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3 **Title:** What do Australian dermatologists expect to be paid for store-and-forward  
4 teledermoscopy? A preliminary investigation.  
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3 **Title**

4 What do Australian dermatologists expect to be paid for store-and-forward teledermoscopy?  
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8 **Abstract**

9 INTRODUCTION: Determining appropriate remuneration for teledermoscopy service is  
10 important because inadequate remuneration can be a barrier to practitioner uptake and  
11 participation. This study explores dermatologist remuneration expectations for a single lesion  
12 store-and-forward teledermoscopy consultation.  
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17 METHODS: 14 dermatologists participated in telephone interviews during May and June  
18 2017. Questions regarding remuneration focused on a clinical scenario involving  
19 teledermoscopy of a single lesion suspected to be skin cancer. The initial scenario was an  
20 existing patient, with a provisional diagnosis of benign neoplasm from the images, to be  
21 followed-up with routine skin checks, taking three minutes to review. Participants indicated  
22 their remuneration expectation by selecting from an ascending array of pre-determined  
23 remuneration ranges. The question was repeated a further four times with one aspect of the  
24 scenario changed each time; consultation length, source (patient or general practitioner),  
25 required follow-up, and a new rather than existing patient. Participants were also asked how  
26 appropriate they thought teledermoscopy was for the scenario, and whether they would  
27 choose to undertake the consultation presented.  
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37 RESULTS: Nine dermatologists selected the AU\$61-90 or AU\$91-120 remuneration ranges  
38 for the initial scenario. When given the opportunity to comment on teledermoscopy service  
39 provision in Australia respondents reflected that it was a valuable, advanced dermatology  
40 service, but they would prefer face-to-face consultation with patients where possible to allow  
41 for a full body examination.  
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46 DISCUSSION: Dermatologists expect to be remunerated in the range of \$61-\$120 for a  
47 single lesion store-and-forward teledermoscopy consultation when face-to-face examination  
48 is not possible.  
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53 **Key Words**

54 Teledermoscopy, Dermatology, Remuneration, Healthcare Financing, Health Services  
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3 **Introduction**

4 Store-and-forward teledermoscopy involves the capture of digital images of the skin through  
5 a dermoscope which are forwarded to a dermatologist. It is used to provide patients or  
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8 practitioners with an asynchronous dermatologist consultation that can result in diagnoses  
9 and management advice<sup>1, 2</sup>. Alternatively, asynchronous teledermoscopy can be used to triage  
10 patients for in-person appointments<sup>2, 3</sup>. Due to its often-pigmented nature, skin cancer is  
11 conducive to store-and-forward teledermoscopy. The addition of a dermoscope for collection  
12 of clinical images has been shown to improve diagnostic accuracy<sup>1</sup>. Store-and-forward  
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Australia has the highest rate of skin cancer in the world, and with a large geographic area coupled with an uneven of dermatologists means some population groups in need of specialist dermatological care may face difficulties in accessing it. Teledermoscopy has the potential to improve access for the early diagnosis and triage of skin cancer<sup>5, 6</sup>.

The health system in Australia operates as fee-for-service; therefore, dermatologists are typically remunerated for consultations by receiving a set Medicare Benefits Scheme (MBS) reimbursement and often a patient co-payment (determined by the specialist or clinic).

Although teledermoscopy is currently being used in clinical practice, it is not currently reimbursed under the MBS. Remunerating dermatologists for providing teledermoscopy is important, since inadequate remuneration has been acknowledged as a barrier to practitioner uptake and participation in telehealth<sup>7, 8</sup>. However, determining appropriate remuneration can be complicated as it involves multiple stakeholders, including the dermatologists, the payer (Medicare), and patients.

This research aims to quantify the remuneration expectation of Australian dermatologists for a single lesion store-and-forward teledermoscopy consultation for suspected skin cancer. This topic has not been investigated in Australian or international literature, although there is some research that highlights the important impact of compensation on service viability and uptake<sup>7, 9</sup>.

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3 **Methods**

4 To quantify remuneration expectations, we used an adapted direct stated-preference  
5 methodology which involved interviewing dermatologists and asking them to select  
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7 remuneration from a range of values for a specified clinical teledermoscopy scenario. Direct  
8 stated-preference is also known as a contingent valuation, and while normally used to elicit  
9 willingness-to-pay, has been adapted to investigate willingness-to-accept (remuneration in  
10 this case)<sup>10</sup>. Contingent valuation methodology is so named because respondents are asked to  
11 select a value contingent on the scenario presented to them<sup>11</sup>. Ethics approval was received  
12 from The University of Queensland School of Pharmacy Ethics Committee, reference  
13 2016/09, November 21<sup>st</sup>, 2016.  
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21 *Interview Questionnaire*

22 The questionnaire was piloted with three dermatologists and four individuals from the general  
23 population before recruitment commenced.  
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27 The questionnaire contained background questions and research questions about expectations  
28 for teledermoscopy remuneration. The background questions covered dermatology  
29 experience, teledermatology experience, and primary site of practice (metropolitan, or rural  
30 and remote). To provide context for the remuneration answers respondents were also asked to  
31 estimate their average hourly billing and provide information on standard initial and review  
32 consultation fees at their private clinics. Questions related to earnings and fees were optional.  
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34 The research questions consisted of five questions where respondents were presented with a  
35 specific clinical scenario (Table 1) and asked to identify their expected remuneration by  
36 selecting from a set of ascending pre-determined remuneration ranges. The questionnaire  
37 contained two additional questions eliciting Likert scale responses, regarding perceived  
38 appropriateness of teledermoscopy for the given scenario, and whether the dermatologist  
39 would perform the teledermoscopy consultation. The final question was an open-ended  
40 question where respondents could provide any free-text comments about teledermoscopy  
41 services in Australia.  
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51 The scenarios were designed using teledermoscopy examples from literature and expert  
52 opinion and were amended during the pilot process to improve readability and understanding.  
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55 Respondents were presented with five scenarios in total; the initial scenario and four  
56 variations (Table 1). The initial scenario described an existing patient (of the dermatologist's

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3 practice) with a suspected skin cancer; provisional diagnosis was benign neoplasm based on  
4 the images; no follow-up was required beyond routine skin checks, and the teledermoscopy  
5 consultation took three minutes. The next four remuneration questions changed one item per  
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8 scenario whilst keeping all other items constant. The respondent was asked to indicate if they  
9 would adjust their answer and if so indicate their new expected remuneration amount on the  
10  
11 scale. Again, these variations were derived from literature and expert opinion<sup>12, 13</sup>.

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14 When indicating their remuneration expectation respondents were asked to select from an  
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16 ascending array of pre-determined remuneration brackets including \$0, \$1-30, \$31-60, \$61-  
17 90, \$91-120, \$121-150, and more than \$150. These values were selected with the current  
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19 MBS dermatologist attendance fee of \$72.75 as an approximate median. Respondents were  
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21 instructed to select the gross amount they expected to receive for providing the service  
22 regardless of payment source (MBS and / or patient). When responding to the remuneration  
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24 expectation questions respondents were asked to assume that they would perform the review  
25 in the scenario (rather than decline it).

#### 26 27 28 29 *Recruitment and data collection*

30 Dermatologists were recruited via an email invitation sent to 102 fellows through the  
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32 Queensland faculty of the Australasian College of Dermatologists (ACD). In Australia, all  
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34 dermatologists are members of the ACD, therefore the entire Queensland dermatologist  
35 cohort was invited to participate. Snowball sampling was used to recruit additional  
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37 respondents, which brought in respondents from other Australian states. Potential respondents  
38 could indicate their interest or enter their contact information into a dedicated survey  
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40 webpage or by emailing the primary researcher (CS). The primary researcher contacted each  
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42 interested respondent and organised a convenient time to complete the telephone interview.  
43 Prior to the interview, study information and a copy of the interview questions were emailed  
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45 to the respondent, and informed consent was obtained. All interviews were conducted by  
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47 telephone by the primary researcher during May and June 2017.

#### 48 49 50 *Data analysis*

51 Data were analysed by comparing the remuneration brackets selected by respondents for each  
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53 clinical scenario. Collective responses from each scenario were compared to each other to  
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55 identify any trends in remuneration expectation that may be attributable to clinical scenario  
56 variation. Likert scale responses were presented graphically, and free-text comments were

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3 grouped into common themes. Due to the small number of respondents no formal analysis  
4 was undertaken on free text responses. Responses are reproduced verbatim in Table 2. All  
5 reported figures are AU\$ representing a 2017 cost year.  
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## 8 9 **Results**

### 10 *Respondent characteristics*

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12 Recruitment and interviews occurred between April and July 2017. In this study, 14  
13 dermatologists were interviewed; eight responded to the ACD invitation email (8% response  
14 rate from this invitation) and six were recruited through snowballing. Of these, two practiced  
15 primarily in non-metropolitan locations (14%), 12 had previous experience either formal or  
16 informal with store-and-forward teledermatology (86%), and six routinely used store-and-  
17 forward as part of their clinical practice (43%). All the dermatologists worked in private  
18 practice, however some also worked in other settings including public hospitals, private  
19 hospitals, and for the defence force. Four (28%) had been practicing (designated by  
20 registration with the ACD) for less than five years, five (36%) had 5-10 years' experience,  
21 and five (36%) had been practicing for more than 10 years.  
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25 Responses regarding average hourly billing and standard consultation rates were provided by  
26 13 out of 14 respondents. Some respondents stated that their clinics discounted fees for  
27 pensioners and concession card holders (this was not one of the structured questions). Non-  
28 discounted consultation fees for an initial consult ranged from \$200-265, and review  
29 consultations ranged from \$99-180.  
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### 31 *Remuneration responses*

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33 Responses to the initial clinical scenario (existing patient, suspected skin cancer, benign  
34 neoplasm diagnosis from images, follow-up with routine skin checks, consultation taking  
35 three minutes) remuneration question (Figure 1) ranged from \$0 to \$91-121, with majority of  
36 the responses (N=8, 57%) in the \$61-90 and \$91-120 categories.  
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53 When the initial scenario was changed to increase the consult time to 15 minutes, receive the  
54 consult from a GP, patient required in-person for follow-up, or consult received from a new  
55 patient (Table 1), some of the dermatologists amended their expected remuneration (Figure  
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3 2). Remuneration selections did not change much from the initial scenario when the scenario  
4 was changed so that the teledermoscopy information came from a general practitioner (Figure  
5 2).  
6 2). When the consultation scenario length was increased to 15 minutes the respondents  
7  
8 selected higher remuneration ranges (Figure 2). When asked if they would change their  
9 remuneration expectation for a patient who required an in-person examination after the  
10 teledermoscopy consultation, seven respondents stated as part of their answer that they would  
11 either discount the teledermoscopy consultation or discount the in-person consultation  
12 (Figure 2).  
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21 The last changed scenario was a consultation request from a patient that was unknown to the  
22 dermatologist. During piloting it was highlighted that this scenario may be undesirable or  
23 unrealistic for some clinicians due to the perceived medico-legal implications of not having  
24 an established relationship with the patient and not having the ability to perform a full body  
25 skin examination. To account for this, respondents were given the option to say they would  
26 not undertake the teledermoscopy consultation in this scenario. As expected, four respondents  
27 (29%) stated that they would not undertake the review, citing medico-legal concerns. Of the  
28 other ten respondents who said they would undertake the review, some selected higher  
29 remuneration ranges to the initial scenario (Figure 2).  
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37 Respondents were then asked two Likert scale questions which referred to the initial scenario.  
38 The results are shown in Figure 3. They show the respondents belief about the  
39 appropriateness of teledermoscopy for the initial clinical scenario, and the respondents  
40 decision about whether to perform the specified consultation. Of the 11 (79%) who said they  
41 would undertake the consultation most specified that this was because it was an existing  
42 patient.  
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### 51 *Perceptions of teledermoscopy.*

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53 When given the opportunity to comment on the provision of teledermoscopy service in  
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55 Australia respondents reflected that it was a valuable addition to clinical practice, it advanced  
56 dermatology service, but given the option they would prefer in-person consultation with

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3 patients if possible. Responses to the open-ended questions are listed in Table 2.  
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## 10 **Discussion**

11 Dermatologists selected remuneration ranges of \$0-120 for the initial clinical scenario with  
12 the majority (N=9, 64%) expecting remuneration in the ranges of \$61-90 or \$91-120.

13 Respondents commented that their selected remuneration was relative to their in-person  
14 consultations fees in a private practice setting (rather than a public hospital setting), and due  
15 to this, needs to not only cover their time, but the business expenses associated with running  
16 their clinics. When the teledermoscopy consultation time was increased from 3 minutes to 15  
17 minutes higher remuneration was expected (Figure 2). This aligns with current fee-for-service  
18 reimbursement convention in Australia<sup>9</sup>.  
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25 In the current study, remuneration expectations for teledermoscopy were less than reported  
26 in-person consultation fees. This is consistent with established remuneration practices in  
27 international contexts. Remuneration for teledermoscopy in the Netherlands was reported as  
28 €68 per consultation (paid by private health insurers, compared to €192 for in-person) in  
29 2011<sup>14</sup>, and in the United States it was USD\$15 in 2003 (paid by the Department of Veterans  
30 Affairs, compared to USD\$18 for an in-person)<sup>12</sup>. In these studies patients were referred from  
31 a primary care provider to the dermatologist for a range of dermatological conditions (not  
32 specifically skin cancer) and it was not required that the dermatologist had previously  
33 examined the patient being referred.  
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42 Currently, there are no Australian cost analyses available for teledermoscopy services<sup>2</sup>.  
43 However, there are some comparable services offered either online or via mobile phone  
44 applications (apps) that have published prices. FirstCheck (Australia) is an online service  
45 which offers consumers a smart-phone attachable dermoscope for a purchase price of \$29.95  
46 and an online review of a dermoscopic image of a lesion for \$19.95<sup>15</sup>. These prices fall within  
47 the ranges that were provided for dermatologists to select from and align with the responses  
48 received from all except one respondent who selected \$0 for all scenarios. The respondent  
49 who selected \$0 for each scenario stated in their comments that he/she was uncomfortable  
50 charging current patients for digital consultations, and he/she declined to perform a  
51 consultation for the unknown patient.  
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4 All respondents indicated the valuable contribution that teledermoscopy provided to  
5 dermatology care for patients who were unable to attend in-person appointments, a result that  
6 has been demonstrated in previous studies<sup>4</sup>. Majority of respondents stated that, given the  
7 option they would always prefer seeing patients in person as they are able to complete a full-  
8 body skin check. Respondents believed in-person examination reduced indemnity issues  
9 related to lesion selection (for teledermoscopy) and limitations of performing a full skin  
10 check via telehealth. A number (n=4, 29%) of respondents either currently performed or had  
11 previously performed consultancy for a New Zealand teledermatology provider where they  
12 performed consultations via telehealth for a patient that they have not previously examined  
13 in-person. Their participation in this service may seem at odds with the indemnity concerns  
14 identified in the current study but could be explained by the perception that vicarious liability  
15 rests with the service provider as opposed to the dermatologist. Others cited potential medico-  
16 legal concerns associated with teledermatology including the lack of quality assurance, record  
17 keeping, uncertainty regarding indemnity insurance, and the lack of a uniform platform (or  
18 technology) for teledermoscopy. In the absence of Australian guidelines for teledermatology,  
19 clinicians could refer to the American Telehealth Association guidelines<sup>16</sup> or guidelines from  
20 the [International Skin Imaging Collaboration](#) (ISIC)<sup>17</sup>. These provide guidelines for image  
21 acquisition, storage, retrieval, transmission, and display, and if read in conjunction with the  
22 Australian Privacy Principles (Schedule 1 of the Australian Privacy Act)<sup>18</sup> could be translated  
23 for use in an Australian setting.  
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38 Sample size was a limiting factor in this research. It is possible that the response rate was low  
39 due to availability of respondents and the lack of incentive offered. The responses do not  
40 necessarily represent the remuneration expectations of Australian dermatologists.  
41 Additionally, results may have further generalisability issues given the high level of  
42 respondent experience with teledermatology or teledermoscopy. It should also be noted that  
43 statistical significance could not be calculated for the differences in remuneration expectation  
44 for the five different clinical scenarios due to the low response rate.  
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51 Given that the patient in the initial clinical scenario was considered to be an existing patient,  
52 the consultation could be considered a review consultation if the lesion being examined had  
53 been examined at a previous appointment; however, this was not specified in the scenario.  
54 Some dermatologists commented during the interview that their answers were based on this  
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3 assumption. Future research should stipulate the type of consultation clearly so that  
4 respondents are able answer accurately. The perspective of other stakeholders such as  
5 funding agencies (public or provide) and consumer's willingness-to-pay are necessary for a  
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7 broader perspective of the remuneration and overall economic impact for a medical service  
8 such as teledermoscopy. Ultimately, any public funding (e.g. Medicare) will be decided by  
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10 virtue of a Medical Services Advisory Committee (MSAC) decision on an application.  
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12 Application can be made by any medical profession, medical industry and others with an  
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14 interest in seeking Australian government funding for a new medical service. Store-and-  
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16 forward teledermoscopy has been put forward for funding previously, with an unsuccessful  
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18 outcome<sup>19, 20</sup>.

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21 The data collected from these interviews provide a preliminary insight into the specialist  
22 remuneration expectations for providing teledermoscopy services in Australia. As has been  
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24 highlighted in other publications, remuneration is an important factor for ensuring telehealth  
25 services are provided sustainably and equitably<sup>7,9</sup>. In Australia dermatologists expect to be  
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27 remunerated in the range of \$61-\$120 for a single lesion store-and-forward teledermoscopy  
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29 consultation when an in-person examination is not possible. Overall, Australian  
30 dermatologists believe that teledermoscopy is an acceptable mode of care for patients who  
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32 are unable to attend in-person consultations. However, they would prefer an in-person  
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34 consultation which gives them the option to conduct a full-body examination when necessary.  
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40
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44
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48
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**Tables**

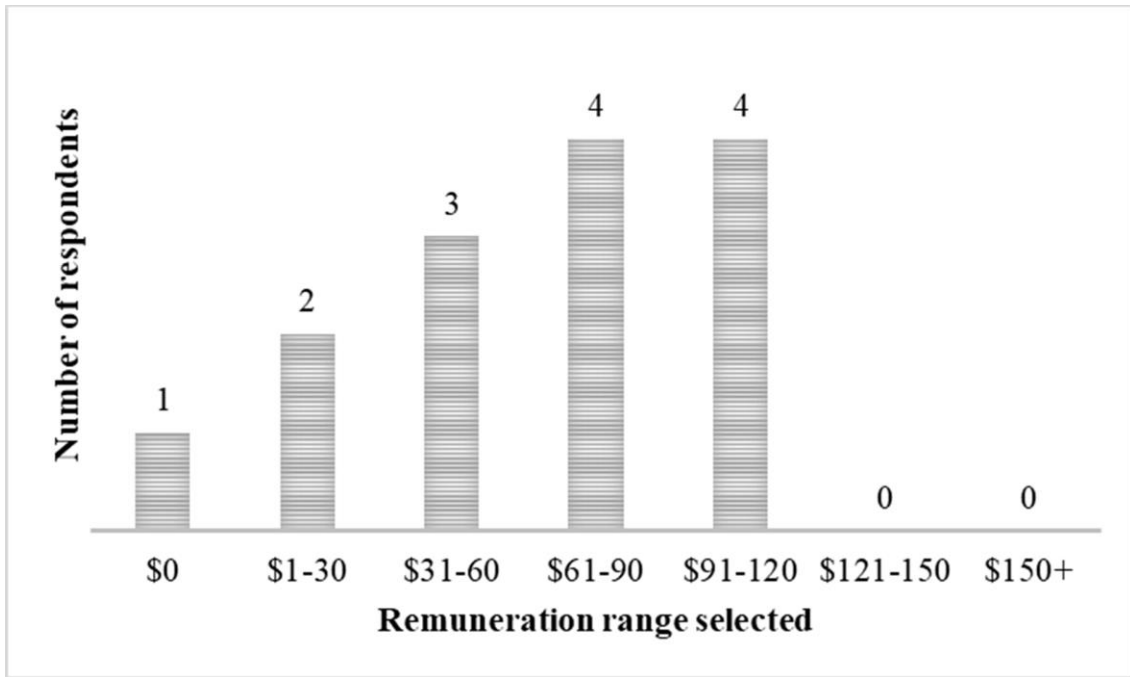
Table 1. Clinical scenario variations

<b>Item</b>	<b>Scenario 1: Initial</b>	<b>Scenario 2: consultation time 15 minutes</b>	<b>Scenario 3: GP referral</b>	<b>Scenario 4: in-person follow- up appointment required</b>	<b>Scenario 5: Unknown patient</b>
<b>Reason for referral (Provisional diagnosis)</b>	Suspected skin cancer (Benign neoplasm)				
<b>Time taken to review</b>	3 minutes	<b>15 minutes</b>			
<b>Teledermoscopy information received from</b>	A patient who is known to you (i.e. you have examined or treated them previously)		<b>A general practitioner (GP)</b>		<b>New patient with no existing relationship to you.</b>
<b>Required follow-up</b>	No action required, full skin check as planned (or review sooner if changes/concerns)			<b>In person consultation required because a diagnosis could not be determined from the teledermoscopy images</b>	

Table 1. Respondent quotes from open-ended question

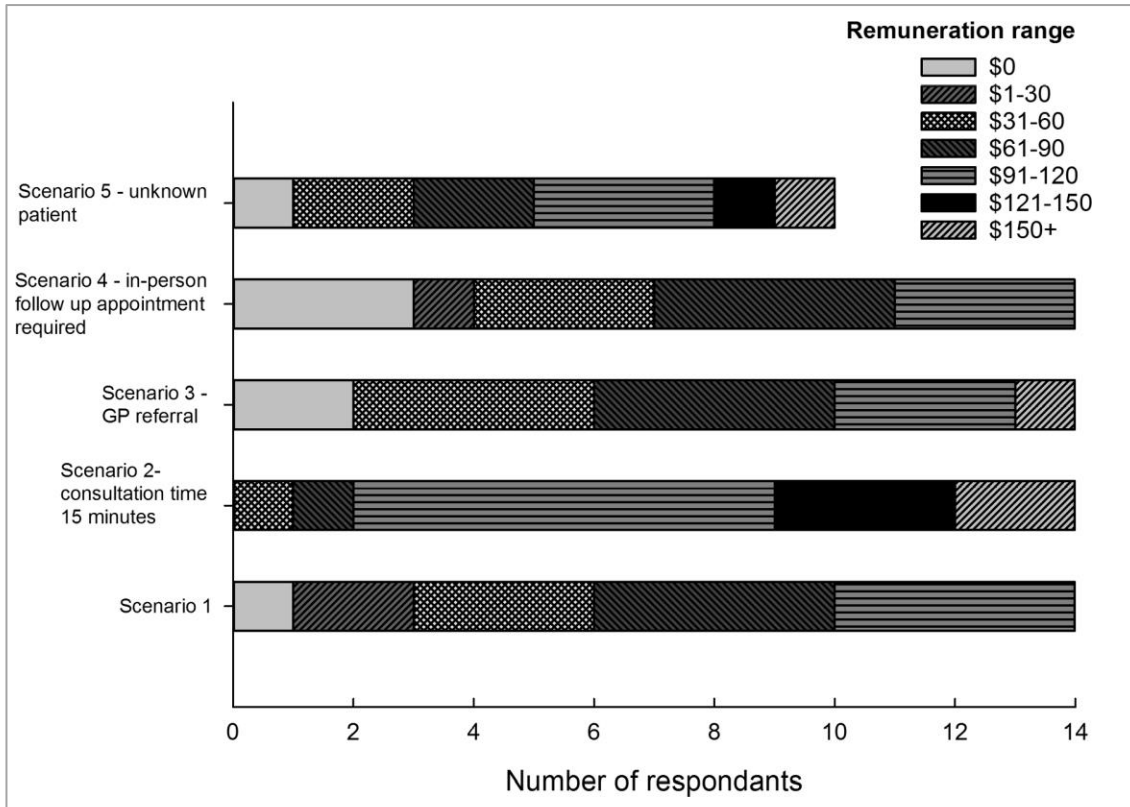
"It is an absolute must for rural areas."
"It is already happening."
"I think it's appropriate, just not for me - I have enough work in my private practice."
"Helpful for existing patients where you have a pre-existing understanding of their skin. Good for patients or those unable to travel to the clinic easily (overseas or rural)."
"[Teledermoscopy] services don't yet have a high enough quality standard... [it] requires a nationally standardised platform."
"[Teledermoscopy] Has revolutionised dermatology in Australia, a significant advance for dermatology,"
"I would continue to provide service regardless of funding, but would prefer to be paid."
"There are medico-legal issues with encryption/privacy principles."

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3 **Figures**  
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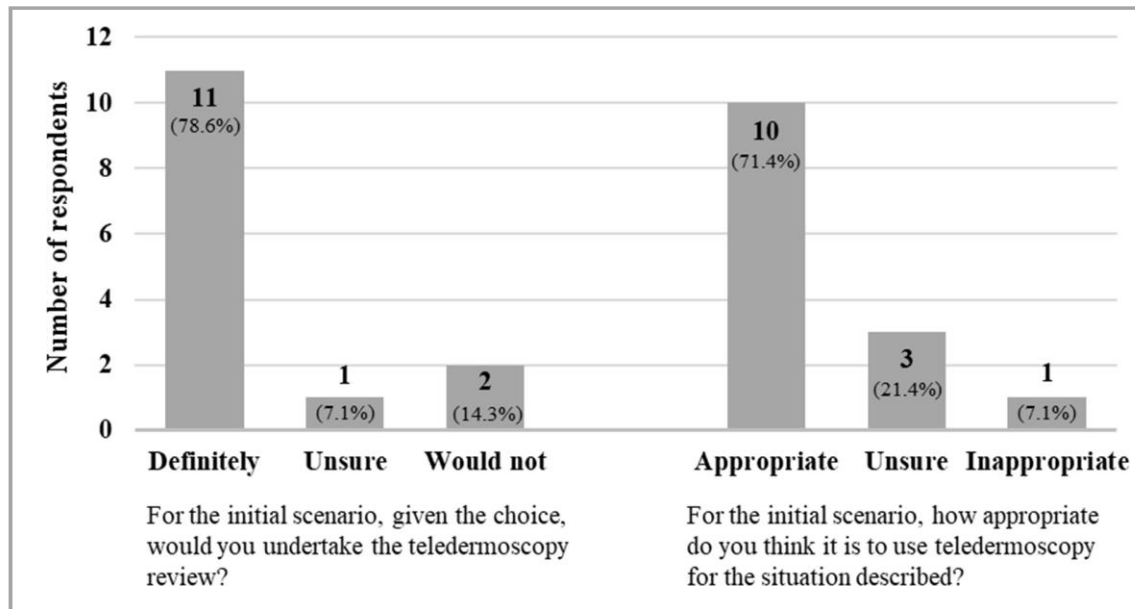
26 **Figure 1. Initial scenario expected remuneration**

27 Figure 1 shows the expected remuneration selected by respondents for the initial scenario.  
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**Figure 2. Scenario remuneration expectation variation**

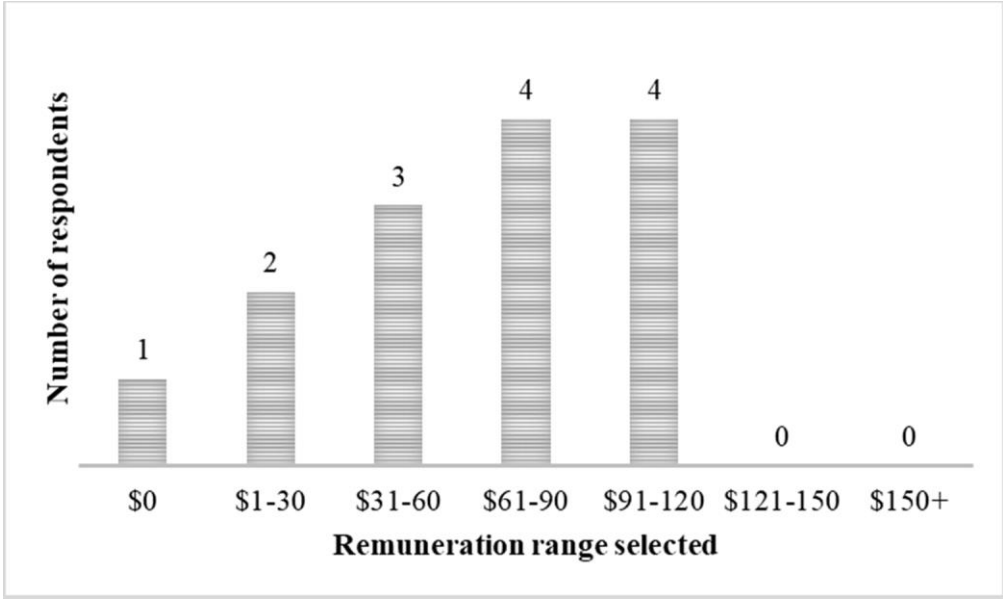
Figure 2 shows the expected remuneration selected by respondents for all 5 scenarios.



**Figure 3. Consultation decision and appropriateness**

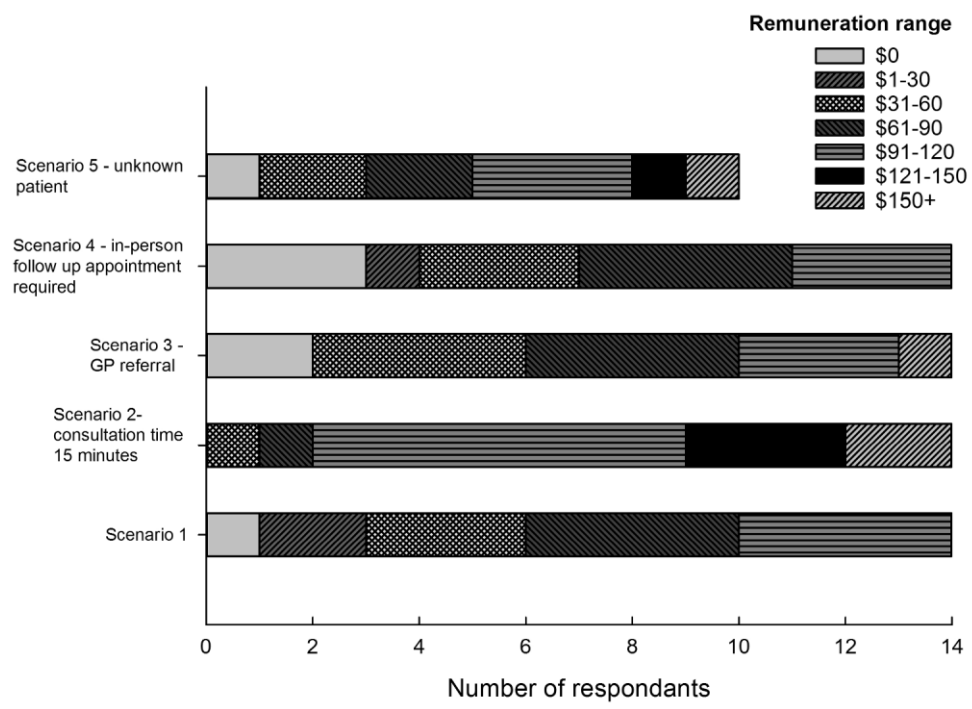
Figure 3 shows the results for the 2 Likert scale questions regarding the appropriateness and likelihood that respondents would undertake the consult described in the initial scenario.

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