,[1-11] based upon a standardised methodology.[12,13]

This work built upon international experiences including the United Kingdom's National Health Service (NHS), which implemented the Quality and Outcomes Framework (QOF) in 2004. The QOF is a voluntary annual reward and incentive programme for general practices, and forms part of practices' basic income. At the time of its introduction, QOF was the largest healthcare-related pay-for-performance (P4P) scheme in the world,[14] and in 2023 the total value of QOF was £768 million.[15] Over time the scale and scope of financial incentives in the QOF has reduced,[16] and Scotland dismantled the framework altogether in 2016.
The involvement of the National Institute for Health and Care Excellence (NICE) in the QOF started in 2009 when they took on responsibility for indicator development. Twenty years of QOF provides an opportunity to reflect on what has been learnt that may inform future quality improvement work by the ESC.

What is pay-for-performance?

Pay-for-performance is broadly defined as a payment model that rewards healthcare providers for meeting pre-defined targets for specific indicators.[17] Ultimately, the goal of clinical guideline developers including NICE and the ESC is to improve patient care and outcomes through the implementation of high-quality evidence-based guidelines. P4P can help achieve this goal, and is now used within healthcare systems in England, Germany, France, Australia, New Zealand, North America, South America and Canada.[18,19]
A methodologically robust and transparent approach, accompanied by careful testing of QIs intended for use in P4P frameworks mitigates the risk of unintended consequences, a risk which may be higher where performance-related payment is implicated.

Benefits and limitations of the QOF

The benefits and limitations of the QOF have been extensively discussed within the literature (Table 1). Benefits include a more structured and systematic approach to the care for a wide range of chronic conditions. However, this is potentially at the cost of being

disease focussed, protocolised, data-orientated and with an attendant risk of unintended consequences.[14,16,20-26]

Table 1. Benefits and limitations of the Quality and Outcomes Framework (QOF)

Benefits	Limitations
• Initial catalyst for computerisation • More structured care for chronic diseases • Modest improvements in care • Greater skill mix within general practices • Influenced care across almost all providers	• Focus on what can be measured • Single disease focus • De-professionalisation – prompts / tick box • Lack of continuous quality improvement • Sustainability when incentives removed

NICE involvement in the QOF

NICE took on responsibility for QOF indicator development in 2009. Previously, QOF indicators were developed by a group of appointed primary care experts (the "Expert Panel") supported by a group of clinicians.[27] As an independent organisation, the transfer of this responsibility to NICE allowed a more neutral approach, insulated from political pressures.[27] The transfer to NICE also fostered greater transparency, as committee meetings are open to public observers, and committee papers are available online (https://www.nice.org.uk/get-involved/meetings-in-public/indicator-advisory-committee). Under NICE, potential QOF indicators are frequently piloted in around 30 representative general practices in the UK. This process helps to remove the risk of post-implementation problems with indicators,[14] but may result in longer indicator development times. The first QOF indicators developed by NICE went live in April 2011.

NICE indicator development

The NICE indicator development programme operates according to the core NICE principles, with a transparent and robust methodology available in an 'indicator process guide'.[28] The key principles of P4P indicator development include: evidence base; an independent advisory committee; user input; transparency; consultation; and regular review.

Evidence base

The NICE P4P indicators measure processes of medical care that are linked to improved outcomes (such as blood pressure monitoring) or intermediate clinical outcomes (such as blood pressure control). Process indicators are evidence-based and underpinned by NICE quality standards, NICE guidance or other sources of high-quality evidence such as guidance from the United Kingdom's National Screening Committee.

Since 2004 the QOF in England has contained a small number of outcome indicators, although over time it has become apparent that indicators with small denominators can be subject to random variation in achievement, and therefore payment may not accurately reflect patient care.[26] Therefore, although an indicator may have a strong link to the evidence base, challenges associated with small denominators at individual provider (practice level) may make it unsuitable for use in the QOF.

Independent advisory committee and user input

The development of NICE indicators is led by the Indicator Advisory Committee, who are volunteers independent of employment by NICE (https://www.nice.org.uk/get-involved/meetings-in-public/indicator-advisory-committee-iac/iac-members). The committee membership comprises a range of backgrounds including GPs, commissioners (payers), primary and secondary care health professionals, lay members, researchers, public health specialists and quality improvement experts.[29]

Additional topic experts (often including guideline developers) are invited to attend the committee to advise members on a topic-by-topic basis and to assist in discussions. The standing committee review all topics, and the diverse membership ensures that generalists and specialists work together to develop robust evidence-based and clinically useful indicators, supported by experts from within NICE.

Transparency and consultation

Since the start of NICE's involvement in developing indicators for use in the QOF, all committee meetings have been open to public observers to allow transparency of the evidence that is under consideration and the decision-making process. This has removed some of the previous mystique around the indicator development process.[27] The Covid-19

pandemic was a catalyst to enabling the meetings to be available via an online platform, which has increased the accessibility to public observers.

A wide range of stakeholders are consulted for their views on draft indicators, which is felt to improve the content, generalisability, and acceptability of the final product.

Regular review

Indicators are reviewed by NICE QI staff on a regular rota, and when an associated guideline is updated. A summary of the NICE evaluation is presented to the Independent Advisory Committee to consider whether an indicator remains applicable, requires re-consideration, or should be withdrawn.

How do NICE systematically assess the validity of indicators?

The latest update to the NICE indicator process guide was published in December 2019, and included the addition of a framework to help appraise the validity of indicators based on work by MacLean *et al* (Table 2).[13] The framework supports the NICE advisory committee to consistently and systematically assess a range of indicators, whilst also providing assurance to external users that the indicators are meaningful and likely to result in improved care.

Table 2: National Institute for health and Care Excellence criteria to appraise the validity of pay-for-performance indicators

Domain	Criteria
Importance	The indicator reflects a specific priority area identified by NHS England or Department of Health and Social Care. The indicator relates to an area where there is known variation in practice. The indicator is likely to lead to a meaningful improvement in outcomes. The indicator addresses under or over-treatment.
Evidence base	The indicator is derived from a high-quality evidence base. The indicator aligns with the evidence base.
Specification	The indicator has defined components necessary to construct the indicator, including numerator, denominator and exclusions.

	The indicator has a minimum population level.
Feasibility	The indicator is repeatable. The indicator is measuring what it is designed to measure. The indicator uses existing data fields, or the burden of additional data collection is acceptable.
Acceptability	The indicator assesses performance that is attributable to or within the control of the audience. The results of the indicator can be used to improve practice.
Risk	The indicator has an acceptable risk of unintended consequences.
Adapted from MacLean et al.[13]	

P4P indicators published alongside clinical guidelines

Historically, NICE has published indicators following guideline publication. However, in December 2023 the update of NICE's guideline on cardiovascular disease risk assessment and lipid modification included a new indicator that could be used to support quality improvement in managing cholesterol, which was published within the clinical guideline.[30,31] This new NICE indicator was included in the 2024/25 QOF with financial incentives attached (box 1).

Box 1

NICE guideline: Cardiovascular disease: risk assessment and reduction, including lipid modification

NICE guideline recommendation: For secondary prevention of cardiovascular disease, aim for low-density lipoprotein (LDL) cholesterol levels of 2.0 mmol per litre or less, or non-HDL cholesterol levels of 2.6 mmol per litre or less.

NICE P4P indicator: The percentage of patients with cardiovascular disease in whom the last recorded LDL cholesterol level (measured in the preceding 12 months) is 2.0 mmol per litre or less, or last recorded non-HDL cholesterol level (measured in the preceding 12 months) is 2.6 mmol per litre or less, if LDL cholesterol is not recorded.

ESC quality indicators

The ESC tends to avoid providing P4P specifications for their QIs at the development stage. For instance, the ESC QI for preventive cardiology,[32] which accompanied the respective clinical practice guidelines,[33] did not detail P4P implementation (Box 2). This is important given that the ESC QIs are designed to have international applicability across different healthcare systems. Local regulatory bodies and commissioning organisations may then be interested in creating a country-specific P4P strategy based upon some, or all, of the relevant ESC QIs based upon the available resources and health infrastructure locally.

Box 2

Main QI (6.1): Proportion of patients with established or high risk for atherosclerotic cardiovascular disease (ASCVD) who have low-density lipoprotein cholesterol (LDL-C) levels at or below that recommended for their estimated cardiovascular risk.

Numerator: Patients with established or high risk for ASCVD who have LDL-C levels at or below that recommended for their estimated cardiovascular risk.[a]

Denominator: Patients with established or high risk for ASCVD who have no contraindication, refusal, or history of intolerance to statins, ezetimibe and proprotein convertase subtilisin/kexin type 9 (PCSK9) inhibitors.

[a] *LDL_C targets for patients with established ASCVD is <1.4 mmol/L (55 mg/dL) and >50% reduction from baseline. LDL_C targets for patients with high risk for ASCVD is <1.8 mmol/L (70 mg/dL) and >50% reduction from baseline*

Tailored care

A criticism of QOF is that it does not incentivise person-centred care for patients with more complex conditions who may require greater individualised care planning.[34] For example, applying universal glycated haemoglobin (HbA1c) targets to all patients with diabetes regardless of their co-morbidities may risk incentivising under- or over-treatment.[35,36] However, to avoid the potential of disadvantaging patients or practices, healthcare providers may record that a patient should not be considered as part of the denominator for an indicator, for example, because they have declined the healthcare intervention, or it is contra-indicated. Some indicators may explicitly exclude a population where benefit and risk may differ, for example: the percentage of patients with diabetes *without moderate or severe frailty* in whom the last IFCC-HbA1c was 58 mmol/mol or less in the preceding 12 months.[37]

Opportunities for improving quality of care

The mission of the ESC is to reduce the burden of cardiovascular disease. It is apparent that in Europe the evidence-practice gap for some cardiovascular diseases and interventions is wide and geographically variable. This in itself suggests that the second translational gap for cardiovascular disease is modifiable. New interventions, behaviours and skills are now required to address this; learnings can be sought from others, including NICE. Whilst the political approach to health care improvement is, in part, dependent upon local government, the ESC QIs can be used by healthcare professionals to advocate for quality improvement initiatives at scale.

Future challenges

The main goal for any future initiatives in this space may aim to unify the methods by which quality of care is measured for common cardiovascular diseases and interventions. Such a global and multi-societal collaboration creates an opportunity to standardise quality indicators and thus facilitates comparative analyses across borders. Harmonising the quality measures in various clinical settings and healthcare systems help understand the specific challenges for their implementation, and thus drives the development of tailored approaches to overcome these challenges in practice.

Conclusion

The widespread use of QIs has the potential to improve the provision of high-quality, evidence-based care across a wide range of conditions, and so improve patient outcomes and health-system performance. With 15 years' experience of developing quality indicators NICE have significant expertise in the development of quality indicators. This internal capability is supplemented and amplified through NICE working with an independent advisory committee. The transparent approach taken by NICE has allowed international groups including the ESC to build on this work, which in turn has allowed NICE to learn from the approaches taken by others.

References

1. Abdin A, Wilkinson C, Aktaa S, Bohm M, Polovina M, Rosano G*, et al.* European Society of Cardiology quality indicators update for the care and outcomes of adults with heart failure. The Heart Failure Association of the ESC. *Eur J Heart Fail* 2024. doi: 10.1002/ejhf.3376
2. Arbelo E, Aktaa S, Bollmann A, D'Avila A, Drossart I, Dwight J*, et al.* Quality indicators for the care and outcomes of adults with atrial fibrillation. *Europace* 2021;**23**:494-495. doi: 10.1093/europace/euaa253
3. Aktaa S, Tzeis S, Gale CP, Ackerman MJ, Arbelo E, Behr ER*, et al.* European Society of Cardiology quality indicators for the management of patients with ventricular arrhythmias and the prevention of sudden cardiac death. *Europace* 2023;**25**:199-210. doi: 10.1093/europace/euac114
4. Ali N, Aktaa S, Younsi T, Beska B, Batra G, Blackman DJ*, et al.* European Society of Cardiology Quality indicators for the care and outcomes of adults undergoing transcatheter aortic valve implantation. *Eur Heart J Qual Care Clin Outcomes* 2024:qcae006. doi: 10.1093/ehjqcco/qcae006
5. Aktaa S, Gale CP, Brida M, Giannakoulas G, Kovacs G, Adir Y*, et al.* European Society of Cardiology quality indicators for the care and outcomes of adults with pulmonary arterial hypertension. Developed in collaboration with the Heart Failure Association of the European Society of Cardiology. *Eur J Heart Fail* 2023;**25**:469-477. doi: 10.1002/ejhf.2830
6. Grand J, Schiele F, Hassager C, Nolan JP, Khoury A, Sionis A*, et al.* Quality indicators for post-resuscitation care after out-of-hospital cardiac arrest: a joint statement from the Association for Acute Cardiovascular Care of the European Society of Cardiology, the European Resuscitation Council, the European Society of Intensive Care Medicine, and the European Society for Emergency Medicine. *Eur Heart J Acute Cardiovasc Care* 2023;**12**:197-210. doi: 10.1093/ehjacc/zuad006
7. Lee GA, Aktaa S, Baker E, Gale CP, Yaseen IF, Gulati G*, et al.* European Society of Cardiology quality indicators for the prevention and management of cancer therapy-related cardiovascular toxicity in cancer treatment. *Eur Heart J Qual Care Clin Outcomes* 2022;**9**:1-7. doi: 10.1093/ehjqcco/qcac070
8. Gencer B, Gale CP, Aktaa S, Halvorsen S, Beska B, Abdelhamid M*, et al.* European Society of Cardiology quality indicators for the cardiovascular pre-operative assessment and management of patients considered for non-cardiac surgery. Developed in collaboration with the European Society of Anaesthesiology and Intensive Care. *Eur Heart J Qual Care Clin Outcomes* 2023;**9**:331-341. doi: 10.1093/ehjqcco/qcac057
9. Aktaa S, Gencer B, Arbelo E, Davos CH, Desormais I, Hollander M*, et al.* European Society of Cardiology Quality Indicators for Cardiovascular Disease Prevention: developed by the Working Group for Cardiovascular Disease Prevention Quality Indicators in collaboration with the European Association for Preventive Cardiology of the European Society of Cardiology. *Eur J Prev Cardiol* 2022;**29**:1060-1071. doi: 10.1093/eurjpc/zwab160
10. Aktaa S, Abdin A, Arbelo E, Burri H, Vernooy K, Blomstrom-Lundqvist C*, et al.* European Society of Cardiology Quality Indicators for the care and outcomes of cardiac pacing: developed by the Working Group for Cardiac Pacing Quality Indicators in collaboration with the European Heart Rhythm Association of the European Society of Cardiology. *Europace* 2022;**24**:165-172. doi: 10.1093/europace/euab193
11. Schiele F, Aktaa S, Rossello X, Ahrens I, Claeys MJ, Collet JP*, et al.* 2020 Update of the quality indicators for acute myocardial infarction: a position paper of the Association for Acute Cardiovascular Care: the study group for quality indicators from the ACVC and the NSTE-ACS guideline group. *Eur Heart J Acute Cardiovasc Care* 2021;**10**:224-233. doi: 10.1093/ehjacc/zuaa037

12. Aktaa S, Batra G, Wallentin L, Baigent C, Erlinge D, James S*, et al.* European Society of Cardiology methodology for the development of quality indicators for the quantification of cardiovascular care and outcomes. *Eur Heart J Qual Care Clin Outcomes* 2022;**8**:4-13. doi: 10.1093/ehjqcco/qcaa069
13. MacLean CH, Kerr EA, Qaseem A. Time Out - Charting a Path for Improving Performance Measurement. *N Engl J Med* 2018;**378**:1757-1761. doi: 10.1056/NEJMp1802595
14. Roland M, Guthrie B. Quality and Outcomes Framework: what have we learnt? *BMJ* 2016;**354**:i4060. doi: 10.1136/bmj.i4060
15. NHS England. NHS Payments to General Practice, England 2022/23. https://digital.nhs.uk/data-and-information/publications/statistical/nhs-payments-to-general-practice/england-2022-23
16. Morales DR, Minchin M, Kontopantelis E, Roland M, Sutton M, Guthrie B. Estimated impact from the withdrawal of primary care financial incentives on selected indicators of quality of care in Scotland: controlled interrupted time series analysis. *BMJ* 2023;**380**:e072098. doi: 10.1136/bmj-2022-072098
17. Mathes T, Pieper D, Morche J, Polus S, Jaschinski T, Eikermann M. Pay for performance for hospitals. *Cochrane Database Syst Rev* 2019;**7**:CD011156. doi: 10.1002/14651858.CD011156.pub2
18. Jamili S, Yousefi M, Pour HE, Houshmand E, Taghipour A, Tabatabaee SS*, et al.* Comparison of pay-for-performance (P4P) programs in primary care of selected countries: a comparative study. *BMC Health Serv Res* 2023;**23**:865. doi: 10.1186/s12913-023-09841-6
19. Russo LX, Powell-Jackson T, Maia Barreto JO, Borghi J, Kovacs R, Gurgel Junior GD*, et al.* Pay for performance in primary care: the contribution of the Programme for Improving Access and Quality of Primary Care (PMAQ) on avoidable hospitalisations in Brazil, 2009-2018. *BMJ Glob Health* 2021;**6**:e005429. doi: 10.1136/bmjgh-2021-005429
20. Chew-Graham CA, Hunter C, Langer S, Stenhoff A, Drinkwater J, Guthrie EA*, et al.* How QOF is shaping primary care review consultations: a longitudinal qualitative study. *BMC Fam Pract* 2013;**14**:103. doi: 10.1186/1471-2296-14-103
21. Mendelson A, Kondo K, Damberg C, Low A, Motuapuaka M, Freeman M*, et al.* The Effects of Pay-for-Performance Programs on Health, Health Care Use, and Processes of Care: A Systematic Review. *Ann Intern Med* 2017;**166**:341-353. doi: 10.7326/M16-1881
22. Doran T, Kontopantelis E, Valderas JM, Campbell S, Roland M, Salisbury C*, et al.* Effect of financial incentives on incentivised and non-incentivised clinical activities: longitudinal analysis of data from the UK Quality and Outcomes Framework. *BMJ* 2011;**342**:d3590. doi: 10.1136/bmj.d3590
23. Lester H, Matharu T, Mohammed MA, Lester D, Foskett-Tharby R. Implementation of pay for performance in primary care: a qualitative study 8 years after introduction. *Br J Gen Pract* 2013;**63**:e408-415. doi: 10.3399/bjgp13X668203
24. Minchin M, Roland M, Richardson J, Rowark S, Guthrie B. Quality of Care in the United Kingdom after Removal of Financial Incentives. *N Engl J Med* 2018;**379**:948-957. doi: 10.1056/NEJMsa1801495
25. NHS England. General Practice Forward View. https://www.england.nhs.uk/publication/general-practice-forward-view-gpfv/
26. NHS England. Report of the Review of the Quality and Outcomes Framework in England. 2018. doi:
27. Lester H, Campbell S. Developing Quality and Outcomes Framework (QOF) indicators and the concept of 'QOFability'. *Qual Prim Care* 2010;**18**:103-109. doi:
28. National Institute for Health and Care Excellence. NICE indicator process guide. 2019. doi:

29. National Institute for Health and Care Excellence. Indicator advisory committee members. https://www.nice.org.uk/get-involved/meetings-in-public/indicator-advisory-committee-iac/iac-members
30. National Institute for Health and Care Excellence. Cardiovascular disease: risk assessment and reduction, including lipid modification. NICE guideline [NG238]. https://www.nice.org.uk/guidance/ng238
31. National Institute for Health and Care Excellence. Cardiovascular disease prevention: cholesterol treatment target (secondary prevention). NICE indicator. IND268. 2023. doi:
32. Aktaa S, Gencer B, Arbelo E, Davos CH, Désormais I, Hollander M*, et al.* European Society of Cardiology Quality Indicators for Cardiovascular Disease Prevention: developed by the Working Group for Cardiovascular Disease Prevention Quality Indicators in collaboration with the European Association for Preventive Cardiology of the European Society of Cardiology. *Eur J Prev Cardiol* 2022;**29**:1060-1071. doi: 10.1093/eurjpc/zwab160
33. Visseren FLJ, Mach F, Smulders YM, Carballo D, Koskinas KC, Bäck M*, et al.* 2021 ESC Guidelines on cardiovascular disease prevention in clinical practice: Developed by the Task Force for cardiovascular disease prevention in clinical practice with representatives of the European Society of Cardiology and 12 medical societies With the special contribution of the European Association of Preventive Cardiology (EAPC). *European Heart Journal* 2021;**42**:3227-3337. doi: 10.1093/eurheartj/ehab484
34. Close J, Byng R, Valderas JM, Britten N, Lloyd H. Quality after the QOF? Before dismantling it, we need a redefined measure of 'quality'. *British Journal of General Practice* 2018;**68**:314-315. doi: 10.3399/bjgp18X697589
35. Kearney M, Treadwell J, Marshall M. Overtreatment and undertreatment: time to challenge our thinking. *Br J Gen Pract* 2017;**67**:442-443. doi: 10.3399/bjgp17X692657
36. Strain WD, Hope SV, Green A, Kar P, Valabhji J, Sinclair AJ. Type 2 diabetes mellitus in older people: a brief statement of key principles of modern day management including the assessment of frailty. A national collaborative stakeholder initiative. *Diabet Med* 2018;**35**:838-845. doi: 10.1111/dme.13644
37. National Institute for Health and Care Excellence. NICE indicator 179, diabetes, HbA1c 58 mmol/mol. https://www.nice.org.uk/indicators/ind179-diabetes-hb-a1c-58-mmol-mol