The SIGMA framework – a new data collection approach on animal population and animal disease. And possibly more?

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INTRODUCTION

The EC frequently asks EFSA for scientific advice to support their decision-making process to face existing (e.g. African Swine Fever and Avian Influenza) and emerging animal health threats. Climate change and market globalisation are making the epidemiological scenarios increasingly complex. In this context, an effective and proactive data collection process plays a key role. EFSA critically assessed the data collection process in place and identified the steps that could be improved. The SIGMA project aims to (i) increase data quality; (ii) reduce the workload of data providers; (iii) shorten the timeframe in providing higher quality scientific advice. The SIGMA approach is based on four intrinsically linked pillars: a) the Country Cards, the first European Compendium on livestock and animal testing data ownership; b) the SIGMA Data Model on livestock and animal disease data; c) the SIGMA EST Tool, a web application to map and transform the national data into data compatible with EFSA standards 4) the SIGMA reporting tools to access, visualise, analyse and validate the submitted data.

METHODOLOGY

The SIGMA project was driven by key questions originating from the analysis of the risk assessment process: (i) which are the most frequently received requests for scientific advice? (ii) which (statistical) methodologies can address these requests and which data are needed? (iii) who owns these data? (iv) how to increase the level of standardisation? (v) how to reduce the workload of the data providers and reward them? Requests for advice from 2014 were considered and the terms of reference were turned into epidemiological parameters to be estimated. The data needs were formalised in a single relational data model which includes a section on livestock and a section on laboratory data. The data owners were identified, and the national data management framework presented in a web infographic publicly available. The creation of a web application to automatically transform the national data into a set of EFSA standard data was outsourced. Last, a validation dashboard, accessible by the data providers, was realised with the double goal of facilitating

the validation of the submitted data and offer the data providers a set of downloadable maps, tables and plots for national purposes.

RESULTS

The SIGMA project produced four main outcomes. The SIGMA Country Cards – the first European Compendium on livestock and animal testing data ownership. The information on the hierarchical structure of the national bodies involved in the data management are reported in an online and public infographic. The SIGMA Data Model – a unique, flexible, and interoperable set of variables and related controlled terminology for the collection of livestock data of all animal species and laboratory data on any pathogen. The SIGMA EST tool – a web application, that each data provider can configure based on the structure of the relevant national data, to transform the raw national data into a set of EFSA standard data, ready to be submitted. The SIGMA reporting tool – an interactive interface made available to the data provider to analyse, visualise, and validate the submitted data. The implementation of the SIGMA approach was tested with the data on African Swine Fever and related target population. Countries submitted, for the first time, pig population data at farm level and all results from ASF animal testing, including tests performed on domestic animals.

DISCUSSION

SIGMA represents an attempt to rethink and improve data collection across the EU and beyond. The SIGMA framework offers multiple benefits. The SIGMA Data Model allows for collection of data on all domestic animal species and all diseases. The level of detail of the SIGMA data (no aggregation) makes them suitable for different risk assessment purposes, avoiding double reporting. The SIGMA Country Cards provide information on the livestock and animal testing data ownership and management in each country, available for consultation to the public, researchers and risk managers. The SIGMA EST tool requires an initial effort for its configuration. Once configured, the tool transforms a national set of data into EFSA standard data, reducing the likelihood of interpretation errors and improving harmonisation across countries and reporting year. The SIGMA reporting tool enable the data providers to analyse, visualise and validate the submitted data. The reports are downloadable and can be used for national purposes. The SIGMA approach has successfully been applied to the collection of ASF data and its extension to other data domains should be considered.