A Teledermatology Network for Underserved Areas of South Africa

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Definitions

Telemedicine:
Practice of medicine across a distance.

Teledermatology:
One example of a telemedicine specialty.
# Telemedicine: Two Primary Modalities

<table>
<thead>
<tr>
<th>Live Interactive Video</th>
<th>Store-and-forward</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Synchronous (in real time)</td>
<td>• Not synchronous</td>
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<tr>
<td>• More closely simulates in-person visit</td>
<td>• Patient doesn’t interact with consultant</td>
</tr>
<tr>
<td>– Converse with patient and referring provider</td>
<td>• Logistically straight-forward</td>
</tr>
<tr>
<td>– Patient can see you</td>
<td>• Higher resolution</td>
</tr>
<tr>
<td>• Lower resolution</td>
<td>• Equipment $</td>
</tr>
<tr>
<td>• Equipment $$$</td>
<td></td>
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Store and Forward Telemedicine

Images and history sent via email

Diagram from:
High, J Am Acad Dermatol, 2000

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Fundamental Questions

- Is the telemedicine modality accurate?
- Is privacy protected?
- Will patients be satisfied with it?
- Will practitioners use it?
- Is it cost effective?
ICT Use South Africa

• Internet users (2002): 3.1 million (7%)
  – Ranks 36th in world
• Cell phones (2003): 17 million (39%)
  – 18th in world
• Land line phones (2002): 4.8 million (11%)
  – 33rd in world

Source: CIA World Fact Book online

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The Burden of Skin Disease in South Africa

- 3-4 million patients/dermatologist
- HIV/AIDS: New twists to skin disease
- Resources limited
- Empirical treatment common (wasteful)
- Referral inconsistent

How can specialty care be delivered?

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A Teledermatology Network for S.A.

• Goal: Enhance delivery of dermatological care to underserved areas of S.A.

• Benefits:
  – Decrease morbidity/mortality from skin disease
  – Provide clinical education in skin disease recognition, management, and referral
  – Become a model of teledermatology for regions of similar need
Objectives

• Identify committed dermatologically underserved health care sites
  – Must be email-enabled
• Assure digital imaging equipment
  – Camera/computer
• Train providers in digital photography of skin lesions and image handling

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Objectives (cont’d)

• Teledermatology consultations
  – Render opinion by email within 5-7 days
    • Sooner if required
  – Provide feedback to referring provider
  – Provide education/references

• Patient and provider surveys
  – Satisfied?
  – Helpful (improve outcome)?

• Periodic site visits to troubleshoot, review

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Teledermatology Network for S.A.

Map reference: MS Encarta
Example Patient Referral

Via email:

Hi Roy

Please comment on this XX year old Xhosa man, painter for 10 years, completed TB treatment 1 year ago, who presents with these widespread itching ulcerating skin lesions for about 1 year.

I'm thinking of severe impetigo/secondary bacterial infection, upon some underlying condition such as scabies, eczema or secondary syphilis, or ?? SLE.

I tested him today for HIV and VDRL, awaiting results.

I've put him on Flucloxacillin, Phenergan, and aqueous cream, to see him next Friday.

I'll send you 3 e-mails, with 2 photos per e-mail, not to jam the server. Would it be ok to make the pictures smaller in future - re loss of detail?

Regards
Example Response

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R. Colven—Principal Investigator—University of Washington & University of Cape Town

Dermatology Consultant Response

Date: 2 April, 2005
Date referral received: 1 April, 2005
Teledermatology Site: George
Patient code: 7 Outpatient  Provider code: 1
Consultant Name: Roy Colven, MD  Institution: UCT
Number of Images: 6
Total file size: 8.2 MB
Case Summary:
XX year old male with one year history of itchy, eroded skin. History of TB, treatment completed 1 year ago. Works as a painter. No history of atopy mentioned. HIV status not yet known.

Teledermatological exam:
6 images show the extremities, buttocks, and face of an African adult male. The images show hyperpigmented plagues, papules and nodules, most eroded, and some, especially on the legs with heavy crusting. Most lesions appear chronic. His face shows a symmetrical pattern of hyperpigmented and erythematous plaques over the cheeks. He has some edema of his lower eyelids, but his conjunctivae look spared.
Example Response

Assessment:
This looks best for secondarily infected prurigo nodules. I will stick my neck out and predict that his HIV test will be positive. His arms, legs and buttocks have the appearance of “pruritic papular eruption” commonly seen in relatively advanced HIV. Staph carriage is likewise prevalent in HIV patients, making secondary infection a likely event. This is not to say that he couldn’t have atopic eczema, or another systemic cause of itching with secondary lesions from scratching that have become infected. Secondary syphilis usually doesn’t erode, and the one year history would make this unlikely. Easy to rule out, though.
Recomendations:
I completely agree with your management thus far. In addition to the flucloxacillin and phenergan, I would also give him a topical steroid to help reduce the symptoms from these chronic lesions. Either Lenovate or 10% Dovate ointment would suffice, which ever you can give him in reasonable quantity. Ultimately, if he test HIV seropositive, he would be a candidate for antiretrovirals.
Please let me know the results of his HIV test.

(Footnote: HIV+)
Example Response

Feedback for Referring Provider:

Image quality: Excellent
Historical data: Sufficient
Comments: none

Educational value: High
Review during next site visit? Yes
Etiology of pruritic papular eruption with HIV infection in Uganda.

Resneck JS Jr, Van Beek M, Furmanski L, Oyugi J, LeBoit PE, Katabira E, Kambugu F, Maurer T, Berger T, Pletcher MJ, Machtinger EL.


CONTEXT: A frequent cause of human immunodeficiency virus (HIV)-related morbidity in sub-Saharan Africa is a commonly occurring, intensely pruritic skin rash. The resulting scars are disfiguring and stigmatizing. Despite the substantial prevalence of pruritic papular eruption (PPE) among HIV-infected Africans, the cause has been elusive. (Abstract continues.)
Example Response

Please note:
This opinion, unless otherwise specified, is based solely on the historical data and images provided by the referring provider and does not reflect a complete review of the patient’s history nor a complete physical, including skin, exam.
Immediate Benefits

• Specialist opinion
  – Triage, diagnostic support, management guidance.
• Dermatologist response rate 100%.
• Timely.
• Referral/response in medical record.
• Archive of images for future reference.
• Opportunity for referring provider learning.
• Further education with case review during site visits.

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Pitfalls

• Historical information often insufficient.
  – Nurses better than doctors
• Image quality variable.
• Uploading images, history takes time.
• Consents/questionnaires add burden to referral.
• Equipment breaks down or goes missing.

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Preliminary Results

• Patient Referrals: 40
• Providers: 8 (6 doctors, 2 nurses)
• Rashes 38  Solitary lesions 2
• Patient pigmentation
  – Darker 35
  – Lighter 4
  – Unable to tell 1
• Adults 32  Children 8
• Female 21  Male 18  Gender not given 1

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Patient Referral by Site

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Preliminary Results

- Insufficient history given: 17 (43%)
- Referrals where images not interpretable: 2 (5%)
- Patient comfort: Very good-excellent
- Patient satisfaction overall: Excellent
- Provider satisfaction overall: Excellent

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University of Washington - University of Cape Town
Dermatology Education Exchange

Seattle
47° 45’ N
122° 30’ W

Cape Town
35° 55’ S
18° 22’ E
Future Directions

- Extend Network
  - SA Military
  - NGO’s aiding with antiretroviral roll-out
  - Other sub-Saharan African nations
  - SA prison system
- Web-based, password-protected, referrals/responses
- Explore cellular network for transmitting images
- Establish system of reimbursement
- Extend network of teledermatologists
- Further research:
  - E.g., Assessment of diagnostic accuracy of rashes in darkly pigmented patients
Teledermatology South Africa Website

http://faculty.washington.edu/rcolven/teledermatology.shtml
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