National Science Foundation
United States Antarctic Program

Defining the Medical Care Requirements to Support the NSF’s Research Enterprise in Antarctica
Science performed includes:
- Upper atmosphere studies
- Astrophysics
- Climate change
- Seismology
- Glaciology
- Geology
- Marine biology
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?