Teaching non-clinical topics: lessons from a public health module for medical students

Paula Whittaker[1], Greg Williams[2]

Background
A new public health teaching for medical students in year four was introduced. This paper evaluates the planning and implementation of the first year of delivery.

Methods
Kern et al’s six step approach to curriculum development was used as an evaluation framework:

- Problem identification
- Needs assessment
- Goals and objectives
- Educational strategies
- Implementation
- Evaluation and feedback

The delivery of the programme was assessed by direct observation of teaching and the end of year teaching review meeting, plus data from student feedback questionnaires.

Results
Problem identification was based on student feedback and gap analysis of the medical school curriculum against the standards set out in the GMC’s Outcomes for Graduates. The public health learning needs of the medical students were examined from the perspectives of the students, the medical school and the NHS. Goals and objectives were chosen using the Outcomes for Graduates set out by the GMC as a basis. The module used a mixture of face-to-face and online teaching using a range of pedagogic approaches. The teaching was very interactive throughout and emphasised the links between public health and clinical medicine. Students completed anonymous feedback questionnaires which were overwhelmingly positive. The student feedback, plus feedback from the student representative, was used to inform changes in the programme implemented the following academic year.

Conclusion
This new public health module has successfully integrated into the clinical curriculum. Lessons learnt from the first year of implementation are transferable to the delivery of other non-clinical topics.
Background

Public health is a small sub-specialty of medicine, making up fewer than two per cent of doctors on the UK’s General Medical Council (GMC) specialist register (GMC, 2016). However, the core principles of public health are relevant to all doctors, and are an important part of the undergraduate medical curriculum (GMC, 2009). In Manchester Medical School, public health is taught in years one and two via small group work, topic specific lectures and Intended Learning Outcomes (ILOs) incorporated into the Problem Based Learning (PBL) cases. Previous to 2014 public health was not taught as part of the core curriculum beyond year two, but a limited number of students could access public health teaching by choosing optional attachments in years three or five. In September 2014 delivery public health in year four began consisting of two days of mandatory face-to-face teaching plus on-line resources.

Recommendations for the delivery of public health teaching from the literature

The medical education literature recommends that effective public health teaching should; be based on clear ILOs, be integrated with the clinical curriculum, be interactive, include exposure to public health specialist role models and be updated in response to feedback.

1. Clear ILOs

Clear ILOs help students know what is expected of them, and help teachers plan the content and delivery of their sessions (Harden, 2002). There has been criticism of the move to outcomes focussed education in medicine, with concerns being raised that it disempowers students and reduces the flexibility and responsiveness of teaching (Hussey & Smith 2002, Rees 2004). Pre-determined ILOs deliver most value if limited to key concepts that allow variation from group to group and student determination of their own learning needs.

2. Integration with clinical curriculum

At first glance public health can appear to be the polar opposite of clinical medicine, with its focus on populations, social sciences and prevention rather than individual patients, biological science and the treatment of disease. However, understanding epidemiology helps doctors diagnose individual patients and plan treatment holistically (Fineberg, 2011). With the raising prevalence of chronic diseases linked to social and behavioural causes and the need to manage spiralling treatment costs, public health is becoming more relevant to doctors’ daily practice (Monroe, 2011).

Several studies examining the effectiveness of integrated learning in medicine have reported improvements in student satisfaction, knowledge and self-directed learning (Lehmann et al. 2013, Grasl et al. 2012, Woltering et al. 2009, Johnson et al. 2011). Problem-based learning cases have been shown to be effective in increasing medical students’ short-term knowledge in public health competencies (Hoover et al. 2012, Gurpinar et al. 2005). However, if public health only exists as a minor component within clinical teaching there is a danger it becomes invisible to students and
teachers in the curriculum (Mahoney et al. 2011). Longitudinal integration across all years of the medical curriculum also requires careful co-ordination to ensure that unnecessary repetition is avoided and that public health elements are not eroded over time (Campos-Outcalt, 2011).

3. Interactive delivery
Students value teaching in a positive atmosphere with opportunities to ask questions, group interaction and relevance to the ‘real’ world (McLaughlin & Mandlin 2001, Steinert 2004, Chi et al 1994, Mayo et al. 1993). Even in very large lectures interaction can be incorporated successfully using methods such as brainstorming (Cantillon, 2003), think-pair-share (Lyman, 1981), clicker interaction (Caldwell, 2007) or buzz groups (Fraser & Greenhalgh 2001). Using a range of activities ensures the teaching appeals to students with different learning styles, for example: brainstorming and role-play to appeal to activists, knowledge quizzes and background references for theorists, small group discussion and links to videos for reflectors, and case studies and problem-solving for pragmatists (Vaugh & Baker 2001). Whilst all these methods help the tutor to organise the session, the most important skill is to maintain an encouraging atmosphere for sharing ideas.

4. Teaching should include exposure to public health specialist role models
Medical students have reported poor role modelling of public health skills (Rego & Dick 2005). Focus groups with medical students in Canada found that the lack of exposure to practising public health specialist role models was a major factor in students’ disengagement with the public health curriculum (Tyler et al. 2009).

5. Feedback should be used to update teaching sessions
Module-specific online student feedback reported to course leaders has been shown to improve the overall end of year student satisfaction with their degree programme (Tucker et al. 2008). Feedback from the students should be used to alter the session for the following group (Nevo & McClean 2001). Feedback needs to be received by tutors in a timely fashion to enable this to happen, and students have been shown to give more thoughtful feedback when they receive feedback on the resultant changes in teaching (Cleary et al. 2013).

Aim
This paper will evaluate the planning and implementation of the first year of delivery of the new public teaching days for year four medical students.

Methodology
The development and delivery of the new public health teaching was assessed using Kern et al’s six step approach to curriculum development as an evaluation framework (Kern et al. 2009):

- Problem identification
- Needs assessment
- Goals and objectives
- Educational strategies
- Implementation
- Evaluation and feedback

How effectively the course organisers addressed each of the above was examined in relation to good
practice identified from the medical education literature. The evidence of how the course design and delivery team addressed the above steps was gathered from documentation such as curriculum proposals and business cases.

The delivery of the programme was assessed by direct observation. PW observed one introductory lecture and one group work session. Student feedback was sought from every student that attended the mandatory teaching days via an anonymous paper evaluation questionnaire collected at the end of each teaching day. PW observed the end of year review meeting for tutors and student representatives.

Results

1. Problem Identification
The inadequacy of the previous delivery of public health learning was identified from two sources; students and from a gap analysis against the GMC Outcomes for Graduates (GMC, 2009).

The public health teaching team gathered feedback from students in clinical years that they felt the core medical programme required more public health teaching. This was obtained through feedback to optional attachments and from a reference group of student contacts. The students that gave feedback represent a small proportion of the student population, and it is possible that they do not reflect the average view of the study body.

2. Needs Assessment
The public health learning needs of the medical students were examined from three perspectives;

1. the learners: students had spontaneously expressed their felt public health learning needs through formal and informal feedback
2. the institution (and tutors): Manchester Medical School had identified the need to make the delivery of public health knowledge and skills more visible in its curriculum
3. the needs of the NHS: the public health teaching team presented evidence that doctors with good levels of public health knowledge and skills practice more effective evidenced-based medicine and patient choice.

3. Goals and objectives
The following ILOs were devised using the GMC Outcomes for Graduates (GMC, 2009) as a basis:

- To be able to use key principles of population health and prevention in managing and preventing clinical conditions, and be aware of the impact of health inequalities
- To be able to apply the principles and methods of evaluation, audit, research and development, and standard-setting to improve the clinical effectiveness and other aspects of the quality of health services
- To be aware of the framework within which healthcare is delivered in the UK
- To be able to fulfil clinical and legal responsibilities to protect the health of individual patients and populations against communicable disease and environmental hazards
- To be able to use, analyse, and interpret health information to improve clinical practice
- To be able to think critically, challenge the status quo, evaluate and apply evidence, synthesise evidence of different types, and be aware of different types of knowledge relevant to public health
- To adopt a ‘population perspective’ in everyday clinical practice, and in considering health
inequalities

4. Education strategies

A mixture of face-to-face and online teaching was used. Each year four students were required to attend two full days of public health teaching; one day during their Paediatric block and one day during their Obstetrics and Gynaecology block. Prior to these mandatory teaching days students were encouraged to work through three e-learning modules. The teaching was outcomes-focused based on the ILOs listed above.

Structure of face-to-face teaching days

The ILOs and key concepts were introduced using lectures at the beginning of each day. Most of the day was spent in small groups working on public health scenarios. The large group came together at the end of the day for a wrap up and overview of the ILOs.

Piloting of small group work

In July 2014 simulations of the planned small group work sessions were run by the teaching team with a group of six volunteer students who had completed optional attachments in public health. As a result of feedback from these students the small group work was changed to maximise interaction and student self-directed learning.

5. Implementation

A total of 410 students attended the teaching days. It is not known how many students accessed the e-learning modules.

Observation notes: Introductory lecture on health service public health and screening

The lecturer was very enthusiastic about public health and its relevance to clinical medicine. She used a wide variety of clinical examples to explain the key concepts of epidemiology, health economics and screening. She regularly checked understanding with the audience and invited student interaction. There was good signposting to web resources and e-learning throughout the lecture. The lecturer had an open interactive style and invited discussion from the floor. She identified the students’ concerns and addressed these. About half-way through the lecture the students were asked to stand up and write their thoughts on a white board. This helped focus attention and lifted the energy in the room. This exercise was followed by the related technical detail and including interactive questioning of the audience.

There was a lot of material presented in this introductory lecture and the lecturer struggled to present it all within the one hour session. Some content needed to be skipped over. The students were reminded that the slide set was available online for them to read afterwards. Although generally maximising interaction in lectures is to be welcomed, the context of this lecture was the start of a whole day of teaching including four hours dedicated to small group interaction. This context may make interaction in this case less important as the role of the lecture was to lay the basis for the students to apply the explained concepts in the following small group work sessions. Some of the content of the lecture could be simplified to ensure the key concepts were covered in the one hour time limit. The lecturer gave a lot of examples of the work of public health specialists in relation to the topics discussed. These topics would be more relevant to students if examples were able to be given of their application in clinical work rather than the sub-speciality of public health.

Observation notes: Small group work session- Individual funding request

This was a very detailed role play scenario. Two hours was the correct amount of time needed for the students to work through the scenario and explore the associated ILOs. The students in the observed group understood the ILOs by the end of the session. Each student was assigned a role and there was no option for students not to interact with the scenario. The students all seemed to enjoy their roles and
understand the task they had been given to complete.

6. Evaluation and feedback
Students were requested to complete paper feedback questionnaires at the end of each teaching day. The questionnaires consisted of a balanced mixture of closed and open questions. The questionnaire was limited to one side of A4 to maximise the response rate (see appendix for a copy of the feedback questionnaire).

Feedback was provided anonymously to encourage honest and open criticism. 244 responses were received for the paediatrics block teaching day and 238 responses were received for the obstetrics and gynaecology teaching day, a response rate of 60% and 58% respectively. The student feedback was overwhelmingly positive. The full results are presented in the additional material.

Peer feedback mechanisms were not utilised during the module.

All the small group facilitators were briefed by the course leaders at the beginning of the teaching day. All the small group facilitators were invited to attend a debriefing session at the end of the teaching day to feedback aspects the students appeared to enjoy, what aspects they failed to engage with and anything the tutors struggled with.

A review meeting took place at the end of the academic year with all the tutors and student representatives to review feedback and suggestions for change. This meeting was open and informal and allowed all those in attendance to share their views. The views of the student representatives were actively sought and directly led to changes in the plan for delivery for the following academic year.

Discussion

The new public health module has successfully addressed a gap in the undergraduate medical student curriculum in this topic using a range of teaching methods and was well received by the first cohort of students.

Strengths of new programme
The face-to-face teaching days were very interactive. The changes from lecture to role play to debates effectively kept the students focussed and interested throughout the day. The interactive activities, plus the tutors’ descriptions of how they perform their roles within the public health department, helped to bring the subject to life. The scenarios used highlighted the links with clinical practice, although this was not always emphasised by the tutors, none of whom were practising clinicians. The teaching was outcomes-focussed and clearly linked to the ILOs. Role-modelling is important in the professional development of doctors (Kern et al. 2009). Unlike other specialities, medical students do not get access to public health specialists during their clinical attachments. Therefore the opportunity to spend some time with public health specialists is important to making medical students aware of public health as a career option, but also the importance of applying public health principles in their clinical work.

The public health module is designed to be learner centred (McClean & Gibbs 2010). This includes constant redesign based on student feedback and student representation on the review panel. Inviting student representatives to participate in the review panel is a good way of engaging motivated students; however they may not represent the needs and attitudes of the entire student body. Focus groups could be used to source opinions from disenfranchised learners (Keister & Grames 2012).

Limitations of new programme
The learning needs for the new module were not identified by the students’ themselves, but were based on GMC Outcomes for Graduates (GMC, 2009). Identifying their own learning needs has been linked to an increase in students translating learning into practice (Grant, 2002). A survey incorporated into the e-
learning modules could be used to assess the students’ own pre-course learning needs. Medical students are motivated by clinical practice. It has been suggested that non-clinical topics need to be delivered in ‘symbiosis’ with clinical work to achieve long-term knowledge and skill transfer and changes in attitudes and beliefs (Prideaux, 2003). Although topics were integrated with the clinical curriculum and there was constant referencing of clinical scenarios, the fact that none of the tutors involved were clinicians may have undermined the ability of the students to see public health as relevant to clinical work. The inclusion of a clinician to describe how they use public health knowledge and skills in practice would reinforce the value of public health to the students.

Currently, student feedback is obtained using paper questionnaires. The response rate of less than 70% means that this feedback may not be reliable and valid (Kogan & Shea 2007). An online survey could be made compulsory, ensuring a valid and reliable level of response. Tucker et al. developed an online student feedback system where staff responded to students outlining changes that were planned based on feedback, enabling students to see that their feedback had been heard, valued and contributed to course improvements (Tucker et al. 2008). This model could be adopted by the public health teaching team with the benefit that online responses may reduce the administrative burden of inputting responses from paper questionnaires. No feedback was collected regarding the e-learning modules. This could be included in the overall survey or added to the end of the e-learning module itself.

Peer review feedback is not utilised as a feedback mechanisms despite a large number of tutors being present on the same day. This could be used as a continuous professional development opportunity. Each tutor could be observed by one peer who would then feedback their constructive advice for improvements. Manchester Medical School routinely records all lectures. These recordings could undergo peer review in a group development session. This approach has been enthusiastically endorsed by medical school lecturers in Canada (McLeod et al. 2013).

The e-learning modules were optional. It was not known how many students completed the e-learning prior to attending the face-to-face teaching days. It was reported by tutors that many of the students obviously had not accessed the e-learning modules prior to attending the taught modules which meant that time had to be spent in the face-to-face sessions explaining the concepts covered by the e-learning. This means that students who have completed the e-learning may be frustrated by this repeating of basic concepts that they have already learnt.

**Limitations of this evaluation**

There is no data on what the effect of the new public health module has been on students’ knowledge of public health topics. This will be measureable through the inclusion of public health questions in student progress tests, but due to the small number of questions relating to public health there may not be adequate data to give a reliable assessment for a number of years.

**Take Home Messages**

- Medical students express a desire to be taught more public health
- Linking to the clinical curriculum is vital; including doctors that can explain how they apply public health in their role would increase the perceived relevancy of public health to medical students
- Blended learning is of limited effectiveness unless students are obliged to access pre-attendance electronic resources
Dr Paula Whittaker is a Consultant in Public Health and Senior Clinical Lecturer in Public Health. Paula is the programme director for BSc (Hons) Innovation and Enterprise in Clinical Medicine and the deputy programme director and director of evidence based practice for the MPH. Greg Williams is the Research Programme Manager in the Manchester Urban Collaboration for Health (MUCH) team within the University of Manchester. He also undertakes undergraduate and postgraduate teaching in public health.

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Bibliography/References

http://dx.doi.org/10.1027/s15516709cog1803_3
http://dx.doi.org/10.1136/bmj.323.7316.799


Appendices
APPENDIX 1: Student Feedback Questionnaire
Undergraduate – Speciality Block - Public Health- Feedback Form

How would you rate the overall day?

Very Unsatisfactory  Unsatisfactory  Good  Excellent

How would you rate the introductory presentations?

Very Unsatisfactory  Unsatisfactory  Good  Excellent

How would you rate the morning workshop?

Very Unsatisfactory  Unsatisfactory  Good  Excellent

How would you rate the afternoon workshop?

Very Unsatisfactory  Unsatisfactory  Good  Excellent

Has today’s session improved your understanding of public health?

Yes  No

Would you be interested in learning more about public health?

Yes  No

What were the 3 best parts of today?

What were the 3 worst parts of today?

What would you do differently?

Any other comments or suggestions?

____________________________________________________________________________________
___________________________________________________________________

Additional Material 2: Student Feedback Results
1. Public Health Day in Paediatrics Block
<table>
<thead>
<tr>
<th>Time</th>
<th>Group A</th>
<th>Group B</th>
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<td>09.30</td>
<td>Introduction to Public Health (10 minutes)</td>
<td></td>
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<tr>
<td></td>
<td>Lecture on infectious disease control and immunisations (25 minutes)</td>
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<tr>
<td></td>
<td>Introduction to Inequalities and Prevention (25 minutes)</td>
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<td>10.30</td>
<td>Introduction to Group Work 1: Measles Outbreak in a School (5 minutes)</td>
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<td>Introduction to Group Work 2: The Debates (5 minutes)</td>
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<tr>
<td>10.50</td>
<td>Movement/Break</td>
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<tr>
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<td>Measles Outbreak in a School (Small groups of approx. 8 students with facilitator)</td>
<td>The “Old” Tobacco</td>
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<td></td>
<td>Debate : Sugar is the new tobacco</td>
</tr>
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<td>Lunch</td>
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</tr>
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Feedback and review of ILOs

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<th>Percentage of responses</th>
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<th>Good</th>
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<td>Improve understanding of public health</td>
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<td>Interested in learning more about public health</td>
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<td>Best part of the day</td>
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### Percentage of responses

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### Percentage of responses

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**Declaration of Interest**

The author has declared that there are no conflicts of interest.