

Working with schools in deprived areas to raise aspirations for medicine and other healthcare science careers

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ABSTRACT – Educational attainment is inversely related to socio-economic status. The achievement gap widens as children progress through the system. Take up of science options is particularly poor and difficulties are compounded by lack of relevant science-based work experience in deprived areas. The interaction of these factors is examined in some detail in an area of socio-economic deprivation. High attainment in sciences is usually considered a core requirement for acceptance into medicine and widening access to medicine for school leavers is therefore very difficult in these circumstances. A partnership between hospitals and local schools, including science-based work placements, is described. Cooperation between the NHS and schools by provision of work experience and teaching materials could help to address these issues as well as potential staffing difficulties in other healthcare science careers in the future. Expenditure can be justified on the grounds of known links between health, education and employment.

KEY WORDS: A levels, NHS outreach schools, raising aspirations sciences, socio-economic disadvantage, widening access medicine

Introduction and background

Widening access to higher education is a priority for UK universities and is chiefly about levelling the playing field for students who are socio-economically disadvantaged. Widening access to medicine is particularly difficult because of high academic requirements and a competitive selection process. Low attainment at A level in socio-economically disadvantaged

areas is associated with a number of factors low aspirations, adverse peer group pressure, difficult teacher recruitment and lack of parental support. National statistics highlight this trend but may not reveal the depth of the disadvantage suffered in some localities.^{1,2} Research has shown that raising aspirations in disadvantaged groups is key to these challenges.³ Low aspirations may be obvious: a boy in a science class who enjoyed learning about the heart through dissection said at the end, ‘Perhaps I could be a butcher’ (P Dodds, personal communication, 2004).

In the NHS, recruitment is a challenge for many professions, especially those that are science based. Recent publicity about redundancies is likely to be replaced by shortages of staff within a few years as school rolls fall, the population ages and expected retirements take place. Within the NHS, the issue is seen as one of widening participation (rather than access) – people not seizing opportunities provided for higher education and careers in the NHS.

County Durham includes some of the most deprived wards in England and a number of these are in the worst 10% (highest score on the index of multiple deprivation – an index which incorporates the effects of poor health, unemployment, income, educational attainment, crime and environment).⁴ It is recognised that access to good healthcare in these wards is unsatisfactory, clearly illustrating the ‘inverse care law’, though attempts are being made to address this.⁵ Primary schools not achieving targets in literacy and numeracy are overwhelmingly located in these areas (Keith Mitchell, Director of Education, personal

communication, 2000). Figure 1 relates student progression through school to socio-economic factors – the gap at key stage (KS) 1 (age 7) widens progressively and is more marked when higher achievements are considered. In this county half the schools, particularly in the more deprived areas, do not have sixth forms, depriving younger students of aspiring role models.

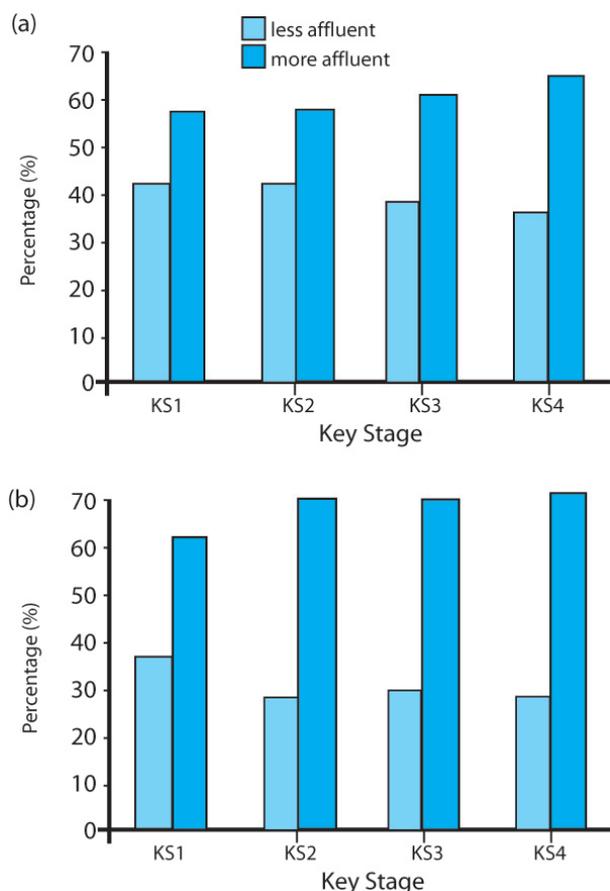


Figure 1. Comparison of the success of students in the less affluent 50% of the population (by Income Deprivation Affecting Children Index⁴) in reaching particular levels at different stages in their education. a) Illustrates success in achieving the approximate median mark. b) Illustrates success in reaching the upper quartile of marks. Key stage (KS) 1 represents start of primary education while KS 4 represents year 11 (GCSE).

For application to medicine, and many other

NHS careers, sciences are usually regarded as essential;⁶ it is therefore a matter of grave concern that few pupils in these areas take up science subject options at A level. Accurate figures are not available because of crossboundary movements but in 2005, only 84 students out of a GCSE cohort of about 6,000 took A level biology and chemistry in the sixth forms catering for the vast majority of students. Only 10 of these were from the less affluent half of the county. Science A/B grades come almost exclusively from more affluent areas so it is clear that very few would get A/B grades in sciences from a less affluent area. Only four were identified in this study. Any attempt to improve this situation would require interventions well before GCSEs.

This pattern is likely to be replicated in other socio-economically disadvantaged areas. Half of all science A level entries come from just 18% of schools with unacceptable variation in science attainment and teacher availability across types of student, particularly social class but also ethnicity and locality.⁷

Research has shown that students from the state sector perform better at university than those from the independent sector.⁸ This work, however, was carried out before the current drive to widen access and for disadvantaged groups it is reasonable to postulate that the difference could be greater. Medical schools have shied away from accepting disadvantaged students with lower A level grades (coupled with other selection tests). Instead, as A levels are no longer regarded as sufficiently discriminating, it has been suggested that the hurdle be further raised from AAB to AAA or starred A levels.⁹ Some have set up a 'year 0' for disadvantaged students to which those with much lower A levels may apply if judged to have potential. Others have focused their efforts on widening access through graduate entry and access courses which cater for mature students, not school leavers.

The place of work-based learning in the school Curriculum

Work experience is compulsory in KS 4 (14–16 year group). Its potential for motivating and enhancing self-esteem is recognised. At this stage, students are making substantive decisions about their post-GCSE options, though the process of decisionmaking starts much earlier.^{2,10} New science curricula emphasise an applied approach to teaching science and provide opportunities for the NHS to be introduced into the curriculum.^{11,12} Common clinical conditions such as diabetes, asthma and heart disease are included and the teacher is expected to link teaching with local careers opportunities. As of 2007, only 2% of employers in County Durham offer science-based work placements and 0.6% of pupils are taking up opportunities for work experience in sciences or technology (Figure 2).

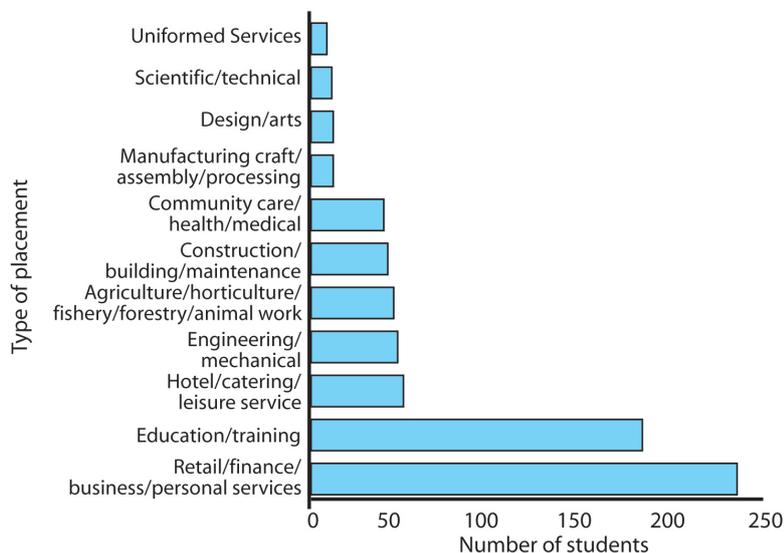


Figure 2. Work experience placements arranged by County Durham Local Education Authority in 2004-5 by occupational category. Placements in community care/health/medical were predominantly in nursing homes.

Lack of availability may be a factor. Work experience in medicine is difficult to obtain and tends to be given to older students who are also the friends and family members of doctors. Medical schools do not insist on NHS work experience but it is widely perceived by students as an advantage when applying. Thus already disadvantaged students feel further disadvantaged for medicine.

NHS support for the science curriculum

Energetic support of science teaching by universities and the NHS from as early a stage as possible could be motivating and help to raise aspirations. There is evidence that this might be effective.^{10,13,14} Work placements provided by the NHS in science areas from age 14 onwards would raise the profile of other NHS careers besides medicine (giving students an alternative and still satisfying career if they do not achieve the grades required for medicine). The perceived risks (confidentiality, emotional trauma) need to be balanced against the opportunity costs and risks of not staffing these areas in the future. Whatever approach is taken, investment in promoting links between the NHS, schools and employment opportunities can be defended on the basis of recognised links between health, education and employment.¹⁵

Provision of work placements, and other outreach activities to schools, appeals to NHS staff who are often parents themselves and trained communicators at all levels. The chief concern among local NHS staff is that students are often poorly selected for placements. A charitably funded partnership between local hospitals and eight schools has been developed (The William Harvey Project). Four students from each of the schools, competitively selected by teachers

for motivation and potential in science, are offered structured placements with workbooks to complete, university visits and other events, together with careers events for the whole class. Linked with this is problem-based study (analogous to the approach now taken by many medical schools) focused around clinical scenarios such as a 15-year-old boy with asthma. This can be supplemented by visits to the hospital (eg X-ray department, lung function testing) or by relevant NHS staff. This has been enthusiastically received by teachers and students and now forms the basis of a module of continuing professional development. Early indications are that teaching around a clinical scenario can be motivating.¹⁴

Early outcome measures of our partnership with schools will be in the post-GCSE choices made by the enrolled students. The ultimate aim is to ensure recruitment of high calibre local staff to the NHS while at the same time publicising the rich variety of NHS careers to schools. Health education for the students, their families and friends is an additional benefit. The whole project supports local efforts to widen access to medicine. It is hoped that science careers outside the NHS will also benefit.

Challenges

Outreach to schools is not at present perceived by the NHS as 'core business' but within the next few years the need for this is likely to become obvious as school rolls fall and more staff are expected to retire. It requires committed leadership. The William Harvey Project is charitably funded. A case can be made for shared funding by the NHS and the education sector. Evaluation of educational interventions is very difficult as good controls (same school, teacher and other variables) are not available. It is clear that the interventions offered are highly appreciated and the project's second intake is over subscribed. Post-GCSE

choices will be examined closely and compared with controls matched by age, socio-economic status and grades predicted at end of year 9 (two years before GCSE).

Conclusion

Widening access to medicine for school leavers in disadvantaged areas is very difficult, particularly because of low achievement in sciences. Links with the NHS can enliven the curriculum and has the potential to raise aspirations for medicine and other science-based NHS careers. Expenditure can be justified by accepted links between health, education and employment.

Acknowledgements

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Since writing this paper the William Harvey Project has been externally evaluated by Colin Greenhalgh, CBE, on behalf of the funding charities. He noted that 25 students were going on to A levels, mostly including one or more sciences. Twenty of the first cohort aimed for careers in the NHS, mostly science-based.

Durham County Council's Education Development Service analysed the students' GCSE results by three different methods. The students were compared with two control groups who had been matched for socio-economic status, gender, prior attainment and predicted results. One group had been matched for school. Students in the project did significantly better than both groups of matched students who had not been included. In the first cohort nine of the students had only been predicted D grades (because teachers' priorities were different from ours). The results were all the more impressive. In subsequent cohorts we believe the teachers have learned to select more appropriately.

The project was regarded as excellent value for money and all those who contributed were congratulated. It now continues under the leadership of Dr Julie Cox. Longer term funding has been secured from NHS sources and the project is to be emulated in Cambridge.

The problem-based case scenario mentioned - "Gary's Problem" - is now the subject of a funding application to the Wellcome Trust by the Science Learning Centre North East (part of Durham University). The aim is to disseminate "Gary" nationally together with other case scenarios under development.

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Pupils in County Durham sign up to a schools project to help find

The medical scientists of the future

Medical students typically come from a relatively narrow range of schools. The William Harvey Project aims to encourage students from schools with little or no history of producing medical students to think of a career in medicine or related disciplines. Pupils from schools across the county are selected to take part in the William Harvey Project, the scheme which offers teenagers the chance to find out how the science they learn in a classroom can be used to help patients.

Initially funded by the Sutton Trust and the Odgen Trust, the project works in partnership with Durham University, Aimhigher, The Durham Science Learning Centre and County Durham Education Development Service to support local hospitals and schools to work together to encourage young people to think about science-based careers within the NHS.

The Project Director is Consultant Respiratory physician at the University Hospital of North Durham, Dr Sarah Pearce. She commented that the William Harvey Project was launched in 2006 to link three hospitals in County Durham with eight local schools in an effort to address a desperately low take-up of science related subjects at A-level. Recruitment to science – based careers is especially difficult. School students often have low aspirations and the take up of science options is particularly poor in County Durham. Widening access to medicine is very difficult and this project goes some way to address all of these issues.

The scheme nurtures students who have demonstrated an aptitude in science and longer term it is hoped the project will improve recruitment to medical traineeships and other science related professions within the NHS as well as university courses in the field of bio-medical science.

The William Harvey Project provides curriculum materials, school ambassadors from the NHS, offers guaranteed work experience to selected

students in years 10 and 11, and also teaches teachers about sciences in the NHS.

Co-ordinating the project, Education Project Officer Catherine Henderson said: “All the students have a tour of one of the three hospital sites and are invited to attend a series of science-related workshops and events. They also have the opportunity to undertake work experience in one of three hospitals across the Trust during years 10 and year 11 of their schooling (leading up to GCSE). In the students’ first year (year 10) they have one week visiting a number of departments working with staff in Radiology, Cardiology, Pathology, Medical Physics, and many other science-related departments. Year 11 students can choose to have one week in one department of their choice - usually on a ward - where they can learn and understand how many professions are involved in the patient’s pathway. Durham University comments that the NHS provides the only high quality work experience in science for local schools.

At the end of the programme yr 11 students are invited to attend a Residential Summer school at Durham University Stockton Campus which is funded by Aim Higher.

Sir Arnold Wolfendale FRS - 14th Astronomer Royal and patron of the project - said while talking to NHS staff on a recent visit to one of the hospitals in the Trust “Good luck to all who take part in this project. We want more local students to become our future health professionals, scientists and doctors”.



Comments from students:

- *Enjoyed every day - staff treated me like a young individual and took time to explain everything especially when I didn't understand the first time.*
- *It was cool ! Never thought the x-ray department did as much - thought it was just about broken bones.*
- *Thank you for a very interesting week I learnt such a lot and want to work in the NHS with people in a caring environment the varied one week work experience on the William Harvey project gave me the opportunity to see different careers which has helped me decide what I want to do.*

Dr Julie Cox, Consultant Radiologist, recently agreed to share the lead role with Dr Sarah Pearce Respiratory Consultant at UHND with a view in the future to accepting full responsibility.

Anyone wanting to know more information about the William Harvey Project or members of staff who would be willing to accept a student in their department for a short period - a day or a week - should please contact:

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