



# Defining emerging chemical & microbial contaminants: in search for common ground

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**Conclusions**

- Both the scientific literature & expert panels can be used to define emerging contaminants.
- However, consensus among experts regarding most important definition criteria is limited.
- Common definition for emerging chemical and microbial contaminants can be defined, but is more general.

**Future aims**

- To develop an early identification methodology for emerging contaminants to drinking water quality using the definition criteria found in this study

This study was performed as part of the project PS-DRINK. For more information, visit our project webpage! ([http://www.rivm.nl/Onderwerpen/D/Drink\\_en\\_zwemwater/Projecten/Risicos\\_voor\\_drinkwater\\_PSDRINK](http://www.rivm.nl/Onderwerpen/D/Drink_en_zwemwater/Projecten/Risicos_voor_drinkwater_PSDRINK)) (In Dutch)



**Introduction**

- Emerging contaminants pose a potential threat to public health through e.g. the consumption of drinking water.
- Early and integral identification of emerging chemical and microbial contaminants is needed to protect human health.
- However, many different definitions are used for emerging chemical and microbial contaminants.

**Objectives**

- To evaluate definitions used for emerging chemical and microbial contaminants in the scientific literature.
- To determine which criteria are most important for the definition.
- To define one definition that is applicable to both emerging chemical and microbial contaminants.

**Methods**

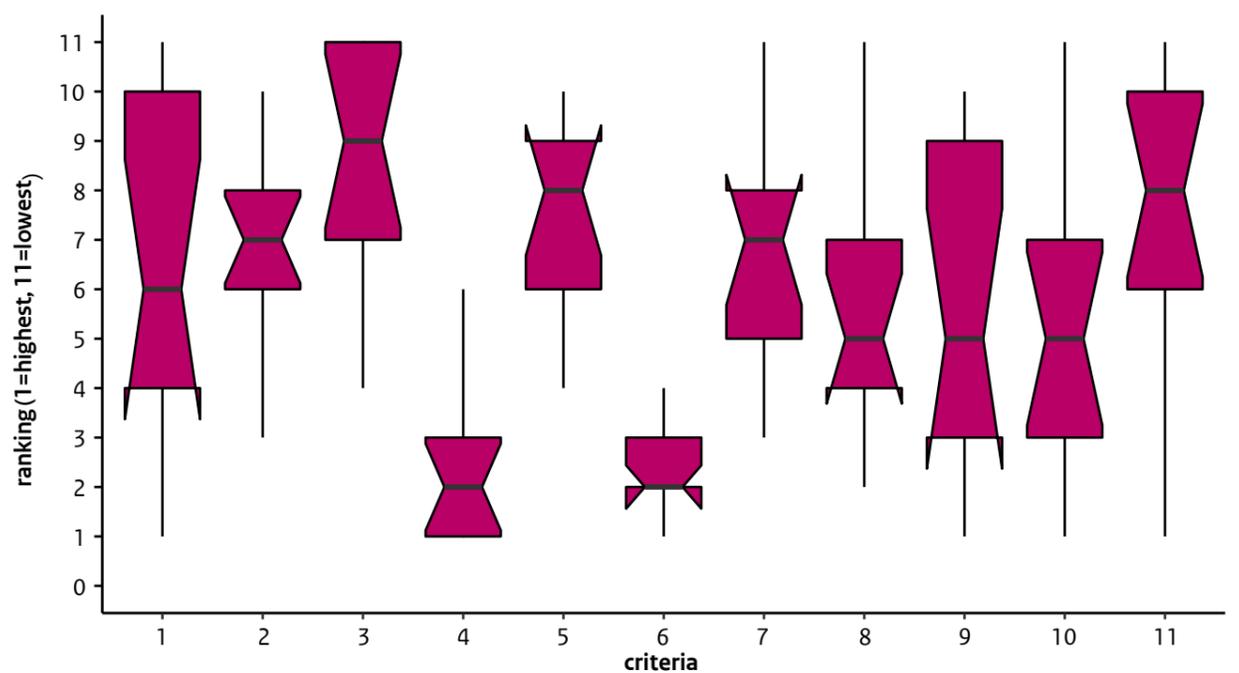
1. A literature review for the definitions used for emerging contaminants (and synonyms) as well as emerging pathogens.
2. Experts in the field of microbiology, chemistry or both were asked to rank criteria based on their importance.

**Literature review**

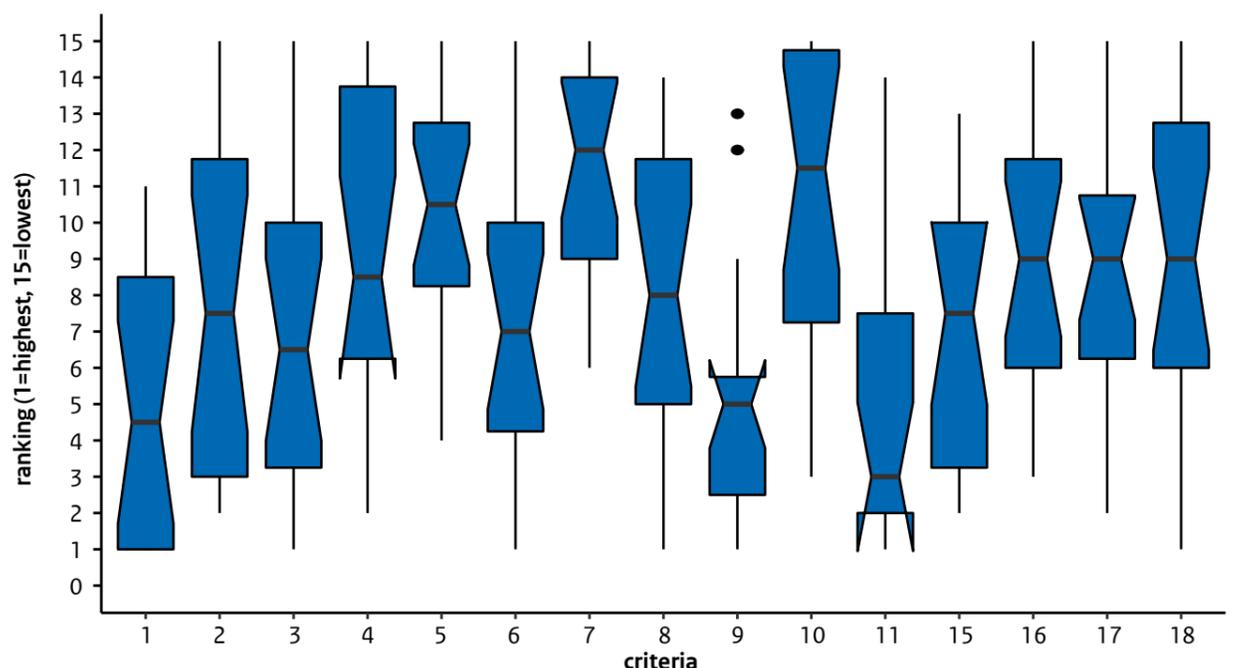
- Definition criteria that are mentioned by > 30% of the articles are considered to be important.
- Most important definition criteria for **emerging pathogens** are an **increased incidence** (criterion 1,2 and 3), an **expanded geographical range** (criterion 4) as well as an **expanded host range** (criterion 5).
- Most important definition criteria for **emerging chemical contaminants** are **being a potential risk to public health** (criterion 2), **being unregulated** (criteria 6, 9 & 11), and **being detected in the environment** (criteria 4 & 9).

**Expert panel**

- Experts rank 'unregulated' and 'being detected in the environment' as most important definition criteria for emerging chemical contaminants.
- There was no consensus found among experts regarding most important definition criteria for emerging pathogens.



**Figure 1.** Notched boxplot of ranking by experts (n=13) of 11 definition criteria found in the literature for emerging chemical contaminants. The notches show the confidence interval around the median. Some of the notches (criteria 1, 5, 6,7, 8, 9) are bigger than the interquartile range of the boxplots. Since the notches of the boxplots relating to criteria 4 and 6 do not overlap with any of the other notches, there is strong evidence (> 95%) that these are considered the most important definition criteria.



**Figure 2.** Notched boxplot of ranking by experts (n=18) of 15 definition criteria found in the literature for emerging pathogens. The notches show the confidence interval around the median. Some of the notches (criteria 4, 9, 11) are bigger than the interquartile range of the boxplots. Furthermore, the filled circles indicate outliers. None of the criteria have been significantly ranked highest.