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# Cough and Dyspnoea of an Asthmatic Patient at Mt. Kilimanjaro

Is the diagnosis of breathing disorders at altitude as easy as handbooks suggest?

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Kilimanjaro, seen from Amboseli National Park (Kenya)



# Patient's History 1

- 58 years, male
- Allergic asthma since childhood
  - Normally stabilized by drugs since years
    - Ipratropiumbromide / fenoterol spray (Berodual®)
    - Beclometason / formoterol powder inhalator (Symbicort Turbohaler)
  - Some rare exacerbations
- Planned ascent to Kilimanjaro (5,895m) via Rongai Route

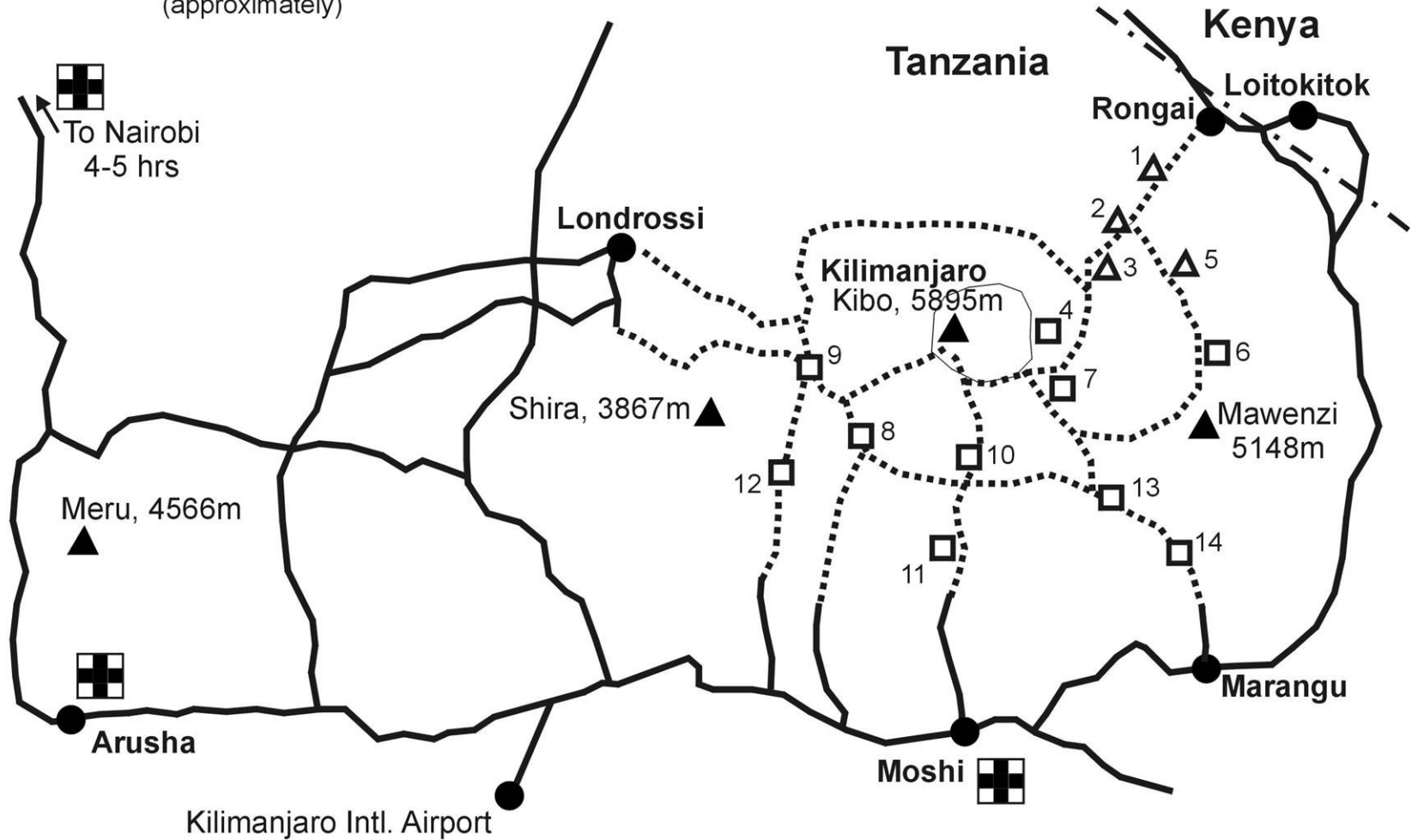
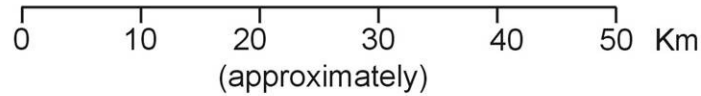


# Patient's History 2

- Route and symptoms

- Moshi (1,400m) no symptoms
- Cave Camp (2,830m) dry cough
- 2nd Cave Camp (3,450m) cough more severe, mild dyspnoea
- School Hut (4,750m) severe & persisting cough, dyspnoea at rest
- Uhuru Peak (5,896m) (not attempted)
- Moshi & Germany still dry cough



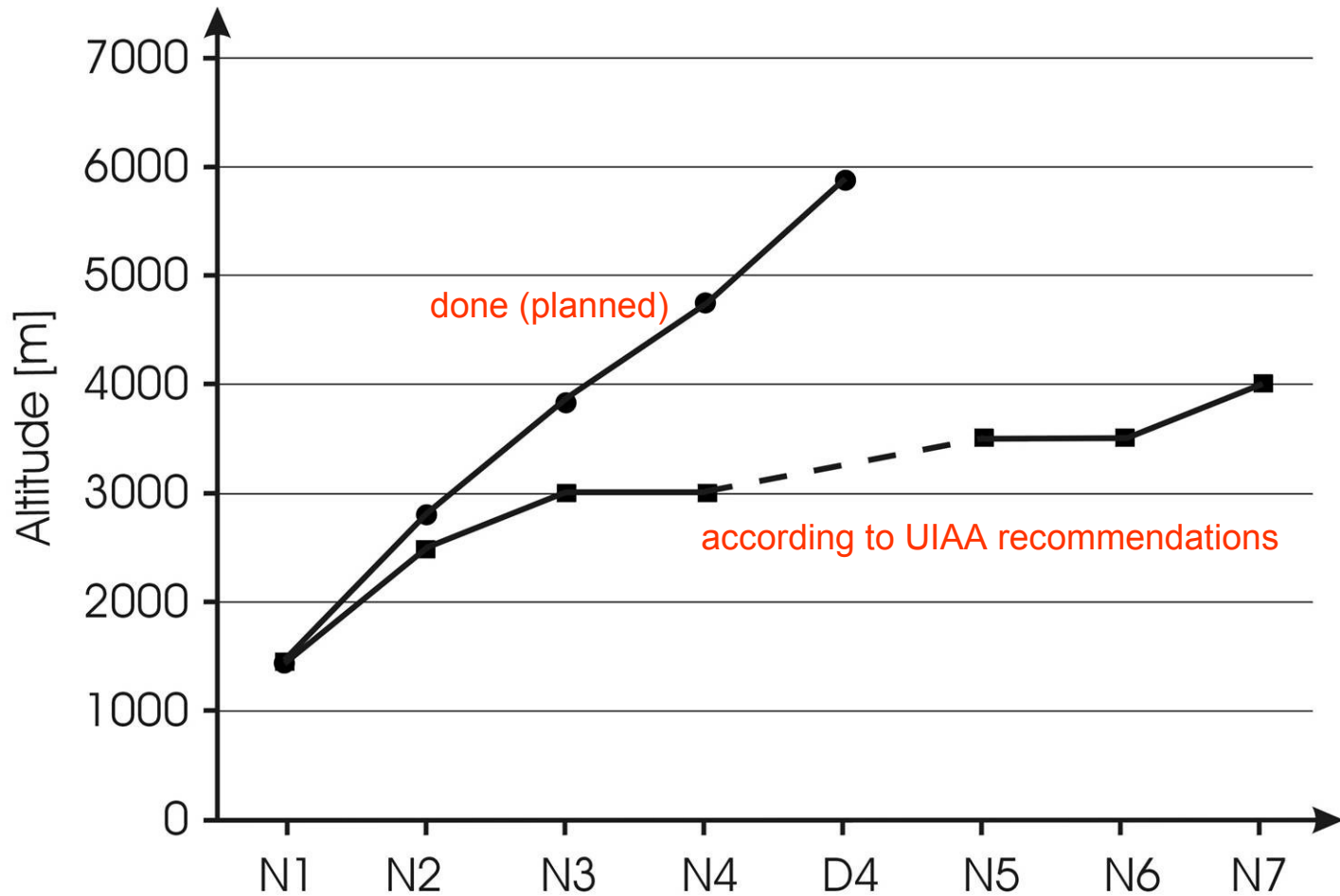


- Hospital
- Road or gravel road
- Treck

- |                        |                           |                       |
|------------------------|---------------------------|-----------------------|
| 1: 1st Cave Camp 2830m | 6: Mawenzi Tarn Hut 4315m | 11: Mweka Camp 3830m  |
| 2: 2nd Cave Camp 3450m | 7: Kibo Hut 4700m         | 12: Machame Hut 3020m |
| 3: 3rd Cave Camp 3850m | 8: Baranko Hut 3985m      | 13: Horombo Hut 3720m |
| 4: School Hut 4720m    | 9: Shira Hut 3880m        | 14: Mandara Hut 2720m |
| 5: Kikelewa Camp 3600m | 10: Barafu Camp 4645m     |                       |



# Altitude Profile



Sleep locations of the tour described

N1 Moshi  
N2 1st Cave Camp  
N3 3rd Cave Camp  
N4 School Hut  
D4 Summit

N1...: Night 1...  
D1...: Day 1...



# What's your diagnosis?

You are here!



# Risk Factor 1: Road Travel



- Possible Diagnosis:
  - Exacerbation of COPD / Asthma
- Mechanism:
  - Dust may irritate bronchial system

On the road approaching Machame Route of Kilimanjaro



# Risk Factor 2: Altitude

- Possible Diagnosis:
  - HAPE
- Mechanism:
  - Hypoxia

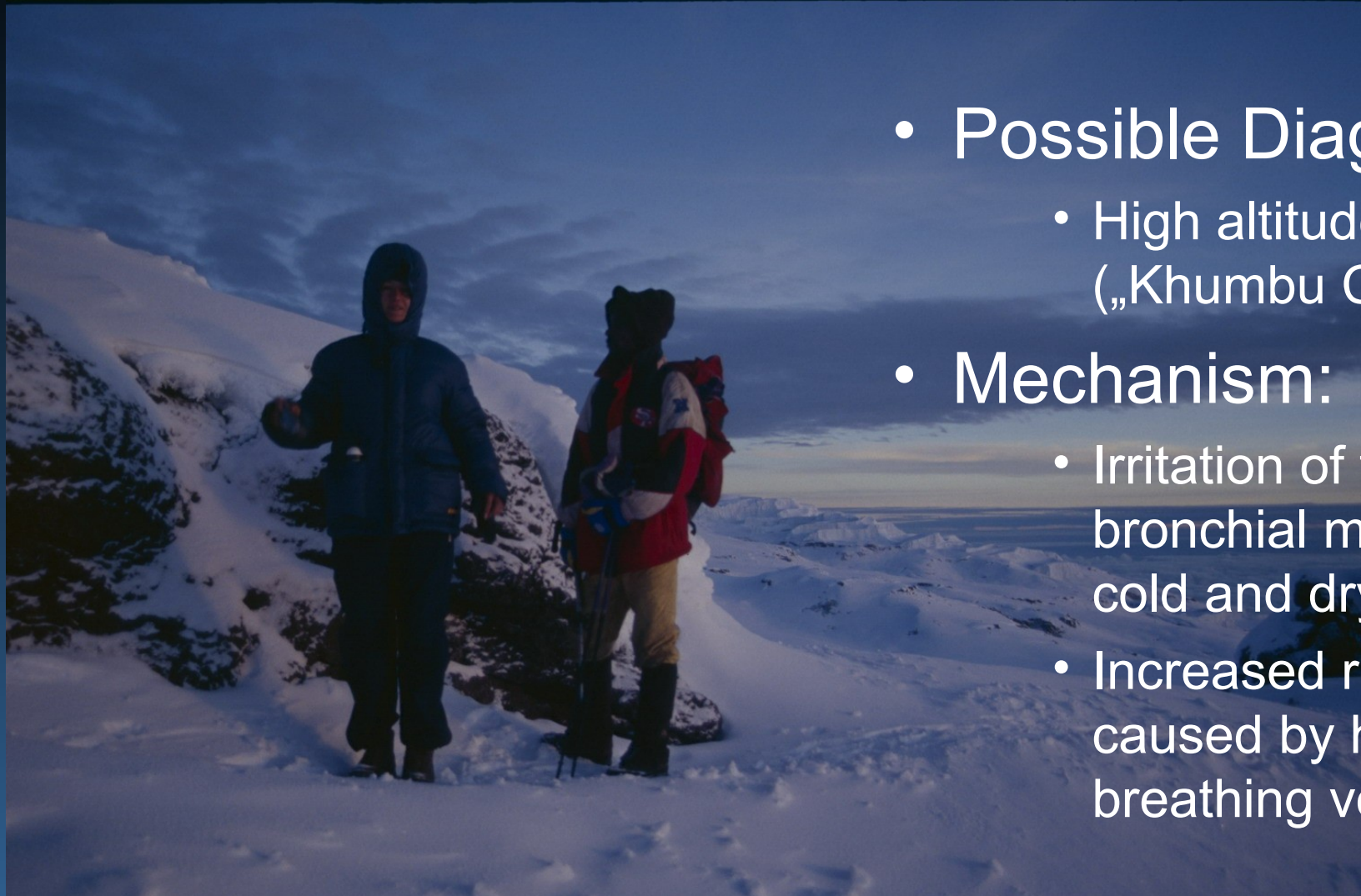


Barafu Bivouac (4,540m) below the Breach Wall of Kilimanjaro



# Risk Factor 3: Cold

- Possible Diagnosis:
  - High altitude cough („Khumbu Cough“)
- Mechanism:
  - Irritation of the bronchial mucosa by cold and dry air
  - Increased risk caused by high breathing volume



Early Christmas morning in the sky of Africa:  $-26^{\circ}\text{C}$  at Uhuru Peak (5,895), Kilimanjaro



# Other diagnoses?

- ...
- **Important differential diagnoses to HAPE**
  - “Physiological dyspnoea”
  - Altitude cough (“Khumbu cough”)
  - Hyperventilation syndrome
  - Sleep apnea
  - Cardiac insufficiency
  - Pulmonary embolism (/deep vein thrombosis, DVT)
  - Pneumonia



# Rarer differential diagnoses

- **Asthma**
- **CO intoxication**
- **CO<sub>2</sub> narcosis**
- **Pneumothorax**
- **Neurogenic pulmonary oedema**
- **Drug induced pulmonary oedema**
- **Aspirin induced pulmonary oedema**



# How will you treat the patient?

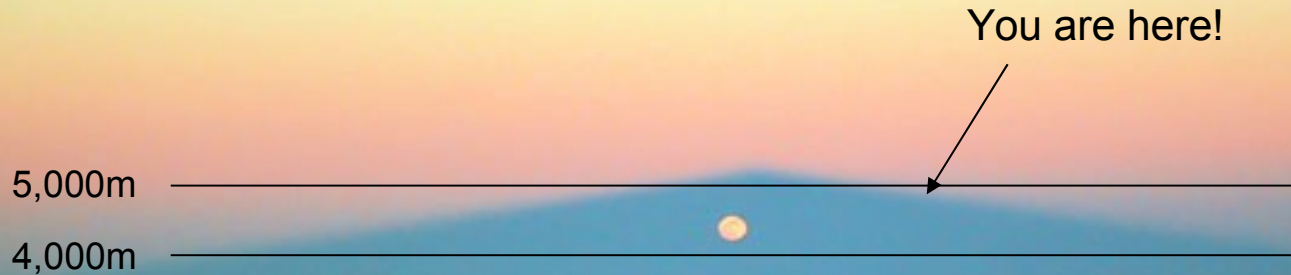
- ... (your ideas should be here)

One recommendation is:  
„Descent!“



# Profile of a Volcano

How far down do you think you'll be able to go with a severe ill mountaineer?



Moonrise in the shadow of Mt.Kilimanjaro, Mt. Shira (3,867m) in foreground



# Field treatment performed by the group

- Nifedipine capsules
  - No effect
    - slow release would be safer at altitude
- Asthma spray
  - No effect
- Noscapine
  - No effect
- Descent
  - NO EFFECT !



# Final diagnosis

- Reinfection with *Pertussis bordetella*
  - Serological proven
    - IgG 78 U/ml (>30 positive)
    - IgM 6 U/ml ( <9 negative)
    - IgA 45 U/ml (>22 positive)
- Patient was vaccinated during childhood, but never boosted
  - Recommended at the age of ~40 years
- Problem:
  - Possible danger for travel companions



Enjoy Africa!

Thank you for your attention!

Ascent to Barafu Bivouac at Mt. Kilimanjaro at about 4,200m