



***National Science
Foundation
United States Antarctic
Program***

**Defining the Medical Care
Requirements to Support the NSF's
Research Enterprise in Antarctica**



Stakeholders

- Antarctic participants (users)
- NSF (provider)
- Institutional (NSF): research mission
- Public
 - end user of research enterprise
 - ultimate “payer”
- Other international antarctic programs
- Private expeditions



Population Demographics

- ~ 3500 persons deploy during the year (3 stations, 2 ships)
- ~325 persons winter-over
 - physically isolated for up to 8 months
- Average age: ~ 37 years
- 65% male, 35% female
- Population medically screened annually
 - variations based on age, length / location of deployment



“On-ice” Medical Care

- **Based on “health care needs assessment”**
 - historical clinic workloads
 - population size, demographics
 - pre-deployment medical screening to eliminate existing problematic medical conditions
 - ability to sustain quality of care over the long-term
 - ability to evacuate patient, if necessary



Medical Care Overview

- **Comparable to ambulatory/emergent care clinic in US**
- **Majority of clinic visits “routine”**
- **Minimal in-patient care**
- **Seasonal, station-to-station variability**
- **Highlight “problem cases”**
 - accidents/injuries
 - cases requiring transport elsewhere for definitive care



Risk Management

- **Physical environment, isolation**
- **Medical emergencies** (existing medical conditions or exacerbated by environment)
- **“Job” risks** (accidents, injuries)
- **Risks to mission, program**



Experience

- Clinic workload statistics
- “Med-evac” experience
- Effectiveness of medical screening



Trend analyses

- **Medical care on-ice**
 - routine ambulatory / emergent care clinics (borne out by data)
 - staffed for routine activities, with contingency plans for emergencies
 - do not staff for “mass casualty” situation (rather, prepare / plan to maximize community response)



Trending, con't

- **Emergencies / problem cases**
 - cardio-vascular
 - “acute abdomens”
 - injuries
- **Prevention, wellness activities**
 - injuries ~45% of med-evacs
 - significant impact on lost - work time
 - musculo-skeletal injuries predominate



Focus for improvement

- **Better screening?**
 - for cardio-vascular risks, sensitivity and selectivity of non-invasive screening methods possibly inadequate
 - better profiling of medical risk factors
- **Better on-ice diagnostics, treatment**
 - Tele-medicine providing distinct improvements
 - If evacuation easy, clinically better for patient
 - “Standard of care” expectations rising
- **Accident prevention programs**
 - Where’s the better pay-off..on prevention ...or treatment ?



Challenges

- **Medical screening tools**
 - sensitivity, selectivity of tests
 - projecting risks over next 12-month period
 - where to set the cut-off threshold
- **Logistics limitations**
- **Leveraging on-ice capabilities with technologies**
- **Balancing program risks with personal risks**
- **Public perceptions of emergencies**
- **Return-on-investment decisions**
- **Staff clinic for routine or disaster situations ?**
- **Acceptable risk: how safe is “safe enough”**



Impacts / Outcomes

- **Clinic operations**
 - Maintain wellness, productivity of staff
 - Manage emergencies
- **Maximize ROI (medical care -vs- research mission)**
- **Satisfy stakeholder expectations**



Any questions?

