Ecological Factors Questionnaire
(Score: 0–11)

Risk Assessment and Mitigation Factor	Risk Score

E-1. Environmental or biological conditions favorable to disease transmission

Tropical climates provide temperature and humidity that are more favorable to disease transmission than arid or temperate climates.

1 – Yes
0 – No

E-2. Travel links with countries with recent outbreaks of infectious diseases

Rapid air transit permits persons to travel from a high-risk country while incubating an infectious disease and makes movement restrictions more difficult to use to control disease transmission.

2 – Persons can enter the country within 12 hours of departing from a country at high risk of the infectious disease
1 – Persons can enter the country within 24 hours of departing from a country at high risk of the infectious disease
0 – Travel from a high-risk country requires more than 24 hours

E-3. Trade links with countries with recent outbreaks of infectious diseases

Movement of goods minimally increases risk of disease transmission (exception is by stowaway person or animal)

2 – Goods can enter the country within 24 hours of departure from a country at high risk of the infectious disease
1 – Goods can enter the country within 48 hours of departure from a country at high risk of the infectious disease
0 – Goods are in transit over 48 hours after departure from a country at high risk of the infectious disease

E-4. High degree of human interaction

Person-to-person transmission increases when humans are in close proximity.

2 – Urban environment
1 – Suburban
0 – Rural

E-5. High degree of population mobility

Increased movement leads to increased potential for exposure of large numbers of people and increased risk of disease transmission prior to identification of infected cases.

2 – High traffic volume (international airport, border crossing, urban mass transit)
1 – Moderate traffic volume (urban setting)
0 – Little to no population movement (rural setting)

E-6. Immunosuppressed populations at risk for the disease

Children, pregnant women, persons with HIV/AIDS. the elderly, and the severely malnourished are more susceptible to disease and would likely experience an increased death rate.

2 – Vulnerable children, pregnant women, persons with HIV/AIDS, the elderly, or severely malnourished populations are at high risk for exposure and unlikely to have early access to healthcare services

1 – Such populations present but with good access to healthcare services

0 – No vulnerable populations at risk

Total Ecological Factor Score: Range 0–11

Infrastructure Factors Questionnaire
(Score: 0–18)

Risk Mitigation and Assessment Factor — Risk Score

I-1. Presence of animal-human interaction

Risk for transmission of disease from animal reservoir to humans increases as contact increases.

2 – Domestic occupational contact between potential animal reservoirs and humans (i.e., backyard farms)
1 – Commercial occupational contact between potential animal reservoirs and humans (commercial animal production) or in hunting activities
0 – No regular animal-human contact

I-2. Effective human disease surveillance process

Prompt collection and reporting of diseases is necessary to direct disease investigation and control efforts.

2 – Disease surveillance and reporting nonexistent
1 – Disease surveillance and reporting functions only when special emphasis
0 – Well-developed disease surveillance and reporting process

I-3. Social, climate, or geographic response barriers

War, natural disaster, adverse weather conditions, geographically dispersed population would increase the difficulty in reaching needy populations.

2 – Uncertain social or climatic factors preventing response effectiveness (war, impassable weather)
1 – Geographic features present that decrease response effectiveness (dispersed populations, disrupted road, rail lines)
0 – No adverse factors that would hinder a response

I-4. External assistance needed to detect, investigate, respond to, and control disease or prevent new cases

Disease spread may occur before external assistance is available; healthcare infrastructure may be inadequate to treat cases.

2 – External disease investigation and treatment resources needed to respond to and manage outbreak
1 – External technical assistance needed to verify diagnoses, investigate disease, and develop response
0 – No external diagnosis or treatment resources necessary

I-5. Disease diagnoses can be made and verified rapidly

Control and treatment measures can be targeted most appropriately when the pathogen can be identified.

2 – Limited clinical diagnostics available
1 – Basic clinical and laboratory support present
0 – Advanced laboratory diagnostics available within 48 hours

I-6. Effective healthcare delivery system

Effective, accessible healthcare protects from unusual sickness and death by providing prompt disease diagnosis and treatment.

2 – Minimal availability of basic healthcare services
1 – Effective healthcare services available to those with sufficient money or prestige
0 – Effective healthcare services available to all

I-7. Healthcare delivery system able to manage highly infectious pathogens

Person-to-person transmission often occurs in hospitals when inadequate attention is paid to infection control principles.

2 – No reverse isolation patient rooms, poor observance of infection control principles
1 – Little experience with highly infectious diseases, basic infection control observed
0 – Suspect cases isolated in reverse isolation patient rooms, strong infection control practices

I-8. Effective public communication system

Effective risk communication between government agencies and the public is necessary to provide reassurance and instructions on personal steps to take to protect from disease.

2 – No effective risk communication structure or processes in place
1 – Media resources but not used regularly, entire population not reached
0 – Language-specific messages delivered by multiple media sources and messengers

I-9. Effective interagency coordination

Effective preparation and response planning requires communication and coordination among all local and central government agencies, including agriculture, veterinary medicine, public health, education, interior, communication, and security.

2 – Little regular cooperation and communication between government agencies at the central and local levels, and between these levels
1 – Interagency cooperation takes place only during a crisis and in response to pressure from senior government leaders
0 – Good interagency communication and coordination between agencies at the central government level, and between central and local authorities, as demonstrated in collaborative preparedness plans and response exercises

Total Infrastructure Factor Score: Range 0–18

Response Factors Questionnaire
(Score: 0–38)

Risk Assessment and Mitigation Factors	Risk Score

R-1. Authorities have identified animal reservoirs ☐

Response efforts are more effective when animal reservoirs have been identified before the crisis occurs.

2 – Local health or public health officials are not aware of animal reservoirs
0 – Local health or public health officials are aware of animal reservoirs, or no animal reservoir exists

R-2. Authorities have identified disease transmission risk factors ☐

Response efforts are more effective when risk factors have been considered before the crisis occurs.

2 – Local health or public health officials are not aware of disease risk factors
0 – Local health or public health officials are aware of disease risk factors

R-3. Authorities have identified high-risk groups ☐

Response efforts are more effective when high-risk groups have been identified before the crisis occurs.

2 – Local health or public health officials are not aware of high-risk groups
0 – Local health or public health officials are aware of high-risk groups

R-4. Effective risk communication to public about disease ☐

Early self identification of disease cases allows infectious persons to be isolated and treated.

2 – No public risk communication about disease
1 – Public announcements in mainstream media about disease symptoms, risk factors and prevention steps
0 – Comprehensive public risk communication using multiple forms of outreach about disease symptoms, risk factors, prevention steps, and where to get help and more information

R-5. Authorities have disease surveillance systems in place for animal reservoirs ☐

Early detection and rapid response is more likely when effective surveillance systems are in place.

2 – No surveillance system in place
1 – Surveillance system implemented in response to outbreak
0 – Efficient baseline surveillance system in place

R-6. Measures (such as vaccinations when available) are in place to protect domestic animal reservoirs from diseases ☐

Disease prevention efforts can reduce susceptibility of domestic animal populations.

2 – No preventive measures are routinely utilized
1 – Domestic animals are vaccinated when disease identified in region
0 – Domestic animals are routinely vaccinated to protect from disease

R-7. Measures are in place to protect domestic animal populations from wild populations

Animal-to-animal disease transmission is reduced when domestic animals are protected from exposure to diseases circulating in wild animal reservoirs.

2 – No actions are taken to protect domestic animal populations from wild animal populations
1 – Domestic animal populations are separated from wild animal populations when disease cases identified
0 – Domestic animal populations are routinely kept from contact with wild animal populations

R-8. Authorities proactively cull infected animal populations

Removal of infected animals is necessary to control animal disease spread and reduce risk of human exposure.

2 – No culling of infected animals
1 – Partial or voluntary culling of infected animal populations
0 – Institutionalized programs in place for rapid culling of infected animal populations

R-9. Authorities proactively cull exposed animal populations

Removal of exposed animals is necessary to control animal disease spread and reduce risk of human exposure.

2 – No culling of exposed animal populations
1 – Partial or voluntary culling of exposed animal populations
0 – Institutionalized programs in place for culling of exposed animal populations within 3 kilometers of diseased animals

R-10. Disease surveillance systems in place for presence of human disease

Early detection and rapid response is more likely when effective surveillance systems are in place.

2 – No surveillance system in place
1 – Surveillance system implemented in response to outbreak
0 – Efficient baseline surveillance system in place

R-11. High-risk areas are monitored for disease cases

Early detection of disease in high-risk areas may allow exposure reduction.

2 – No additional monitoring or surveillance in high-risk areas
1 – Passive detection systems used (i.e., thermal monitors in airports)
0 – Location-specific early detection procedures emphasized, i.e., authorities contact day care centers, schools, nursing homes, hospitals often to inquire about cases, provide repeated education reminders

R-12. Disease surveillance system detects pathogenicity of disease

Identification of severe versus mild cases of disease allows limited resources to be better prioritized.

2 – No surveillance system in place
1 – Surveillance system present but does not distinguish between mild and severe cases
0 – Surveillance system distinguishes mild disease cases from severe cases

R-13. Authorities perform active human case finding in vicinity of animal cases

Persons in close proximity to animals are at greater risk for exposure; actively seeking such human cases allows a faster response to new cases.

2 – No attempts to identify new disease cases in vicinity of infected animals
0 – Active human case finding started in vicinity of identified animal cases

R-14. Authorities rapidly perform contact tracing

Persons potentially exposed to infectious cases must be quickly identified and managed to interrupt disease transmission.

2 – No active contact tracing
1 – Contact tracing limited only to likely exposure groups
0 – Contact tracing identifies and contacts individuals who may have been exposed

R-15. Exposed contacts are appropriately isolated, prophylaxed, or vaccinated

Exposed persons must be treated or isolated to prevent disease transmission to others.

2 – No individual treatment of persons based on probably exposure
1 – Exposed persons are educated and instructed to seek medical attention if they develop disease symptoms
0 – Exposed persons are individually evaluated for exposure risk and are isolated, prophylaxed, or vaccinated as appropriate

R-16. Authorities appropriately isolate and treat infected persons

Active human cases must be isolated to prevent disease from being spread to others.

2 – No isolation of infected persons
1 – Voluntary or incomplete isolation during treatment
0 – Cases isolated during treatment and strong infection control in place

R-17. Disease diagnosis is rapidly made and verified

Control and treatment measures can be targeted most appropriately when the pathogen can be identified.

2 – Limited clinical diagnostics available
1 – Basic clinical and laboratory support present
0 – Advanced laboratory diagnostics available

R-18. High-quality disease treatment provided

Quality healthcare rapidly reduces disease transmission and encourages sick persons to seek treatment.

2 – Minimal availability of basic healthcare services
1 – Healthcare services available to those with sufficient money or prestige
0 – Quality healthcare services available to all

R-19. Effective interagency response coordination

An effective response requires rapid, coordinated action by all involved local and central government agencies, with little confusion about roles and responsibilities so effort is not wasted.

2 – Little evidence of coordinated crisis responses between officials at different levels of government and between government agencies
1 – Interagency cooperation occurs only during a crisis in response to pressure from senior government leaders or criticism from the media or other sources
0 – Effective coordinated interagency responses to routine emergencies and disasters

Total Response Factor Score: Range 0–38

Transparency Factors Questionnaire
(Score: 0–14)

Risk Assessment and Mitigation Factors	Risk Score

T-1. Disease containment efforts are effective

Effective disease containment measures reduce the likelihood of sustained transmission and the risk to other countries.

2 – Disease containment efforts ineffective
1 – Disease containment efforts effective only with external assistance
0 – Effective disease containment efforts

T-2. Public infrastructure maintained

Decay of basic societal services caused by (or coincidental to) disease outbreak suggests that authorities will be unable to prevent sustained transmission of disease and other countries will be at greater risk of disease introduction.

2 – Law enforcement, fire protection, healthcare services overwhelmed by disease
1 – Some interruption of essential services (water, power, telephone, food services) directly or indirectly caused by disease
0 – No interruption of public infrastructure

T-3. *Authorities openly discuss risk factors for disease, and acknowledge strengths and weaknesses in surveillance and response capabilities*

Open discussion of risk factors and system limitations implies willingness to communicate openly about disease control issues.

2 – No discussion of risk factors and system limitations in open media or official discussions
1 – Selective acknowledgement of findings when domestic or international pressure exerted or with media reporting
0 – Open discussion of risk factors, diseases, and system strengths and weaknesses

T-4. Authorities provide regular updates about disease findings within reasonable limits to protect patient privacy

Open discussion of disease outbreaks and effectiveness of interventions builds international trust and allows other countries to implement reasonable protective measures.

2 – No discussion of disease prevalence or effectiveness of control measures in open media or official discussions
1 – Selective acknowledgement of findings when domestic or international pressure exerted or with media reporting
0 – Open release of case numbers, effectiveness of disease control measures

T-5. Authorities maintain public trust

Public trust is essential for citizens to comply with instructions from authorities.

2 – Little or no evidence of public trust in government authorities, civil disorder
1 – Governmental authorities criticized in press, by other governmental authorities, and by general public
0 – Free exchange of information between public and government officials, criticism encouraged and addressed in orderly fashion

T-6. Open media reporting

Open media reporting is essential to maintaining an open society and ensuring that governmental authorities are responsive to the needs and concerns of citizens.

2 – Strict control or censorship of media reporting

1 – Limited media reporting about governmental actions

0 – Free press, open criticism of governmental authorities allowed, authorities respond to media misinformation

T-7. Open reporting to international organizations such as WHO

International organizations play important coordination and collaboration role in preventing international disease transmission.

2 – Minimal reporting to WHO, rare in-country visits permitted

1 – Reporting to WHO only in presence of international pressure

0 – Open and frequent reporting to WHO, on-site visits permitted upon request

Total Transparency Factor Score: Range 0–14

Disease-Specific Outbreak and Transmission Factors Questionnaire (Score: 0–36)

Risk Assessment and Mitigation Factors	Risk Score

DOT-1. Disease endemic in the geographic area ☐

A disease that is continually present in an area has adapted to local environmental and biological conditions and is much more difficult to eradicate or control than one that has been recently been introduced.

2 – Disease is endemic to the area
0 – Disease is not endemic to the area

DOT-2. Disease is caused by unknown agent, or source, vehicle, or route of transmission is unusual or unknown ☐

Lack of information about disease reservoir, transmission, and control increases risk because control measures cannot be targeted at particular areas. Extraordinarily restrictive measures are more likely to be necessary in order to control disease transmission.

2 – Agent and route of transmission are unknown
1 – Disease is understood but usual control measures are ineffective
0 – Disease and route of transmission are understood, control measures are effective

DOT-3. Disease caused by pathogen that is present in or released into the environment and has the potential to spread across international borders ☐

Transmission could occur across political boundaries so human exposure would be greater and population movement restrictions will be less likely to control transmission.

2 – Pathogen can be carried long distances by animals, i.e., migratory waterfowl
1 – Pathogen present in or could be released into air or water
0 – Pathogen not present in the environment

DOT-4. Animal reservoir for the disease ☐

Diseases are nearly impossible to eradicate and very difficult to control if they exist in animals.

2 – Wild animal reservoir exists
1 – Domestic animal reservoir exists
0 – No animal reservoir exists

DOT-5. Animal reservoir highly mobile ☐

The geographic range of a disease increases if the animal reservoir freely moves around the world, while the human exposure risk increases if the animal reservoir surreptitiously follows human movement patterns (e.g., rats and plague, skunks and raccoons and rabies).

2 – Terrestrial animals adapted to manmade conveyance (i.e., truck, ship, automobile)
1 – Avian reservoir
0 – Terrestrial animal reservoir with minimal geographic range

DOT-6. Disease transmission between different types of reservoir animals

A disease is more difficult to eradicate or control if it can be transmitted from one type of animal to another, since different control measures must often be used.

2 – Disease transmission exists between types of animals (i.e., birds and pigs)
0 – No disease transmission between different types of animals

DOT-7. Mixing between susceptible wild and domestic animals

A disease that can be transmitted from wild animals to domestic animals puts these domestic animals and their human caretakers at risk for exposure.

2 – Mixing between wild and domestic animals
0 – No mixing between wild and domestic animals

DOT-8. Animal-to-human transmission of disease

Humans are at increased risk if disease can be transmitted from an animal reservoir.

2 – Easy animal-to-human transmission
1 – Rare animal-to-human transmission
0 – No animal-to-human transmission

DOT-9. Person-to-person transmission

The speed and route of person-to-person transmission has a dramatic effect on control measures.

2 – High degree of person-to-person transmission (Reproduction rate >4 (Measles =12, seasonal influenza=5))
1 – Moderate degree of person-to-person transmission (Reproduction rate 2-4 (SARS=3.5))
0 – Low degree of person-to-person transmission (Reproduction rate <2)

DOT-10. Disease pathogenicity in animal reservoir

A highly pathogenic disease that is rapidly fatal to its reservoir host is less likely to spread than a disease with few or no symptoms that allows its host to continue to move around and expose humans.

2 – Low disease pathogenicity in animal reservoir
1 – High disease pathogenicity in animal reservoir
0 – No animal reservoir or no animal-to-human transmission

DOT-11. Disease pathogenicity in humans

A highly pathogenic disease will cause more disruption to society due to sickness and death than a low pathogenic disease.

2 – High pathogenicity (>5% case fatality rate)
1 – Low pathogenicity (<4% case fatality rate)

DOT-12. Unusual disease occurrence for geographic area, season, or population

Unusual presentation may suggest a new variant of a disease or a genetically altered pathogen.

2 – Unusual or unexpected setting for disease to occur
0 – Usual disease setting

DOT-13. Evolution of cases is more severe than usual or with unusual symptoms

Unusual cases may suggest a new variant of a disease or a genetically engineered strain; usual control measures may be ineffective.

2 – Disease severity or transmission is unusually high in subgroups of people not usually highly susceptible, i.e., young healthy adults
1 – Disease severity and transmission is unusually high in subgroups of people at increased risk, i.e., elderly, infants, immunosuppressed
0 – Normal disease severity and transmission

DOT-14. Disease occurs in area of high international traffic

Control measures are difficult to put in place across international borders without adverse economic and political consequences, so risk of widespread international transmission greatly increased.

2 – Disease transmission occurs in high traffic areas where detection and control is difficult, i.e., international airport or crowded border crossing
1 – Transmission occurs in high traffic area but surveillance systems are in place to identify and control potential cases
0 – No disease outbreaks in areas of high international traffic

DOT-15. Disease occurs in area of poor sanitation or where water- and food-borne diseases are common

Early detection and response is difficult when the background disease burden is high since new cases of a febrile disease may not become apparent until there has been person-to-person transmission.

2 – Transmission occurs in areas of high population density (>5,000 persons/km2) with poor public health infrastructure, high background disease burden
1 –Transmission occurs in areas (<5000 persons/km2) with poor public health infrastructure, high background disease burden
0 – No disease exists in areas with high background disease burdens

DOT-16. Increased mobility of high-risk groups exists

High-risk agricultural and healthcare workers may be the principle sources of spread of a highly infectious disease.

2 – High risk groups come into contact with many other people in the course of their usual activities (i.e., healthcare workers who live in an urban area; agricultural workers who travel to markets)
0 – No particular increased exposure risk of high-risk groups

DOT-17. Disease cases develop among healthcare personnel

Excessive sickness and death among healthcare delivery personnel could rapidly degrade healthcare system.

2 – Disease occurs in healthcare personnel despite usual infection control measures
1 – Rare disease cases occur in healthcare personnel
0 – No disease cases occur in healthcare personnel

DOT-18. Initial disease case (Index case) has high-risk travel or exposure history

Increases risk of rapid international spread of pathogens that are not usually anticipated by healthcare personnel and so are more likely to be misdiagnosed.

2 – Index case recently traveled to region with exposure risk
1 – Index case in close proximity to potentially infectious cases, i.e., international traveler or highly mobile population
0 – No unusual travel or exposure

Total Disease Specific Outbreak and Transmission Factor Score: Range 0–36