

# Open Data Portal Based on Collaborative Sharing in Visualizing Health Information

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## Abstract

Data openness is one of the government policy focuses in many countries. In Indonesia, this can be seen in Laws no. 14/2008 on Public Information Openness. On the other hand, open data in Indonesia is still difficult to find, obtain and reprocessed by public. This is shown by the position of Indonesia that considered low in global ranking. Furthermore, health data is very important in research and development of science. In this paper, we present a national open health data portal based on collaborative sharing that expected to improve the potential use of health data by public. This portal focuses on representing and visualizing open health data and considering other aspects, namely data license, data formats, data description and data sensitivity. The main features of this portal are data search, data visualization, data access and data sharing. The methodology of this research consists of several stages: requirement analysis, the collection and categorization of data, portal design, portal implementation, and testing and evaluation. In this case, we collected the sample of health data that are obtained indirectly from some of credible and reliable sources such as Ministry of Health, Republic of Indonesia (pusdatin.kemkes.go.id) and the Indonesia Data Portal (data.go.id). The expected benefit of this study for public is improving accessibility to open data in Indonesia especially health data where people can find, obtain and share accurate health data with ease.

**Keywords:** Collaborative Sharing, Health, Open Data, Portal

## 1. Introduction

As of the development in technology today, the openness of data becomes important issue in many countries. The majority of developing countries have given special attention in the infrastructure of open data. Indonesia as one of the founding countries of OGP (Open Government Partnership) has directed the focus of public policy in the openness of the data. Indonesia has regulated in Laws No. 14/2008 on the openness of public information<sup>1</sup>.

On the contrary, the implementation in Indonesia is still lacking on the providing and utilization of open data.

This can be seen by looking at the position of Indonesia in global rankings by several organizations. Based on Open Data Index 2014 issued by OKFN (Open Knowledge Foundation), Indonesia was ranked 41 with score 40%.<sup>2</sup> Other worldwide ranking issued by ODI (Open Data Institute), Indonesia was in position 40 with below average score<sup>3</sup>.

Based on Open Data Barometer above indicates that Indonesia is ready in open data but there are some aspects in Indonesia that considered low, namely: government datasets and emerging impact. The low score of government dataset in entrepreneurship, business, and social

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policy indicates that there is a lack implementation of open data in government institution. In example, some of ministries provide data in non-machine readable format like pdf. This issue causes the lack of emerging impact in utilization of open data such as social, political, and economic area.



Figure 1. Indonesia in Open Data Barometer 2015 [3]

In health sector, the research and development of science have to be sustainable. It needs large and valid datasets. But, the obstacle in research in the health area is the difficulty of getting the data for reasons of bureaucracy and privacy. The impact is the low number of health researches in Indonesia<sup>4</sup>. This indicates that one of solution in improving the innovation of research is implementing open health data.

In this case study, we developed open health data portal based on collaborative sharing in which each person, institution or organization can contribute in the collection of data. Furthermore, open data can be utilized by everyone in many objectives<sup>5</sup>. The process of validation and verification of data will be carried out by a competent reviewer. In order to encourage legal openness, any data in portal will be licensed with ODbL<sup>6</sup> and Creative Commons<sup>7</sup> to facilitate public in knowing what actions can be performed with the data. We also designed this portal to provide data based on Tim Berners Lee’s 5 Star Model<sup>8</sup> with various format of open data.

Data openness in health area will unleash many potential in science advancement<sup>9</sup>. This openness offers many potential benefits to health organizations, government, and public such as transparency, public participation, research, healthcare, decision making, and innovation<sup>10</sup>. This open health data portal is expected to help Indonesia achieve those benefits where public can find, obtain and share the accurate health data quickly and easily.

## 2. Design

### 2.1 Architecture

The architecture is designed based on requirement analysis from interview with some expert in health sector. This consists of infrastructure layer, management layer, services layer, access layer, and user layer. This architecture can be seen in figure below.

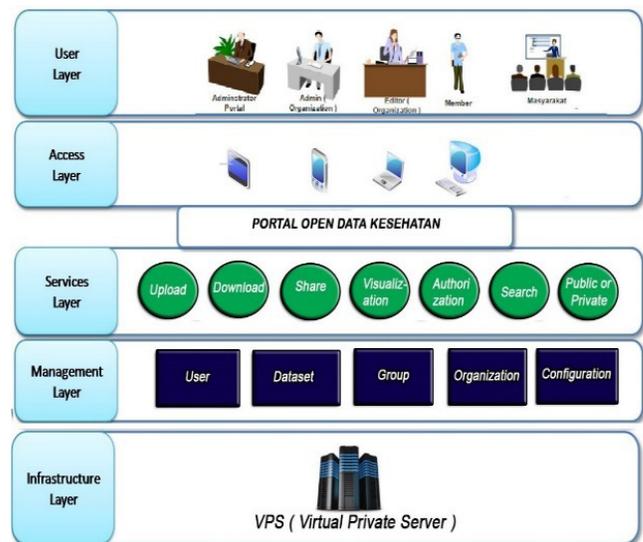


Figure 2. Architecture of Portal Open Health Data.

- User Layer : This layer represents the users involved in the open health data portal. These stakeholders are individuals or organizations that have a role and responsibilities in the utilization of open data portal.
- Access Layer : This layer is intended to increase the accessibility of various services provided in the architecture, so those can be used by a variety of telecommunication devices.
- Service Layer : This layer provides a various of services where user can upload, download, share, visualize, search the data in portal. Furthermore, there are

features to encourage collaborative sharing and ensure the validity of the open data.

- Management Layer : This layer represents a collection of functions that support the management and maintenance of services in open health data portal such as User, Dataset, Group, Organization and Configuration.
- Infrastructure Layer : This fundamental layer represents all elements of the infrastructure that required by the open health data portal. This layer consists of a virtual private server and networks.

### 2.2 Collaborative Sharing

This portal is designed to support collaborative sharing. Collaborative sharing is a concept that allows users from different organization to share their sources or data. In this case, the users are individual or group of people from health institution such as health department, hospital, community health center, etc. The illustration of collaborative sharing in this portal can be seen in this figure below.

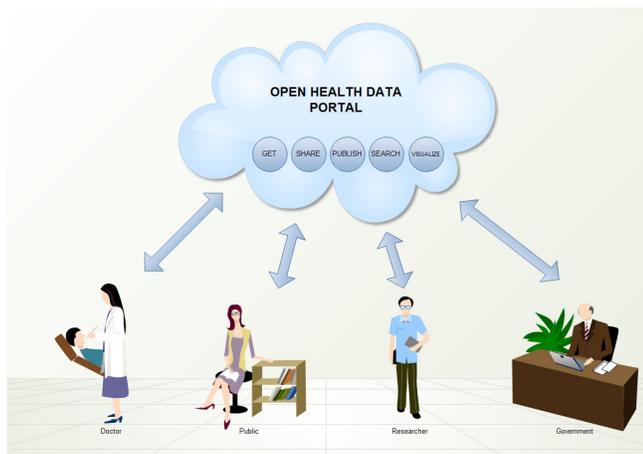


Figure 3. Collaborative Sharing

## 3. Open Health Data Portal

The name of this open health data portal based on collaborative sharing is *healthnesia*. These are some description and explanation from *healthnesia*.

### 3.1 Access

This portal can be accessed in <http://www.healthnesia.com> from various communication devices. The users

can view, download and share the open health data without registration. The registered users are members. Members are under organization and will be verified by Administrators. Members can upload the dataset based on certain topics. Every organization has editor. Editor is user that can add, modify, and delete datasets within the organization. Administrators are responsible in verifying users, maintaining datasets, and creating groups or topics. Administrators have all privilege on this portal.

### 3.2 Datasets

We collected 44 sample datasets from some credible and reliable sources such as Ministry of Health, Republic of Indonesia ([pusdatin.kemkes.go.id](http://pusdatin.kemkes.go.id))<sup>11</sup> and the Data Portal Indonesia ([data.go.id](http://data.go.id))<sup>12</sup>. We chose the data source from government agencies and converted to digital format.

The datasets consists of a csv, .xls and .xlsx format. The data set has been categorized in groups such as health facilities, diseases and general data. In addition, there is a link where the URL is associated with the data set such as articles, journals and others.

### 3.3 Health Data Visualization

We chose the data source from government agencies and converted to digital format. In order to get information, we have to visualize the datasets. From visualization, the datasets will be meaningful and can be used in various objectives. There are three data visualization in this portal:

1. Table: in this visualization, users can see the number of records that exist in the datasets. Users can adjust the number of records that they want to view, search existing data in the table, and filter data by the desired field.

Dataset ini berisi mengenai jumlah kasus ru purung yang tergapai per provinsi

Data Explorer

Grid Graph Map 99 records 1 - 99

kode_p...	nama_p...	tahun	jumlah...	jumlah...	cfr
11	Prov. Na...	2005 - 2...	0	0	0
11	Prov. Na...	2011	0	0	0
11	Prov. Na...	2012	0	0	0
12	Prov. Su...	2005 - 2...	8	7	87.5
12	Prov. Su...	2011	0	0	0
12	Prov. Su...	2012	0	0	0
13	Prov. Su...	2005 - 2...	4	1	25
13	Prov. Su...	2011	0	0	0
13	Prov. Su...	2012	0	0	0
14	Prov. Riau	2005 - 2...	9	7	77.7778
14	Prov. Riau	2011	0	0	100
14	Prov. Riau	2012	1	1	0
15	Prov. Ja...	2005 - 2...	0	0	0
15	Prov. Ja...	2011	0	0	0
15	Prov. Ja...	2012	0	0	0
16	Prov. Su...	2005 - 2...	1	1	100
16	Prov. Su...	2011	0	0	0

Filters

Field

kode\_provinsi

Add

Figure 4. Health Data Visualization : Table

2. Graph: On the graph page, users can see a visualization of data in a graph or chart. These types of chart that can be used are the lines and points, lines, points, bars and columns. The graph shown adjusted to the parameters contained in the data fields

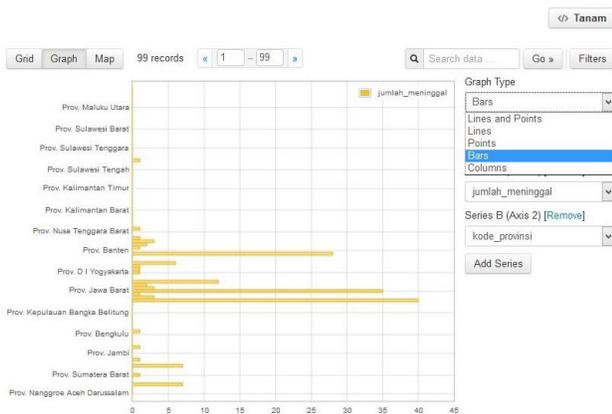


Figure 5. Health Data Visualization : Graph.

3. Map: On the map page, users can see a visualization of data based on geographical location. Users can select which columns will be used as the latitude and longitude fields or GeoJSON field.

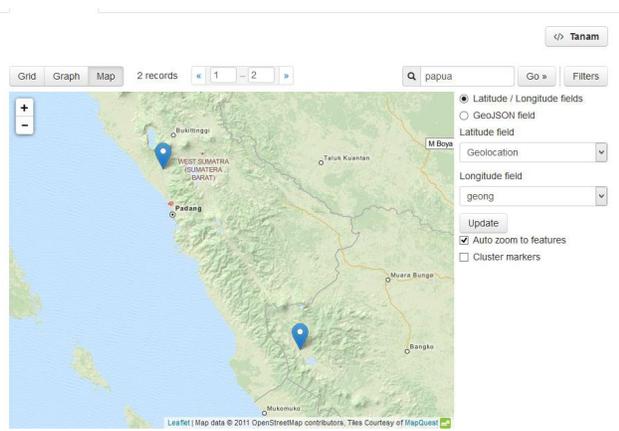


Figure 6. Health Data Visualization : Map.

## 4. Conclusion

As developing countries, Indonesia has a huge potential in improving public services. Based on Open

Data Barometer, Indonesia ready in Open Data but the implementations are poor. In health sector, one of causes in the low number of innovation in research and developing are the availability of health data. The portal that we developed has features that allow the society to search, view, get, visualize and publish health data. This health data in portal are open so can be used in any purpose. We designed the portal based on collaborative sharing so every user can contribute in providing open health data. It expected to improved society awareness in openness data. This portal facilitates the public in generating, acquiring and reusing health data that can be accessed for 24 hours with a variety of communication devices. It also has visualization in form of tables, graphs and maps, so users can get information from open health data.

## 5. Acknowledgements

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