

# New study outlines tool that can assess the chance a disease outbreak is of unnatural origins

March 26 2020

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Did coronavirus mutate from a virus already prevalent in humans or animals or did it originate in a laboratory? As scientists grapple with understanding the source of this rapidly spreading virus, the Grunow-Finke assessment tool (GFT) may assist them with determining whether the coronavirus outbreak is of natural or unnatural origins.

Unless the question of origin is asked, unnatural outbreaks cannot be identified. Public health training, practice and culture defaults to the assumption that every [outbreak](#) is natural in origin and does not routinely include [risk assessments](#) for unnatural origins.

A study, "Application of a risk analysis tool to Middle East respiratory syndrome (MERS-CoV) outbreak in Saudi Arabia," recently published in *Risk Analysis*, developed a modified GFT (mGFT) to improve the sensitivity of the tool, which has been validated against previous outbreaks.

The mGFT contains 11 criteria for determining if an outbreak is of unnatural [origin](#). The criteria are as follows:

1. Existence of a biological risk: The presence of a political or terrorist environment from which a biological attack could originate.
2. Unusual strain: In unnatural outbreaks, the strains may be atypical, rare, antiquated, new emerging, with mutations or different origins, genetically edited created by synthetic biotechnology. It may demonstrate increased virulence, unusual environmental sustainability, resistance to prophylactic and therapeutic measures, or difficulty in detection and identification.
3. Special aspects of the biological agent: It cannot be ruled out that a biological agent has been genetically manipulated.
4. Peculiarities of the geographic distribution of disease: It is unusual from an epidemiological perspective, if the disease, is identified in a region concerned for the first time ever or again after a long period of time.
5. High concentration of the biological agent in the environment: If a

biological agent is released artificially, we can expect to find it in unusually high concentrations in the air, soil and drinking or surface water over a large area.

6. Peculiarities of the intensity and dynamics of the [epidemic](#):

Characterized by the percentage of cases of a disease per unit of time or the total number of cases.

7. Peculiarities of the transmission mode of the biological agent: In general, natural epidemics will feature paths of transmission which are typical for the pathogen and its natural hosts, deviations from the natural paths of infection could indicate that biological agents have been deliberately disseminated.

8. Peculiarities of the time of the epidemic: Epidemics of certain infectious diseases occur in increased numbers during certain seasons, either because they are dependent on the weather, or they occur after certain intervals in time.

9. Unusually rapid spread of the epidemic: The speed at which some epidemic spreads is determined by the virulence, resistance and concentration of the pathogen, the contagiousness of the disease and the intensity of the transmission process, on the one hand, and on the susceptibility and disposition of the exposed population, on the other.

10. Limitation of the epidemic to a specific population: Biological attacks can be directed against large heterogeneous population groups and military contingents or against selected target groups.

11. Special insights: Any suspicious circumstances identified prior to the outbreak, during the period of outbreak or post-outbreak, which would point to an unnatural outbreak.

If the tool reveals a score of less than 30 points, out of 60 possible points, then the outbreak is of natural cause. Each criterion is given a value between 0-3, based on available data. The value is then multiplied by a set weighting factor between 1-3 points. The sum of points is divided by the maximum number of points, for a probability which indicate the likelihood of bioterrorism. This tool can be applied to the [coronavirus outbreak](#) to flag unusual patterns.

**More information:** Xin Chen et al, Application of a Risk Analysis Tool to Middle East Respiratory Syndrome Coronavirus (MERS-CoV) Outbreak in Saudi Arabia, *Risk Analysis* (2020). [DOI: 10.1111/risa.13472](#)

Provided by Society for Risk Analysis

Citation: New study outlines tool that can assess the chance a disease outbreak is of unnatural origins (2020, March 26) retrieved 20 March 2023 from <https://medicalxpress.com/news/2020-03-outlines-tool-chance-disease-outbreak.html>

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