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Towards quality criteria for regional public health reporting: concept mapping with Dutch experts

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Background: In the Netherlands, municipal health assessments are carried out by 28 Regional Health Services, serving 418 municipalities. In the absence of guidelines, regional public health reports were developed in two pilot regions on the basis of the model and experience of national health reporting. Though they were well received and positively evaluated, it was not clear which specific characteristics determined 'good public health reporting'. Therefore, this study was set up to develop a theoretical framework for the quality of regional public health reporting in The Netherlands. **Methods:** Using concept mapping as a standardized tool for conceptualization, 35 relevant reporting experts formulated short statements in two different brainstorming sessions, describing specific quality criteria of regional public health reports. After the removal of duplicates, the list was supplemented with international criteria, and the statements were sent to each participant for rating and sorting. The results were processed statistically and represented graphically. The output was discussed and interpreted, leading to the final concept map. **Results:** The final concept map consisted of 97 criteria, grouped into 13 clusters, and plotted in two dimensions: a 'product' dimension, ranging from 'production' to 'content', and a 'context' dimension, ranging from 'science' to 'policy'. The three most important clusters were: (i) 'solution orientation', (ii) 'policy relevance' and (iii) 'policy impact'. **Conclusion:** This study provided a theoretical framework for the quality of regional public health reporting, indicating relevant domains and criteria. Further work should translate domains and criteria into operational indicators for evaluating regional public health reports.

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Introduction

As in the European Union, regions and local authorities in The Netherlands are becoming an increasingly important and administrative level in public health policymaking. Since 2003, the Dutch Public Health (Preventive Measures) Act (WPG) has obliged local authorities to assess municipal public health on the basis of epidemiological analysis, once every 4 years.[1,2] These assessments are carried out by 28 Regional Health Services (RHSs), serving 418 municipalities and dedicated to the monitoring, protection, and promotion of public health.[3]

Differences in these assessments between RHSs, for example, in the selection of topics reported, methodological issues and reporting format, make it difficult to compare the public health status of a particular municipality with the national public health status or that of other municipalities. Moreover, the RHSs face the problem of making their epidemiological knowledge more useful for both regional and local

public health policy (van Bon-Martens MJH, submitted for publication). From this perspective, two main issues arise. First, little is known about the extent to which epidemiological information is used in local and regional health policymaking, and which factors, such as the characteristics of public health reports, may influence the actual use of such information.[4] Second, there is a lack of a systematic overview of the different RHSs' public health reports and the way in which they are produced, so that a comparison on relevant characteristics cannot be made.

In the absence of scientific guidance on how to make RHS public health reporting more useful for local public health policymaking, regional public health reports for the local authorities were developed in two pilot RHS regions. These were based on the model and on experience of the 4-yearly national Public Health Status and Forecasts reports (PHSFs) of the Dutch National Institute for Public Health and the Environment (RIVM).[5–12] These PHSFs have been successful in contributing to evidence-based public health policymaking in The Netherlands. They provide a practical elaboration of relevant theoretical perspectives for evidence-based policymaking and are acknowledged as one of the best practice-based models in Europe for national public health reporting (van Bon-Martens MJH, submitted for publication).[8,13]

This pilot study concluded that the empirical model for a regional PHSF could be characterized by: (i) its products, (ii) its content and design and (iii) its underlying process and organization (van Bon-Martens MJH, submitted for publication). Furthermore, the regional PHSFs had become well known and widely used.[14] However, the question arose of what specific characteristics of this empirical regional PHSF are factors in 'good public health reporting', so that they could be identified as quality criteria.

The issue of quality criteria for public health reports that have an impact on public health policy is also of interest internationally.[15–21] Both in Europe and in the USA, criteria have been developed for quality of public health reporting, mainly based on expert opinion and discussion.[13,20]

These international criteria, together with the characteristics of the empirical regional PHSF model referred to earlier, could be regarded as a practice base for the quality assessment of regional public health reporting in The Netherlands. However, a theoretical framework to serve as a sound basis for a quality assessment instrument was still lacking. Therefore, this study was set up to develop a theoretical framework for the quality of regional public health reporting in The Netherlands, using the method of concept mapping.[22]

Methods

Concept mapping

Concept mapping is a standardized tool for developing a conceptual framework of a complex topic, for use as a guide to evaluation or planning. In concept mapping, thoughts and ideas are represented in the form of a picture or map, the content of which is entirely determined by a group of experts.[22] It combines an inductive group process with several multivariate deductive statistical analyses, and concludes with a group interpretation of the conceptual map that finally results.[23] Such a final concept map shows 'a pictorial representation of the group's thinking which displays all of the ideas of the group relative to the topic at hand, shows how these ideas are related to each other and, optionally, shows which ideas are more relevant, important or appropriate'.[22] Concept mapping has been used in a variety of subjects; for example, education, children and youth, health promotion, (mental) health and care and the arts, as well as for a variety of purposes; for example, planning, evaluation, survey design, theory building, translating research into practice, curriculum development and (quality) management.[24–32] In this study, the method described by Trochim was used, involving six steps: preparation, generation of statements, structuring of statements, representation of statements in the form of a concept map, interpretation and utilization.[22]

Participants

Conceptualization works best when the process involves a variety of people in some way engaged in and/or responsible for the topic at hand. Broad and heterogeneous participation helps to ensure that a wide variety of viewpoints are considered and encourages a broader range of people to adopt the resulting conceptual framework. However, it is not necessary that all participants take part in every step of the process. Although there is no strict limit to the number of people who can be involved in concept mapping, between ten and twenty people seems to be a workable number.[22]

For the development of a theoretical framework for quality criteria for regional public health reporting, the following relevant groups were identified: the 'producers' (staff of the RHSs: epidemiologists, policy advisors and management), the 'intended users' (municipal officials) and 'national stakeholders' (such as the Ministry and the Inspectorate). In order to obtain heterogeneity of experiences and opinions, an effort was made to include producers and intended users from different regions in The Netherlands. Purposive sampling was used, leading to a list of 63 participants, of whom 35 (55.6%) eventually took part at some stage of the study (table 1). Reasons for non-participation were mainly of a practical nature, such as diary problems or illness.

Generation of statements

Statements were generated in two brainstorming sessions with different participants. For the second session alone, participants received information beforehand on the evaluation of the empirical model for a regional PHSF and on the practice-based criteria found in the international literature.[13,20] The aim and background of the sessions, the usual rules for brainstorming, and the focus of the concept mapping process were introduced similarly in both sessions. The following working definition of a regional public health report was presented: 'A report aimed at creating knowledge and awareness of important regional public health problems and their determinants, among policymakers and others involved in organizations that can influence the health of the population'. This is a slight modification of the definition by Rosén.[33] In particular, the phrase 'a comprehensive system of different products and measures' was replaced by 'a report', to avoid steering the participants too much towards possible specific characteristics. The participants were then asked to formulate short statements or sentences that described a specific characteristic of a 'good' regional public health report that supports evidence-based local public health policy. During the sessions, statements were numbered uniquely, entered into a computer and displayed on a large screen as they were generated, so that all the participants could see the set of statements as they evolved. Moreover, audio recordings of the sessions were made to enable confirmation of the statements and editing. At the end of the sessions, the further steps in the concept mapping process were explained to the participants, who were instructed on the structuring task for which they would be approached individually.

Table 1 Participants in the concept mapping process

	Invited	Response		
		Brainstorming *and* structuring	Brainstorming *or* structuring	Total
	n	*n*	*n*	*n (%)*
Producers (RHSs)				
Epidemiologists	17	8	3	11 (64.7)
Policy advisors	7	3	1	4 (57.1)
Management	10	2	3	5 (50.0)
Intended users	10	5	0	5 (50.0)
National stakeholders	19	9	1	10 (52.6)
Total	63	27	8	35 (55.6)

In the first session, 18 participants produced a list of 61 statements, and in the second session 16 participants listed 51 statements. We removed 25 more or less duplicate statements, and supplemented the list with 10 criteria from international literature that were missing from the experts' list, but, in our judgement, were relevant for a 'good' regional public health report in The Netherlands.[13,20] The 97 statements in the resulting final list were then numbered randomly from 1 to 97.

Structuring of statements

Each of the 97 statements with its unique number was printed on a separate index card, and the complete set of cards was sent to each participant for individual structuring. This structuring involved two distinct tasks: rating and sorting.[22]

For the rating task, each participant was asked to rate each statement on a 5-point Likert-type response scale by dividing the index cards into five equal piles of increasing importance for a good regional public health report.

For the sorting task, each participant was asked to group the index cards with the statements into piles based on their meaning or their content 'in a way that makes sense to you'. It was stressed that each participant could choose his or her own criterion for this division, which should be done as an associative process without too much thinking.

Analyses

The individual rating and sorting data of 29 participants was entered into the computer using the Ariadne software for concept mapping.[34] Ariadne computed a binary symmetric similarity matrix per respondent (the similarity between any two statements in the same pile being set at 1). The programme then made an aggregated (group) matrix by counting the individual matrices. A high value in this matrix indicates that many of the participants put that pair of statements together in a pile and implies that the statements are conceptually similar in some way.[22] This aggregated similarity matrix was then used as the input for a (non-metric) principal component analysis (PCA), a technique for translating the distances (or in this case the correlations) between statements into coordinates in a multidimensional space. The first two dimensions of the PCA solution for each statement were plotted in a point map.

Ariadne further classified the statements by completing a cluster analysis with the coordinates of the statements, grouping statements that were similar in some sense into clusters. A working group of five participants chose the final number of clusters, by examining which statements were grouped together each time the cluster solution in Ariadne was moved from one to the next lower (e.g. from 18 to 17

clusters), deciding whether that grouping still made sense for the statements in the conceptualization. This was done using a cluster tree as suggested by Trochim.[22] Based on the examination of this cluster tree, the working group chose the 13-cluster solution as the lowest in which all clusters still made sense conceptually, and they formulated the labels that would best cover the content of the final clusters.

Subsequently, the researchers refined the cluster labels, labelled the axes showing opposing issues and identified and labelled 'regions' of clusters. The average rating for each statement and for each cluster was calculated using the information from the rating task. The results of these calculations were represented in the concept map as differences in height. The width of the line defining the 'cluster box' indicated the relative importance that participants attached to each cluster.[34]

Results

All 97 statements and their mean rankings are presented in Supplementary table S1, grouped by the 13 clusters determined in the course of the analysis. The mean rankings varied from 1.62 to 4.79. The three most important statements were: (i) 'Gives administrators guidance for setting priorities in the field of public health', (ii) 'Gives insight into the present state of health in the municipality' and (iii) 'Contains knowledge that is useful for policymaking' (see figure 1 for the top ten of statements). These three statements originated in three different clusters.

Figure 2 shows the final 13 clusters with their mean rankings, varying from 2.17 to 3.81. The three most important clusters were: (i) 'solution orientation', (ii) 'policy relevance' and (iii) 'policy impact'. The same top three were identified by each category of participants, although the sequence differed. The least important clusters were 'marketing', 'undefined' and 'broad utility' (figure 2). Except for 'broad utility', these bottom three differed between the categories of participants. Other clusters that were included were 'interaction' (RHS epidemiologists), 'scientific foundation' (municipal officials and RHS managers) and 'reliability' (municipal officials).

The cluster map, presented in figure 3, shows the relations between the clusters in a two-dimensional plot, based on the first two dimensions of the PCA solution for each statement. Based on the clusters' labels and their positions on the map, we labelled the horizontal dimension as 'product', ranging from 'production' to 'content' and the vertical dimension as 'context', ranging from 'science' to 'policy'. The 'product' and 'context' dimensions together accounted for 51% of the total variance.

Subsequently, we labelled three regions: 'process' (the clusters 'scientific foundation', 'reliability', 'broad utility', 'interaction' and 'position policy cycle', mainly situated on the 'production' side),
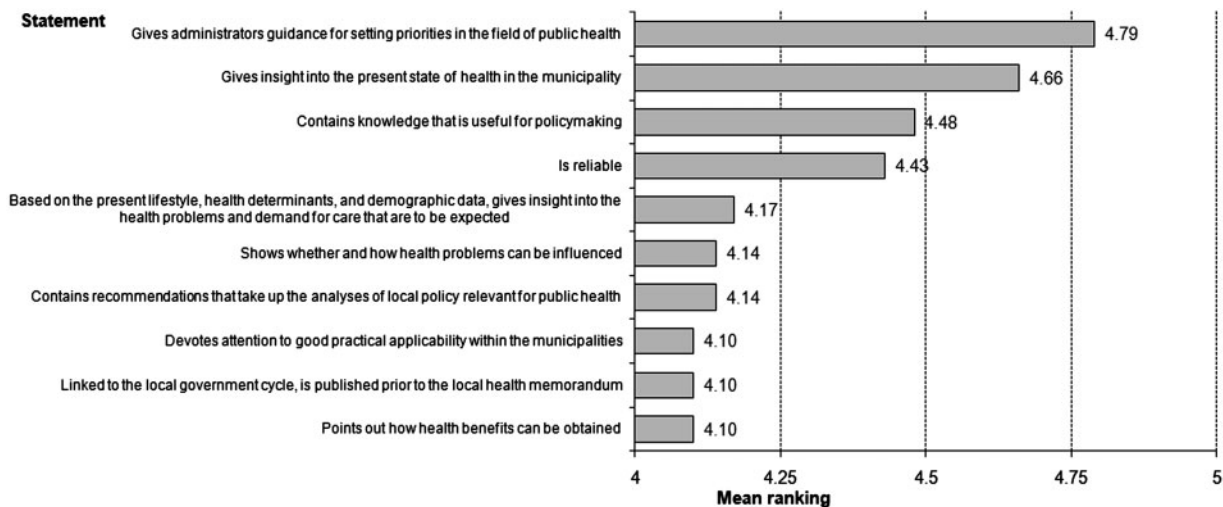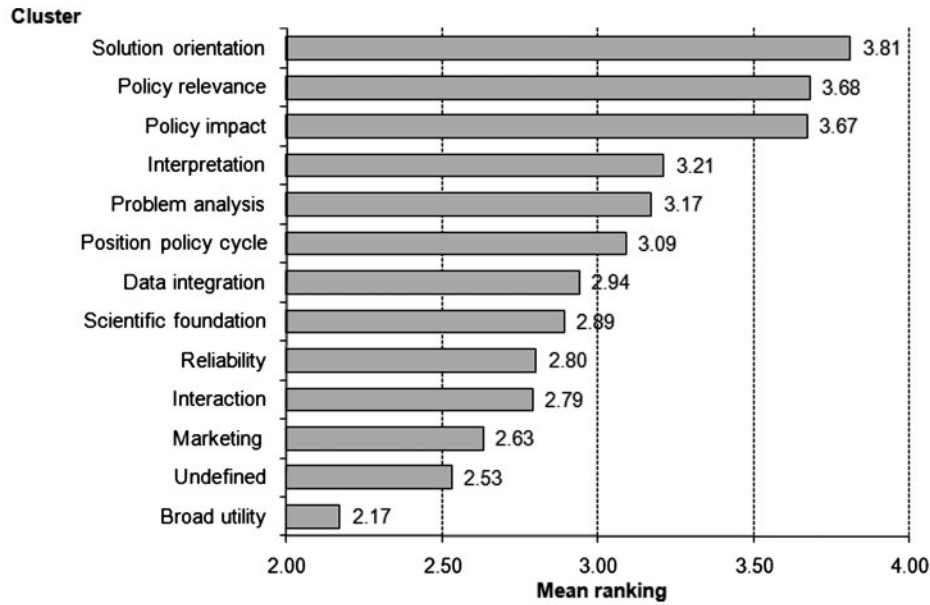

Figure 1 Top 10 statements and their mean ranking
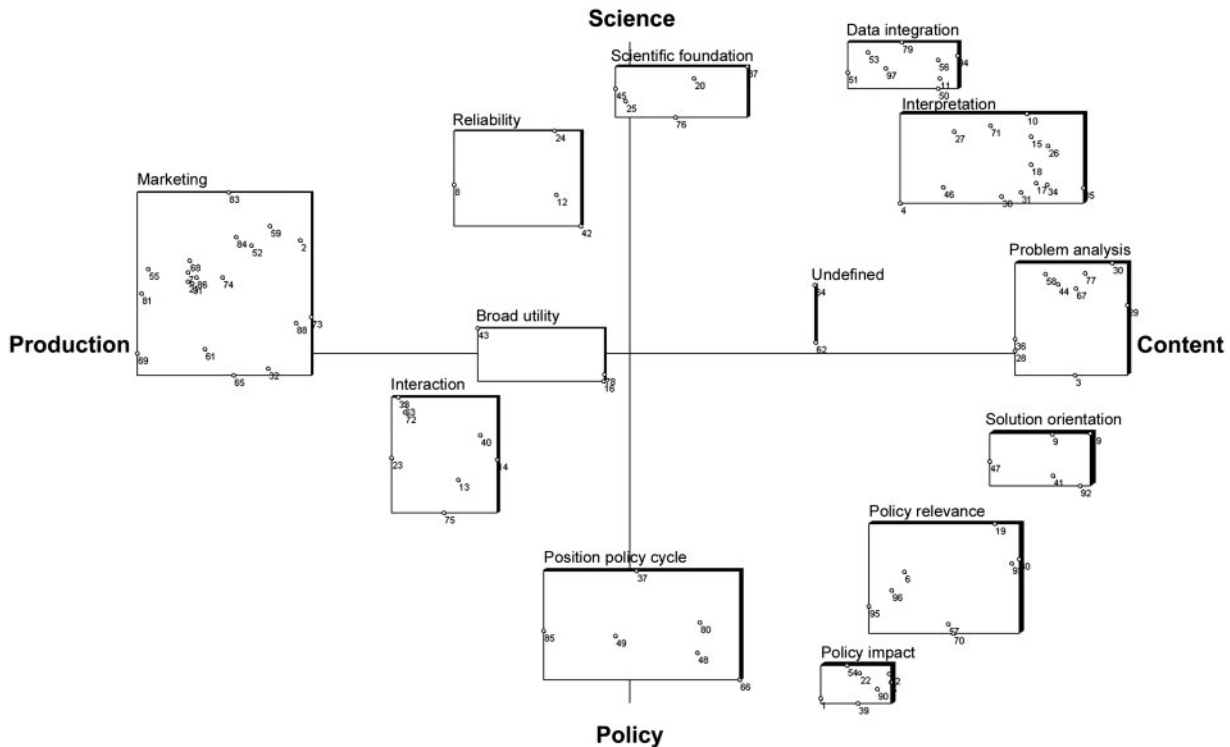
Figure 2 Clusters and their mean ranking

Figure 3 Final concept map showing the 97 brainstormed statements, grouped into 13 clusters

'giving significance' (the clusters 'data integration', 'interpretation', 'problem analysis' and 'undefined', situated in the 'science-content' quadrant) and 'having significance' (the clusters 'solution orientation', 'policy relevance' and 'policy impact', situated in the 'policy-content' quadrant).

On the 'product' dimension, the number of statements was highest on the 'content' side ($n = 59$), while on the 'context' dimension this number was highest on the 'science' side ($n = 57$). A third of the statements were situated in the 'science-content' quadrant ($n = 34$).

In general, the clusters on the 'content' side of the plot were ranked higher than the clusters on the 'production' side, since the highest ranked

clusters were found to be mainly situated in the 'policy-content' quadrant ('having significance').

Discussion

Methodological considerations

The validity of the theoretical framework depends mainly on the completeness of the relevant criteria. Through purposive sampling, we ensured a wide variety of viewpoints. Reasons for non-participation were mainly of a practical nature, decreasing the probability of selective

non-response. To inspire participants of the second brainstorming session to come up with new statements, they received information on practice-based criteria beforehand. Nevertheless, 25 of the 51 statements in this session had already been mentioned in the first session, which implies saturation of statements made by the participants. Finally, after both brainstorming sessions, we added 10 international criteria, missing but judged to be relevant. In our opinion, these considerations led to the generation of a fairly complete set of statements.

Another aspect of the validity of the theoretical framework is the division into 13 clusters, based on the sorting task of the participants. Unfortunately, six participants in the brainstorming sessions (18.2%) did not perform this sorting task. Non-participation was highest among the RHS managers, so the division into clusters should be interpreted with some caution.

This also holds true for the ranking: non-participation for this task was also highest among the RHS managers. However, the top three clusters were quite similar between the different categories of participants, suggesting a high level of agreement between participants on the most important clusters.

The concept map was constructed as a theoretical framework for assessing the quality of regional public health reporting in The Netherlands. The question arises as to whether the theoretical framework can be generalized for other countries and/or for national public health reporting. Most criteria seem to be also applicable in other settings, though some are very specific, for example, the criterion 'also contains analyses for the Social Support Act'. Hence, a new concept map should be constructed for international purposes, with heterogeneous international participation.

Other studies

In comparison with the empirical regional PHSF model as mentioned in the introduction, the concept map covers all three major characteristics (products, content and design, and process and organization) and includes even more domains (and criteria), such as 'scientific foundation' and 'policy impact' (van Bon-Martens MJH, submitted for publication). Moreover, the concept map serves as a theoretical framework for assessing the quality of regional public health reporting, whereas the empirical PHSF model serves more as an example of the practical elaboration of many, but not all, criteria. Indeed, building on this empirical model, a toolkit to support other RHSs in public health reporting has already been developed and implemented.[35–37]

All relevant international practice-based criteria of the EVA-PHR project and the RAND Corporation are represented in the concept map, since 10 missing criteria were added before the structuring task. Conversely, not all of the concept map's criteria are covered by the international criteria, in particular, none in the cluster 'position policy cycle'. The EVA-PHR criteria mainly cover the 'science-content' quadrant of the concept map, while the RAND criteria mainly cover the 'science' context, for both 'production' and 'content'.[13,20]

The identification of the cluster 'interaction' fits well into the theoretical perspective of research utilization, where interaction is seen as an important condition for implementing research findings into policy.[4,38–40] In this perspective, it is worrying that 'interaction' was ranked rather low, especially by the RHS epidemiologists. Likewise, only two of the international criteria, both EVA-PHR criteria, relate to this 'interaction' cluster.

In our study, the number of statements and the mean cluster ranking showed that the 'content' side of the 'product' dimension generally received more attention than the 'production' side. However, this Dutch concept map is already showing that more attention was given to 'production', especially 'interaction', than in the case of the international criteria. This may be due to the success of the empirical regional PHSF model, which is acknowledged nationally as a standard for regional public health reporting.[41–43]

Utilization

The domains and criteria in the concept map can already be used by the producers of regional public health reports as a checklist for improving the quality of their reports. For greater effectiveness, 'interaction' should be given a more prominent role in this. For 'interaction' purposes, the empirical regional PHSF model provides a tool for the design of the research process (van Bon-Martens MJH, submitted for publication). Consequently, the local authorities would benefit from more usable and better tailored regional public health reports, ultimately leading to greater policy impact.

We intend to undertake the sixth and final step of the concept mapping procedure in a follow-up study to translate the criteria into measurable indicators, by having Dutch experts formulate standards with corresponding questions. For example, the criterion 'devotes attention to good practical applicability within the municipalities' could be made measurable by asking the RHSs to score the question 'How well were the recommendations for local authorities formulated in the report?', using a 5-point Likert-type response scale, expressed in terms of five practices ranging from worst to best practice. The resulting instrument could then be used to assess the quality of regional public health reporting (relevant for producers and users), to make comparisons in the quality of public health reporting between RHSs (relevant for the Inspectorate and the Ministry), and to relate the quality indicators to the actual use of the regional health reports in making local public health policy—the ultimate 'proof of the pudding' of the usefulness of the developed theoretical framework and its quality criteria.

Supplementary Data

Supplementary data are available at *EURPUB* online.

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Key points

- Using concept mapping with Dutch experts, a theoretical framework was developed for assessing and improving the quality of regional public health reporting in The Netherlands.
- The final concept map consisted of 97 criteria, grouped into 13 clusters, and plotted in two dimensions: 'product', ranging from 'production' to 'content' and 'context', ranging from 'science' to 'policy'.
- The clusters and criteria in the concept map can be used by the producers of regional public health reports as a checklist for improving the quality of their reports, for greater policy impact and for the benefit of evidence-based local public health policy.
- Further work should translate domains and criteria into measurable indicators for evaluating regional public health reports.

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