

## Enhancing photography skills using smartphones in resource-limited settings

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### Abstract

Teledermatology aims to increase access to dermatological care through either store-and-forward (S&F) or live interactive technology. S&F teledermatology can help connect clinicians and remote dermatologists from anywhere in the world using images and clinical information. As the static images serve as the basis for interpretation, making diagnoses and ultimate therapeutic plans, the quality and type of photographs submitted are integral to the success of the programme. Photography guides have been developed from telemedicine associations for ideal clinical circumstances and obtaining professional-level photographs. We have adapted this training for iPhones and Androids in resource-limited settings for S&F teledermatology.

### Key learning points

- Teledermatology is particularly useful in connecting patients with poor specialty care access with providers across the globe.
- As static images serve as the basis for interpretation, making diagnoses and ultimate therapeutic plans in store-and-forward teledermatology, the quality and type of photographs submitted are integral to the success of the programme.

### Introduction

Telemedicine allows for the distribution of healthcare through electronic means, facilitating long-distance provider and patient interactions. Improved technology has made telemedicine more convenient and reliable, particularly in the post-COVID-19 era.<sup>1</sup> Dermatology, being a visually dependent specialty, is particularly suited for this mode of healthcare.<sup>2</sup> As much of the developing world has limited access to physicians and specifically subspecialty care, teledermatology is one of various modalities to enable healthcare to reach rural areas.<sup>3</sup> Much of teledermatology occurs asynchronously, through store-and-forward (S&F) technology, in which patient history

and photos of skin lesions are documented in an electronic communication system and sent to a dermatologist who then evaluates the case and provides their expert recommendations. As static images serve as the basis for interpretation in S&F, the quality and type of photographs submitted are integral to making accurate diagnoses and therapeutic plans. The American Telemedicine Association has developed a guide for taking photographs in ideal clinical circumstances.<sup>4</sup> We have adapted this training for smartphones such as iPhones and Androids, to be used in the field in resource-limited settings.

Prior to the initiation of any teledermatology encounter, informed consent is of course essential, as required by local or national guidelines. This can be done in writing or verbally and should include an explanation of the benefits and risks of telemedicine in a language that is simple and understandable by the average patient.<sup>4</sup>

### How-to

**Physical environment:** The room or environment should ensure patient privacy. The patient should be positioned so that they are comfortable. Background lighting from windows or other sources should be minimized and additional indoor lighting may be necessary to effectively illuminate the patient. Distracting backgrounds should be reduced, although this can be a challenge in resource-limited settings. A nonreflective blue or grey background is best. This can often be achieved by either positioning the patient directly in front of a plain wall or placing a patient gown or drape under the patient.

**Views:** For a generalized rash, taking three images can effectively represent the rash.

- a vertically oriented photo of the patient showing the extent and distribution of the rash;
- a medium distance (~24 inches/cm) photo can demonstrate the arrangement and configuration; and
- a close-up to highlight a representative lesion is recommended.

When taking a close-up image, the primary lesion must be clearly identified, focused and centred. In general, the image should be taken in a perpendicular plane to that of the lesion.

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It is also important to ensure that the location/anatomy is identifiable in at least one of the images (Fig. 1). Oblique photos may also be considered to show skin surface changes. For subtle lesions, consider identifying the lesion with adhesive labels, surgical tape or washable markers. Measurement tools can also be helpful to show the size and distribution of lesions.



**Fig 1. (a)** and **(b)** Multiple photos from varying distance can help show the distribution and morphology of the rash.

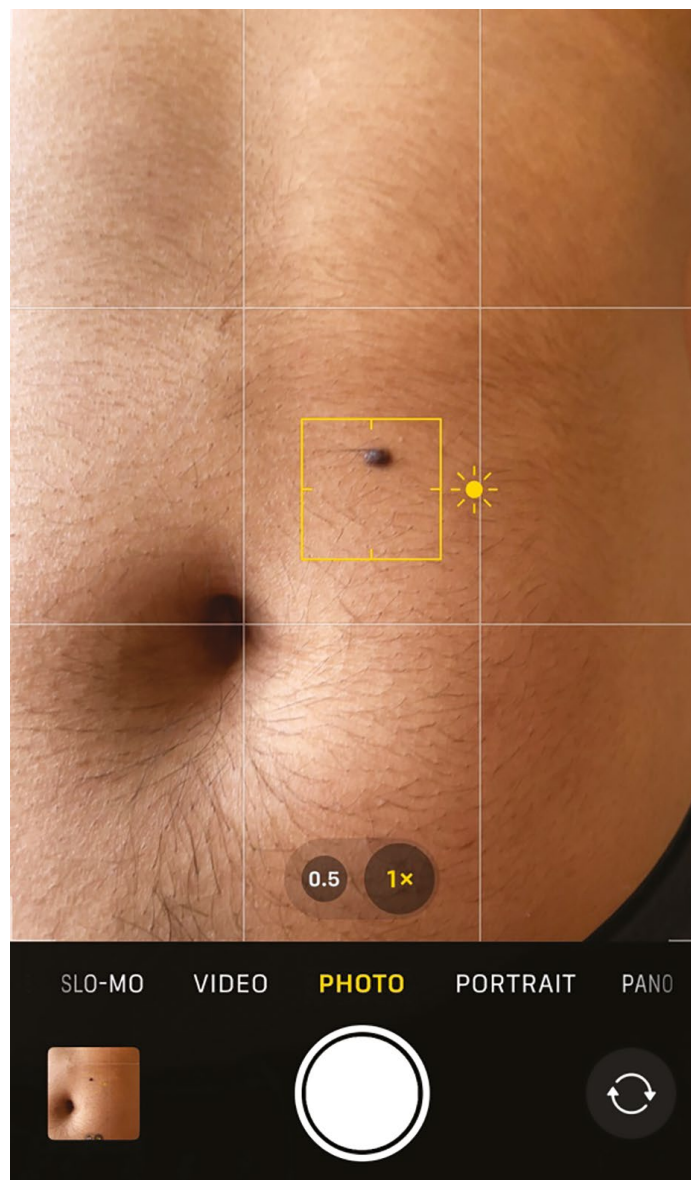
**Orientation and framing:** As most anatomical units are longer than they are wide, orienting the camera vertically will allow for maximal utilization of space. The camera should be at the level of the lesion in question with the lesion centred in the field of view. The framing of the skin lesion should show the extent of involvement and should include both involved and uninvolved areas. It is also recommended to document symmetry when possible. If only one hand is involved for example, showing both hands in one image allows the viewer to compare the involved area with the uninvolved side (Fig. 2).



**Fig 2.** Framing should show both involved and uninvolved areas. Document symmetry when possible.

**Smartphone use:** First, ensure that the smartphone camera lens is clean by using a soft, lint-free cloth to gently wipe the lens. A microfiber cloth is ideal, but any soft cloth will suffice. Next, open the camera application. Tap the lightening-shaped icon to use flash to eliminate shadows, or turn off the flash if it causes an unwanted glare. Most smartphones have the ability to autofocus. Autofocus can be used by placing the lesion of

interest in the centre of the frame. Tapping the screen at the site of the lesion will allow the camera to focus on a particular part of the photo. Tap the sun icon and drag it up and down to adjust the brightness. Click the shutter button to take a photo. Preview the last photo taken by tapping the icon on the lower left of the screen (Fig. 3).



**Fig 3.** Screenshot of a smartphone camera application.

## Conclusion

Teledermatology is particularly useful in connecting patients with poor specialty care access with providers across the globe. As mobile technologies continue to advance, the possibilities for teledermatology remain far reaching. We hope that this photography guide will help train those taking photos in the field with smartphones for S&F teledermatology.

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