Evidence from pharmacology and pathophysiology suggests that chemicals with dissimilar mechanisms of action could be of bigger concern in the toxicological risk assessment of chemical mixtures than chemicals with a similar mechanism of action.

Mathematical models have been developed for the toxicological risk assessment of chemical mixtures. However, exposure data as well as single chemical toxicological data are required for these models. When addressing this data need, it could be attractive to focus on chemicals with similar mechanisms of action, similar modes of action or with common target organs. In the European Union, efforts are currently being made to subgroup chemicals according to this need. However, it remains to be determined whether this is the best strategy to obtain data for risk assessment. In conditions such as cancer or HIV, it is generally recognised that pharmacological combination therapy targeting different mechanisms of action is more effective than a strategy where only one mechanism is targeted. Moreover, in diseases such as acute myocardial infarction and congestive heart failure, several organ systems concomitantly contribute to the pathophysiology, suggesting that a grouping based on common target organs may also be inefficient. A better option may be to prioritise chemicals on the basis of potency and risk of exposure. In conclusion, there are arguments to suggest that we should concomitantly consider all targets that a chemical can affect in the human body and not merely a subset.