Implementation of the updated NICE haematological cancers (NG47) improving outcomes guidelines across Specialist Integrated Haematological Malignancy Diagnostic Services (SIHMDS) in England: a UK NEQAS LI survey

Ashley Cartwright,1 John A Snowden,2,3 Helen Whitehouse,1 Stuart Scott,1 Liam Whitby1

Aims Haematological malignancies represent a diverse group of diseases with complex diagnostic requirements. National Institute for Health and Care Excellence (NICE) Haematological Cancer: Improving Outcomes Guidance was published in 2003 and updated in 2016 (NG47), providing recommendations for service delivery including Specialist Integrated Haematological Malignancy Diagnostic Services (SIHMDSs). This survey assessed the implementation of NG47 guidelines, with a specific focus on implementation in relation to laboratory SIHMDS delivery.

Methods A survey was issued to the 17 SIHMDSs identified in England. The questionnaire covered laboratory configuration, information systems, integrated reporting and multidisciplinary team (MDT) working recommendations.

Results In the 10 responding SIHMDS, full implementation of recommendations was not achieved. Higher levels of implementation were reported in ‘colocated’ services compared with ‘networked’ SIHMDS. Increased guideline implementation was reported with longer duration since initial establishment of a SIHMDS and for laboratory based as opposed to clinical (MDT) reporting recommendations.

Conclusions Our survey highlights variable implementation of NICE guidance across SIHMDS, with higher levels of implementation in ‘colocated’ services compared with ‘networked’ SIHMDS. Increased guideline implementation was reported with longer duration since initial establishment of a SIHMDS and for laboratory based as opposed to clinical (MDT) reporting recommendations.

Updated IOG was published in 2016, which developed the original recommendations under the term Specialist Integrated Haematological Malignancy Diagnostic Service (SIHMDS). Supporting evidence for the updated guidelines included cost-effectiveness analysis of SIHMDS in comparison to single-pathology disciplines. The guidelines aimed to promote harmonisation of testing pathways available to patients diagnosed with haematological malignancy across England and provided the basis for the NICE Quality Standard (QS150) relating to SIHMDS provision across all ages.

Implementation of clinical guidelines can be impacted by educational-level, financial-level and organisational-level barriers rarely allowing complete adoption. The implementation and...
uptake of NICE guidance have been previously reviewed in relation to cancer diagnosis preguideline and postguideline implementations.11 Despite the barriers faced, the study suggested that implementation of guidelines led to a reduction in the cancer diagnostic interval (duration from symptomatic presentation to diagnosis). This finding indicates that while implementation of guidelines is complex, patient-based clinical outcomes can be improved with their implementation. Levels of guideline implementation have also been assessed across other healthcare sites. The physical distance reported between laboratories one operating across three sites and two operating across five sites. SIHMDSs, three reported working across a single NHS site for service delivery, with one SIHMDS operating across two sites, one operating across three sites and two operating across five sites. The physical distance reported between laboratories operating as networked SIHMDS varied from 0.2 to 100.0 miles (median = 14.6 miles).

Overall compliance with the 32 recommendations assessed ranged from 46.9% to 84.4% when considering individual SIHMDS, with 73.1% average compliance observed across the 10 SIHMDS providers. When considering the implementation of NG47 guidelines across the two types of SIHMDS models, implementation in single-entity SIHMDS was 83.8%, with networked SIHMDS having 68.8% guideline implementation. Results of implementation rates across individual recommendations for single-entity and networked SIHMDS are detailed in table 1.

Further breakdown of the results showed that there were slight differences in overall implementation when considering the number of years an SIHMDS had been established. For SIHMDS established for 5–7 years, implementation was 70.3%; for SIHMDS established for 8–10 years, the implementation was 74.2%; and for SIHMDS established over 11 years ago, the overall implementation was 76.6%.

The SIHMDSs returning results all met the minimum population for providing a diagnostic service (>500 000), with two out of three (66.7%) of single-entity SIHMDS and six out of seven (85.7%) networked SIHMDS providing services for children (<16 years), young people (16–24 years) and adult (≥24 years) populations. The two SIHMDSs that do not deliver a service across all age groups do not provide haematological malignancy diagnostics for children. All SIHMDSs are accredited by a recognised independent organisation (United Kingdom Accreditation Service (UKAS)); however, networked SIHMDSs are only accredited as individual specialist pathology disciplines and not as a single accredited service providing haematological malignancy diagnostics.

The highest rates of overall implementation were observed with respect to assessment of the reporting recommendations. All single-entity SIHMDS services reported implementation of IT systems set up for integrated reporting, issuing final reports, containing all relevant information for disease management and send-away results being integrated into the final report. For networked SIHMDSs, these specific areas of the reporting recommendations returned a range of implementation rates. Five out of seven (71.4%) have a dedicated IT system for integrated reporting, with four (57.1%) issuing final integrated reports and incorporating send-away results into the final reports. Most importantly, only three of seven (42.8%) networked SIHMDSs issued final integrated reports containing all the relevant information for disease management.

Lowest rates of implementation were observed when reviewing clinical recommendations related to MDT meetings, particularly in relation to reviewing all newly diagnosed and all newly relapsed patients. Only one of the three single-entity SIHMDSs (3.3%) reported the implementation of recommendations reviewing all newly diagnosed and newly relapsed cases. Furthermore, one of the seven networked SIHMDSs (14.3%) reported the implementation of recommendations reviewing newly diagnosed cases, and none reported implementation of recommendations requiring review of all relapsed patient cases. In addition, low levels of implementation were observed when reviewing all SIHMDSs for cases of lymphocyte or plasma cell proliferation of uncertain significance (which overlap lymphoma and myeloma), with 33.3% of single-entity SIHMDSs reporting implementation and 42.8% of networked SIHMDSs. The review of all external quality assessment exercises and outcomes is not routinely discussed at MDT meetings, with 33.3% of single-entity SIHMDSs implementing this recommendation compared with 28.6% of networked SIHMDSs.
DISCUSSION
When the ‘Improving Outcomes in Haematological Cancers’ guidance document was first published in 2003, the NHS Cancer Plan15 was set out to reform approaches to cancer diagnostics15 with a view to delivering better prevention, detection and treatment in cancer care and reducing inequalities with standardisation.15

In our survey, data returns were received from 10 out of 17 SIHMDSs identified. While this may have been a limitation or a reflection of the reluctance of some individual SIHMDSs to respond to the survey, it may reflect the general picture of variable degrees of implementation of the NICE NG47 guidelines and quality standards. Our survey identified several key findings from the responding centres. Levels of implementation across the recommendations assessed within NG47 guidelines have not been fully achieved by any SIHMDS. Across the 10 SIHMDSs providers that responded, overall compliance with the 32 recommendations assessed was 73.1%. However, it

Table 1  Summary of implementation rates across individual recommendations for single-entity and networked SIHMDS

| NICE NG47 recommendations assessed | Compliance among single-entity SIHMDS (%) | Compliance among networked SIHMDS (%) | Overall compliance among all SIHMDS (%) |
|------------------------------------|------------------------------------------|--------------------------------------|----------------------------------------|
| Laboratory configuration recommendations |                                         |                                      |                                        |
| Should serve child, adolescent and adult populations | 2 (66.7) | 6 (85.7) | 8 (80.0) |
| Should serve a population of >500 000 | 3 (100.0) | 7 (100.0) | 10 (100.0) |
| Should be managed by a single trust | 2 (66.7) | 3 (42.8) | 5 (50.0) |
| Should have a central reception for all specimens | 3 (100.0) | 5 (71.4) | 8 (80.0) |
| Should have an IT system set up for specimen booking at central reception | 3 (100.0) | 6 (85.7) | 9 (90.0) |
| Should be accredited by recognised independent organisation | 3 (100.0) | 7 (100.0) | 10 (100.0) |
| Should have an IT system enabling two-way communication between SIHMDS and other healthcare professionals | 1 (33.3) | 4 (57.1) | 5 (50.0) |
| Overall implementation for laboratory configuration | 80.9% | 77.6% | 78.6% |
| Reporting recommendations |                                         |                                      |                                        |
| Should have an IT system set-up for integrated reporting | 3 (100.0) | 5 (71.4) | 8 (80.0) |
| Should have a full range of age-appropriate specialist haematologist and haematopathology input for diagnosis and report authorisation | 3 (100.0) | 6 (85.7) | 9 (90.0) |
| Should issue final integrated reports | 3 (100.0) | 4 (57.1) | 7 (70.0) |
| Final integrated reports should contain all disease management information. | 3 (100.0) | 3 (42.8) | 6 (60.0) |
| Diagnostic pathways should have a robust process for report validation including double reporting. | 3 (100.0) | 6 (85.7) | 9 (90.0) |
| Should issue and release individual reports prior to final integrated report if there is an urgent clinical need | 3 (100.0) | 6 (85.7) | 9 (90.0) |
| Send-away results sent to external laboratories should be integrated into the final report. | 3 (100.0) | 4 (57.1) | 7 (70.0) |
| Integrated reports should contain disease subtype reporting based on WHO guidelines. | 3 (100.0) | 6 (85.7) | 9 (90.0) |
| Overall implementation for report recommendations | 100% | 71.4% | 80% |
| Multidisciplinary meeting recommendations |                                         |                                      |                                        |
| MDTs should be undertaken at least once per week. | 3 (100.0) | 7 (100.0) | 10 (100.0) |
| MDTs should discuss all cases and integrated reports. | 2 (66.6) | 3 (42.8) | 5 (50.0) |
| MDTs should review all new diagnoses for integrated reporting. | 1 (33.3) | 1 (14.3) | 2 (20.0) |
| MDTs should review all newly relapsed patients for integrated reporting. | 1 (33.3) | 0 (0.0) | 1 (10.0) |
| MDTs should review all cases of diagnostic uncertainty for integrated reporting | 1 (33.3) | 5 (71.4) | 6 (60.0) |
| MDTs should discuss response to treatment during and completion of therapy. | 3 (100.0) | 5 (71.4) | 8 (80.0) |
| MDTs should assess disease extent (staging and prognosis) and probable course. | 3 (100.0) | 7 (100.0) | 10 (100.0) |
| MDTs should work out treatment plans for all new diagnosis and relapsed patients. | 3 (100.0) | 7 (100.0) | 10 (100.0) |
| MDTs should review treatment decisions made in the interval between MDTs. | 3 (100.0) | 4 (57.1) | 7 (70.0) |
| MDTs should discuss discontinuing treatment when effectiveness has become limited. | 3 (100.0) | 5 (71.4) | 8 (80.0) |
| MDTs should agree on dates for discussing patient progress. | 3 (100.0) | 4 (57.1) | 7 (70.0) |
| MDTs should discuss clinical trials and audit results. | 3 (100.0) | 5 (71.4) | 8 (80.0) |
| MDTs should review all SIHMDS reports of lymphocyte and plasma cell proliferation of uncertain significance (which overlap with lymphoma and myeloma). | 1 (33.3) | 3 (42.8) | 4 (40.0) |
| MDTs should review all SIHMDS reports of borderline conditions such as aplastic anaemia and other non-malignant bone marrow failure syndromes which may overlap with hypoplastic myelodysplastic syndrome. | 2 (66.6) | 5 (71.4) | 7 (70.0) |
| MDTs should record the minimum dataset for all cases of haematological malignancy within its specified catchment area, in line with the cancer registry. | 3 (100.0) | 6 (85.7) | 9 (90.0) |
| MDTs should discuss all EQA exercises and outcomes. | 1 (33.3) | 2 (28.6) | 3 (30.0) |
| GPs should be given information about their patients’ illness, treatment, changes in management and the names of MDT members responsible for their patients’ management. | 3 (100.0) | 7 (100.0) | 10 (100.0) |
| Overall implementation for MDT recommendations | 76.5% | 63.9% | 67.6% |
| Overall compliance with recommendations assessed | 83.8% | 68.8% | 73.1% |

EQA, External Quality Assessment; GP, general practitioner; IT, information technology; MDT, multidisciplinary team; NICE, National Institute for Health and Care Excellence; SIHMDS, Specialist Integrated Haematological Malignancy Diagnostic Services.
could be hypothesised that SIHMDSs returning data have the highest rates of implementation, and that non-returners have limited to no compliance. Given the proportion of data returns (58.8% of the identified SIHMDSs in England), overall compliance with the 32 recommendations could be as low as 43.0% when considering the whole SIHMDS cohort. When assessing laboratory set-up recommendations, compliance could be as low as 46%. For reporting recommendations and MDTs, the levels of compliance could be as low as 47% and 40.4%, respectively.

Furthermore, across the 10 responding SIHMDS providers, compliance with the recommendations ranged from 46.9% to 84.4%. Such variability has not been previously reported and is important in a number of respects. Equitable delivery of high-quality diagnostics has not been assured and may be at least inconsistent and possibly not adequately provided in some regions. With such variability, it is challenging to evaluate clinical benefits and health economic impact of the SIHMDS model on patient care and outcomes.

Additionally, findings from the survey suggest that implementation across single-entity or ‘colocated’ SIHMDS is more achievable than ‘networked’ SIHMDS. Our survey has highlighted that implementation of NG47 guidelines in single-entity SIHMDS was 83.8%, with networked SIHMDS having 68.8% guideline implementation. This was anticipated, that is, NG47 states recommendations are ‘most likely’ achieved if the pathology disciplines within a SIHMDS are located at a single site. However, NG47 does not state that SIHMDS ‘should’ be located at a single site, based on recognition of the barriers of providing a colocated service due to geographical and restructuring logistics, and most pathology disciplines having remits beyond haematological malignancy diagnostics. Networked SIHMDSs reported operating between physical distances with a median of 14.6 miles, ranging from 0.2 to 100.0 miles, potentially explaining the differences in implementation.

Since the publication of NG47, NHS England has developed its genomics services via genomic laboratory hubs within the NHS England regions. The newer sophisticated high-throughput genomic technologies have justified increasingly centralised service models. NG47 anticipated these developments, which are accommodated via networked models. Haematology-oncology genomic tumour advisory boards maintain operational links for integrated reporting with the regional SIHMDSs and thereby close links with clinical MDTs. As previously, some SIHMDSs straddle NHS regional boundaries, and local arrangements apply in these settings to ensure continuity of links between component services. Concurrent major service delivery model changes such as NG47 and the redesignation of genomic services have inevitably led to conflicting priorities and ultimately compromised complete implementation of either. Moving forward, further evolution of the SIHMDS model is required due to this rapidly changing diagnostic landscape that may impact colocated SIHMDS delivery.

Our survey reflects that integrated reporting across SIHMDS has improved with implementation of NG47, with 8 of 10 SIHMDS IT systems designed to enable integrated reporting and 7 out of 10 issuing final integrated reports using these bespoke IT systems (despite some also issuing individual reports). Overall, local reports may be issued in these SIHMDSs in cases of clinical urgency, with a final integrated report issued at a later date, once all results have been obtained in order to meet the WHO framework for disease diagnostics and classifications. However, while integrated reporting has improved since the publication of NG47 guidelines, there has been no full implementation of recommendations across all SIHMDS, despite the inclusion of reporting recommendations in 2003 guidance.

Low implementation rates across review of some disease-stage categories in MDT meetings are recognised in our survey, with low implementation of recommendations suggesting review of all cases, all newly diagnosed and newly relapsed patients. The reasons for the low levels of implementation are not within the scope of this study, although integrated diagnostic reports from networked services contained all disease management information in only three out of seven (42.8%) services. It has previously been recognised that accuracy of diagnosis through a multidisciplinary approach is an important factor in improving patient outcomes in haematological malignancy, ensuring correct treatment and prognostic pathways. As such, review of all cases, newly diagnosed and relapsed cases should routinely be performed as part of an MDT to ensure diagnostic accuracy and certainty, with all reports containing information relating to disease management.

Diagnostic reports should also contain disease subgroups based on evidence outlined in WHO framework for disease diagnostics and classifications. While 9 out of 10 SIHMDSs reported implementing this recommendation, SIHMDSs are using two different editions of the WHO Classification. Seven SIHMDSs are using the most recent edition of the guidelines (WHO Classification of Tumours of Haematopoietic and Lymphoid Tissues, Revised Fourth Edition, 2017). However, two SIHMDSs reported the use of the fourth edition, published in 2008. The difference in the guidelines is based on updated genetic information available as a result of the increased application of high-throughput genetic testing. Reporting of disease subtypes using the most updated classification system is important to ensure harmonisation of diagnostic provisions and prognosis for patients, aiding therapy selection and improving overall quality of care.

Low levels of implementation were also observed for the recommendation for MDTs to review all reports of lymphocyte and plasma cell proliferation of uncertain significance (which overlap with lymphoma and myeloma), with 4 out of 10 (40%) SIHMDSs reviewing these cases. While the reasons for implementation were not sought as part of this study, it has previously been recognised that accuracy in lymphoma diagnostics is problematic, with historical rates of diagnostic concordance ranging from 64% to 80%. In 2018, lymphoma was the most commonly diagnosed haematological malignancy, representing 50.5% diagnoses, with myeloma representing 18.0% of newly diagnosed haematological malignancies. Our findings suggest that improving the review of this disease subtype by MDT is required to aid in the prevention of incorrect diagnoses, particularly given the incidence of these diseases. In addition, 30% of SIHMDSs do not review all reports relating to borderline conditions such as aplastic anaemia and other non-malignant bone marrow failure syndromes which may overlap with hypoplastic myelodysplastic syndrome (MDS) complicating their diagnosis. Improving review of this disease subtype may improve diagnosis as, for example, approximately 10% of patients presenting with MDS have decreased marrow cellularity, suggestive of aplastic anaemia as a differential diagnosis. Accurate diagnosis with differentiation between MDS and aplastic anaemia has important prognostic and therapeutic implications.

To facilitate guideline implementation, NICE have introduced tools to allow healthcare services to monitor and track guideline implementation within a specific service. For the NG47 guidelines, these include provision of a baseline assessment tool that allows determination of whether practice is in line with the recommendations and assimilation of evidence to show that
clinical practice is in line with guidelines. NICE also provides general guidance regarding the practical steps to improving quality of care based on guidelines. However, the low rate of implementation of certain recommendations within NG47 guidelines suggests either that individual SIHMDS centres have deemed certain recommendations irrelevant to clinical practice, view certain recommendations as unachievable or have had to prioritise implementation of key recommendations. Although our survey was not designed to identify the barriers to implementation, these aspects require further exploration, but there are likely to be multiple factors, including NHS organisational aspects and financial restraints in delivering an appropriate operational structure, suitably trained personnel, laboratory facilities, advanced technologies and equipment, and integrated quality management/IT systems. While NICE states that it is not mandatory to apply all recommendations within guidelines, the overall aim of improving the quality of care through implementation suggests that increased guideline uptake results in improved quality of care and as such NICE could provide further assistance to aid increased implementation.

Several studies have previously identified issues with guideline implementation including the financial costs of implementation, personnel required to appraise guidelines and coordination of multidisciplinary groups necessary for implementation. Previously, attempts have been made to ensure implementation through development of guideline implementation planning checklists and reviews of implementation methods and approaches. Review of the barriers and strategies for guideline implementation has shown that providing a structured plan can improve implementation, and it is possible that this should be recommended for SIHMDS elements of NG47. This could be a framework-based outline, providing key recommendations requiring implementation in year 1 and then additional recommendations for services to focus on implementing for each subsequent year, with a view to having full implementation within 5–10 years. Although the findings in this study demonstrated that even SIHMDSs established >10 years are not fully implementing the guidelines, a framework-based approach could increase overall implementation.

Given the observed differences in the accreditation of SIHMDS in single-entity and networked services identified in this study, a framework-based, yearly outline could also provide a secondary purpose by acting as a basis for independent audit and accreditation bodies, such as UKAS, to perform assessments against agreed minimum standards. This would also drive SIHMDS to become accredited as a single service, as recommended in NG47 (but only partially implemented herein) rather than as individual specialist modalities. SIHMDS review of the outcomes of such accreditation assessment could identify factors for non-compliance with the NICE guidelines and quality standards and, where necessary, make a case (internally or externally) for additional resources to meet recommendations.

In conclusion, we have surveyed SIHMDSs in England and in the responders, complete NG47 guideline compliance has not been achieved by any SIHMDS. There is variable implementation of NICE guidance across individual SIHMDSs, with likely inequity of access, standardisation and quality in haematological oncology diagnostics. Provision of a more structured framework for guideline implementation could assist in increasing and monitoring compliance through accreditation to meet the goals of quality and equity of access to harmonised haematological-oncology diagnostic and prognostic services across the NHS in England. This would provide a basis for evaluating the clinical benefits and health economic impact of the SIHMDS model on patient care and outcomes.

Key messages

⇒ Implementation of NG47 guidelines was assessed among Specialist Integrated Haematological Malignancy Diagnostic Services (SIHMDS) within England, specifically relating to laboratory configuration, information systems, integrated reporting and multidisciplinary team working recommendations.

⇒ There was variable implementation of guidelines across individual SIHMDS, with likely inequity of access, standardisation and quality in haematological-oncology diagnostic and prognostic services across the NHS in England.

⇒ Provision of a more structured framework for guideline implementation could assist in increasing levels of implementation.

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ORCID iD Ashley Cartwright http://orcid.org/0000-0002-3516-9733

REFERENCES

1 National Cancer Registration and Analysis Service. CancerData: Incidence [Internet]. [cited 2021 Jun 8], 2018. Available: https://www.cancerdata.nhs.uk/incidence/base_numbers
2 Swerdlow SH, Campo E, Harris NL. WHO classification of tumours of haematopoietic and lymphoid tissues. Revised 4th. Lyon: IARC, 2017.
3 National Institute for Health and Care Excellence. Improving outcomes in haematological cancer (CSG3) [Internet]. [cited 2021 Jun 8], 2003. Available: https://www.nice.org.uk/guidance/csg3
4 National Institute for Health and Care Excellence. Haematological cancers: improving outcomes (NG47) [Internet]. [cited 2021 Jun 8], 2016. Available: https://www.nice.org.uk/guidance/ng47
5 Snowden IA, O’Connell S, Hawkins I, et al. Haematological cancers: improving outcomes. A summary of updated NICE service guidance in relation to specialist integrated haematological malignancy diagnostic services (SIHMDS). J Clin Pathol 2017;70:461–8.
6 Dalley C, Basarir H, Wright JG, et al. Specialist integrated haematological malignancy diagnostic services: an activity based cost (ABC) analysis of a networked laboratory service model. J Clin Pathol 2015;68:292–300.
7 National Institute for Health and Care Excellence. Haematological cancers: Quality standard [Q5150] [Internet]. [cited 2021 Jul 14], 2017. Available: https://www.nice.org.uk/guidance/qs150/chapter/Quality-statements

Cartwright A, et al. J Clin Pathol 2023;76:618–623. doi:10.1136/jclinpath-2021-208075
8 Forsner T, Hansson J, Brommels M, et al. Implementing clinical guidelines in psychiatry: a qualitative study of perceived facilitators and barriers. *BMC Psychiatry* 2010;10:8.

9 Grol R, Wensing M. What drives change? barriers to and incentives for achieving evidence-based practice. *Med J Aust* 2004;180:57–60.

10 Graham ID, Logan J, Harrison MB, et al. Lost in knowledge translation: time for a MAP? *J Contin Educ Health Prof* 2006;26:13–24.

11 Neal RD, Din NU, Hamilton W, et al. Comparison of cancer diagnostic intervals before and after implementation of NICE guidelines: analysis of data from the UK general practice research database. *Br J Cancer* 2014;110:584–92.

12 Mears A, Kendall T, Strathdee G, et al. Progress on NICE guideline implementation in mental health trusts: meta-analyses. *Psychiatr Bull* 2008;32:383–7.

13 Ince P, Haddock G, Tai S. A systematic review of the implementation of recommended psychological interventions for schizophrenia: rates, barriers, and improvement strategies. *Psychol Psychother* 2016;89:324–50.

14 AIX L, Michail M, Quaderi SA. Implementation of NICE clinical guideline 95 for assessment of stable chest pain in a rapid access chest pain clinic reduces the mean number of investigations and cost per patient. *Open Hear* 2015;2:e000151.

15 Department of Health. *The NHS cancer plan: a plan for investment, a plan for reform*. London, 2000.

16 Ireland R. Haematological malignancies: the rationale for integrated haematopathology services, key elements of organization and wider contribution to patient care. *Histopathology* 2011;58:145–54.

17 Prescott RJ, Wells S, Bisset DL, et al. Audit of tumour histopathology reviewed by a regional oncology centre. *J Clin Pathol* 1995;48:245–9.

18 Lester JF, Dojcinov SD, Attanoos RL, et al. The clinical impact of expert pathological review on lymphoma management: a regional experience. *Br J Haematol* 2003;123:463–8.

19 Proctor IE, McNamara C, Rodriguez-Justo M, et al. Importance of expert central review in the diagnosis of lymphoid malignancies in a regional cancer network. *J Clin Oncol* 2011;29:1431–5.

20 Gagliardi AR, Marshall C, Huckson S, et al. Developing a checklist for guideline implementation planning: review and synthesis of Guideline development and implementation advice. *Implement Sci* 2015;10:1–9.

21 Schünemann HJ, Wiercioch W, Etxeandia I, et al. Guidelines 2.0: systematic development of a comprehensive checklist for a successful guideline enterprise. *CMAJ* 2014;186:E123–42.

22 Prior M, Guerin M, Grimmer-Somers K. The effectiveness of clinical guideline implementation strategies—a synthesis of systematic review findings. *J Eval Clin Pract* 2008;14:888–97.

23 Fischer E, Lange K, Klose K. Barriers and strategies in guideline Implementation—A scoping review. *Health Care* 2016;4:36.