

# QMRA Batch Assessment Report

## Comprehensive Risk Assessment Results

### Assessment Summary

Total Scenarios: 15  
Compliant: 1 (6.7%)  
Non-Compliant: 14 (93.3%)

Date: October 14, 2025

# Executive Summary

## Overall Assessment Statistics

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Total Scenarios Assessed: 15  
Compliance Rate: 6.7% (1/15)  
Average Annual Risk: 5.46e-01  
Maximum Annual Risk: 9.99e-01  
Total Predicted Illnesses: 79,972

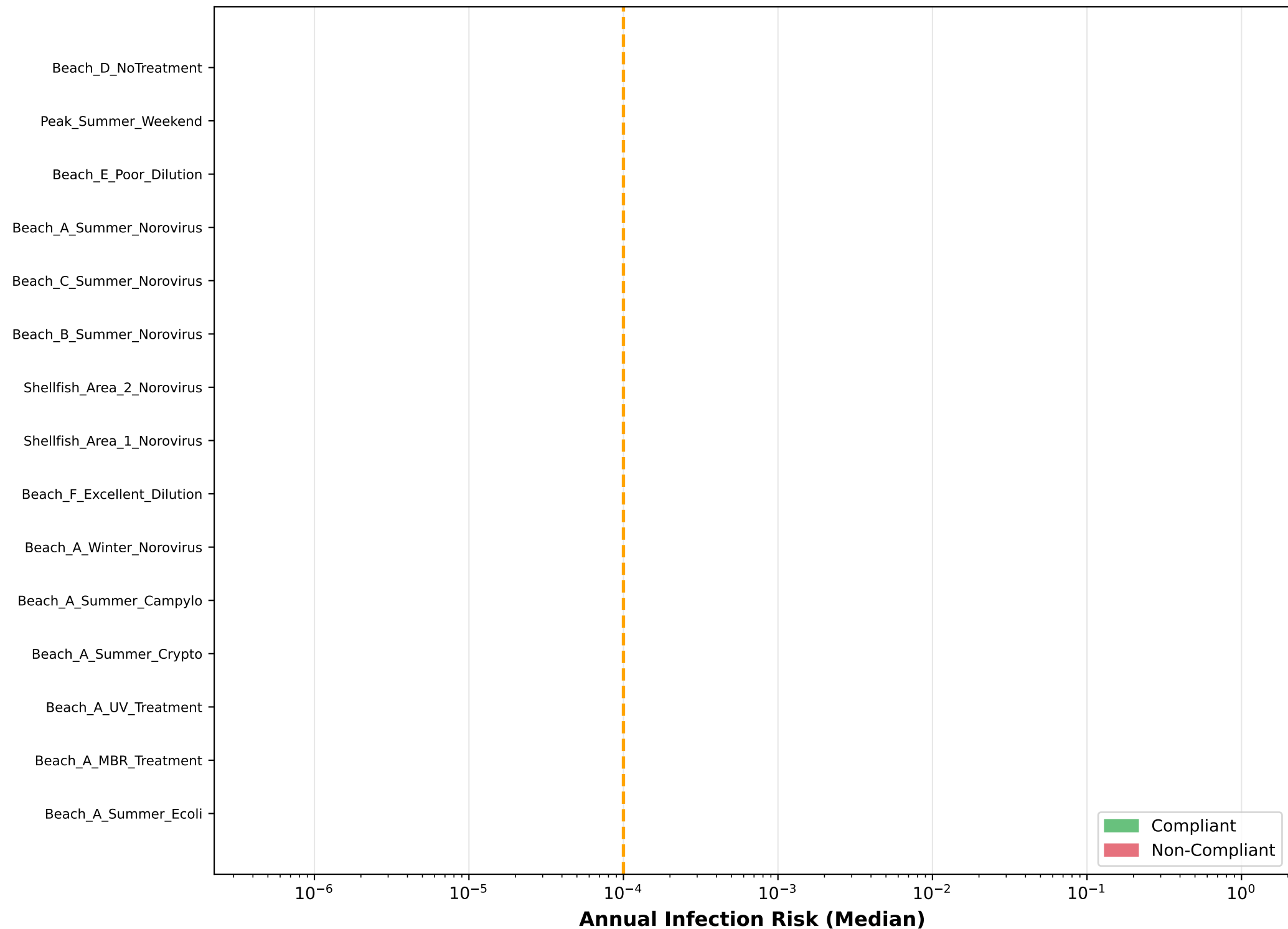
## High Risk Scenarios (Top 5)

Beach_D_NoTreatment	Risk: 9.99e-01	Impact: 4,995
Peak_Summer_Weekend	Risk: 9.97e-01	Impact: 19,930
Beach_E_Poor_Dilution	Risk: 9.73e-01	Impact: 11,671
Beach_A_Summer_Norovirus	Risk: 8.99e-01	Impact: 13,482
Beach_C_Summer_Norovirus	Risk: 8.87e-01	Impact: 7,093

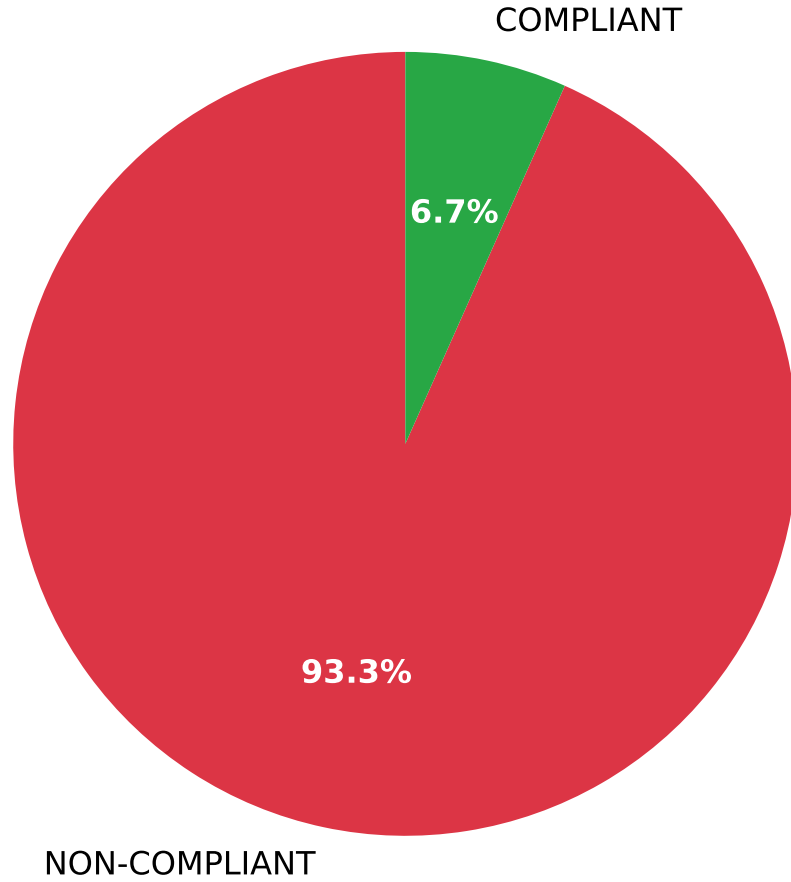
## Compliant Scenarios

Beach_A_Summer_Ecoli	Risk: 4.66e-07
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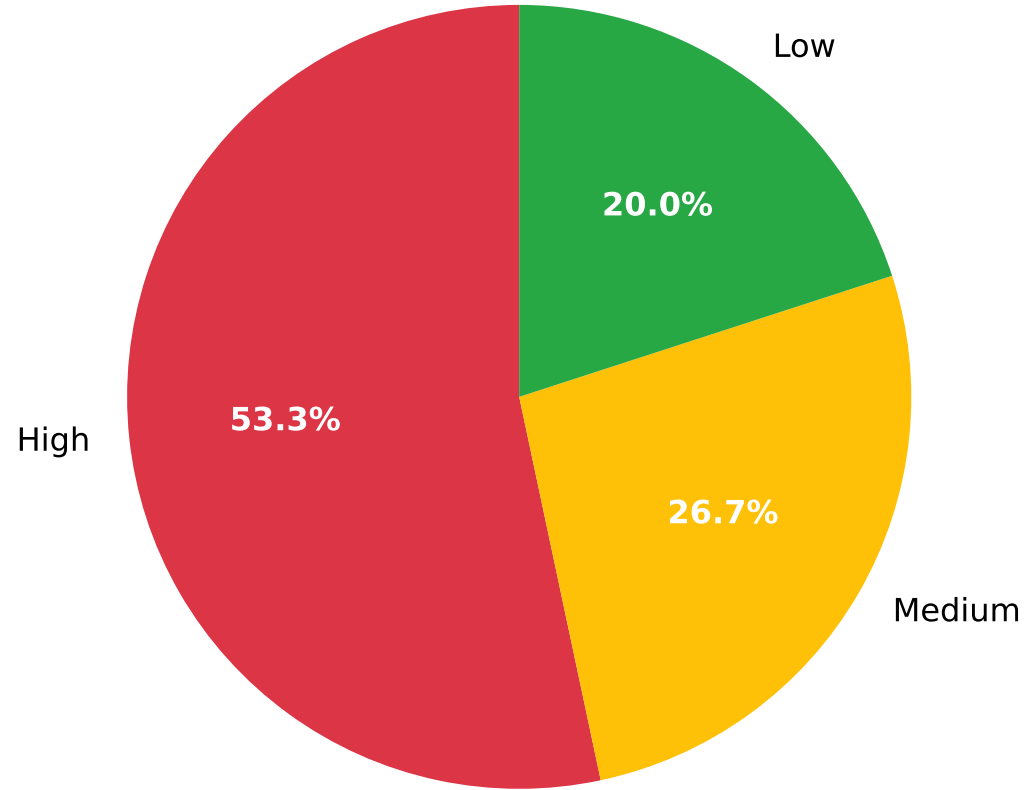
# Risk Assessment Overview - All Scenarios



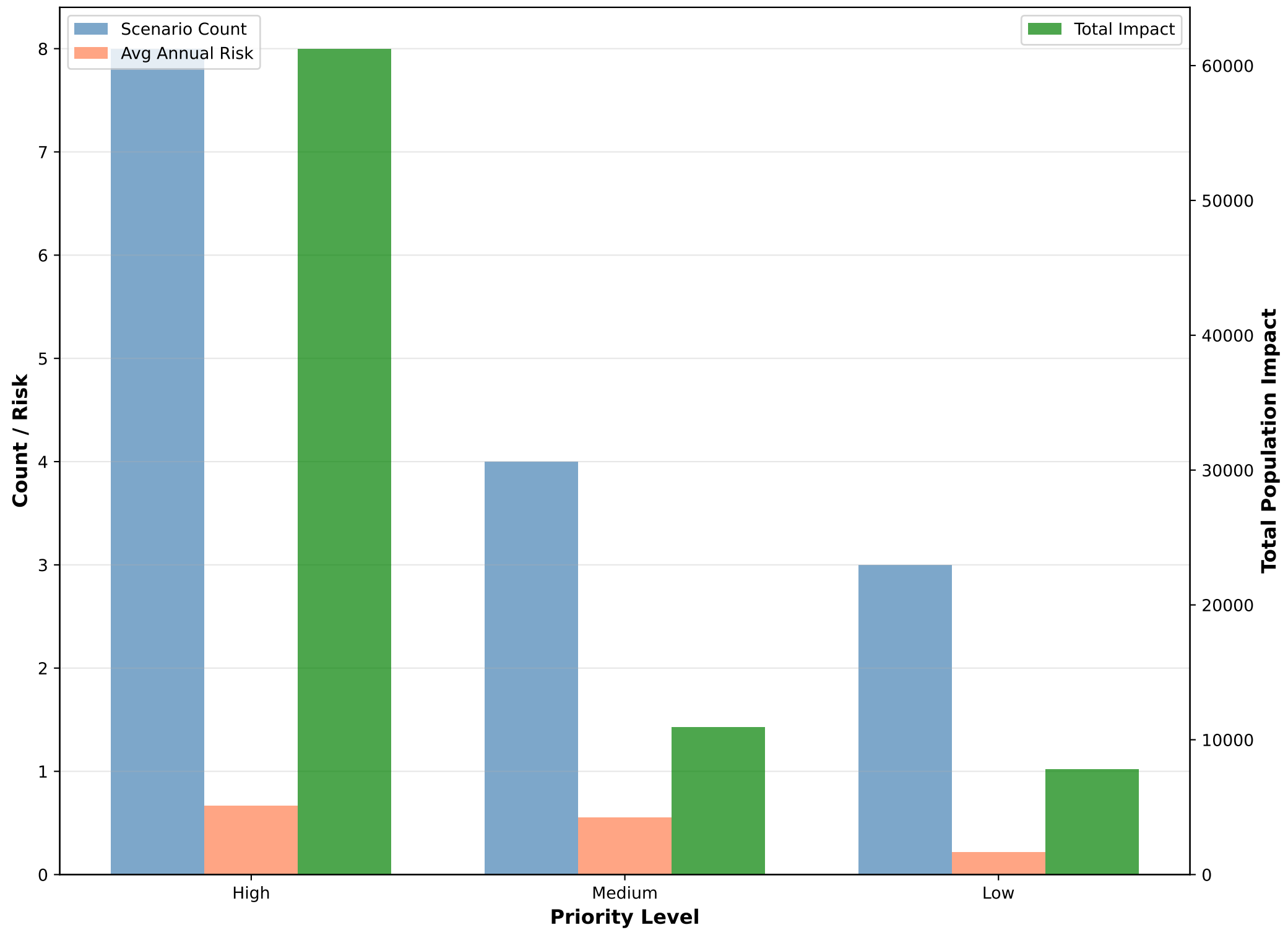
### Compliance Status



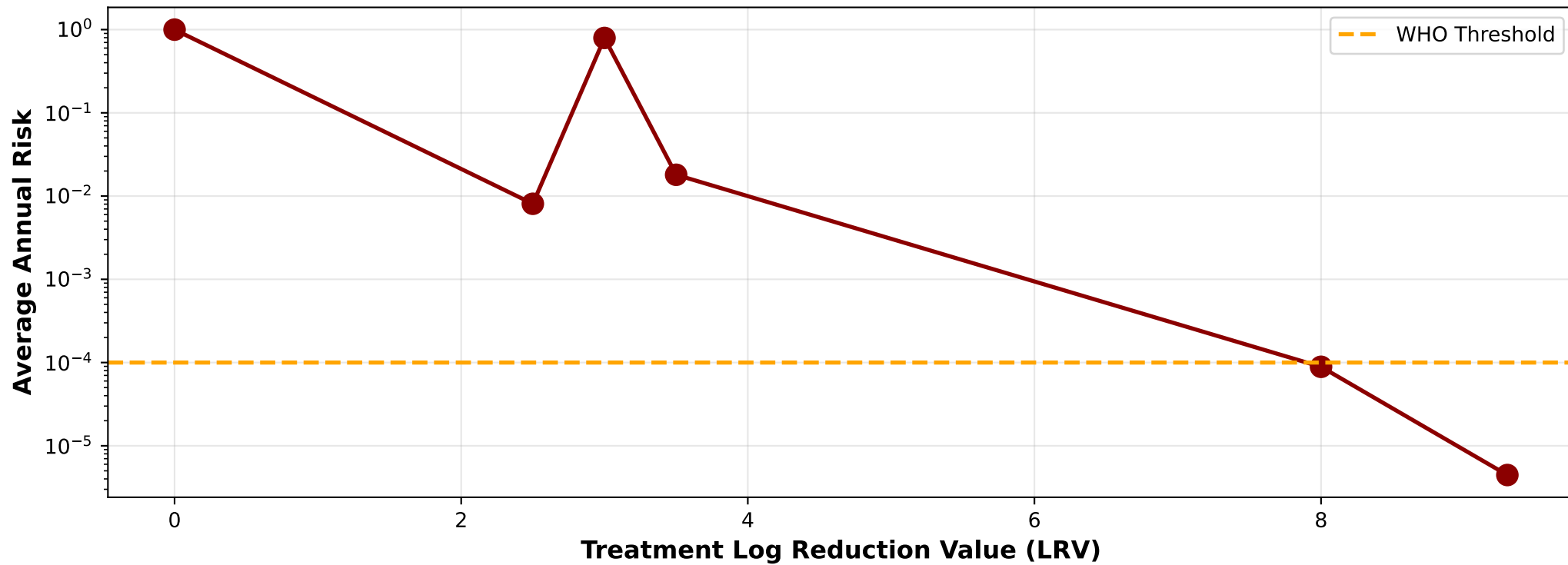
### Priority Distribution



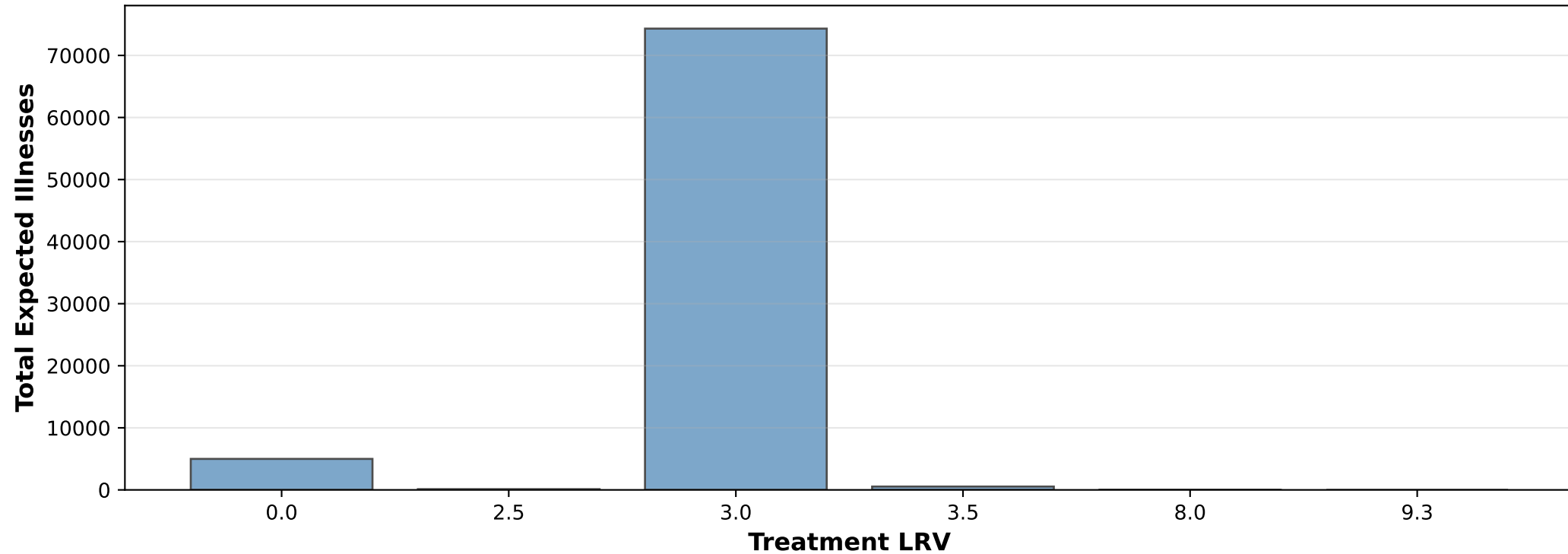
# Priority-Based Risk Analysis



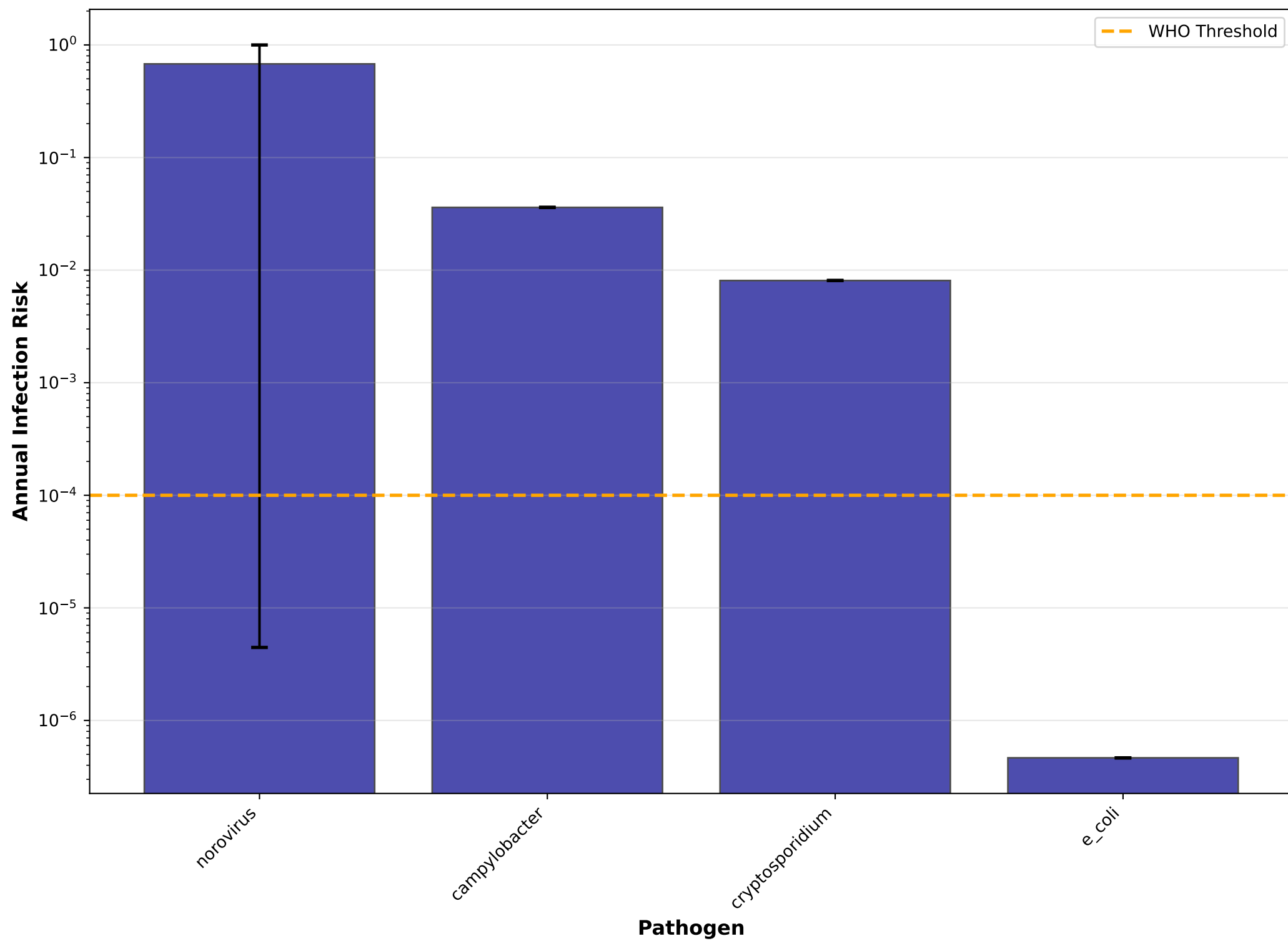
### Treatment Effectiveness - Risk Reduction



### Treatment Effectiveness - Population Impact



# Pathogen Risk Comparison



# Detailed Results Summary

Scenario_ID	Scenario_Name	Pathogen	Annual_Risk_Median	Population_Impact	Compliance_Status
S001	Beach_A_Summer_Norov	norovirus	8.99e-01	13,482	NON-COMPLIANT
S002	Beach_A_Winter_Norov	norovirus	5.96e-01	1,192	NON-COMPLIANT
S003	Beach_B_Summer_Norov	norovirus	7.80e-01	7,804	NON-COMPLIANT
S004	Beach_C_Summer_Norov	norovirus	8.87e-01	7,093	NON-COMPLIANT
S005	Shellfish_Area_1_Norov	norovirus	6.75e-01	3,373	NON-COMPLIANT
S006	Shellfish_Area_2_Norov	norovirus	6.98e-01	2,092	NON-COMPLIANT
S007	Beach_A_Summer_Campy	campylobacter	3.61e-02	540	NON-COMPLIANT
S008	Beach_A_Summer_Crypt	cryptosporidium	8.08e-03	121	NON-COMPLIANT
S009	Beach_A_Summer_Ecol	e_coli	4.66e-07	0	COMPLIANT
S010	Beach_D_NoTreatment	norovirus	9.99e-01	4,995	NON-COMPLIANT
S011	Beach_A_UV_Treatment	norovirus	8.88e-05	1	NON-COMPLIANT
S012	Beach_A_MBR_Treatment	norovirus	4.45e-06	0	NON-COMPLIANT
S013	Beach_E_Poor_Dilution	norovirus	9.73e-01	11,671	NON-COMPLIANT
S014	Beach_F_Excellent_Dilu	norovirus	6.40e-01	7,678	NON-COMPLIANT
S015	Peak_Summer_Weekend	norovirus	9.97e-01	19,930	NON-COMPLIANT



# Recommendations

## 1. IMMEDIATE ACTION REQUIRED

14 scenarios (93.3%) exceed WHO risk thresholds.

Priority should be given to high-risk, high-population scenarios.

## 2. HIGH PRIORITY SCENARIOS

8 scenarios require immediate attention.

Focus on treatment upgrades and improved dilution.

## 3. TREATMENT UPGRADES RECOMMENDED

2 scenarios have inadequate treatment ( $LRV < 3.0$ ).

Consider UV disinfection ( $LRV 8.0$ ) or MBR ( $LRV 9.3$ ) upgrades.

## 4. IMPROVE DILUTION CONDITIONS

1 scenarios have poor dilution ( $< 50x$ ).

Review discharge locations and outfall design.

## 5. POPULATION EXPOSURE MANAGEMENT

10 scenarios affect  $> 1,000$  people annually.

Consider beach closures during high-risk periods.

## 6. SUCCESS CASES

1 scenario(s) meet WHO guidelines.

These demonstrate effective risk management strategies.