**Objective**
Develop an evidence-based, probabilistic risk forecasting model that can help guide mission planning, requirements development, and align science with engineering technology development.

**Scope**
The IMM forecasts medical outcomes for in-flight operations only and medical impacts to the mission.
- Maximizes in-flight mass, volume, power for a given crew and mission profile
- Does not assess long-term or chronic medical impacts of crew health

**Approach**
- Uses ISS resources as medical capabilities.
- Evidence-based clinical research methods
- Probabilistic risk assessment techniques while collaborating with other NASA centers.

**Formulating the Conceptual Model of IMM**
1. **Goal**
   - The inability to treat an ill or injured crew member
2. **Context**
   - The inability to adequately reduce crew health risks via in-flight medical system within operational constraints
3. **Scope**
   - Enable evidence-based, risk-informed decisions by the HRP community in the context of crew profiles and mission constraints
   - Enable evidence-based, risk-informed decisions by the flight surgeon community in the context of crew and mission profiles
   - Provide comparative risk assessments among crew and mission profiles
   - Identify the medical equipment, pharmaceuticals, and consumables that most influence the decrease of mission health risks
   - Optimize the allocation of medical resources for a given mass, volume, power, cost and level of acceptable risk
   - Communicate comparative risk assessments effectively with engineering technology development.

**Fundamental Questions**
- What are the optimal medical resources to minimize crew health risk?
- What is the expected crew functional impairment?
- What medical resources are most likely to be utilized?
- What medical conditions can be expected to have the most impact on crew health?
- What is the probability of loss of crew life or evacuation due to medical events?
- What is the expected crew functional impairment?
- What are the optimal medical resources to minimize crew functional impairment and the probability of evacuation or loss of crew life?

**Example 2**
On a six month mission, is the amount of Ibuprofen sufficient if crew size is increased from three to six crew members?

The medical conditions that require Ibuprofen do not change due to crew size

**Most Frequent Medical Conditions requiring Ibuprofen**
1) Back injury
2) Sprain/Strain - Shoulder
3) Paresthesia
4) Back pain (SAS)
5) Sprain/Strain – Elbow

Quantity of Ibuprofen is insufficient for 2.0% of the trials

Quantity of Ibuprofen is insufficient for 45.0% of the trials

**Outputs**
- Medical Condition Occurrences
- Crew Impairment
- Clinical End States
- Mission End States
- Resource Utilization
- Optimized Medical System

**Next Steps**
- IMM Database Development
- Selection of long-term software technology platform
- External Verification & Validation; Non-Advocate Review (NAR)
- Configuration Management of Clinical Data Inputs
- ISS Medical System Re-design Support
- Constellation Program Health System Requirements Support