

Choropleth Mapping as a tool of advocacy in Primary Health Care and Public Health Practice

Scope:

According to the Webster's dictionary, definition, “to advocate” means to espouse a cause by argument, to plead in favor of, to recommend publicly ^{1, 2}. The business of improving population health has always been linked to action. To effect change may never be politically “safe” and is never a simple matter ³. The classic tale of cholera in mid–19th century London reminds us that at its finest, public health is data driven and intervention oriented. The Public Health Problem (E.g. Measles Outbreak) has to be documented first, then analyzed for the determinants the caused the problem (may be low vaccine coverage), then action has to be taken to tackle the problem (may be correct the community rejection through advocacy) and finally the effect of the action on the public health problem has to be documented (improved acceptance followed by coverage).

Advocacy is an activity by an individual or group which aims to influence decisions within political, economic, and social systems and institutions. Advocacy can include many activities that a person or organization undertakes including media campaigns, public speaking, commissioning and publishing research ⁴.

During the 1848 cholera epidemic, John Snow mapped out the locations of cholera cases and demonstrated that the epidemic raging in London was not evenly distributed across the city. This observation led to the identification of different water sources from commercial water suppliers, and eventually to the act of removing the handle from the Broad Street pump that was delivering contaminated water downstream of London from the Thames. Cholera cases declined in the surrounding area. The tale of the Broad Street pump must have been spread across London, as others—no longer Snow alone—began to advocate the provision of clean water ³.

Among the various tools of Public Health Advocacy, Health Communication & Social Marketing Practice include Map Making as rich tool for appropriate communication.

A Choropleth map is a thematic map in which areas are shaded or patterned in proportion to the measurement of the statistical variable being displayed on the map, such as population density or per-capita income. The Choropleth map provides an easy way to visualize how a measurement varies across a geographic area and it shows the level of variability within a region ⁵. Choropleth Maps are effective tools of visualizing Health Indicators across areas.

Centers for Disease Control and Prevention, (CDC) Atlanta in 2012 has released “Cartographic Guidelines for Public Health” through The Geography and Geospatial Science Working Group (GeoSWG) an organization of geographers, epidemiologists, statisticians, and others who work with spatially-referenced data. Choropleth Maps have been extensively discussed and demonstrated its use to address multiple public health problems like Infant Mortality Rates across the States of USA ⁶.

Objective:

To develop a simple way to create Choropleth maps of health indicators in low resource setting like a Primary Health Center.

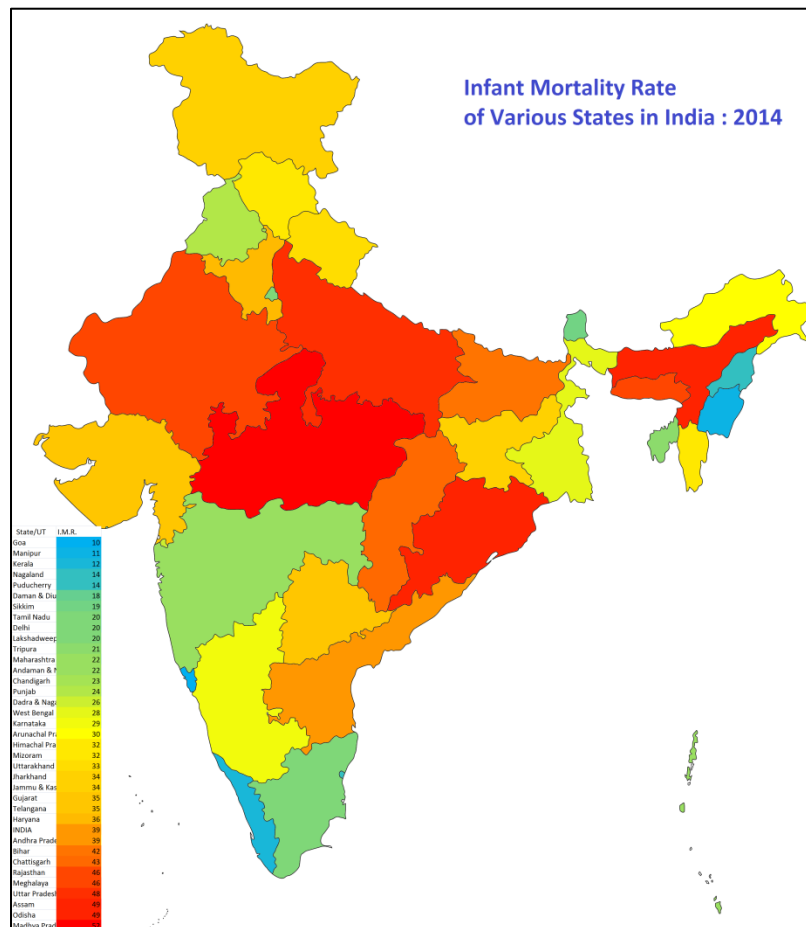
Methodology: In our project Windows based spreadsheet, MS Paint are used for crating Choropleth Maps. Conditional Formatting and Color scales are used for grading IMR (Infant Mortality Rates) across the states of India as an example . Health Management Information System under Ministry of Health & Family Welfare, Government of India is used as a database for Health Indicators , the IMR of different states was taken from the database in this current demonstration ⁷. When mapping quantitative data, a specific color progression is used to depict the data properly. There are several different types of color progressions used by cartographers. Bi-polar progressions are normally used with two opposite hues to show a change in value from negative to positive or on either side of some either central tendency, such as the mean of the variable being mapped.

Implications: Advocacy is a major managerial tool when implementing various health programs like RMNCH+A program (Reproductive, Maternal, Newborn, Child and Adolescent Health). Whether, in a Primary Health Center or at the District Magistrate, when advocating health inputs or outputs, it becomes a challenge to Medical officer to convince stake holders on Health Indicators. The Intersectoral Coordination and Community Participations which are the foundations of Primary Health Care require a Behavioral Change of public in general and public policy makers and implementers in particular. For example a district or village may have a higher IMR due to diversion of electricity for non-medical uses which is affecting the vaccine cold chain leading to failure in vaccination which inurn is leading to more outbreaks of VPDS (Vaccine Preventable Disease) The District Health officials have to impress upon the District Collector and Public that while the electricity is limited by its scarce availability it cannot be diverted at the cost of the district’s health priorities like vaccination. While graphs may be used to convince the administrators about higher IMR of the concerned district, they may accept this fact more easily when they see their district is getting reflected badly in terms of the color of their districts with reference to neighboring districts. In a resource limited country

like India, where the health budget itself is very low the medical fraternity faces a number of challenges due to local social, political and community ignorance making health a non-priority which in turn affect the health demands and Health Care Delivery . Hence The Visualization of health indicators across districts and states in the form of Choropleth maps impress the district officials to give Health its due priority and monitor progress in the implementation of National Health Programs. The comparative difference in shades of health indicators (eg, Red for High Risk, Green for Low Risk) in the Choropleth maps alert program officers on performance in the district reflecting the health of the community. For the current project, Infant Mortality Rate (IMR 2014) ⁷ is used to create a Choropleth Map (Figure 1). As can be seen from the figure, states like Goa, Manipur, Kerala, Nagaland and Puducherry have very low IMR, whereas states like Uttar Pradesh, Assam , Odisha and Madhya Pradesh have a very high IMR. This generates awareness among program managers to advocate measures of high priority in their respective states. In the given example the Medical and Health Head of state with high IMR has to implement policies that can bring down the IMR. As required it has to be marketed to various other non medical groups including the ministers who are decision makers of the policies that affect the IMR. The ability of the medical person to market the health agenda will be aided by a tool like a Choropleth map than a simple graph⁸.

Limitations in the use of Technology: Lack of training and awareness among Medical officers and other advocates of Public Health is a major hindrance in using Geospatial technology.

Figure 1 Choropleth Map of India depicting IMR: 2014



References

1. Definition of ADVOCATE (Meaning of ADVOCATE), a 8 Letter Word [Internet]. [cited 2016 Nov 29]. Available from: <http://www.hyperdictionary.com/dictionary/advocate>
2. Advocate | Define Advocate at Dictionary.com [Internet]. [cited 2016 Nov 29]. Available from: <http://www.dictionary.com/browse/advocate>
3. Bassett MT. Public Health Advocacy. Am J Public Health. 2003 Aug;93(8):1204.
4. Advocacy. In: Wikipedia [Internet]. 2016 [cited 2016 Nov 24]. Available from: <https://en.wikipedia.org/w/index.php?title=Advocacy&oldid=744312786>
5. Choropleth map. In: Wikipedia [Internet]. 2016 [cited 2016 Nov 24]. Available from: https://en.wikipedia.org/w/index.php?title=Choropleth_map&oldid=744269965
6. Cartographic Guidelines for Public Health [cited 2016 Nov 29]. Available from: https://www.cdc.gov/dhdsp/maps/gisx/resources/cartographic_guidelines.pdf

7. Home - Home [Internet]. [cited 2016 Nov 24]. Available from: <https://nrhm-mis.nic.in/SitePages/Home.aspx>
8. Sopan, A., et al., Community Health Map: A geospatial and multivariate data visualization tool for public health datasets, Government Information Quarterly (2012), doi:10.1016/j.giq.2011.10.002

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10. Brief Biography (100 words):

Dr Sairam Challa is experienced in surveillance of vaccine preventable disease, public health advocacy, outbreak investigations and was part of the World Health Organization's team for Polio Eradication in India.

Dr Snigdha Patnaik, Professor and Head for the Dept of Community Medicine is practicing Public Health for more than 14 years and is purporting the first Clinical Epidemiological Unit in this part of the country.

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