Editorial

Getting the signal to noise ratio right in the management of diabetes in primary care: time to stratify risk and focus on outcomes rather than process

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Introduction

Rates of lower limb amputation in diabetes are not declining in the UK; it is possible that the incidence is actually rising in type 2 diabetes.1 This is despite the considerable investment in monitoring the lower limb in people with diabetes for possible neurovascular complications through a pay-for-performance (P4P) system, designed to improve the quality of care in chronic diseases, and in place since 2004.2

Signal to noise ratio describes the ratio of useful to irrelevant data. Email, for example, often contains very little valuable data compared with the large number of ‘spam’ messages which might appear. The phrase has been used to describe problems with information overload,3 frustrations with administration,4 difficulty in interpreting bone metabolism markers in cancer,5 and listed as a factor contributing to errors in the implementation of guideline-based decision-support systems.

A possible contribution to the lack of impact of diabetes foot screening on amputation rates is the ratio of normal examinations a practitioner might perform for each abnormal finding.

Providing links to information may not be enough

The Scottish Care Information – Diabetes Collaboration (SCI-DC) foot risk assessment tool brings together all the information recommended in the most recent national guidance (Scottish Intercollegiate Guideline Network (SIGN) diabetes clinical guideline.) However, as Crawford et al report the system seems to be used to ensure that P4P targets are met rather than as a clinical tool.6 In the commentary to this paper we discuss how linking data should overcome at least one barrier to achieving quality but in itself does not appear to be enough.7

Risk stratification shows promise, though more evidence is needed

The approach described in the paper by Wrobel et al stratifies risk but is unable to demonstrate a benefit on clinical outcomes.8,9 Embedding a system of risk
stratification may be the best way ahead. This may enable primary care practitioners to focus on higher risk patients – improving the signal to noise ratio. Stratifying risk, for example, is used increasingly in primary care to assess vascular risk, and to highlight people at higher risk of stroke in atrial fibrillation.\textsuperscript{10–12}

**Summary**

We need to consider how to improve the signal-to-noise ratio in managing the lower limb in diabetes and stratification of risk is an option. Stratifying risk is likely to be helpful, though probably as part of a package of other measures. Whilst the combination of risk stratification and pay-for-performance has improved care in cardiovascular disease, it did not result in instant optimal management – gaps in quality and technical implementation issues remain.\textsuperscript{13,14}

Although the effectiveness of P4P remains a matter of debate,\textsuperscript{15} there are indicators that introducing P4P has improved intermediate markers in the quality of care in diabetes.\textsuperscript{16} Previous studies have suggested that the introduction of a shared information system is associated with improving care in diabetes.\textsuperscript{17} However, caution is needed in deciding whether this represents cause and effect.\textsuperscript{18} As incorporation into P4P indicators improves data recording there maybe scope to include stratification of risk of lower limb problems and appropriate referral into P4P indicators.

It is also possible that other professional groups might be more effective in detecting changes in the foot in people with diabetes. In Salford a care pathway which involves paper based assessment by podiatrists is associated with a substantial fall in the rate of amputation.\textsuperscript{19}

The purpose of informatics is how to better use data and information to improve the quality of care.\textsuperscript{20} The ongoing rise, or at best lack of any fall, in the rate of amputation in diabetes is a challenge for us all. Sharing information, stratifying risk, and providing the right care are critical. We also need to explore how P4P might help achieve better outcomes. Improving the signal to noise ratio by focussing care on higher risk individuals and providing feedback about outcomes, in this case rates of amputation, are recommended as the next steps to improve quality.

**REFERENCES**


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