Numeracy in the NHS

A steady drip, drip approach

Implementing the numeracy challenge
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Overview

Administering IV injections can be a risky business – if incorrectly done, it can harm patients and also have potentially damaging consequences for the nurses involved. It’s vital to get this right, which makes the training involved particularly important.

- Correct measurement of drug dosages is vital.
- Remedial and catching up classes in mathematics are essential.
- This is an area of difficulty for many trained nurses.
- Mathematics is seen to be difficult and the prerogative of ‘clever’ people.

Susan Starkings: Drug Calculation and the Mathematics required for Nursing, MSOR Connections Nov 2003 Vol 3 No 4

Claire Boyd, a practice development trainer with the North Bristol NHS Trust, has used one-to-one numeracy tuition to boost the confidence of the student nurses. By linking the maths directly to nursing practice, and breaking each calculation down into stages, Claire has almost doubled success rates on IV calculation tests.

How you can use this

The key message is to identify exactly where numeracy is needed in the workplace. The need for good maths for health professionals has been well researched and reported; make maths meaningful for your learners by starting with how they will apply the skills.

Make maths matter. Stress the real impact of learning maths – in the health sector this can literally be life or death.

‘Some dose-related incidents have reported medications being dispensed which have exceeded the recommended therapeutic range, other incidents report of patients/clients receiving double the dose prescribed, in one of these it contra-indicated against the patient’s blood pressure monitoring.

‘A nurse administered an injection; after it was given she was not sure if the dose was correct. Staff were advised to observe for any reactions.’

North Staffordshire Primary Care Trust 2003

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How it works

Lack of confidence in numeracy skills can be a barrier to development and training for some nursing and midwifery staff. At North Bristol NHS Trust, nurses are required to pass a test in IV calculation, which was originally administered as part of an IV study day. The proportion of nurses failing to pass the test first time round was 50%.

A new approach was clearly needed. They decided to remove the test from the study day and add in one-to-one sessions for nurses who required numeracy support.

Since taking the new approach, success rates have been boosted (90–99% of those who receive one-to-one tuition pass the test) and overall numeracy confidence has increased.

What maths is involved in calculating drug doses for intravenous drug administration?

- Converting larger units into smaller units and vice versa (e.g. milligrams into micrograms).
- Dose: formula using fractions and multiplication.
- Flow rate: calculation of flow rate by using multiplication by 60.
- Flow rate and patient weight: integrating patient’s weight into fractions formula.

Claire Boyd has developed her own set of materials to help nurses to break down the maths involved and work out where they need to brush up their skills. (These materials are not currently available for wider distribution.)

‘It’s not so much the difficulty of each step – it’s more the complexity of putting everything together which can cause problems.’

Claire Boyd, practice development trainer, North Bristol NHS Trust

Background skills

Claire works with practitioners on their background numeracy, checking for skills gaps. Some members of staff may never have learnt certain skills (for example older members may not have learnt metric measures), others may have forgotten things (use it or lose it, as they say). Claire pays particular attention to:

- rounding decimals, for setting an infusion rate when working on drip rate calculations
- metric measures and the conversion of milligrams to micrograms
- percentages, fractions and decimals and calculations required for the increase or decrease of medication
- ratios – working out the correct ratio of stock solution and dilutant
- averages – looking at, for example, average intra-cranial pressure recordings
- formulae – for the administration of tablets and capsules, and for the administration of oral mixtures.
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Getting it right

Claire then moves on to the specifics of IV administration, starting with the formula for drug dosages for injection, and through a process of worked examples, she makes sure that the practitioner has a clear understanding and is comfortable with each step of the maths involved. Drip rates are tackled next, with particular reference to the different kinds of pumps the practitioner will be using, and the duration of the infusion required. Other aspects that need to be factored in, such as body weight, are also worked on.

Passing the IV calculation test

Practitioners are allowed to use a calculator during the test. By the time they have benefited from one-to-one sessions with Claire, including practice tests, they have had sufficient practice in both knowledge and skills to be confident enough to know what and how to calculate. Claire’s pre-test tips on the calculations involved and the necessity of checking that your answers are reasonable are timely and helpful. The pass rate for these practitioners is excellent and has increased from 50% to between 90 and 99%.

More numeracy in the NHS

At the North Bristol NHS Trust, Claire also works with newly qualified nurses on NICU (Neonatal Intensive Care Unit) to boost their confidence and help them make the transition from student to fully fledged practitioners. A practical workbook contains all the information required for working with this special group.

The Wirral University Teaching Hospital offers a course called Medicinal Maths. It is a short, ten-week course contextualised for the health sector, leading to the National Test in Numeracy at Level 1 or 2.

The course content covers all aspects of functional numeracy, including:

- the four rules of number
- fractions
- percentages
- ratio
- metric measurement
- scale/volume
- averages.

In Oxfordshire, a successful Nursing Calculations programme was developed through Skills for Health to offer health workers a new way to review and improve their skills and practices around drug and other healthcare calculations.

The programme is:

- centred on the learner, not the teacher
- focused on work practices, not maths theory
- action learning/collaborative enquiry, not classroom chalk and talk
- tailored to the needs of the participant, the department and the trust.
This case study was produced by the National Center for Excellence in Teaching Mathematics (NCETM) as part of LSIS’s Implementing the numeracy challenge project.