

Dissemination and implementation of the Guideline

Introduction

Following the rapid expansion of clinical guidelines over the past 20 years, the challenges of their dissemination and implementation have been studied in a number of publications. Grimshaw et al (2004)¹, as part of the NHS Health Technology Assessment Programme, analysed 235 publications and concluded that there was little systematic attempt to justify the suggested innovations. The Cochrane EPOC group has also published a number of reviews regarding interventions designed to encourage change in professional behaviour in order to close the gap between research and implementation. In 2010 Medves et al² emphasised the importance of changing the behaviours of the multi-professional team in guideline implementation.

In 2012 Grimshaw et al³ published a systematic review, sponsored by the ATS and ERS, using COPD guidelines as a model. Many of the reported strategies reflected social science theories and models. They used work published by Graham et al⁴ to develop a 'Knowledge to Action Cycle'. The development of a guideline is characterised as a knowledge creation funnel and an action cycle is used to enable the guideline to "engineer change in health care". They identified barriers to change at organisational, peer group, professional-patient interaction, competing priorities and lack of resources. To help to overcome these barriers to change a series of interventions were described (Table 11.1).

Other interventions used for guideline implementation include organisational interventions such as a review of professional roles (e.g. registered nurses undertaking roles previously thought of as roles of doctors); communication initiatives, such as the introduction of telemedicine; structural changes, for example the development of electronic prescribing and finally the introduction of economic penalties to encourage adherence to guidelines.

Intervention	Definition	Barriers addressed	Effectiveness	Resource Considerations
Printed Educational Materials	Distribution of printed recommendations	Individual professional knowledge	Generally effective	Inexpensive
Educational Meetings	Conferences, lectures workshops etc.	Individual professional knowledge, attitudes and skills	Generally effective	Inexpensive to modestly expensive
Educational Outreach	Use of trained individual(s) who meet with providers to change practice	Individual professional knowledge, attitudes and skills. Social marketing approach	Generally effective	Relatively expensive
Local Opinion Leaders	Use of nominated providers (opinion leaders) as educational influencers	Individual professional and peer group knowledge, attitudes and skills	Generally effective	Moderately expensive
Audit and Feedback	Summary of clinical performance	Individual professional awareness of current performance	Generally effective	Variable. Cheaper if data are part of routine practice
Reminders	Patient or encounter specific information Computer aided decisions	Individual professional cognitive/memory barriers	Generally effective	Variable but may be expensive to implement
Multifaceted Interventions	Intervention of two or more components	Target multiple barriers of the included intervention components	No dose response relationship demonstrated	More costly

Table 11.1 Guideline Implementation Interventions (after Grimshaw)³

Intervention and Education Strategies

1 Identification of Target Individuals/Groups

Education for all staff who administer oxygen is fundamental to the success of this guideline. The management of respiratory failure is traditionally the responsibility of health care workers in acute settings, such as the ambulance service, accident and emergency departments and other acute hospital settings. However, the role of nursing and allied health professionals is changing and professional boundaries are shifting, both in the acute and community sectors. This is reflected in recent initiatives such as 'out of hours' services, 'drop-in centres', 'early discharge' initiatives, community COPD services and 'virtual hospitals'. It is therefore important for a wide range of health professionals to understand how to apply emergency guidelines. These include:

- Any doctor who manages acute illness mainly, but not exclusively, within a hospital setting.
- Doctors, registered nurses and other healthcare workers in hospital and in the community who manage patients who may develop respiratory failure.
- Physiotherapists who manage respiratory patients.
- Ambulance staff and other first responders.
- Other healthcare professionals who are involved with the management of acutely ill patients.

Oxygen education should also be incorporated into the curriculum for trainees of the above professions, with a particular focus on undergraduate medical, nursing and allied healthcare professional students, as well as postgraduate trainee doctors (see section 7).

2 Audit

Six audits of the adherence to the BTS Emergency Oxygen Guidelines have been undertaken since the publication of the first Emergency Oxygen Guideline in 2008. The audit cycles use a BTS bespoke on-line audit tool and the analysis, which is provided by the BTS, produces both high-level national perspectives, as well as local Trust data. The most recent audit in 2015 involved 181 UK hospitals representing 2473 wards and 55,208 patients, 14% of which were on oxygen. Despite improvement over the course of the audit cycles there were still 42.5% of patients receiving oxygen in 2015 therapy without oxygen prescriptions, and 47% of patients using oxygen had no target saturation range specified (5). There is also evidence that clinical staff may not always respond appropriately to patients with high or low oxygen saturation levels. Clearly, there is still much work to be done in the implementation and dissemination of this guideline to ensure safe use of oxygen within acute trusts.

Developing and managing the audit strategies is time intensive and relatively expensive at both national (BTS) and local trust levels. Audit studies such as these are not a routine part of NHS data collection and thus have to rely on enthusiastic individuals to enter the data. However, the benefits have been considerable, with clear evidence of improvement in clinical practice. Details of the audit process and audit results are available on the British Thoracic Society Website (www.brit-thoracic.org.uk).

3 Changes to Structure/Process

One very important way to alter practice and to encourage implementation is by the modification of the process of care. Perhaps the single most powerful way to do this is by introducing strict criteria for prescribing oxygen.

Consistent implementation of the guideline requires an 'oxygen section' in the prescription chart or electronic prescribing record. A specimen example of a written prescription chart is available within

the Trust Oxygen policy example on the BTS website (see online appendix 4). As so many patients are prescribed oxygen it is recommended that oxygen should be placed at the start of the prescription chart and should include the commonest target saturation ranges as pre-printed options (94-98% and 88-92%).

Electronic prescribing is now becoming the norm and these systems can be set up to prevent the prescribing of oxygen without first setting a target range and also organised in such a way that any oxygen prescription must be completed before the rest of the prescription can be accessed. It has been reported that customising these systems can dramatically increase the proportion of patients who have oxygen prescribed (6).

Details of the initial mode of delivery (e.g. nasal cannulae, Venturi mask) and the inspired oxygen concentration and/or flow rate may be specified in a prescription but may need to be modified over time to keep the patient within their target saturation range. This needs careful monitoring and oxygen delivery has to be adjusted by nursing or physiotherapy staff to keep the patient within the target range. These changes must be documented in bedside documents or in electronic medical records for clinical and medico-legal reasons.

4 Financial Incentives

The Commissioning for Quality and Innovation (CQUIN) enable commissioners to reward excellence by linking a proportion of the healthcare provider's income to the achievement of quality improvement goals. CQUINs can be agreed at a National or local level. Since 2009, many CQUIN schemes have been developed that cover many aspects of care, however, this has never included oxygen therapy. Current guidance is found at <https://www.england.nhs.uk/wp-content/uploads/2015/03/9-cquin-guid-2015-16.pdf> .

The guideline group encourages commissioners to develop local CQUINs to improve the safe prescription of oxygen in acute trusts. For example, payment of an agreed sum will be made only if an agreed percentage of patients who are admitted to hospital (for both elective and non-elective reasons) have a target range for oxygen saturation recorded on the prescription chart. Alternatively the percentage of patients who have been prescribed oxygen and are within the target saturation range could be used as a CQUIN target.

5 Local Quality Improvement (Change Agents) and Local Opinion Leaders

Change agents are local leaders in innovation and are in a unique position because of their first-hand knowledge of the local barriers that may impede implementation of the guideline and their ability to identify potential local solutions. Many Trusts and Clinical Commissioning Groups have trained innovation and service development staff who employ standard improvement methodologies such as PDSA Cycles (Plan; Do; Study; Act) and run charts to evaluate and monitor service changes. These staff need to be made aware of the importance of correct oxygen usage and the improvements in patient safety that can be achieved by the implementation of the oxygen guideline.

Local opinion leaders were the key to the dissemination of the 2008 guideline. The BTS instigated a scheme whereby individuals in acute trusts were nominated as Oxygen Champions. These Champions had an interest in the safe use of oxygen and their achievements include:

- Introducing local oxygen policies throughout UK acute hospital trusts.
- Conducting audits of compliance, including providing data for the national audits.
- Helping to organise staff and student education.

- Introducing new prescription charts.
- Advising local clinical governance leads in NHS organisation about oxygen usage.
- Undertaking talks and discussions both within hospitals and community settings.
- Publicising the guideline with particular emphasis on known areas of poor practice (e.g. not prescribing oxygen according to target oxygen saturations).
- Organising and leading local meetings and educational events.

The guideline group strongly supports the continued work of oxygen champions not only within acute hospital trusts but also in all areas where emergency oxygen is used such as Ambulance Trusts, Community Trusts who provide acute support, voluntary rescue organisations and Clinical Commissioning Groups (CCGs)

6 Printed and Other Educational Materials

a) Local guidelines and oxygen policy

It is recognised that short 'user friendly' versions of the guideline are essential to achieve local implementation. The BTS provides a number of different versions together with 'key points' to organisations such as hospital managers and CCGs (online appendices 9 and 10). The BTS website also provides guideline summaries and flow-charts which are directed to a number of different areas such as pre-hospital settings (appendix 5), emergency medicine, acute general hospital wards (appendix 3 and 10), general practice (appendix 10) etc. In addition, specimen oxygen observation and prescription charts are also provided within the Trust Oxygen policy example on the BTS website (see online appendix 4).

The guideline committee recommend that the shortened version of the new oxygen guideline should be made available on the website of every NHS trust. In addition, following publication of the 2017 guideline the guideline committee strongly encourages all healthcare providers to update their local oxygen policies. A specimen example of a local policy is available on BTS website to help with the production of policy in individual trusts (online appendix 4).

b) Educational Material

The publication of educational materials is now part of the development of guidelines. The materials used to promote the implementation of the guideline include summaries (see above); an online teaching module free to BTS members (this module was developed to support the 2008 guideline and will be reviewed in the light of the 2017 update); a specimen example of local policy (appendix 4); information regarding the use of emergency oxygen on the Respiratory Futures website (<http://www.respiratoryfutures.org.uk/programmes/oxygen/>) slides for doctors and nurses (appendices 7 and 8) and in addition there are also accredited modules offered by independent respiratory education charities that focused on the management of respiratory failure, including oxygen therapy.

7 Staff Education including Educational Meetings and Outreach

There was a lot of effort to publicise the 2008 Emergency Oxygen Guideline in a variety of national, regional and local settings. Respiratory physicians, specialist nurses and Oxygen Champions led talks and discussions both within hospitals and in community settings in order to publicise the guideline with particular emphasis on known areas of poor practice such as not prescribing oxygen according to target oxygen saturations.

The 2017 Guideline will be launched nationally and then implementation will occur at a local level by health care professionals. Teaching material slides for doctors and nurses are available on the BTS website (see above) and these could be incorporated into local e-learning packages. The medical presentation is suitable for FY1, FY2 doctors and specialty trainees and is also appropriate for senior medical students. Nurse education is best in small groups in sessions lasting 30 minutes. The Joint Royal Colleges Ambulance Liaison Committee (JRCALC) also provides ambulance-orientated guidelines on its website that are based on the BTS Guideline.

Other potentially high impact teaching strategies that are useful for staff managing oxygen treatment include:

- Encouraging Trusts to invest in the wider use of web-based learning modules.
- Developing local technology-enhanced learning tools that incorporate e-learning including simulated scenarios involving oxygen management.
- ‘Did you know?’ key points printed on card with a website address for further information, for example ‘Did you know that failure to prescribe oxygen to a target saturation range can increase the probability of death?’
- Locally tailored *clinical implications* of audit and guidelines that are made available in an accessible format for all practitioners involved.
- Succinct, printed ‘good practice guide’.
- Examples of successful innovations and details of how these were achieved.

8 Develop education and learning standards and competencies

The Guideline Committee recommends that the main learning points in the Guideline are utilised to develop a succinct set of quality standards and clinical competencies that can be employed by undergraduate and postgraduate programmes. In addition, as suggested in section 4, these standards could also be developed into core NHS standards such as (CQUIN) with financial penalties for those Trusts who do not adhere to the standards.

The following groups should consider developing competencies within their various curricula:

- a. **Medical Undergraduate Programmes**
There is considerable national variation in undergraduate medical curricula. However, oxygen management is now stipulated as a skill in the GMC’s Tomorrow’s Doctors and the Oxygen Guideline provides the core knowledge for this skill. There is also a suggestion that a national prescribing examination will be introduced for medical students that will also include questions about oxygen management.
- b. **Nurse Undergraduate Programmes**
Higher Education Institutes (HEIs) undertaking nurse and allied professional undergraduate training vary in their emphasis on respiratory education and there is anecdotal evidence that there is often very little teaching about oxygen management. It would be possible to develop an education resource that could be piloted at one HEI, for example during pre-registration nursing education, and subsequently identify ‘oxygen education champions’ within each HEI. A refined education resource can be made available to all HEIs free of charge.
- c. **Medical Postgraduate Education**
Trainees working within postgraduate curricula are not independent practitioners. Thus it is important to make sure that the elements of oxygen management are included in the

Foundation, Core Training, GPVTS and relevant specialist registrar curricula. It is also important that bedside observations charts and electronic prescribing systems should be well designed to support doctors and nurses in safe oxygen use.

d. Nursing and Allied Professional Postgraduate Education

This is generally competency based and managed by the various employing authorities. However, HEIs are also involved in developing specific programmes. All healthcare professionals need to demonstrate that they undertake CPD and competency in oxygen management.

9 Assessment of learning needs via training needs analysis (multifactorial Interventions)

A bespoke training package that is based on the unique training needs of a local workforce is more efficient and has a potentially greater impact than a 'one size fits all' national training initiative. A training needs analysis of a local workforce will enable efficient and appropriate CPD coordination and the production of a package that is tailored to the needs of a professional group or, for example, a specific initiative such as a 'virtual hospital'.

Training needs analyses can be developed by exploiting audit data and surveys and comparing existing practice against quality standards which are based on the appropriate clinical competencies and knowledge that practitioners need to possess.

10 Mechanism to monitor and evaluate educational initiatives

In order to be of use, the initiatives and teaching materials need to improve the way the guideline is implemented. However, when implementing a portfolio of educational initiatives it is difficult to attribute a positive effect to individual initiatives without a well-defined research project. An alternative and more practical approach is to monitor the overall effect of a range of initiatives by regular audit (Section 2 above). The national BTS and local audit data has proved to be an excellent source of data. Regular audits, particularly those performed in line with the current validated templates and statistical assistance, can thus be used to evaluate the overall impact of the educational initiatives at local and national level. If repeat analysis of training needs is carried out based on the same template, it will - after addressing the education and learning requirements of specific staff groups - provide assurance of staff competencies.

Conclusions

This strategy sets out the importance of engaging with all organisations and bodies that are involved clinically, educationally and managerially with the use of oxygen in the acute setting. The various implementation/educational initiatives designed to facilitate the implementation of the Guideline need careful assessment based on well-structured audit cycles at both national and local level. The importance of developing core NHS standards with appropriate staff education is key to the implementation of the Guideline.

References

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