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## **Human Disease/Clinical Medical Sciences in Dentistry: Current state and future directions of undergraduate teaching in the UK and Ireland**

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### **Abstract**

In March 2017, a group of teachers of human disease/clinical medical science (HD/CMSD) representing the majority of schools from around the UK and Republic of Ireland met to discuss the current state of teaching of human disease and also to discuss how the delivery of this theme might evolve to inform improved healthcare. This study outlines how the original teaching in medicine and surgery to dental undergraduate students has developed into the theme of HD/CMSD reflecting changing needs as well as guidance from the regulators, and how different dental schools have developed their approaches to reach their current state. Each school was also asked to share a strengths, weakness, opportunities and threats (SWOT) analysis of their programme and to outline how they thought their HD/CMSD programme may develop. The school representatives who coordinate the delivery and assessment of HD/CMSD in the undergraduate curriculum have extensive insight in this area and are well-placed to shape the HD/CMSD development for the future.

### **1 INTRODUCTION**

The teaching of Human Disease/Clinical Medical Sciences in Dentistry (HD/CMSD) is an important part of undergraduate dental programmes in order that new graduates are able to practice safely. For example, at the very least, a patient can expect not to come to harm as a consequence of dental treatment because of an avoidable medical complication or drug interaction during a course of treatment, and should really be able to expect to see a dentist who is well informed and up-to-date in aspects of medicine and pharmacology. A network of teachers involved in medicine and surgery or human disease teaching for dental students, developed over many years, where topic leads from the different dental schools would meet and compare notes and develop teaching and assessment for their individual schools. A principal recent outcome of this group was agreement in 2011 of a curriculum for clinical medical science in dentistry to act as a framework for topic leads in their respective schools. [1] The group continues to meet sporadically, typically when a need arises.

Courses and curricula in HD/CMSD across schools evolved as a result of a number of factors, including ongoing revision of guidance from the GDC and evolving links with medical schools from whom much teaching was obtained. It was felt that a further meeting of the teachers group was needed, to evaluate developments in the different schools in the UK and Ireland and what were likely future development intentions.

Invitations were sent to all UK and Ireland dental schools. There then followed a meeting held in Cardiff in 2017 where participants from many schools around the UK and Ireland met for a 1-day symposium. Each school representative attending was asked to give a short presentation covering the current state of their HD/CMSD teaching and likely future developments, as well as conduct a strengths, weaknesses, opportunities and threats (SWOT) analysis. Each delegate was also asked to share as much of their own course material as they felt able as PDFs, presentations or other formats. The collected materials were

subsequently distributed amongst those that attended to further aid with the development of HD/CMSD courses in their respective schools. Of the 18 dental schools delivering undergraduate dental education across the UK and Ireland, twelve were able to attend and contribute. The schools represented were from all the component countries of the United Kingdom as well as both schools in the Republic of Ireland. The schools represented were also a mix of those traditional schools with 5-year dental programmes, and more recently-established graduate-entry dental schools with a very different history and ethos. The background of the delegates attending was varied also, and included both UK National Health Service (NHS) and university employees, from varied clinical backgrounds including oral medicine, oral and maxillofacial surgery, oral surgery, oral pathology and special care dentistry. Interestingly, the majority of those attending with responsibility for the delivery of HD/CMSD teaching in their schools have degrees in both dentistry and medicine. These persons are well-placed to have good insight into the relevance of, and depth needed for, the medically-related topics contained within the HD/CMSD courses. Some had taken over the role from colleagues in the medical school who formerly ran the “medicine and surgery” dental undergraduate teaching programmes.

## **2 THE DEVELOPMENT OF MEDICINE & SURGERY, HUMAN DISEASE/CLINICAL MEDICAL SCIENCE IN DENTISTRY**

Human Disease/Clinical Medical Sciences in Dentistry (HD/CMSD) is a core topic for safe and effective practice in dentistry. The GDC of the UK has issued guidance to dental schools over many years regarding what must be taught in undergraduate dental curricula. From the 1970s, until its last edition in 1990, the GDC issued successive editions of a document entitled “Recommendations Concerning the Dental Curriculum” at approximately 5-year intervals. In 1997, the GDC issued a revised curriculum document, *The First Five Years*, [2] with a second edition in 2002 [3] and an interim third edition in 2008 [4]. These were succeeded by further guidance in the documents “Preparing for Practice” [5] and the “Preparing for Practice revised edition” [6] in 2015.

Examination of the 1980 edition of *Recommendations Concerning the Dental Curriculum* show the guidance that was available to schools to deliver what was then referred to as teaching in Medicine and Surgery, and demonstrate that the GDC were quite aware of the need for dental undergraduate students to be well-versed in medical, surgical and pharmacological knowledge and to be formally examined in these topics.

In 1997, with the first edition of *The First Five Years*, [2] there was greater clarity regarding instruction in medical and surgical topics, which they grouped collectively as Human Disease. In Paragraph 55, it was noted that

“Part of the undergraduate dental curriculum must be devoted to instruction in medicine and surgery (human disease) and to attendance at accident and emergency departments. A Trust, usually the host Trust, is provided with specific funding to supply the facilities and staff for this part of the curriculum and it must be used for that purpose in agreement with the dental dean or equivalent person.”

This edition of the *First Five Years* went further by offering detailed guidance on delivery and also suggested that

“Responsibility for the provision of courses must rest with the heads of university departments of medicine and surgery. Continuity of teaching, preferably by physicians and surgeons who have a particular personal responsibility for teaching dental students is most important. The appointment of a coordinator from within the staff of the dental school is essential.”

In 2002, the GDC published the second edition of The First Five Years [3] and there was some minor refinement of the directions concerning HD/CMSD.

In 2008, a third edition (interim) of The First Five Years was published with a proviso that a further curriculum document would follow in 2010 to replace The First Five Years altogether. This revised document was greatly changed. There was less direct guidance as to how a course should be delivered and by whom, and no mention of by whom and how the teaching in Human Diseases should be managed. Furthermore, there was no mention of how assessments should be conducted. The GDC had shifted its focus towards a loose series of outcomes to be achieved rather than the methods, by which they should be managed. The direction of how the dental and medical schools should work together, and in particular any mention of specific funding for HD/CMSD had been lost.

In 2011, a fully revised document was published entitled “Preparing for Practice” [5] and subtitled “Dental team learning outcomes for registration.” A second edition of “Preparing for Practice” was published in 2015,<sup>6</sup> but the statements relating to HD/CMSD remained unchanged from the first edition. By 2015, therefore, the latest stage had been reached of continuing evolution of what the GDC requires dental schools to teach undergraduate students in relation to HD/CMSD such that they are safe and competent to begin independent dental practice. The ways by which the dental schools of the UK and Ireland achieve this are different, as described later.

### **3 FUNDING IN THE UK OF MEDICINE & SURGERY, HUMAN DISEASE/CLINICAL MEDICAL SCIENCE IN DENTISTRY**

In England and Wales in April 2001, the Multi-Professional Education and Training Budget (MPET) was created by the merger of the Non-Medical Education and Training Budget, the Medical and Dental Education Levy, and the Service Increment for Teaching.<sup>8</sup> Service Increment for Teaching (SIFT) was established in 1976 and a separate budget was set aside for dental student teaching within NHS dental hospitals, known as Dental SIFT, and dental hospitals were also allocated a separate Medical for Dental SIFT fund which directly supported the teaching in Medicine and Surgery/Human Disease.

### **4 ORGANISATION AND DELIVERY OF HD/CMSD**

As a result of the original First Five Years document and the funding allocation, many dental schools essentially franchised the teaching and learning in HD/CMSD to their counterpart medical school and retained only a liaising clinician within the dental school structure. Much of the delivery of the teaching of HD/CMSD was provided by clinicians and staff from the medical school and there may have been limited input into the actual content of lectures, practicals and clinical attachments from the dental schools. The sequential curriculum documents from the GDC have evolved such that the instruction for delivery of teaching and assessment of HD/CMSD has changed. Initially, it was necessary for dental students to attend accident and emergency departments as well as medical and surgical outpatient clinics and ward rounds. There was a formal assessment in the clinical examination and diagnosis of a real-life medical or surgical

patient. Later the clinical exam could be in the form of an objective structured clinical examination (OSCE). In later curriculum documents, the GDC was no longer prescriptive of the need for medical and surgical attachments or the mode of examination in HD/CMSD, so long as the stated outcomes were met.

In Cardiff dental school over the last 10 years or so, for example, the teaching and assessment of HD/CMSD has followed the guidance of the relevant GDC documents and at present, the teaching still has a large input from the school of medicine. Changes to teaching and assessment practice in the modern environment in both medical and dental schools have resulted in different allocations of staff and resources and the teaching and learning methods of students have also evolved. Following communication with individuals at other dental schools responsible for HD/CMSD it became apparent that there was a need to compare notes across schools to see what approaches to the delivery of HD/CMSD were being used and to share and develop best practice. This resulted in a 1-day symposium held in Cardiff in 2017, and the following is a summary of the findings of that meeting.

## **5 OUTCOMES OF THE HD/CMSD SYMPOSIUM**

Table 1 gives a summary of the teaching and assessment of the HD/CMSD programmes for the participating schools. In relation to in which clinical years the teaching is mostly delivered, there are differences. Some schools primarily deliver the teaching over years 2 and 3, with others in years 3, 4 and 5. An argument for delivering teaching early is that it gives dental students the knowledge, and hopefully the understanding, of human health and disease such that they are safe to begin clinical dental practice on patients, often starting in year 3. A further advantage for some dentistry programmes is that typically in year 1, students will have studied basic sciences such as anatomy, physiology, biochemistry and some basic pharmacology. In year 2, students build on this, looking at pathological mechanisms such as inflammation, immunity, neoplasia and so on, which then translates into year 3 with body-system diseases being taught, for example the respiratory system where inflammation and immunity may be reflected in chronic obstructive pulmonary disease (COPD) and asthma, and neoplasia as lung cancer, for example through smoking. The basic mechanisms of arterial atherosclerosis and cardiac rhythm disorders learned in year 2 translate to the management of hypertension and thrombosis and the use of antihypertensive and anticoagulant medication and how this impacts on dental treatment. The downside of delivering HD/CMSD teaching early is that the students have had limited contact with patients and have taken few medical histories, so the immediate relevance of what they have learned is lost. An advantage of delivering HD/CMSD teaching later in the dental course is that there is immediate relevance to what is being taught and the appreciation and understanding is perhaps greater.

**Table 1. A summary of teaching and assessment in the participating schools**

Dental school	Which years in the BDS course HD/CMSD teaching is delivered	Which year(s) in the BDS course is HD/CMSD formally assessed	Teaching predominantly by medical staff	Teaching predominantly by dental staff	In-house online teaching/resource	PBL/small group teaching incorporated	Clinical attachments	Clinical or OSCE exam
Aberdeen	2, 3, 4, 5	2, 3, 4, 5	even	even	N	Y	Y	Y
Belfast	3	3	x		N	N	Y	Y
Bristol	1, 2, 3	3	x		N	Y	Y	Y
Cardiff	2, 3	3	x		N	N	N	N
Cork	3, 4	4	x		N	Y	Y	N
Dublin	3	3	x		Y	Y	Y	Y
Glasgow	2, 3, 4, 5	2, 3, 4, 5		x	N	Y	N	Y
Kings London	2, 3	3, 5		x	Y	Y	N	Y
Leeds	4, 5	4, 5		x	Y	Y	Y	Y
Newcastle	3, 4	3, 4	x		Y	Y	N	Y
Peninsula	2, 3, 4	1, 2, 3, 4, 5	x		Y	Y	N	N
Sheffield	2, 3	3	x		N	Y	Y	Y

Where the bulk of the teaching is delivered by colleagues in the medical school there is a tendency to lose sight of the immediate dental relevance of the subjects under discussion, and this is compounded if the teaching is delivered early in the dental course.

Attending delegates were also asked to do a SWOT analysis of their current programmes and share this with the group. Table 2 is a summary of the main themes which came out of this exercise. In the schools where the model of franchised teaching of HD/CMSD was delivered by the medical school, the lecture-based programme was typically delivered by subject experts from medicine and surgery. On the one hand this was seen as a strength, but on the other hand, the lack of dental relevance included in the lectures was a distinct weakness. Often the lectures are a version of, or even the same lectures, that are delivered to medical

undergraduates. Despite having specific learning outcomes derived from the various GDC curricula relating to HD/CMSD, the depth and breadth of the topics may not always be appropriate for dental undergraduate students. Another drawback of having subject experts deliver lectures is that across the various themes and topics of the HD/CMSD course a large number of individual lecturers may be involved, each with a small part to play and often not well coordinated. The risk is of repetition and overlap in lectures, or worse, areas that are not covered within a theme. Without clear reference to the dental relevance of the areas under discussion dental undergraduates were not always able to embrace the teaching, and given that the topics were often taught before many dental students have seen their own patients on clinics and taken many medical histories, the immediate relevance was lost. It is difficult to expect medical specialist lecturers to know the dental relevance of their teaching, but it is this aspect that would help to engage the students in learning and understanding. In addition to this, with contraction of academic university departments in medicine and surgery over recent years, increasing reliance is placed upon colleagues in the NHS or in clinical service provision to deliver teaching. This may be performed on a grace and favour basis or on personal relationships with individual clinicians and may not be reflected in job-planning of non-university staff. Furthermore, the demands of service provision may override those of teaching which may result in short-notice cancellation of teaching and rescheduling of lectures out of sequence, which again disheartens dental students and leads to dissatisfaction with the course and poor feedback. A further aspect of the dental school links to the hospital is the change in structure in medicine and surgery care. There has been a shift from a "clinical firm" (eg, house officers, senior house officers and a registrar) with a lead consultant, which would admit and look after patients under the care of a named consultant. This has been replaced by a shift-based system where junior doctors looked after all medical or surgical patients no matter who is their named consultant. The former stable hierarchical structure of a "firm" has now a constantly shifting group of junior staff. Trying to match this new arrangement to a group of observing dental students on a clinical attachment often proves impossible, where there is no consistent supervising consultant to give a lead to teaching and learning.

**Table 2. Summary of the SWOT analysis themes in the participating schools**

Strengths	Weaknesses	Opportunities	Threats
<p>Teaching from (medical/surgical) subject experts can be good</p>	<p>Lack of dental context and relevance from non-dental lecturers</p> <p>Lack of control of HD/CMSD budget makes increasing the staff/time for teaching very difficult</p>	<p>Bringing HD/CMSD in-house from medical school can increase control and opportunity to develop dental relevance of course</p> <p>Bringing control/budget for HD/CMSD in-house may allow for increased small group teaching and better explanation of dental relevance</p>	<p>Reduction of HD/CMSD detail in sequential GDC curricula may allow dental schools to reduce HD/CMSD teaching to the detriment of students and patients</p> <p>Loss of detail/focus by GDC curricula in HD/CMSD may lead to school reducing commitment and budget allocation</p>
<p>Where the dental school has control over budget, teaching can be more dentally-focussed</p>	<p>Teaching of HD/CMSD early in the BDS course means students can't see immediate relevance and importance—leads to loss of engagement</p>	<p>Moving HD/CMSD teaching to later in the BDS course may improve understanding and engagement</p>	<p>Reduced focus on whole patient care and increasing focus on technical aspects of dentistry</p>
<p>In-house HD/CMSD teaching allows for integration throughout the BDS course</p>	<p>Where there is a single staff member in the dental school responsible for HD/CMSD teaching and assessment, succession planning and support is essential</p>	<p>Engaging with Special Care Dentistry and similar may spread the load of teaching and increase student engagement</p>	<p>Job-planning of HD/CMSD course leaders to reduce teaching time and increase direct clinical care (especially in non-university staff)</p>
<p>Increased dental relevance means better student engagement and feedback</p>	<p>Using clinical medical staff in teaching risks late-notice changes where clinical commitments override teaching responsibilities</p>	<p>To develop blended and/or online learning to improve student access to teaching resource (to support small group teaching)</p>	<p>Geographical relocation of dental schools away from medical schools/hospitals may reduce links to medical specialties</p>



Another aspect of franchising HD/CMSD teaching to the medical school is that where there is a single individual in the dental hospital responsible for coordinating the teaching (and assessment), the loss of that individual through retirement or change in role leaves a large gap. The “institutional memory” or “institutional knowledge” invested in that individual is lost and the relationships developed with the medical school and hospital clinicians are also lost. To quote from one such paper warning of “...the loss of institutional knowledge from those retiring, and the impacts these could have ...” is immediately applicable to many HD/CMSD programmes. [10]

In the discussion of opportunities, a few themes emerged which relate to bringing HD/CMSD teaching in-house. The first is that if the teaching is delivered by dentally-qualified staff, then the lack of dental relevance described above when subject experts deliver lectures is overcome, and examples of real dental patient care can be used to illustrate teaching. Additionally, the depth and breadth of teaching can be better matched to dental student learning needs. The reclaim of any budget used for HD/CMSD teaching (medical for dental SIFT as was) may also allow for investment in dental staff to help to deliver small group teaching with better opportunities for discussion, case-based learning and personalised student feedback. The staffing demands for small group teaching are large however.

Finally, two further themes mentioned were the possibility for integrating HD/CMSD teaching with similar areas such as Special Care Dentistry where the dentistry may be relatively straightforward but the wider medical needs of the patient are great. Second the use of blended learning where online resources can serve to replace some of the lectures formerly used, which may include the use of lecture capture software, allowing students to access recorded lectures in audio and video, at a time of their own convenience.

In the discussion on threats to HD/CMSD teaching and learning, the increasing lack of detail supplied by the GDC in the various iterations of curriculum documents was highlighted. Whereas formerly the documents were very specific about how, where and by whom HD/CMSD topics would be taught (and funded), the later documents were increasingly vague. Many schools continue with versions of the model of lectures given by subject specialists from the medical school, there is a gradual trend to move away from this to small group teaching by dental staff. In the newer dental schools where there is no such tradition, and even no close physical link to a nearby medical school or hospital, the teaching of HD/CMSD may be delivered continuously through a vertically-integrated programme or in what has been described as “spiral learning” throughout the BDS course. Also, these schools may not always have clinical teaching staff in oral medicine or OMFS or other relevant disciplines who could be called upon to shape and/or deliver such teaching from a background of medicine and dentistry to inform the depth and breadth of teaching.

## **6 CONCLUSION**

If the future directions of HD/CMSD teaching can be deduced from the different directions of travel schools have taken in recent years, then the UK and Ireland appear to be in a state of flux with some schools employing a system of close collaboration with an allied medical school or hospital and the use of lectures and clinical attachments to meet the learning outcomes of the GDC or the Dental Council of Ireland. In other schools, there is no well-defined block of teaching that could be described as solely HD/CMSD and the teaching in this area occurs longitudinally although the BDS course and is assessed at different times and in different ways. Lying somewhere between these two models are schools who have brought HD/CMSD

teaching in-house (as well as the budget) and are developing small group teaching models, complemented by lectures from dental school staff from different dental specialties and supported by online learning packages which students can access at their own convenience and discuss in tutorials, seminars or other small group sessions. It should be noted that the consensus of the teachers of HD/CMSD was that online resources were helpful to, but could not replace, face-to-face teaching and learning where real-life examples of patients and situations could be drawn upon by experienced clinicians to illustrate or explain a more complex concept or problem. A future symposium could examine and compare teaching best practice across the schools, and also look at different assessment methods, either stand-alone HD/CMSD or integrated questions into wider BDS assessments.

The importance of HD/CMSD teaching in the undergraduate curriculum has never been greater. The population in the UK (and elsewhere) is getting older, with 18% aged 65 and over and 2.4% aged 85 and over [11], and with age comes many medical comorbidities and necessary associated polypharmacy. [12] There are also those patients in the population with special needs [13] who put a greater demand on the skills, knowledge and experience of dental practitioners in the community and in hospital dentistry. The need for a solid foundation in clinical medical science from undergraduate studies and continuing medical education is established and ever increasing.

#### CONFLICT OF INTEREST

The authors declare no conflict of interests.

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