

learning streams to the best of our ability to ensure adequate preparation of the next generation of doctors in an era where clinical rotations are likely to be limited for the foreseeable future.

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COVID-19: challenges and solutions for the future of UK dermatology undergraduate curriculum delivery

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The COVID-19 pandemic has left dermatology practice in disarray globally. Patient-facing services have been compromised for patients and clinicians alike. The implications of such disruption for dermatology undergraduate education are unknown. Numerous undergraduate programmes have faced disruption, with teaching postponed or featuring reformatted, *ad hoc* delivery. Following the pandemic, it is anticipated that UK medical education will face a 'new normal', with a much greater emphasis on technology-enhanced learning.¹ This presents a challenge to dermatology educators as we reflect upon our undergraduate curriculum delivery in an uncertain climate.

The most recent curriculum review occurred in 2015,² and reported that, pre-pandemic, most dermatology education was delivered via a secondary care rotation in the fourth year of study, with a strong predilection for clinic-based observation and teaching. The report also called for greater use of online resources and collaboration between medical schools (Table 1).

Table 1 Methods of undergraduate dermatology education delivery, from 2015 BAD curriculum review.²

Learning and teaching method	Medical schools	
	<i>n</i>	%
Outpatient clinics	30	100
Tutorials	28	93
Observation of surgery	28	93
Observation of specialist nurses	26	87
Problem-based learning	25	83
Lectures	25	83
Log book	24	80
Electronic learning	20	67
Clinical slides/images	20	67
Clinical skills laboratory	18	60
Ward based	16	53
Teaching clinic	16	53
BAD expert lectures	14	47
Other e-lectures	14	47
Histology demonstrations	7	23
Critical appraisal	7	23
Expert patient workshops	5	17

BAD, British Association of Dermatologists.

To continue to provide patient care during the pandemic and beyond, outpatient clinics have been augmented by teledermatology, with dermatologists offering telephone or video consultations. However, this clearly presents challenges for student clinics. In such a scenario, observing clinics immediately becomes more complex, presenting practical issues that range from technical threats to patient consent and time pressures. Access to cohort-wide lectures may be restricted, further

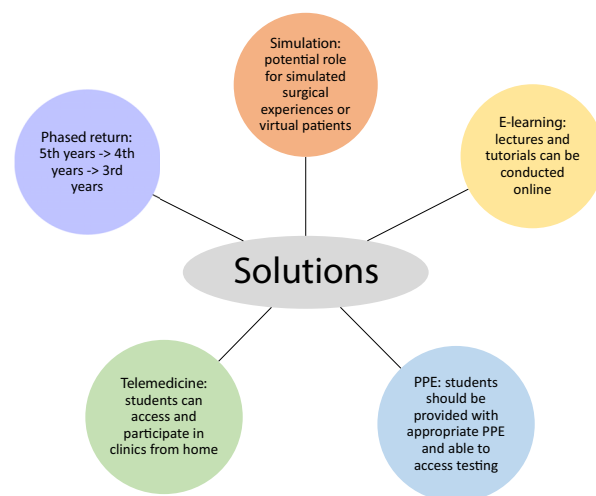


Figure 1 Potential solutions for delivery of undergraduate education in the upcoming academic year, from Medical Schools Council.⁴

Table 2 Potential solutions for delivery of undergraduate education with respect to the domains of clinical teaching, small group teaching and assessment.

Domain	Potential solutions
Clinical teaching	Wide-scale integration of NHS-approved telemedicine and video communication platforms into clinical education. This must feature thorough induction and flexibility in terms of student registration and attendance. Examples may include AccuRx, Zoom or EMIS health. Students should attend such sessions from an appropriate, socially distanced clinical setting. Verbal consent is likely to be sufficient, as teaching may take place at short notice. Longer-term solutions include the educational community engaging actively with relevant parties on the NHS Digital Care Services Framework
Small group teaching	Construction of virtual communities of practice via collaborative platforms such as Slack or Blackboard, and development of evidence base for such communities. Collaboration between dermatology educators at different institutions to pool relevant and emerging digital resources. Such resources should be identified by both students and faculty. Innovation in delivery techniques may include gamified learning ³ (students take part in games that consolidate lecture-based teaching, which can aid revision) and flipped classrooms (students complete online tasks, such as reviewing pre-recorded lectures, prior to attending a face-to-face meeting). These methods have been shown to significantly enhance learning ⁵
Assessment	Examinations in the format of MCQs and 'spotter' tests can be reconfigured to take place online. Virtual OSCEs may become necessary as we make a move towards teledermatology. The curriculum and assessment need to reflect current practice

MCQ, multiple choice question; OSCE, objective structured clinical examination.

compromising the 'traditional' delivery of undergraduate education.

There are numerous examples of web-based materials in dermatology education, although the uptake of such resources is unknown, and their efficacy is poorly evidenced. However, innovations such as gamified learning have been well received by medical students and found to consolidate lecture-based teaching.³ Such resources could be adapted for virtual delivery in the context of social distancing. The use of dermatology resources on social media for professionals and by educational institutions may also be a suitable approach.

Many of the pre-existing threats to dermatology education, such as overwhelming patient numbers and

educator shortages, are likely to be exacerbated in the aftermath of the pandemic.¹ Educators must adapt and seek to sustainably supplement any clinic-based teaching both during the pandemic and beyond. Indeed, the Medical Schools Council has provided initial guidance on how education may be successfully continued in the upcoming academic year⁴ (Fig. 1).

While these recommendations are promising, we have highlighted a number of practical solutions for offering flexible, nonpatient-facing opportunities to deliver content (Table 2).

The COVID-19 pandemic has served as a stark reminder that medical education must adapt to keep up with an increasingly changing world, to ensure continued delivery of teaching when traditional methods cannot be relied upon. Clinical experience should remain at the cornerstone of dermatology education; however, the traditional delivery of such education may not survive the pandemic. As medical education inevitably reorganizes, it is essential that the dermatology educational community reflects on innovation so as to deliver effective, sustainable approaches to teaching. We strongly suggest that it would be timely to consider a new review of the undergraduate dermatology curriculum, prioritizing collaborative working and technology-enhanced learning in the domains of workplace and classroom education.

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Teledermoscopy as a community based diagnostic test in the era of COVID-19?

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Teledermatology has seen an explosion in recent years, with 26% of dermatology departments across the UK offering some form of virtual clinic.¹ This rapid evolution has been further hastened by the COVID-19 pandemic, during which the number of patients seen in face-to-face (FTF) clinics has been limited due to social distancing measures, which are likely to stay in place for the foreseeable future. There is, therefore, a need for an innovative way to ensure that these limited places are allocated carefully to those who really need to be seen FTF. Studies agree that including dermoscopic images in a teleconsultation improve the reliability of telediagnoses, reportedly improving both sensitivity and specificity.^{2,3} Other studies have found that interobserver concordance when using teledermoscopy is moderate to excellent,^{4,5} except for very difficult lesions. We would like to share our departmental experience of using a high-quality teledermoscopy service for urgent suspected skin cancers and routine lesion referrals over a period of 12 months in 2019.

We cater to a population size of approximately 600 000 people, and 12 253 lesion referrals were received by our department in 2019. Urgent suspected skin cancer and routine lesion referrals from primary care were triaged for their suitability for a teledermatology clinic, during which high-quality clinical photographs and dermoscopic images are taken by clinical photographers. Referrals considered unsuitable included genital lesions, hair-bearing skin and subcutaneous lesions. As we cover a wide geographical area, one of the advantages of our service was in establishing medical photography clinics in peripheral hubs, which did not traditionally offer dermatology services, thereby lessening travel time for patients.

In total, 4589 patients with skin lesions were seen in the teledermatology clinic in 2019. Photographs (D33S camera; Nikon, Tokyo, Japan) and dermoscopic images (DELTA 20T; HEINE Optotechnik GmbH, Gilching, Germany) were taken and uploaded into the patient's electronic medical record. Five different consultants trained in dermoscopy reviewed the referral letter and photographs, reporting to the referring general practitioner and to the patient (Table 1). Difficult-to-diagnose lesions were often peer-reviewed.

Strikingly, we were able to divert 86.3% (range 78–93%) of the total number away from needing to attend FTF clinic. More than half of patients (53%; range 51–59%) were directly discharged, 9.9% were referred to the Locally Enhanced Service for surgical treatment in the community and 1.23% to other specialties (Table 1). Only 13.7% needed to be seen FTF, and of these, 17.7%

Table 1 Outcomes for lesion referrals from primary care seen via teledermatology by five different teledermatologists (A–E) 2019.

	Consultant					Total
	A	B	C	D	E	
Total seen, <i>n</i>	1409	707	913	560	1000	4589
Direct discharge, <i>n</i> (%)	732 (51)	419 (59)	467 (51.1)	302 (53.8)	519 (51.9)	2439 (53.1)
Referred to LES, <i>n</i> (%)	167 (12)	67 (9.5)	118 (12.9)	40 (7.1)	64 (6.4)	456 (9.9)
Referred to other specialties, <i>n</i> (%)	23 (1.6)	4 (0.56)	7 (0.77)	9 (1.6)	14 (1.4)	57 (1.2)
Gynaecology, <i>n</i>	1	–	–	–	–	1
Hand surgery, <i>n</i>	7	–	2	1	3	13
Foot surgery, <i>n</i>	–	–	1	–	–	1
Maxillofacial surgery, <i>n</i>	12	2	1	6	8	29
Ophthalmology, <i>n</i>	2	2	–	–	1	5
Oculoplastics, <i>n</i>	–	–	1	–	–	1
Plastics, <i>n</i>	1	–	2	–	2	5
Mohs surgery, <i>n</i>	–	–	–	1	–	1
Patch test, <i>n</i>	–	1	–	1	–	1
MDT referral, <i>n</i> (%)	0 (0)	5 (0.7)	8 (0.87)	0 (0)	2 (0.2)	15 (0.3)
Repeat photos, <i>n</i> (%)	43 (3)	4 (0.56)	40 (4.38)	25 (4.6)	69 (6.9)	181 (3.9)
Direct to surgery, <i>n</i> (%)	342 (24)	52 (7.3)	121 (13.25)	116 (20.7)	181 (18.1)	812 (17.7)
Total diverted from FTF review, <i>n</i> (%)	1307 (93)	551 (78)	761 (83.3)	492 (88)	849 (84.9)	3960 (86.3)
FTF clinic review, <i>n</i> (%)	102 (7)	156 (22)	152 (16.7)	68 (12)	151 (15.1)	629 (13.7)

F2F, face-to-face; LES, Locally Enhanced Service; MDT, multidisciplinary team.