Better health outcomes and safer care through prudent prescribing

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Summary

Medicines continue to have a vital role in the management of a range of medical conditions. However, medicines can contribute to harm, particularly when a person is taking more than one prescribed drug. ‘Polypharmacy’ needs to be closely monitored. Prescribers also need to work in closer partnership with patients.

There are several measures that help make using medicines safer, and one of the most important is a strong reporting culture where adverse events are recorded and used to drive improvement.

This article looks at some of the initiatives already being rolled out to promote prudent prescribing in NHS Wales. It also suggests five ‘next steps’.

Why prudent prescribing?

Prescribing a medicine is one of the most useful, but potentially one of the most dangerous things that most health professionals will ever do. Medicines can be life-extending – for example our ageing population has resulted in a greater prevalence of heart failure but advances in treatment such as ACE inhibitors, have been associated with these patients surviving longer. However, medicines can also reduce quality of life or even result in hospital admission from adverse drug reactions and prescribing errors. By extrapolating (with caution) findings from a study in Liverpool, we can estimate that at any one time, 320 hospital beds in Wales could be filled by patients admitted primarily because of adverse drug reactions. The Liverpool study also observed a fatality rate of 0.15%.

Poor prescribing

Poor prescribing occurs in three ways:

- Over-prescribing – when a medicine is prescribed whose risk of harm exceeds its likely benefit (overall or relative to another medicine).
- Under-prescribing – when a medicine is not prescribed whose likely benefit greatly exceeds the risk of harm.
- Mis-prescribing – when the wrong medicine is prescribed. It can occur as part of a medication error, most commonly caused by prescription of the wrong dose, but may also involve the wrong route, frequency or duration of administration.
All of these forms of poor prescribing can contribute to an unfavourable risk-to-benefit ratio, and reduce or negate the benefits of medicines for patients. Monitoring for wanted and unwanted effects should follow all prescribing; inadequate monitoring may also reduce or negate the benefits of appropriate initial prescribing and result in avoidable waste.

**Three principles of prudent healthcare**

The underlying principles of prudent healthcare are to:

- minimise avoidable harm
- carry out the minimum appropriate intervention
- promote equity between the people who provide and use services.

Services should be delivered using the only-do-what-you-can-do principle. The relationship between user and provider should be remodelled using co-production.

The principles of prudent healthcare were set out in the Welsh Government’s [statement on prudent healthcare](#) in June 2014.[3] All these principles have relevance to prescribing practice.

**Minimise avoidable harm**

All medicines cause adverse reactions. The most common are dose-related reactions, (classified as type A – for “accentuation”). These make up approximately two thirds of all adverse reactions. They are predictable, based on the known pharmacology of the medicine, and so potentially avoidable. Around 70 per cent or more of those adverse reactions which cause admission to hospital are type A.[2] Additionally, it has been found that 20 per cent of patients re-admitted to hospital within a year of discharge from their index admission, are re-admitted due to an adverse reaction.[4]

Less often, individuals may experience unpredictable reactions, (classified as type B – for “bizarre”). These are not readily predictable from the known pharmacology of the medicine. They are classified B because they are often related to individual susceptibility or hypersensitivity, for example an immune or allergic reaction to the medicine.

Very young children and elderly adults are most prone to experiencing type A reactions. In the case of newborn babies and children this may happen as they cannot eliminate the medicine efficiently from the body as their eliminating organs (e.g. the liver or kidneys) are not yet fully mature. In the elderly, especially the frail elderly, these elimination processes may also be impaired. In patients with liver disease, renal failure and heart failure, elimination of medicines may also be impaired. The relative degree of impairment of these elimination processes, as well as their relative importance for elimination of a particular medicine determines the effects impairment may have in moderating the safe and effective dose of that medicine in an individual.

One of the prerequisites of prudent prescribing is that it must be rational – safe, effective and cost-effective – and that by tailoring the treatment to an individual patient, the likely benefits outweigh any likely harm wherever possible.[5] Dose-related failure of an existing therapy to adequately manage a condition may be one of the most important reasons for admission of the elderly to hospital. Age should not, therefore, be used as a reason for withholding adequate doses of effective therapies.[6] Nevertheless there is a clear relationship between increasing age and the frequency of adverse drug reactions, for some common medical conditions.
Antimicrobial prescribing

Antimicrobial resistance is a huge global public health challenge. The appropriate use of antibiotics must be embedded into the prudent prescribing programme for Wales.

The World Health Organization has identified a number of factors driving antimicrobial resistance. These include:

- inadequate national commitment to a comprehensive and coordinated response
- ill-defined accountability
- weak or absent surveillance and monitoring systems
- the inappropriate and irrational use of medicines.[7]

Patient safety

Patient safety is a vital component of quality care. Through the 1000 Lives Improvement work Wales has sought to take the quality and safety agenda, including medicines safety, forward. The recent Trusted to Care report[8] highlighted issues relating to the administration of medicines to elderly patients in hospital, and these issues must be addressed. A culture of high reporting helps to drive improvements in safety.[9] It was of concern that the total number of suspected adverse drug reactions reported to the Medicines and Healthcare products Regulatory Authority via yellow card submissions from Wales fell 36 per cent from 1,013 for the period April 2008 to March 2009, to 649 for the period April 2012 to March 2013. The issue has been actively addressed by the Yellow Card Centre in Wales (YCC Wales) over the last year (for example see the hospital pharmacist champion scheme in the 2013–2014 report) so Wales continues to contribute effectively to pharmacovigilance in the UK. The information gathered also helps prescribers to increase patients’ awareness of the possible effects of the medicines they are using, and thus further enhances safety.

Carrying out the minimum appropriate intervention

Recent publications have highlighted the value of conservative prescribing[10] and parsimonious medicine.[11] Conservative prescribing offers a series of six principles to achieve more cautious and conservative prescribing. Parsimonious medicine proponents state the ethics of parsimonious medicine is not the ethics of rationing, since certain routine practices add no demonstrable value to patient outcomes.

Risks

Rational or appropriate polypharmacy has become an acceptable practice as life expectancy increases, the number of co-morbidities increases[12,13] and the range of effective medicines for medical conditions, such as post-acute myocardial infarction, has increased. Consequently, the risk of adverse events associated with problematic polypharmacy has also increased. This disproportionately affects the frail elderly, who are the group most likely to be receiving several medicines. Some drug combinations may be more toxic together than if the risk of toxicity for each drug is added together, resulting in significant adverse drug interactions.[14]

Less is more

Innovative resources have become available that highlight the importance of carrying out the minimum therapeutic intervention. Gallagher and co-workers have validated a new screening tool to examine prescriptions in the elderly.[15] It is a reliable and comprehensive screening tool for assessing the appropriateness of older patients’ medicines in relation to their existing diagnosis or diagnoses.[16]
The National Institute for Health and Care Excellence (NICE) has identified practice that should be discontinued or not used routinely.\textsuperscript{[13]} In February 2014, there were approximately 1,000 ‘do not do’ recommendations on the NICE website, around a third of which involved medicines.

The All Wales Medicines Strategy Group (AWMSG) has recently posted guidance, prepared by the All Wales Prescribing Advisory Group, for clinicians prioritising medication for a patient prescribed multiple medications for a range of conditions. This guidance includes summary tools and links to other documents and information where appropriate.\textsuperscript{[14]}

Finally, Duerden and colleagues have recently published an important report on polypharmacy, which contains principles to help in the process of medicines optimisation.\textsuperscript{[13]}

**Only do what you can do**

**Promoting equity between the people who provide and use services**

The AWMSG is committed to making sure the most appropriate and cost-effective medicines are accessible to all the people of Wales. The AWMSG process for health technology appraisal in Wales has been stated as robust\textsuperscript{[19]} and accredited by NICE. To support equity in the use of medicines, the Welsh Analytical Prescribing Support Unit monitors the uptake of new medicines recommended by AWMSG and NICE, as well as medicines not recommended for general use in the NHS.

The AWMSG has been setting and measuring prescribing indicators to promote safe, rational, cost-effective, quality prescribing in primary care since 2003. The national indicators and relevant therapeutic priorities are updated. Their purpose is to promote prudent prescribing, they are evidence-based and designed to be clear and applicable at practice level, addressing prescribing efficiency, safety and quality.

Sources of variation in national prescribing indicators between health boards can also be explored to inform improvement strategies and minimise variation. The National Prescribing Indicator results over the last decade (see Table 1 below) show they have moved towards the threshold in each year that they were designated. This is apart from statins, which remained unchanged and quinolones, which rose slightly back to the level seen in 2011–12.

**Remodelling the relationship user provider relationship with co-production**

Person-centred care aims to put people at the forefront of their health and care. It helps individuals make informed decisions, to remain in control and encourages a partnership between individuals, families and services. National Voices (a coalition of health care charities including Arthritis Research UK, Asthma UK, and many more) has recently published a set of evidence-based resources signposting the best evidence about:

- what measures are effective in promoting prevention
- improving information and understanding
- enhancing experience; supporting self-management
- supporting shared decision making.
These resources can be accessed on the National Voices website.

All these materials have relevance to prescribing as well as other aspects of healthcare and can support commissioners and providers in their objective of delivering person-centred care.[22]

**Measures to promote prudent prescribing**

Demand-side measures to improve prescribing have been categorised under the four Es – education, engineering, economics and enforcement.[23]

**Education**

Davis and colleagues were the first to demonstrate interactive, participatory continuing medical education sessions which provide the opportunity to practice skills can result in changes in professional practice and occasionally positively influence healthcare outcome.[24] The Scottish International Guidelines Network (SIGN) states the influence of education on adherence to guidelines is improved when the influence of peers is included. It recommends supporting a multi-professional group with education offered by experts in workshops or conference settings as a useful approach.[25] SIGN also suggests facilitation of education at practice level is helpful. This research and guidance points to effective education to highlight priority issues around prudent prescribing through interactive case-based learning in peer groups and delivered by experts.

**Engineering**

This refers to structural changes needed to promote more prudent prescribing behaviour. One example would be the use of decision support software to remind prescribers about opportunities to prescribe safely, effectively and efficiently. Electronic prescribing to reduce medication errors is also useful to help minimise harm. While electronic prescribing has been available for many years in general practice, it is still not generally available in Welsh hospitals.

**Economics**

Another approach involves financial incentives or budget devolution. In December 2004, AWMSG endorsed a non-mandatory all-Wales prescribing incentive scheme. This provided a recommended framework to health boards of two equally weighted elements: prescribing indicators (both national and health board defined) and a learning portfolio (National Prescribing Audits, Welsh Medicines Resource Centre (WeMeReC), educational materials and other health board defined activity).

In 2008, AWPAG undertook a review of schemes across Wales. AWMSG members agreed the scheme should continue to be available as a template for local adaptation. It is now known as the Clinical Effectiveness Prescribing Programme (CEPP).[26]

The General Medical Services contract for primary care provides further opportunity to promote safe and effective prescribing. The organisational domain of the General Medical Services (GMS) contract contains a medicines management indicator to ensure the practice meets the prescribing adviser at least annually, agrees on up to three actions related to prescribing and subsequently provides evidence of change.[27]

**Enforcement**

This may take the form of legally binding agreements. Positive health technology appraisal recommendations by AWMSG and NICE are required to be followed and the medicines made available, if required, within three months of approval.
Five next steps in Wales: making it happen

1. Workshops in prudent prescribing are being rolled out in all health boards in Wales over the next 12 months. The impact on prescribing practice measured using a comparator (benchmark) region in North East England and time-trend analysis. The national prescribing indicators should be used to assess improvements. Patient outcomes (for example, hospitalisation due to certain adverse reactions) should also be measured where possible. A ‘train the trainers’ approach should be adopted to allow the delegates, supported with pre-prepared teaching resources, to cascade messages from training to colleagues in their workplace (general practice or hospital team).

2. The principles of antimicrobial stewardship should be built into the prudent prescribing workshops to support processes in Wales that promote a reduction in antibiotic resistance. In addition, AWMSG and its subgroups should work with Public Health Wales to develop standards and guidance for healthcare organisations on antimicrobial usage and infection management, to integrate diagnostic algorithms into the All Wales Infection Management Guide and to develop an antimicrobial policy to control agents most likely to cause antimicrobial resistance or *Clostridium difficile*.

3. The development of an integrated technology system to promote the safe and effective use of medicines for patients across Wales must be a high priority. The approach should include the development of electronic prescribing systems in Welsh hospitals. Advice STOPP/START (Screening Tool of Older People’s potentially inappropriate Prescriptions and Screening Tool to Alert doctors to Right [e. appropriate, indicated] Treatments) and NICE ‘do not do’ should be built into around Screening Tool of Older Person’s Prescriptions such systems so prescribers have ready access to these resources, both in the hospital and community settings.

4. Patient safety must be at the forefront of the prescribing, dispensing and administering medicines. We must all adopt a zero tolerance approach to the improper administration of medicines, as outlined in *Trusted to Care*, and encourage reporting of adverse incidents and suspected adverse drug reactions across Wales.

5. Partnerships with the public should be strengthened. The Patient and Public Interest Group recently established by the AWMSG is one example that makes sure patients are involved as equal partners in decisions regarding medicines. Increased public involvement in medicines-related issues, including medicines adherence and reducing medicines waste[26] will make sure NHS Wales delivers healthcare to fit the needs and circumstances of patients.

Acknowledgements
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Table 1. National Prescribing Indicators 2004–2014[28]

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<td>Generic medicines (% of items)</td>
<td>79</td>
<td>91</td>
<td>83</td>
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<td>Low cost statins i.e. simvastatin, pravastatin and atorvastatin (% of statin items including simvastatin and atorvastatin)</td>
<td>New indicator in 2012–2013</td>
<td>N/A*</td>
<td>N/A*</td>
<td>94</td>
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<td>Antibiotics (items/1,000 STAR-PU)</td>
<td>New indicator in 2012–2013</td>
<td>395</td>
<td>415</td>
<td>397</td>
<td>384</td>
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<td>Quinolones (% of antibacterial items)</td>
<td>New indicator in 2012–2013</td>
<td>2.49</td>
<td>2.03</td>
<td>2.98</td>
<td>2.04</td>
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<td>Cephalosporins (% of antibacterial items)</td>
<td>New indicator in 2012–2013</td>
<td>7.12</td>
<td>5.35</td>
<td>4.95</td>
<td>4.42</td>
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<td>Morphine (% of strong opioid items)</td>
<td>New indicator in 2012–2013</td>
<td>40</td>
<td>41</td>
<td>46</td>
<td>53</td>
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<td>Hypnotics &amp; anxiolytics (ADQ/1,000 STAR-PU)</td>
<td>New indicator in 2012–2013</td>
<td>2606</td>
<td>2452</td>
<td>2227</td>
<td>2106</td>
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<td>NSAIDs (ADQ/1,000 STAR-PU)</td>
<td>New indicator in 2012–2013</td>
<td>1384</td>
<td>1283</td>
<td>1175</td>
<td>1111</td>
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<td>Ibuprofen &amp; naproxen (% of NSAID items)</td>
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<td>29</td>
<td>31</td>
<td>32</td>
<td>36</td>
<td>41</td>
<td>56</td>
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<td>Diclofenac (DDD/1,000 PU)</td>
<td>New indicator in 2011–2012</td>
<td>175</td>
<td>164</td>
<td>150</td>
<td>149</td>
<td>124</td>
<td>93</td>
<td>72</td>
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<td>Antidepressants (ADQ/1,000 STAR-PU)</td>
<td>New indicator in 2013–2014</td>
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<td>Long-acting insulin analogues (% of total long and intermediate acting insulin items, excluding biphasics)</td>
<td>New indicator in 2012–2013</td>
<td>93</td>
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PU = prescribing unit  
DDD = defined daily dosage  
ADQ = average daily quantity

Figures are taken from the quarter ending March of each financial year.  
Underlined numbering indicates years in which the measure was an NPI.  
*Measures changed in 2011–2012 and 2012–2013 to reflect a change in the status of specific lipid-modifying agents; therefore figures that are no longer appropriate have not been included in the table.  
Green shading: prescribing performance moving towards threshold; red: moving away; grey: no change.

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