The appropriateness of current UK training in acute internal medicine

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Abstract

Doctors training in Acute Internal Medicine (AIM) need to provide evidence that they can effectively manage 20 'top' and 40 'other important' acute medical presentations. However, the presentations considered important in the AIM curriculum do not have an empirical evidence base. This study compared real-life presentations against those in the AIM curriculum. Data on all presentations to the acute medical service at The Royal Free Hospital, London were collected retrospectively for five non-consecutive weeks and prospectively for one week. Five frequently encountered presentations *viz:* cough, nausea and vomiting, dizziness, hyperglycaemia and lethargy were not amongst those listed as 'top' or 'other important' in the AIM curriculum. Hence, demonstration of competency in these presentations is currently not an explicit requirement.

KEYWORDS: acute internal medicine; common presentations; curriculum; mismatch; training

KEYPOINTS:

- The AIM higher speciality training curriculum lists 20 'top' and 40 'other important' acute medical presentations which trainees must demonstrate they are competent to manage by the end of their speciality training.
- The selection of these presentations does not appear to be evidence-based.
- This six-week study showed that five frequently encountered presentations *viz*: cough, nausea and vomiting, dizziness, hyperglycaemia and lethargy were not amongst the presentations listed as 'top' or 'other important'.

- Trainees would not, therefore, be required to show competency in managing these presentations or possibly the serious diagnoses associated with them.

- There is a clear need for further evidence-based review and development of the AIM higher speciality training curriculum.

Introduction

Acute medicine is the hospital-based speciality that undertakes the initial stages of managing and treating adult patients who present with medical illnesses requiring urgent or emergency care. These patients are often treated on distinct wards called acute medical units (AMUs) and patient care is generally led by consultant physicians, trained or with an interest in acute internal medicine (AIM).

Current routes into AIM higher speciality training

The training programme for physicians interested in a career in AIM is clearly defined although there is some flexibility in the early years. Thus, following graduation from medical school and completion of the foundation programme, trainees can chose to complete either two years of core medical training (CMT) or three years of acute care common stem-acute medicine (ACCS-AM) training (Figure 1).[1-3] After completion of this early phase of training and acquisition of the Membership of the Royal College of Physicians (MRCP) diploma, trainees can progress into higher speciality training.

Future route into AIM higher speciality training

After recommendations from the Shape of Training Report[4], the existing CMT programme will be replaced, from August 2019, by Stage 1 of a new Internal Medicine Training (IMT) programme[5] (Figure 2). This is aimed at providing doctors with a more solid grounding in acute medicine than the CMT programme affords following criticism that current trainees are poorly prepared to take on the duties of a medical registrar.[6]

All trainees who complete Stage 1 of the IMT programme will have the option of deciding whether or not they wish to pursue a career in one of the so-called Group 1 specialties that have been earmarked for providing the majority of acute medical care (Table I). Higher speciality training (i.e. Stage 2 Internal Medicine Training) in these specialities will include twelve months of flexibly integrated internal medicine training to allow trainees to quality with a CCT in their chosen speciality as well as internal medicine (dual CCT). Given that AIM is a Group 1 speciality, higher trainees in AIM will qualify with a CCT in AIM and internal medicine.

The ACCS-AM programme remains open as a route into higher speciality training in AIM via the new IMT pathway: trainees who have completed at least two years of ACCS will be able to enter Stage 1 IMT at IMT 2 level (N Murch, personal communication, February 2019: Figure 3). However, ACCS-AM trainees are only likely to comprise a minority of those entering higher specialty training in AIM.[7]

Current AIM higher speciality training

The higher speciality training programme in AIM (current equivalent of the proposed Acute and Internal Medicine Training Stage 2) includes a minimum of 18 months working in two different AMUs and a minimum of four months' experience working in the each of four specialities viz cardiology, respiratory medicine, geriatrics and intensive care.[1] Provided that these requirements are met, trainees seeking additional accreditation can obtain further medical experience in specialities of their own choosing. Rotation through a range of different hospitals allows trainees to fulfil the requirements of the curriculum whilst also providing them with exposure to facilities varying in size, patient demography, and case-mix.

AIM higher speciality training requirements

Trainees in AIM are expected to develop a broad range of competencies as specified in their speciality training curriculum. This currently includes familiarity with 20 'top' and a further 40 'other important' presentations. By the end of their higher speciality training, trainees are required to demonstrate competency in managing each of the 20 'top' presentations and at least 90% of the 60 presentations considered to be 'top' or 'other important'.[1] However, there is no objective evidence base to support the inclusion of the presentations listed in the AIM curriculum. Thus, it remains unclear whether the focus of AIM training is best aligned towards the presentations most commonly encountered in day-to-day acute medical practice which is a key GMC requirment for all postgraduate curricula.[8]

AIM training in north central and east London is co-ordinated by the The North Central and East London Local Education Training Board (Table II).[9] The Royal Free Hospital in

Hampstead is one of the hospitals providing AIM training and has an allocation of three AIM trainees (N Murch, personal communication, February 2019). The hospital has 499 beds; it has specialist hepatobiliary and renal services, a 24-hour cardiac catheterisation laboratory and direct access to the hyperacute stroke unit at University College London Hospital. The acute medical service is responsible for the early management of adults admitted with a variety of acute medical conditions. Patients aged ≥80 years are managed initially by the acute medical team in the emergency department but are then transferred to the care of health services for elderly patients (HSEP). In the year 2017-2018, 16,092 patients were admitted under the acute medicine team at the Royal Free Hospital, (R Blannin, personal communication, March 2019).

The aim of this study was to analyse the acute medical patient case-mix presenting to the Royal Free Hospital, London over a one year period, in order to assess the appropriatness of the inclusion and hieracy of presentations listed in the AIM curriculum.

Methods

There is no central, electronic database at the Royal Free Hospital for capturing details of patients presenting to the duty acute medical team. Instead, a daily record of acute take patients is maintained, by hand, in an A4 hardcover medical 'take book'; this is kept in the emergency department and updated throughout the day by the acute-take physicians. Each 'take book' contains a contemporaneous record of activity over approximately three months; completed 'take books' are archived within the AMU.

Retrospective study

Information was collected on all patients referred to the acute medical team during five non-consecutive weeks during 2016. Collection periods were selected to evenly cover the entire year so controlling for potential seasonal variation in case-mix while specifically avoiding national bank holidays and major sporting events (Table III).

The acute medical 'take books' for 2016 were retrieved and data on the age, sex, date and day of admission and the medical record number (MRN) of all patients presenting to the service, during the targeted periods, were extracted. The MRN numbers were then used to interrogate the Royal Free Hospital electronic document and record management system (EDRM) to obtain relevant demographic information, and the initial medical clerking notes, in order to identify the working presenting complaint taken, by default, as the first presentation listed. The Royal Free Hospital intranet system *Freenet* was then accessed to retrieve patients' discharge summaries which provided details of their primary diagnoses.

Prospective study

Information on all acute medical admission during the period Monday 13 to Sunday 19 March 2017 was reviewed prospectively. The acute medical 'take book' was used as a contemporaneous record of patients presenting to the acute-take physicians during this week. The majority of the patients admitted to the acute medical service remained under the care of the acute medical team; details of the presenting complaints, together with their primary diagnoses, were collected directly from the acute-take physician during the morning and evening post-take ward rounds. The movements of patients triaged to

specialist teams, after admission, were tracked using the Royal Free Hospital intranet application *PowerChart;* information on presenting complaints and diagnoses were obtained directly from the admitting specialist team. Discharge summaries were subsequently reviewed and information on final diagnoses was recorded.

Data processing and statistical analysis

A number of patients in the retrospective study did not have a presenting complaint recorded in the medical notes. If information on the presenting complaint was missing but information was available on age, sex, ethnicity and primary diagnosis then the missing presentation was imputed, based on patients in the cohort with complete data sets, using the multivariate imputation by chained equations (MICE) algorithm described by Van Buuren and Groothuis-Oudshoorn in R[2].[10]

Data were analysed using descriptive statistics.

Results

The presentations of 845 patients (median [range] age 75 [18 to 102] years: 43.7% men: 71% Caucasian) were evaluated; 697 presented during the five weeks retrospective study while 148 presented during the one-week prospective study. The median number of patients presenting each week was 145 (123 to 67). Information on the presenting complaints was not available for 88 (10.4%) of the 845 patients; the median weekly number of patients with missing presentation data was 14.5 (4 to 26) which comprised 9.8 (2 to 18)% of the weekly take numbers. The missing data were imputed, as described, to provide a complete data set.

Retrospective and prospective studies

The data collected retrospectively were remarkably consistent week by week; breathlessness, falls, chest pain, abdominal pain and confusion were among the top five presentations in each of the five separate collection periods (Figure 4). The data were, therefore, combined to identify the top 20 AIM presentations during the retrospective study periods (Figure 5).

There was also notable similarity between the top 20 presentation in the retrospective and prospective data collection periods (Figure 6). In particular, there was consistency across all six data collection periods for the most common AIM presentations (Figure 7).

Identified presentations and curriculum requirments

The data on the top 20 AIM presentations encountered during the retrospective and prospective arms of the study were combined (Figure 8) for purposes of comparison with the AIM curriculum's 20 'top presentations'. Fifteen of the listed curriculum presentations were amongst the top 20 AIM presentations encountered during the study period (Table IV). However, the remaining five top presentations encountered *viz*. cough, nausea and vomiting, dizziness, hyperglycaemia and lethargy were not listed in the AIM curriculum as either 'top' or 'other important' presentations (Table V). In addition, three of the presentations listed in the AIM's 'common' presentations *viz:* (i) acute kidney injury

and chronic kidney disease; (ii) jaundice; and, (iii) patients requiring palliative and end of life care were not encountered at all during the collection periods.

Common presentations not featured in the AIM curriculum

The most common primary diagnoses underlying the five common AIM presentations not listed in the AIM curriculum were identified (Table VI); all were frequently encountered.

Discussion

In any medical speciality, teaching and training should be underpinned by the identification of the key competencies required for safe and effective clinical practice.[8] However, although thought is undoubtedly given to this process, the objective evidence base behind the selection of these key competencies is often not apparent. In this study, justification was sought for the list of presenting complaints that trainees in AIM have to demonstrate they are competent to manage by the end of their higher speciality training.

Identified AIM presentations and curriculum requirements

The findings in the present study support the inclusion of 15 of the 20 presentations listed as 'top' in the AIM curriculum. Two of the remaining five presentations, rash and weakness/paralysis, were encountered but were not amongst the top presentations. The remaining three presentations, (i) acute kidney injury and chronic kidney disease; (ii) jaundice; and, (iii) patients requiring palliative and end of life care, were not encountered at any time during the study, although this is likely due to the nature and provision of services at the Royal Free Hospital.

The fact that no patients *presented* with acute kidney injury is probably a matter of semantics as a number of patients were seen in whom the primary *diagnosis* was acute kidney injury, but they presented with nausea and vomiting, lethargy and dizziness. This lack of clarity is, however, confusing for trainees. The fact that no patients *presented* with chronic kidney disease is also a matter of semantics but, in addition, the Royal Free Hospital is a regional nephrology centre so patients with chronic kidney disease presenting, for example, with breathlessness due to fluid or metabolic disturbances, would be referred directly to the on-call nephrology team rather than to the on-call acute medical team.

The Royal Free Hospital also houses a tertiary hepatology/hepatobiliary surgery service so that patients presenting with jaundice would likely bypass the on-call medical team and be referred directly to the on-call hepatobiliary team.

The presentation of patients requiring palliative and end of life care to AIM services is classified as a 'top presentation' in the AIM curriculum; however, this was not supported by the results of our study. The reasons for this is likely two-fold. First, the Royal Free Hospital has a palliative care team available throughout the week and patients requiring their services are referred directly to them rather than *via* the acute medicine service. Second it is difficult to identify patients with palliative care needs from the presenting complaints and so an accurate assessment of exposure to these patients cannot be made from the result of this study. Nevertheless, the management of palliative and end of life care is clearly a needed competency for AIM trainees, especially in areas where there is a lack of specialist palliative care input.

Trainees rotate through a number of hospitals during their speciality training which ensures exposure to a wide patient case–mix and range of service provisions.[1] Thus, although AIM trainees at the Royal Free Hospital would not generally be exposed to patients with a background of chronic liver or kidney disease, they may be exposed to these conditions elsewhere in their training. Likewise, although they will be able to gain competency in managing patients with acute kidney injury and those requiring palliative or end of life care it might be difficult to demonstrate this in relation to the prescribed AIM competencies listings.

Common presentations not featured in the AIM curriculum

Cough, nausea and vomiting, dizziness, hyperglycaemia and lethargy were among the top 20 presentations at the Royal Free Hospital, during the study periods. However, none of these is included in the AIM curriculum lists of the 'top' or 'other important' presentations that trainees are required to be able to competently manage.

Given the volume of cases and breadth of serious diagnoses associated with these five presentations, it is surprising that they have not been included as 'notable presentations in the AIM curriculum. The ability to safely and skilfully manage patients presenting with these complaints is of paramount importance and should be at the cornerstone of every acute physician's armamentarium.

Four of the five presentations found to missing from the AIM curriculum (cough, nausea and vomiting, dizziness and hyperglycaemia) are included in the new IMT curriculum as key presentations and conditions in internal medicine.[6] The present study provides evidence for the addition of these presentations and the findings have been conveyed to the AIM Specialist Advisory Committee. However, care must be taken not to inflate the list of required competences unnecessarily as it might then become difficult to discern if a clinician has the requisite breath of skills to practice safely.

A potential solution to this problem, as advocated by the GMC guidelines on post-graduate curricula design[9], would be to focus more on the broad skills sets needed by a successful clinician. These have been termed 'capabilities in practice' (CiPs) and fourteen such skills have been introduced in the new IMT curriculum. Examples include managing an unselected acute medical take and managing patients in outpatient, ambulatory or community settings. A list of common presentations would still has a place as certain conditions are likely to warrant explicit demonstration of competence to manage. Moreover, it would provide a clinical context against which the CiPs can be demonstrated.

Hence, consideration should be given to revising the AIM higher speciality curriculum, in the line with the new IMT curriculum, by introducing CIP-based assessments. This has the added advantage of allowing for continuity and thereby making the transition between Stage 1 and Stage 2 of the IMT more seamless.

Relevance to future curricula design

Trainees entering the new IMT programme in August 2019 will not enter higher speciality training in AIM (Speciality and Internal Medicine Stage 2 Training) until August 2022. No details are currently available on the exact timing of any future changes to the ACCS-AM; however, both programmes are due to be updated in the near future (N Murch, personal communication, February 2019). The findings of this study will be relevant for those involved in the design of both curricula.

Strengths and limitations

This study has a number of strengths. First, it had a clear and distinct aim, which was to provide an evidence base for the selection of acute presentations included in the current higher speciality AIM training curriculum against which trainee competency is judged. The results supported the inclusion of some, but not all of these, and, more importantly, identified notable and serious omissions. Second, there was considerable consistency in the data collected during the five retrospective periods and during the prospective phase. This justified amalgamation of these data sets to provide information on more than 800 AIM presentations and hence allowing a systematic examination of the typical case-mix of medical presentations in a UK hospital. Whilst some hospitals and Trusts do collect basic information on acute admissions this is usually for purposes of service development only.

This study also has its limitations. First, the primary presenting complaint was selected as the one appearing first on the list of presenting complaints in the admission clerking notes. The assumption of primacy based on list position is a reasonable one and there was consistence in the relative proportions and spread of presentations in each data collection period. Second, this is a single-site study and there are no other studies with which to compare the findings. It provides a snap shot of the case-mix to which AIM trainees are exposed in one hospital in the North Central and East London Deanery. It did, however, allow identification of the key finding that, for some common presentations, there are no prescribed competencies, and hence trainees are not required to explicitly demonstrate evidence of engagement in their ePortfolio. Third, the identification of the acute medical admissions relied on manual recording of patient details in a 'take book' while access to further information relied on scanned copied of hand-written clinical notes on the hospital electronic record system. Despite this there was consistency in the number of admissions during each data collection periods, in the patients' demography, their range of presentations and their diagnoses. Nevertheless, this system is clearly suboptimal.

Further studies should be undertaken to establish a picture of the acute medical case-mix at multiple sites across the country. A national, encrypted, central electronic database which collates information on all acute medical patients would be easier to interrogate for research and service planning and could provide an evidence base, using real time data, to inform AIM curriculum development.

Conclusions

This study represents the first attempts to provide an evidence base for the AIM higher speciality training curriculum; further studies are needed to verify the findings. Despite its acknowledged limitations, the study identified the omission of a number of common presentations from the current list of expected management competencies for AIM trainees. There is a clear need for further curriculum development to be firmly evidence-based..

Declaration of competing interests: Nothing to declare.

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Legends to Figures

Figure 1: Current training pathways in acute internal medicine [2-4]

* CMT provides the fundamental skills that are required for the efficient management of acute and chronic medical patients in all settings. Typically, the two-year training programme consists of four or six month rotations through the main medical specialities, including acute medicine.

**ACCS provides a more focussed approach for junior doctors who are specifically interested in careers in acute medicine, anaesthetics, emergency medicine or intensive care medicine. The first two years of the programme consists of six-month rotations though all four of the disciplines, while the third year is more specifically focused on preparation for entering speciality training in the chosen discipline.

Figure 2: Future model of training for physicians wishing to dual accredit in a speciality plus internal medicine[5]

Figure 3: Future training pathway in acute internal medicine[6]

Figure 4: The top 20 AIM presentations across the five weeks of the retrospective study

Figure 5: The combined top 20 AIM presentations across the five-week retrospective data collection periods

Figure 6: The top 20 presentations during the prospective week data collection period

Figure 7: Proportions of the top five presentations of total AIM presentations across individual retrospective and prospective data collection periods

Figure 8: The combined top 20 AIM presentations across the retrospective and prospective data collection periods

Table I: The main hospital specialties set to support the acute medical take (i.e. Group 1 specialties)[6]

Acute Internal Medicine (AIM)
Cardiology
Clinical Pharmacology & Therapeutics
Endocrinology & Diabetes Mellitus
Gastroenterology
Genitourinary Medicine
Geriatric Medicine
Infectious Diseases (except when dual with Medical Microbiology or Virology)
Neurology
Palliative Medicine
Renal Medicine
Respiratory Medicine
Rheumatology
Tropical Medicine

Table II: NHS Trusts/hospitals involved in specialist AIM training in North Central and East London Local Education Training Board (Nick Murch, personal communication, July 2018)

NHS Trust	Hospitals Involved in Training	AIM Training Posts (n)
Barking Havering and Redbridge NHS Trust	• Queen's Hospital	2
	• King George's Hospital	2
St Bartholomew's Health NHS Trust	• Royal London Hospital,	3
	• Newham General Hospital	1
	• Whipps Cross University Hospital	1
Homerton University Hospital NHS Foundation Trust	• Homerton University Hospital	1
North Middlesex University Hospital NHS Foundation Trust	• North Middlesex Hospital	2
Royal Free London NHS Foundation Trust	• Royal Free Hospital	3
	• Barnet General Hospital	3
University College London Hospitals NHS Foundation Trust	• University College Hospital	1
Whittington Hospital NHS Trust	• Whittington Hospital	3

Table III: Weeks selected for the retrospective study

Study week	Study Period 2016
1	Monday 15 February – Sunday 21 February
2	Monday 16 May – Sunday 22 May
3	Monday 25 July – Sunday 31 July
4	Monday 5 October – Sunday 11 October
5	Monday 12 December – Sunday 18 December

Table IV: The presence and ranking of the 20 'top' presentations listed in the AIM curriculum in the list of acute internal medical presentation at the Royal Free Hospital, London 2016-17

AIM curriculum 20 'top' presentations*	Included in RFH top 20 presentations?	Rank position amongst RFH presentations
Abdominal pain	Yes	4
Acute back pain	Yes	18
Acute kidney injury & chronic kidney disease	**No****	Did not feature
Blackout/collapse	Yes	12
Breathlessness	Yes	1
Chest pain	Yes	3
Confusion	Yes	5
Diarrhoea	Yes	16
Falls	Yes	2
Fever	Yes	9
Fits/seizure	Yes	15
Haematemesis & melaena	Yes	14
Headache	Yes	8
Jaundice	**No**	Did not feature
Limb pain & swelling	Yes	10
Management of patients requiring palliative & end of life care	**No**	Did not feature
Palpitations	Yes	20
Poisoning	Yes	17
Rash	**No**	*29*
Weakness & paralysis	**No**	*26*

Abbreviations: RFH = Royal Free Hospital; AIM = acute internal medicine
* Listed alphabetically
** Acute kidney injury and chronic kidney disease are not strictly *presentations;* neither was recorded in this study, as such, although acute kidney injury was one of the most common *diagnoses* encountered

Table V: Presentations to the Acute Internal Medicine service at the Royal Free Hospital, London, 2016-17 not listed as 'common' or 'other important' presentations in the Acute Internal Medicine curriculum

Presentation	Cases* n (%)	Rank position amongst RFH top presentations
Cough	35 (4.1)	6
Nausea & vomiting	33 (3.9)	7
Dizziness	25 (3.0)	11
Hyperglycaemia	18 (2.1)	13
Lethargy	9 (1.1)	19

Table VI: Top identified primary underlying diagnoses in patients with the five common presentations not included in the AIM curriculum 'common' or 'other important' lists

Presentation	Top Identified primary diagnoses
Cough	• Pneumonia/LRTI • Chronic obstructive pulmonary disease • Heart failure
Nausea and vomiting	Sepsis • Acute kidney injury • Pneumonia • Diabetes • Urinary tract infection
Dizziness	• Benign paroxysmal positional vertigo • Presyncope • Atrial fibrillation • Acute kidney injury
Hyperglycaemia	All patients were diabetic: precipitating factors included: • Heart failure • Acute kidney injury • Sepsis • Cellulitis
Lethargy	• Anaemia • Pneumonia/LRTI • Acute kidney injury • Sepsis • Heart failure

Abbreviations: LRTI = lower respiratory tract infectiom