Subject:

An open source statistical engine for the automatic production of standardized diabetes indicators within and across regions: results of the BIRO project.

Abstract:

Aim. The EU DG-SANCO co-funded BIRO project aims at building a shared information system through the application of two consecutive data processing steps, locally and centrally. A participating region maintains a Postgres database of resident data exported with common criteria. A statistical engine is required to deliver a standardized report for each region, including all diabetes indicators agreed by a literature review, and to derive aggregate tables that are sent to a central server to produce a global report based upon the same structure.

Methods R software has been adopted as a development platform for the statistical engine, connected to the database through drivers publicly available. The concept of "statistical object" has been introduced to create aggregate tables from local data that can be sent over the network as encrypted comma delimited files. A taxonomy has been specified to provide details of all objects implemented. Graphical R functions and Latex have been used to produce individual centre and overall reports in .html and .pdf format, at agreed intervals of 6 months.

Results The statistical engine has been successfully developed and tested on both MS Vista and Fedora Linux. Average hardware allowed completing all steps from a test sample of 17,0000 patients and over 90,000 episodes in about 20 minutes. Installation of the software is identical regardless of hardware, requiring R>1.8, Latex (Miktex), Java 6.0 and PostgreSQL. All software is released under the GPL license.

Conclusion. The statistical engine provides a platform for accurate benchmarking that currently does not exist at the point of health care provision. It may serve multiple users, from the EU/NGOs, to provide updated benchmarking of key indicators on a routine basis, to the local physician, to monitor the status of patients in a modern standardized procedure. The system may improve, through a shared infrastructure, the validity and completeness of information available. Users, once inducted to using the software, can apply it independently and build up indicators of higher quality and comparability, to be exchanged safeguarding privacy at the highest level of protection, as a result of the application of rigorous rules set in BIRO by the privacy impact assessment. The application of the statistical engine in regional and individual clinical units can help evaluating clinical practice more rapidly and efficiently. Adoption of open source technology may spread the adoption of the engine at no cost, making it available in deprived areas and worldwide to organizations e.g. the IDF. At the same time, it would allow refining statistical procedures, improving the capacity of current registers to translate data into action.

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