MEMORANDUM

To: All NRAO Employees

From: Jody Bolyard, ES&S Manager

Date: September 10, 2007

Subject: High Altitude Medical Considerations

The Observatory has published rules and requirements to address High Altitude medical exams for employees working or visiting work sites above 3000 meters. All employees must obtain a high altitude medical examination to verify that no medical conditions exist that would make it inadvisable to work at such elevations.

The high altitude medical examination focuses on health conditions that would be absolute or relative contraindications, detailed below, to high altitude work or visits. These requirements are based on Chilean requirements for work at high elevations.

1. Initial high altitude examination:

Prior to the site visit or taking up duty at a site higher than 3000 meters altitude, a high altitude medical examination must be performed. This examination should take place not earlier than 6 months before the visit or taking up duty.

The initial examination includes the tests detailed in the Annual Altitude Health Evaluation, attached. Additional tests may be performed if requested by the medical advisor.

2. Regular high altitude examination:

An annual high altitude medical check-up is required for staff working at high altitude or visiting the high altitude site. It is under the responsibility of the medical advisor to decide which tests shall be performed in this annual examination to provide sufficient medical clearance for work at high altitude.

The following tests shall be done as a minimum:

<table>
<thead>
<tr>
<th>Requirements</th>
<th>Less than 40 years old</th>
<th>40 years and older</th>
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<tbody>
<tr>
<td>Examination by a physician</td>
<td>Every year</td>
<td>Every year</td>
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<tr>
<td>Questionnaire on altitude experience</td>
<td>Every year</td>
<td>Every year</td>
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<tr>
<td>Hemoglobin level</td>
<td>Every year</td>
<td>Every year</td>
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<tr>
<td>Creatinine level</td>
<td>Every 5 years</td>
<td>Every 2 years</td>
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<tr>
<td>Glycemia level (urine and blood)</td>
<td>Every 5 years</td>
<td>Every 2 years</td>
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<tr>
<td>Pulmonary function test</td>
<td>Every 5 years</td>
<td>Every 2 years</td>
</tr>
<tr>
<td>ECG under stress conditions</td>
<td>Every 5 years</td>
<td>Every 2 years</td>
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</table>
A comprehensive high altitude medical examination shall be performed by the medical advisor every five years (staff <40 years old) and every two years (staff ≥40 years old) for staff working in high altitude or visiting the high altitude site. This medical examination is similar to the initial medical examination described in item number 1 above.

3. Contraindications for high altitude access:

**Absolute contraindications:** (permanent conditions not subject to change; one condition is sufficient for a contraindication)

1. Background of cerebral ischemia.
2. Chronic respiratory insufficiency.
3. Severe renal insufficiency (Creatinine clearance less than 40 ml/min)*.
4. Unstable coronary artery disease.
5. Malign arterial hypertension.
6. Pulmonary arterial hypertension (any etiology).
7. Severe anemia (Hb less than 8 gr/100ml).
8. Unstable coronary artery disease.
10. Hemoglobinemia greater than 18.7 gr/dl in men, or greater than 18 gr/dl in women.
11. Unstable coronary artery disease.
12. Malign arterial hypertension.
13. Severe renal insufficiency (Creatinine clearance less than 40 ml/min)*.
15. Morbid obesity (BMI ≥ 40)**.
16. Hemoglobinemia greater than 18.7 gr/dl in men, or greater than 18 gr/dl in women.
17. Unstable coronary artery disease.
18. Malign arterial hypertension.
19. Hemoglobinemia greater than 18.7 gr/dl in men, or greater than 18 gr/dl in women.
20. Unstable coronary artery disease.

**Relative contraindications:** (modifiable in the short term)

1. Well-controlled epilepsy, no seizure in last year.
2. Compensated psychiatric disorders.
4. Insulin-dependent diabetes mellitus.
5. Decompensated type-II diabetes mellitus.
6. Severe hypertriglyceridemia (greater than 800 mg%).
7. Decompensated systemic arterial hypertension.
8. Any uninvestigated cardiac pathology.
9. Other anemias (with hemoglobinemia greater than 8 gr/dl).

*Creatinine clearance (Cockcroft formula) = \((140-\text{Age}) \times \text{Weight (KG)} / 72 \times \text{serum creatinine}\)

The result is expressed in ml/min, and the figure is multiplied by 0.85 for women.

**Body mass index (BMI) = \(\frac{\text{Weight (kg)}}{\text{Height (metres)}^2}\)**

Your physician may prescribe a medication to reduce the physical effects of high altitude ascents. Your doctor can discuss these medications with you. More detailed information on the effects of high altitude exposure is available upon request from the ES&S Office.

4. High Altitude Medical Examination Payment Information.

High Altitude Physical Exams are covered under the NRAO’s PPO medical insurance program. The co-payment should be paid / collected from the examinee. Submit claims to CIGNA under the patient’s Medical ID Number and Group Number 3213380 to the following address:

CIGNA HealthCare
Northeast Claim Center
PO Box 5200
Scranton, PA 18505

5. Results of High Altitude Medical Examination

Results of the examination must be completed on the attached form, marked Confidential, and submitted to:

National Radio Astronomy Observatory
Attention: ES&S Manager
PO Box 2
Green Bank, WV 24944

Address questions to:

Jody Bolyard
ES&S Manager
304-456-2223
jbolyard@nrao.edu
**Evaluación de Salud Anual para Altitud Geográfica**  
*Annual Altitude Health Evaluation*  
* Based on the ACHS norm for medical examinations

### INFORMACIÓN PERSONAL / PERSONAL INFORMATION

<table>
<thead>
<tr>
<th>Nombre:</th>
<th>Fecha:</th>
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<tbody>
<tr>
<td>Name:</td>
<td>Date:</td>
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### EXÁMENES REALIZADOS / TESTS PERFORMED

- Consulta Médica / Medical Checkup
- Electrocardiograma con test de esfuerzo / Electrocardiogram w/stress test
- RX thorax AP / PA Chest X-ray
- Perfil Bioquímico / Biochemical Profile
- Orina Fisioquímico / Urine Test
- Hemograma completo / Blood Test
- Espirometría basal / Basal Spirometry
- Encuesta de altitud / Altitude Survey
- Perfil lipido / Lipid profile
- Otros / Others

### RESULTADOS (por favor marque la evaluación correcta) / RESULTS (please mark correct evaluation)

- **Apto:** Exámenes no muestran aparentemente ninguna condición que contraindique asignaciones a gran altura.
- **Acceptable:** The examination does not show condition(s) which contraindicate altitude assignment.
- **Apto con restricciones:** Favor entregar las restricciones correspondientes al caso.
- **Acceptable with restrictions:** Please provide the corresponding restriction(s).
- **Autorización Pendiente:** Requiere diagnóstico médico, manejo o estabilización.
- **Pending authorization:** Requires medical diagnosis, management or stabilization.
- **No Apto:** Examen arroja contraindicación(es) para el trabajo en altura.
- **Non-Acceptable:** There are condition(s) in the examination which contraindicates work at altitude.

### INSTRUCCIONES ESPECIALES / SPECIAL INSTRUCTIONS

1. Los resultados de los exámenes realizados deben ser entregados al Empleado y no enviados a la Empresa.  
   *Results should be delivered to the employee and not sent to the employer.*

2. Por favor devuelva este formulario, marcado CONFIDENCIAL, a:  
   *Please forward this form, but not the examination results, marked CONFIDENTIAL, to:*

   **ES&S Manager**  
   **PO Box 2**  
   **Green Bank, WV 24944**

Esta Evaluación de Salud tiene validez hasta: dd/mm/aaaa  
Health Evaluation valid until: dd/mm/yyyy

### INFORMACIÓN SOBRE EL DOCTOR / PHYSICIAN INFORMATION

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<thead>
<tr>
<th>Nombre y firma del médico tratante:</th>
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